

GENERAL ELECTRICAL DEMOLITION NOTES:

1. UNLESS INDICATED OTHERWISE TO BE RE-USED, WHEN ELECTRICAL WORK IS TO BE REMOVED, REMOVE RACEWAYS AND WIRING BACK SOURCES. 2. EQUIPMENT, WIRING, MATERIALS, ETC. REMOVED THAT IS SALVAGEABLE AND DESIRED BY THE OWNER TO BE RETAINED, STORE ON THE SITE WHERE DIRECTED BY THE OWNER. OTHERWISE, ALL OTHER MATERIALS AND EQUIPMENT WHICH ARE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED BY HIM/HER FROM THE PREMISES

GENERAL ELECTRICAL NOTES

- 1. MINIMUM POWER AND LIGHTING BRANCH CIRCUIT WIRING CONDUCTOR SIZES SHALL BE #12 AWG. ALL BRANCH CIRCUITS SHALL BE EQUIPPED WITH AN INDIVIDUAL INSULATED GROUND CONDUCTOR SIZED PER THE NEC. WHERE CONDUCTOR AND RACEWAY SIZES ARE NOT GIVEN. PROVIDE SIZES PER REQUIREMENTS OF THE NEC. PROVIDE QUANTITIES OF CONDUCTORS WITHIN BRANCH CIRCUITS AND FEEDERS AS REQUIRED. CONDUCTORS SHALL BE COPPER WITH 75 DEGREE CELSIUS INSULATION.
- 2. MINIMUM CONDUIT SIZE SHALL BE 3/4". EXPOSED CONDUIT IN EXTERIOR, DAMP OR WET LOCATIONS SHALL BE RIGID STEEL. EXPOSED CONDUIT IN INTERIOR DRY LOCATIONS SHALL BE EMT. CONDUIT CONNECTS TO INTERIOR AND EXTERIOR VIBRATING EQUIPMENT SHALL LIQUID-TIGHT FLEXIBLE METAL CONDUIT.
- 3. BRANCH CIRCUIT WIRING IN CONCEALED SPACES ABOVE CEILINGS SHALL CONSIST OF MC TYPE CABLE

DRAWING NOTES (APPLY TO DRAWING E1.1):

- (1) SPLIT SYSTEM AIR CONDITIONING SYSTEM EQUIPMENT FOR I.T. ROOM TO BE REMOVED BY MECHANICAL CONTRACTOR. RX. ASSOCIATED WIRING, CONDUIT, DISCONNECT SWITCHES, ETC. BACK TO LOAD CENTER IN I.T. ROOM.
- (2) UNLESS OTHERWISE NOTED, ALL OTHER EXISITNG ELECTRICAL WORK IN THIS ROOM SHALL REMAIN AND BE KEPT OPERATIONAL.
- (3) USING 3 #12's IN MC CABLE, CONNECT TO EXISTING LIGHTING BRANCH CIRCUIT FOR ROOM.
- (4) MODIFY/ALTER AND RE-PROGRAM AS NEEDED IN ORDER FOR NEW SUPPRESSION SYSTEM CONTROL PANEL FOR I.T. ROOM TO BE MONITORED AS ITS OWN SEPARATE GENERAL ALARM ZONE.
- (5) FM 200 SYSTEM TANK(S) AND ACTUATING VALVE.
- (6) MODIFY GRAPHICS ON EXISTING REMOTE FIRE ALARM SYSTEM ANNUNCIATOR PANEL IN ORDER TO IDENTIFY THE LOCATION OF THE I.T. ROOM. MODIFY EXISTING ANNUNCIATOR PANEL IN ORDER TO PROVIDE FOR BOTH LOCAL VISUAL AND AUDIBLE INDICATIONS OF ALARM CONDITIONS RELATED TO THE SUPPRESSION SYSTEM FOR I.T. ROOM (IE GENERAL ALARM, SUPERVISORY, TROUBLE). MODIFY EXISTING SIGNAL WIRING BETWEEN EXISTING MAIN FIRE ALARM CONTROL PANEL AND EXISTING ANNUNCIATOR PANEL AS/IF NEEDED.
- (7) SUPPRESSION SYSTEM MAINTAINED TYPE ABORT PUSHBUTTON STATION (RED) WITH CLEAR PROTECTIVE FLIP-LID COVER PLATE. MOUNT AT 48" AFF.
- (8) 2 POLE, 60 AMP. FUSE AT 40 AMPS. (9) 2 #8's AND 1 #10 GROUND IN 3/4" CONDUIT TO EXISTING I.T. ROOM LOAD CENTER". WITHIN SPACE OF LOAD CENTER, PROVIDE NEW 2 POLE, 40 AMP CIRCUIT BREAKER TO MATCH EXISTING AND CONNECT WIRING. USE 2 #8's AND 1 #10 GROUND IN 3/4" CONDUIT THROUGHOUT BRANCH CIRCUIT WIRING SHOWN
- FOR SSAC INDOOR UNITS. (10) DOUBLE ACTION PULL STATION AT 48" AFF FOR MANUAL RELEASE OF SUPPRESSION SYSTEM FM 200 AGENT. PULL STATION SHALL BE RED WITH WHITE
- EMBOSSED OPERATING INSTRUCTIONS (11) USING 3 #12's IN 3/4" CONDUIT, CONNECT TO BUILDING'S EXISTING 120 VOLT
- CIRCUIT FOR EXISTING FIRE ALARM SYSTEM.
- (12) MOUNTED TO SIDE OF EXISTING "TREND" CABINET. (13) 3 #12's IN 3/4" CONDUIT TO GFCI RECEPTACLE NEAR SSAC OUTDOOR UNITS. AS APPLICABLE AND WERE NOTED, ROUTING OF CONDUIT TO FOLLOW THAT OF REFRIGERANT PIPING TO/FOR SSAC OUTDOOR UNITS.
- (14) 3 POLE, 30 AMP. FUSE AT 15 AMPS.
- (15) 4 #12's IN 3/4" CONDUIT TO EXISTING PANELBOARD "DP1". WITHIN SPACE OF PANELBOARD, PROVIDE NEW 3 POLE, 15 AMP CIRCUIT BREAKER TO MATCH EXISTING AND CONNECT WIRING. USE 4 #12's IN 3/4" CONDUIT THROUGHOUT BRANCH CIRCUIT WIRING SHOWN FOR SSAC OUTDOOR UNITS. AS APPLICABLE AND WERE NOTED, ROUTING FOR CONDUIT TO FOLLOW THAT OF REFRIGERANT PIPING TO/FOR SSAC OUTDOOR UNITS.
- (16) FILED VERIFY/COORDINATE LOCATION WITH EXISTING CONDITIONS.
- (17) 2-POSITION MAINTAINED KEY OPERATED SELECTOR SWITCH WITH 120 VOLT, 3 AM RATED CONTACT BLOCK (SQUARE D OR EQUAL). MOUNT AT 4' ABOVE FINISHED FLOOR. FOR MANUAL SELECTION OF EITHER AIR CONDITIONING SYSTEM SSAC-14 OR SSAC-1B. LABEL SWITCH POSITIONS AS TO WHAT SYSTEM IS CONTROLLED. (18) THERMOSTAT CONTROL WIRING IN 3/4" CONDUIT FROM I.T. ROOM'S AIR
- CONDITIONING SYSTEMS.
- (19) UNDERGROUND PIPE SLEEVE TO BE INSTALLED BY MECHANICAL CONTRACTOR. SLEEVE TO BE UTILIZED FOR ROUTING OF CONDUITS FOR SSAC OUTDOOR UNITS AND ASSOCIATED GFCI RECEPTACLE. COORDINATE INSTALLATION OF CONDUITS THROUGH SLEEVE WITH REFRIGERANT PIPING AND CONTROL WIRING TO/FOR SSAC OUTDOOR UNITS.

LIGHTING FIXTURE SCHEDULE

		LIGHTING FIATORE SCHEDULE								
	FIXTURE DESIGNATION	DESCRIPTION	VOLTAGE	LAMP QUANTITY	LAMP TYPE	MAXIMUM FIXTURE WATTAGE	FIXTURE MOUNTING	MAKE & MODEL (OR APPROVED EQUAL)		
:)		SHALLOW 2'x4' STATIC LUMINAIRE WITH 22 GAUGE COLD ROLLED STEEL HOUSING, FROSTED RIBBED ACRYLIC SHIELDING, HIGHLY REFLECTIVE NON-GLARE MATTE WHITE POLYESTER POWER COAT FINISH, SINGLE INTEGRAL PRE-WIRED NON-DIMMING LED LIGHT ENGINE AND NOMINAL 6,000 LUMEN OUTPUT.	120		LED (3500K)	64	CEILING RECESSED	H.E. WILLIAMS HET LED SERIES		

-<u>I.T. ROOM</u> PROJECT AREA (SEE PART PLANS)-MAIN ELECTRICAL

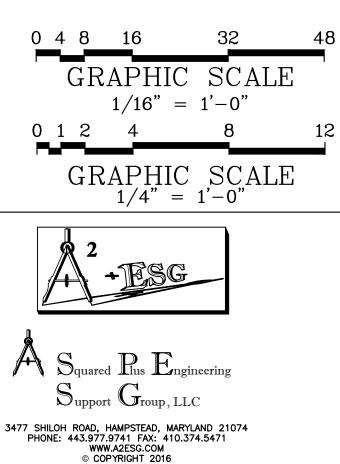
GROUND LEVEL BUILDING PART PLAN

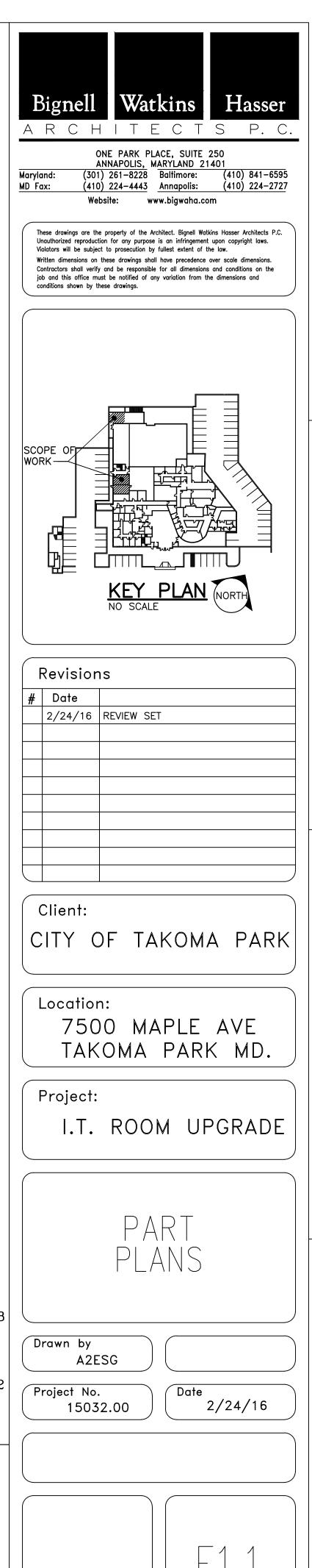
ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
\mathbf{X}	INDICATES REFERENCE TO DRAWING NOTE
	CONNECT NEW TO EXISTING AT THIS POINT
— x—	LINE TYPE INDICATES EXISTING TO BE REMOVED
●	ABORT PUSHBUTTON STATION AT 48" ABOVE FINISHED FLOOR
•	LIGHT FIXTURE. TYPE AS SPECIFIED.
⊢∽⊣	STRIPLIGHT
S	SINGLE POLE TOGGLE SWITCH
	WALL MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSOR AT 48" ABOVE FINISHED FLOOR. WIRING METHOD CONCEALED IN WALLS AND ABOVE CEILINGS WHERE POSSIBLE
	HOMERUN TO SOURCE, EQUIPMENT OR DEVICE
SD _{Z#}	SURFACE MOUNTED AREA SMOKE DETECTOR. ZON NUMBER AS INIDCATED.
n Ø	FIRE ALARM SYSTEM STROBE LIGHT
0 ¹¹⁰ F	COMBINATION FIRE SUPPRESSION SYSTEM HORN AND STROBE AT 80" AFF. CANDELA RATING OF STROBE AS INDICATED. FUSIBLE TYPE DISCONNECT SWITCH. SIZE AS
F	NOTED. NEMA 3R ENCLOSURE FOR EXTERIOR LOCATIONS. NEMA 1 ENCLOSURE FOR INTERIOR LOCATIONS.
- Φ	SIMPLEX RECEPTACLE
ዋ. <i>ቑ</i>	DUPLEX RECEPTACLE AT 18" ABOVE FINISHED FLOOR UNLESS OTHERWISE NOTED. SLASH MARK INDICATES MOUNTING HEIGHT NEAR 48" ABOVE FINISHED FLOOR
WP P	DUPLEX GROUND FAULT CURRENT INTERRUPTING RECEPTACLE WITH NEMA 5–20R CONFIGURATION AT 18" ABOVE FINISHED FLOOR AND WITH WEATHERPROOF COVER PLATE.
₁ ₽ ,₽₽	DOUBLE DUPLEX RECEPTACLE AT 18" ABOVE FINISHED FLOOR UNLESS OTHERWISE NOTED. SLASH MARK INDICATES MOUNTING HEIGHT NEAR 48" ABOVE FINISHED FLOOR.

ABBREVIATIONS

	A, AMP	AMPERE(S)				
	AFF	ABOVE ÈIŃISHED FLOOR				
	AWG	AMERICAN WIRE GAUGE				
	EMT	ELECTRICAL METALLIC CONDUIT				
	ETC	ETCETERA				
	EX	EXISTING				
	FAAP	FIRE ALARM ANNUNCIATOR PANEL				
	FACP	FIRE ALARM CONTROL PANEL				
	FM	FACTORY MUTUAL				
	GFCI	GROUND FAULT CURRENT INTERRUPTING				
	IT	INFORMATION TECHNOLOGY				
	K	KELVIN				
	LED	LIGHT EMITTING DIODE				
	MC	METAL CLAD CABLE				
	NEC	NATIONAL ELECTRICAL CODE				
	NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION				
ИР	#, NO	NUMBER				
	ŘΧ	REMOVE EXISTING				
A	SSAC	SPLIT SYSTEM AIR CONDITIONER				
~	VAC	VOLTS ALTERNATING CURRENT				
	WP	WEATHERPROOF				





PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 36773, EXPIRATION DATE: 01-18-17

SECTION 260500 - COMMON WORK RESULTS FOR ELECTRICAL PART 3 - EXECUTION PART 1 – GENERAL 1.1 RELATED DOCUMENTS A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS, APPLY TO THE WORK UNDER DIVISIONS 26 AND 28. 1.2 RELATED DISAPLINES A. AS APPLICABLE, WORK UNDER DIVISIONS 28 SHALL BE SUBJECT TO THE SAME REQUIREMENTS UNDER DIVISION 26. 1.3 CODES, LAWS AND ORDINANCES A. WORK UNDER DIVISIONS 26 AND 28 SHALL CONFORM TO THE APPLICABLE CODES. LAWS, ORDINANCES AND REGULATIONS FOR THE PROJECT'S LOCATION. THE REQUIREMENTS OF THE AUTHORITIES HAVING JURISDICTION (AHJ) SHALL TAKE PRECEDENCE OVER THE DRAWINGS AND THESE SPECIFICATIONS. CHANGES REQUIRED BY THE AHJ SHALL ONLY BE MADE AFTER REVIEW BY THE ENGINEER. 1.4 DEFINITIONS WIRING: INCLUDES CONDUCTORS, RACEWAYS, CABLES, FIXING, BOXES AND OTHER Α. ACCESSORIES THAT COMPRISE OF A COMPLETE SYSTEM. B. PROVIDE: MEANS TO FURNISH AND INSTALL COMPLETE. 1.5 SUBMITTALS A. REVIEW AND APPROVAL OF SHOP DRAWINGS DOES NOT RELIEVE THE CONTRACTOR D. OF RESPONSIBILITY FOR COMPLYING WITH THE CONTRACT DOCUMENTS OR COORDINATION WITH OTHER DISCIPLINES. AND MASONRY. 1.6 COORDINATION COORDINATE ARRANGEMENT, MOUNTING, AND SUPPORT OF ELECTRICAL EQUIPMENT: TO ALLOW MAXIMUM POSSIBLE HEADROOM UNLESS SPECIFIC MOUNTING HEIGHTS THAT REDUCE HEADROOM ARE INDICATED. TO PROVIDE FOR EASE OF DISCONNECTING THE EQUIPMENT WITH MINIMUM INTERFERENCE TO OTHER INSTALLATIONS. SEALANTS". TO ALLOW RIGHT OF WAY FOR PIPING INSTALLED AT REQUIRED SLOPE. G. SO CONNECTING RACEWAYS AND CABLES WILL BE CLEAR OF OBSTRUCTIONS AND 4 OF THE WORKING AND ACCESS SPACE OF OTHER EQUIPMENT. B. COORDINATE SLEEVE SELECTION AND APPLICATION WITH SELECTION AND APPLICATION OF FIRESTOPPING SPECIFIED IN DIVISION 07 SECTION "PENETRATION FIRESTOPPING." 1.7 PROJECT CONDITIONS CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH THE EXISTING Α. CONDITIONS. MODIFICATIONS TO WORK REQUIRED TO ALLOW FOR EXISTING CONDITIONS SHALL BE PROVIDED. SUBMIT PROPOSED MODIFICATIONS TO THE ENGINEER FOR APPROVAL PRIOR TO INSTALLATION. INTERRUPTION OF EXISTING ELECTRIC SERVICES AND SYSTEMS: DO NOT INTERRUPT ELECTRIC SERVICES OR SYSTEMS TO AND WITHIN THE FACILITY UNLESS PERMITTED UNDER THE FOLLOWING CONDITIONS AND THEN ONLY AFTER ARRANGING TO PROVIDE TEMPORARY ELECTRIC SERVICE ACCORDING TO REQUIREMENTS INDICATED: NOTIFY OWNER NO FEWER THAN SEVEN DAYS IN ADVANCE OF PROPOSED 1. INTERRUPTION. 2. INDICATE METHOD OF PROVIDING TEMPORARY SERVICE OR OPERATION. DO NOT PROCEED WITH INTERRUPTIONS WITHOUT OWNER'S WRITTEN PERMISSION. 1.8 DEMOLITION AND ALTERATIONS RELOCATE EXISTING HANGERS, SUPPORTS, ETC WHERE NECESSARY TO INSTALL NEW WORK. MAXIMUM SPACING REQUIREMENTS OF THE NEC APPLY TO RELOCATED SUPPORTS. EQUIPMENT REMOVED THAT IS SALVAGEABLE AND DESIRED BY ITS OWNER TO BE RETAINED. SHALL BE STORED ON THE PROJECT SITE WHERE DIRECTED BY THE OWNER. OTHERWISE, MATERIALS AND EQUIPMENT REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED BY HIM/HER FROM THE PREMISES AND SHALL BE DISPOSED OF PROPERLY IN ACCORDANCE LOCAL, STATE AND FEDERAL REGULATIONS. WHEN EXISTING ELECTRICAL WORK IS REMOVED, REMOVE RACEWAYS, SUPPORTS, С ETC. TO A POINT FAR ENOUGH BEHIND SURFACE TO ALLOW FOR THE INSTALLATION OF THE NORMAL THICKNESS OF FINISHED MATERIAL. UNUSED WIRING AND CABLE SHALL BE DISCONNECTED AND REMOVED BACK TO THEIR SOURCE. WHEN THE NEW WORK CONNECTS TO EXISTING EQUIPMENT, CONDUIT, WIRING, ETC., D. 1.2 SUMMARY PERFORM NECESSARY ALTERATIONS, CUTTINGS, FITTING, ETC. OF THE EXISTING WORK AS MAY BE NECESSARY OR REQUIRED TO MAKE SATISFACTORY CONNECTIONS BETWEEN THE NEW AND EXISTING WORK AND LEAVE THE COMPLETE WORK IN A FINISHED AND WORKMANLIKE CONDITION. 2. CONNECTORS, SPLICES, AND TERMINATIONS RATED 1.9 PROTECTION 1.3 QUALITY ASSURANCE A. PROTECT MATERIALS AND EQUIPMENT FROM DAMAGE. B. CAP OR PLUG OPENINGS IN EQUIPMENT AND CONDUITS. 1.10 VARIANCES A. WHERE CONFLICTS EXIST WITHIN THE CONTRACT DOCUMENTS, REQUEST CLARIFICATION PRIOR TO SUBMISSION OF BID. IF CLARIFICATION IS NOT REQUESTED, PROVIDE THE WORK REPRESENTING THE HIGHER COST AND QUANTITY. 1.11 WARRANTY A. DURING THE WARRANTY PERIOD, MAKE THE PROPER ADJUSTMENTS TO SYSTEMS, EQUIPMENT AND DEVICES INSTALLED AND PERFORM WORK NECESSARY TO ENSURE THE EFFICIENT AND PROPER FUNCTIONING OF THE SYSTEMS, EQUIPMENT OR DEVICES. 1.12 TEMPORARY POWER AND LIGHTING SERVICES, DEVICES, EQUIPMENT, FIXTURES, WIRING, ETC REQUIRED FOR TEMPORARY POWER AND LIGHTING ARE NOT COVERED UNDER DIVISIONS 26 OR 28. 6. OR EQUAL. PART 2 - PRODUCTS 2.1 SLEEVES FOR RACEWAYS AND CABLES TYPE MC WITH GROUND WIRE. A. STEEL PIPE SLEEVES: SCHEDULE 40, GALVANIZED STEEL, PLAIN ENDS. 2.2 SLEEVE SEALS A. DESCRIPTION: MODULAR SEALING DEVICE, DESIGNED FOR FIELD ASSEMBLY, TO FILL ANNULAR SPACE BETWEEN SLEEVE AND RACEWAY OR CABLE. 1. MANUFACTURERS SHALL BE ONE OF THE FOLLOWING: a. ADVANCE PRODUCTS & SYSTEMS, INC. b. CALPICO, INC. METRAFLEX CO. с. OR EQUAL. d. PIPELINE SEAL AND INSULATOR, INC. e. OR APPROVED EQUAL SEALING ELEMENTS: EPDM INTERLOCKING LINKS SHAPED TO FIT SURFACE OF 2. INDICATED. CABLE OR CONDUIT. INCLUDE TYPE AND NUMBER REQUIRED FOR MATERIAL AND SIZE OF RACEWAY OR CABLE. PART 3 - EXECUTION 3. PRESSURE PLATES: STAINLESS STEEL. INCLUDE TWO FOR EACH SEALING ELEMENT. 3.1 CONDUCTOR MATERIAL APPLICATIONS 4. CONNECTING BOLTS AND NUTS: STAINLESS STEEL OF LENGTH REQUIRED TO SECURE PRESSURE PLATES TO SEALING ELEMENTS. INCLUDE ONE FOR EACH A. BRANCH CIRCUITS: COPPER. SOLID FOR NO. 10 SEALING ELEMENT. FOR NO. 8 AWG AND LARGER. 2.3 GROUT METHODS NONMETALLIC, SHRINKAGE-RESISTANT GROUT: ASTM C 1107, FACTORY-PACKAGED, NONMETALLIC AGGREGATE GROUT, NONCORROSIVE, NONSTAINING, MIXED WITH WATER Δ TO CONSISTENCY SUITABLE FOR APPLICATION AND A 30-MINUTE WORKING TIME.

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALL A. ITEMS SHOWN AND NOT SPECIFICALLY CALLED FOR SPECIFICALLY INDICATED OR DETAILED ON THE SPECIFIED NOR SHOWN, BUT WHICH ARE RE COMMONLY REQUIRED TO MAKE A COMPLETE JOB, PROVIDE FOUNDATIONS, SUPPORTS AND BASES FO

- NECESSARY FOR SATISFACTORY INSTALLATION AND INCLUDING THE FURNISHING AND SETTING OF ANC
- TO CENTER OF WALL-MOUNTING ITEMS UNLESS OT
- PROVIDE MAXIMUM POSSIBLE HEADROOM CONSISTE
- REPLACEMENT OF COMPONENTS OF BOTH ELECTRIC NEARBY INSTALLATIONS. CONNECT IN SUCH A WAY DISCONNECTING WITH MINIMUM INTERFERENCE WITH F. RIGHT OF WAY: GIVE TO PIPING SYSTEMS INSTALL
- A. ELECTRICAL PENETRATIONS OCCUR WHEN RAC
- B. FIRE-RATED ASSEMBLIES: INSTALL SLEEVES FOR
- SIZE PIPE SLEEVES TO PROVIDE 1/4-INCH ANNUI
- E. SEAL SPACE OUTSIDE OF SLEEVES WITH GROUT FC

- 3.2 CONDUCTOR INSULATION AND MULTI-CONDUCTOR
- EXPOSED BRANCH CIRCUITS: TYPE THHN-TH
- RACEWAY, UNLESS OTHERWISE NOTED. B. BRANCH CIRCUITS CONCEALED IN CEILINGS: TYPE METAL-CLAD CABLE, TYPE MC, UNLESS OTHERWISE

- MEASURE INDICATED MOUNTING HEIGHTS TO BOTTO
- HEADROOM MAINTENANCE: IF MOUNTING HEIGHTS ARE NOT INDICATED, ARRANGE AND INSTALL COMP
- E. EQUIPMENT: INSTALL TO FACILITATE SERVICE, MAIN
- 3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIC
- CONCRETE OR MASONRY WALLS, OR FIRE-RATED
- WALL ASSEMBLIES.
- C. CUT SLEEVES TO LENGTH FOR MOUNTING FLUSH
- SLEEVE AND RACEWAY OR CABLE, UNLESS INDICAT
- PROMPTLY PACK GROUT SOLIDLY BETWEEN SLE REMAIN. TOOL EXPOSED SURFACES SMOOTH; PRC
- NON-FIRE-RATED WALLS: SEAL ANNULAR SPACE OR CABLE, USING JOINT SEALANT APPROPRIATE OF JOINT. COMPLY WITH REQUIREMENTS IN
- FIRE-RATED-ASSEMBLY PENETRATIONS: MAINTAIN WALLS AT RACEWAY AND CABLE PENETRATIONS. RACEWAY AND CABLE PENETRATION SLEEVES WITH WITH REQUIREMENTS IN DIVISION 07 SECTION "PEN
- ABOVEGROUND. EXTERIOR-WALL PENETRATIONS: 5 PIPE SLEEVES AND MECHANICAL SLEEVE SEALS. FOR 1-INCH ANNULAR CLEAR SPACE BETWEEN PIP MECHANICAL SLEEVE SEALS.
- 3.3 SLEEVE-SEAL INSTALLATION
- A. INSTALL TO SEAL EXTERIOR WALL PENETRATIONS. B. USE TYPE AND NUMBER OF SEALING ELEMENTS R FOR RACEWAY OR CABLE MATERIAL AND SIZE. PO CENTER OF SLEEVE. ASSEMBLE MECHANICAL SLEE ANNULAR SPACE BETWEEN RACEWAY OR CABLE AN AGAINST PRESSURE PLATES THAT CAUSE SEALING MAKE WATERTIGHT SEAL.
- 3.4 FIRESTOPPING
- A. APPLY FIRESTOPPING TO PENETRATIONS OF ASSEMBLIES FOR ELECTRICAL INSTALLATION FIRE-RESISTANCE RATING OF ASSEMBLY. INSTALLATION REQUIREMENTS ARE SPECIFIED IN DIV FIRESTOPPING."
- END OF SECTION 260500
- SECTION 260519 LOW-VOLTAGE ELECTRICAL POWER
- PART 1 GENERAL
- 1.1 RELATED DOCUMENTS
- A. DRAWINGS AND GENERAL PROVISIONS OF THE CON SUPPLEMENTARY CONDITIONS AND DIVISION 01 SP THIS SECTION.
- A. THIS SECTION INCLUDES THE FOLLOWING:
- 1. BUILDING WIRES AND CABLES RATED 600 V AND
- A. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSO
- DEFINED IN NFPA 70, ARTICLE 100, BY A TE AUTHORITIES HAVING JURISDICTION, AND MARKED I B. COMPLY WITH NFPA 70.
- PART 2 PRODUCTS
- 2.1 CONDUCTORS AND CABLES
- A. MANUFACTURERS: SUBJECT TO COMPLIANCE PRODUCTS BY ONE OF THE FOLLOWING:
- ALCAN PRODUCTS CORPORATION; ALCAN CABLE DIV
- AMERICAN INSULATED WIRE CORP.; A LEVITON COM GENERAL CABLE CORPORATION.
- 4. SENATOR WIRE & CABLE COMPANY.
- 5. SOUTHWIRE COMPANY.
- COPPER CONDUCTORS: COMPLY WITH NEMA WC
- CONDUCTOR INSULATION: COMPLY WITH NEMA WC MULTI-CONDUCTOR CABLE: COMPLY WITH NEMA
- 2.2 CONNECTORS AND SPLICES
- A. MANUFACTURERS: SUBJECT TO COMPLIANCE PRODUCTS BY ONE OF THE FOLLOWING:
- AFC CABLE SYSTEMS, INC.
- HUBBELL POWER SYSTEMS, INC.
- 3. O-Z/GEDNEY; EGS ELECTRICAL GROUP LLC. 4. 3M; ELECTRICAL PRODUCTS DIVISION.
- TYCO ELECTRONICS CORP.
- DESCRIPTION: FACTORY-FABRICATED CONNECT AMPACITY RATING, MATERIAL, TYPE, AND CLASS

LLATION	3.3 SLEEVE-SEAL INSTALLATION A. INSTALL TO SEAL EXTERIOR WALL PENETRATIONS.	3.7 IDENTIFICATION A. COMPLY WITH REQUIREMENTS FOR IDENTIFICATION SPECIFIED IN DIVISION 26
FOR, OR ITEMS SPECIFIED AND NOT TE DRAWINGS, OR ITEMS NEITHER	B. USE TYPE AND NUMBER OF SEALING ELEMENTS RECOMMENDED BY MANUFACTURER FOR RACEWAY OR CABLE MATERIAL AND SIZE. POSITION RACEWAY OR CABLE IN CENTER OF SLEEVE. ASSEMBLE MECHANICAL SLEEVE SEALS AND INSTALL IN	SECTION "IDENTIFICATION FOR ELECTRICAL SYSTEMS." 3.8 FIELD QUALITY CONTROL
REASONABLY INCIDENTAL TO AND B, SHALL BE PROVIDED.	ANNULAR SPACE BETWEEN RACEWAY OR CABLE AND SLEEVE. TIGHTEN BOLTS AGAINST PRESSURE PLATES THAT CAUSE SEALING ELEMENTS TO EXPAND AND	A. PERFORM TESTS AND INSPECTIONS.
FOR EQUIPMENT AS INDICATED OR ID OPERATION OF EQUIPMENT,	MAKE WATERTIGHT SEAL.	END OF SECTION 260523
NCHOR HARDWARE. TOM OF SUSPENDED ITEMS AND OTHERWISE NOTED.	3.4 FIRESTOPPING A. APPLY FIRESTOPPING TO PENETRATIONS OF FIRE-RATED FLOOR AND WALL	SECTION 260526 – GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
S OR OTHER LOCATION CRITERIA MPONENTS AND EQUIPMENT TO	ASSEMBLIES FOR ELECTRICAL INSTALLATIONS TO RESTORE ORIGINAL FIRE—RESISTANCE RATING OF ASSEMBLY. FIRESTOPPING MATERIALS AND INSTALLATION REQUIREMENTS ARE SPECIFIED IN DIVISION 07 SECTION "PENETRATION	PART 1 – GENERAL
ITENT WITH THESE REQUIREMENTS.	FIRESTOPPING."	1.1 RELATED DOCUMENTS A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND
RICAL EQUIPMENT AND OTHER WAY AS TO FACILITATE FUTURE ITH OTHER ITEMS IN THE VICINITY.	END OF SECTION 260500	SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS, APPLY TO THIS SECTION.
ALLED AT A REQUIRED SLOPE.	SECTION 260523 – CONTROL–VOLTAGE ELECTRICAL POWER CABLES	1.2 SUMMARY
TIONS ACEWAYS OR CABLES PENETRATE	PART 1 - GENERAL	A. THIS SECTION INCLUDES METHODS AND MATERIALS FOR GROUNDING SYSTEMS AND EQUIPMENT.
D FLOOR AND WALL ASSEMBLIES. R PENETRATIONS OF FIRE—RATED	 1.1 RELATED DOCUMENTS A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND 	PART 2 - PRODUCTS
H WITH BOTH SURFACES OF WALLS. IULAR CLEAR SPACE BETWEEN	SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS, APPLY TO THIS SECTION.	2.1 CONDUCTORS A. INSULATED CONDUCTORS: COPPER WIRE OR CABLE INSULATED FOR 600 V
ATED OTHERWISE. FOR PENETRATIONS OF CONCRETE	1.2 SUMMARY A. SECTION INCLUDES:	UNLESS OTHERWISE REQUIRED BY APPLICABLE CODE OR AUTHORITIES HAVING JURISDICTION.
SLEEVE AND WALL SO NO VOIDS	1. LOW-VOLTAGE CONTROL CABLING.	2.2 CONNECTORS A. LISTED AND LABELED BY A NATIONALLY RECOGNIZED TESTING LABORATORY
ROTECT GROUT WHILE CURING. CE BETWEEN SLEEVE AND RACEWAY	 CONTROL-CIRCUIT CONDUCTORS. IDENTIFICATION PRODUCTS. 	ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION FOR APPLICATIONS IN WHICH USED, AND FOR SPECIFIC TYPES, SIZES, AND COMBINATIONS OF CONDUCTORS AND
FOR SIZE, DEPTH, AND LOCATION IN DIVISION 07 SECTION "JOINT	1.3 DEFINITIONS A. EMI: ELECTROMAGNETIC INTERFERENCE.	OTHER ITEMS CONNECTED. PART 3 – EXECUTION
N INDICATED FIRE RATING OF	 B. LOW VOLTAGE: AS DEFINED IN NFPA 70 FOR CIRCUITS AND EQUIPMENT OPERATING AT LESS THAN 50 V OR FOR REMOTE-CONTROL AND SIGNALING 	3.1 APPLICATIONS
INSTALL SLEEVES AND SEAL TH FIRESTOP MATERIALS. COMPLY PENETRATION FIRESTOPPING."	POWER-LIMITED CIRCUITS.	A. CONDUCTORS: INSTALL SOLID CONDUCTOR FOR NO. 8 AWG AND SMALLER, AND STRANDED CONDUCTORS FOR NO. 6 AWG AND LARGER, UNLESS OTHERWISE
SEAL PENETRATIONS USING STEEL SELECT SLEEVE SIZE TO ALLOW	1.4 QUALITY ASSURANCE A. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS	INDICATED. B. CONDUCTOR TERMINATIONS AND CONNECTIONS:
PIPE AND SLEEVE FOR INSTALLING	DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION.	1. EQUIPMENT GROUNDING CONDUCTOR TERMINATIONS: BOLTED CONNECTORS.
	B. COMPLY WITH NFPA 70. PART 2 – PRODUCTS	3.2 EQUIPMENT GROUNDING
RECOMMENDED BY MANUFACTURER POSITION RACEWAY OR CABLE IN	2.1 PATHWAYS	A. INSTALL INSULATED EQUIPMENT GROUNDING CONDUCTORS WITH ALL BRANCH CIRCUITS.
LEEVE SEALS AND INSTALL IN AND SLEEVE. TIGHTEN BOLTS	A. CONDUIT AND BOXES: COMPLY WITH REQUIREMENTS IN DIVISION 26 SECTION "RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS."	3.3 INSTALLATION A. GROUNDING CONDUCTORS: ROUTE ALONG SHORTEST AND STRAIGHTEST PATHS
G ELEMENTS TO EXPAND AND	1. OUTLET BOXES SHALL BE NO SMALLER THAN 4 INCHES WIDE, 4 INCHES HIGH, AND $2-1/2$ INCHES DEEP WITH APPROPRIATE RAISED COVERS AS APPLICABLE TO	POSSIBLE, UNLESS OTHERWISE INDICATED OR REQUIRED BY CODE. AVOID OBSTRUCTING ACCESS OR PLACING CONDUCTORS WHERE THEY MAY BE SUBJECTED TO STRAIN, IMPACT, OR DAMAGE.
FIRE-RATED FLOOR AND WALL	SUITE THE INSTALLATION CONDITIONS.	B. BONDING STRAPS AND JUMPERS: INSTALL IN LOCATIONS ACCESSIBLE FOR INSPECTION AND MAINTENANCE, EXCEPT WHERE ROUTED THROUGH SHORT LENGTHS
IONS TO RESTORE ORIGINAL FIRESTOPPING MATERIALS AND	2.2 LOW-VOLTAGE CONTROL CABLE A. PLENUM-RATED, PAIRED CABLE: NFPA 70, TYPE CMP.	OF CONDUIT.
DIVISION 07 SECTION "PENETRATION	1. ONE PAIR, TWISTED, NO. 16 AWG, STRANDED (19X29) TINNED–COPPER CONDUCTORS.	END OF SECTION 260526
	 2. PVC INSULATION. 3. UNSHIELDED. 	
R CONDUCTORS AND CABLES	4. PVC JACKET. 5. FLAME RESISTANCE: COMPLY WITH NFPA 262.	
	2.3 CONTROL-CIRCUIT CONDUCTORS	
CONTRACT, INCLUDING GENERAL AND	 A. CLASS 1 CONTROL CIRCUITS: STRANDED COPPER, TYPE THHN-THWN IN RACEWAY. B. CLASS 2 CONTROL CIRCUITS: STRANDED COPPER, TYPE THHN-THWN, IN 	
SPECIFICATION SECTIONS, APPLY TO	RACEWAY. C. CLASS 3 REMOTE—CONTROL AND SIGNAL CIRCUITS: STRANDED COPPER, TYPE TW OR TYPE TF, COMPLYING WITH UL 83, IN RACEWAY.	
	2.4 IDENTIFICATION PRODUCTS	
D LESS.	A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:	
ED 600 V AND LESS.	 BRADY CORPORATION. HELLERMANNTYTON. 	
SSORIES: LISTED AND LABELED AS	 KROY LLC. PANDUIT CORP. 	
TESTING AGENCY ACCEPTABLE TO FOR INTENDED USE.	5. OR EQUAL. B. COMPLY WITH UL 969 FOR A SYSTEM OF LABELING MATERIALS, INCLUDING LABEL	
	STOCKS, LAMINATING ADHESIVES, AND INKS USED BY LABEL PRINTERS. C. COMPLY WITH REQUIREMENTS IN DIVISION 26 SECTION "IDENTIFICATION FOR	
	ELECTRICAL SYSTEMS." PART 3 – EXECUTION	
E WITH REQUIREMENTS, PROVIDE	3.1 INSTALLATION OF PATHWAYS	
DIVISION. OMPANY.	A. COMPLY WITH REQUIREMENTS IN DIVISION 26 SECTION "RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS" FOR INSTALLATION OF CONDUITS.	
	B. INSTALL MANUFACTURED CONDUIT SWEEPS AND LONG-RADIUS ELBOWS IF POSSIBLE.	
	3.2 INSTALLATION OF CONDUCTORS AND CABLES	
C 70. WC 70 FOR TYPES THHN-THWN. A WC 70 FOR METAL-CLAD CABLE,	A. INSTALLATION OF CONTROL-CIRCUIT CONDUCTORS: 1. INSTALL WIRING IN RACEWAYS. COMPLY WITH REQUIREMENTS SPECIFIED IN	
WC 70 FOR METAL-CLAD CABLE,	DIVISION 26 SECTION "RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS." B. SEPARATION FROM EMI SOURCES:	
E WITH REQUIREMENTS, PROVIDE	1. SEPARATION BETWEEN CABLES AND ELECTRICAL MOTORS AND TRANSFORMERS, 5 KVA OR HP AND LARGER: A MINIMUM OF 48 INCHES.	
	2. SEPARATION BETWEEN CABLES AND FLUORESCENT FIXTURES: A MINIMUM OF 5 INCHES.	
	3.3 REMOVAL OF CONDUCTORS AND CABLES	
	A. REMOVE ABANDONED CONDUCTORS AND CABLES.	
CTORS AND SPLICES OF SIZE,	3.4 CONTROL-CIRCUIT CONDUCTORS A. MINIMUM CONDUCTOR SIZES:	
S FOR APPLICATION AND SERVICE	1. CLASS 1 REMOTE—CONTROL AND SIGNAL CIRCUITS, NO 14 AWG MINIMUM. 2. CLASS 2 LOW—ENERGY, REMOTE—CONTROL, AND SIGNAL CIRCUITS, NO. 16 AWG	
	MINIMUM. 3. CLASS 3 LOW-ENERGY, REMOTE-CONTROL, ALARM, AND SIGNAL CIRCUITS, NO 12	
10 AWG AND SMALLER; STRANDED	AWG MINIMUM. 3.5 FIRESTOPPING	
	A. COMPLY WITH REQUIREMENTS IN DIVISION 07 SECTION "PENETRATION	
R CABLE APPLICATIONS AND WIRING	FIRESTOPPING." 3.6 GROUNDING	PROFESSIONAL CERTIFICATION:
-THWN, SINGLE CONDUCTORS IN	A. FOR LOW-VOLTAGE WIRING AND CABLING, COMPLY WITH REQUIREMENTS IN DIVISION 26 SECTION "GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS."	I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I
PE THHN-THWN CONDUCTORS IN ISE NOTED.	DIVISION 20 SECTION GROUNDING AND DUNDING FOR ELECTRICAL STSTEMS.	AM A DULY LICENSED 3477 SHILOH ROAD, HAM PROFESSIONAL ENGINEER UNDER PHONE: 443.977.974 THE LAWS OF THE STATE OF WWW.A2 MARYLAND, LICENSE NO. 36773, © COPYR EXPIRATION DATE: 01–18–17

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Revisions # Date 2/24/16 REVIEW SET
Client: CITY OF TAKOMA PARK
Location: 7500 MAPLE AVE TAKOMA PARK MD.
Project: I.T. ROOM UPGRADE
ELECTRICAL SPECIFICATIONS
Drawn by A2ESG Project No. 15032.00 Date 2/24/16
$\left[\begin{array}{c} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$

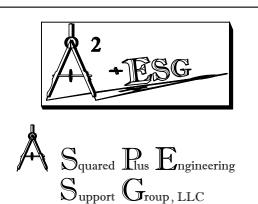
SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS 3.2 SUPPORT INSTALLATION PART 1 – GENERAL A. RACEWAY SUPPORT METHODS: IN ADDITION TO EMT AND RMC MAY BE SUPPORTED BY OPENING 1.1 RELATED DOCUMENTS AS PERMITTED IN NFPA 70. STRENGTH OF SUPPORT ASSEMBLIES: WHERE N A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT. INCLUDING GENERAL AND COMPONENTS SO STRENGTH WILL BE ADEQUATE SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS, APPLY TO STATIC LOADS WITHIN SPECIFIED LOADING LIMITS. THIS SECTION. USED FOR STRENGTH DETERMINATION SHALL BE COMPONENTS PLUS 200 LB. 1.2 SUMMARY C. MOUNTING AND ANCHORAGE OF SURFACE-MOUN A. THIS SECTION INCLUDES THE FOLLOWING: ANCHOR AND FASTEN ELECTRICAL ITEMS AND TH STRUCTURAL ELEMENTS BY THE FOLLOWING METI 1. HANGERS AND SUPPORTS FOR ELECTRICAL EQUIPMENT AND SYSTEMS. INDICATED BY CODE: 1.3 DEFINITIONS 1. TO WOOD: FASTEN WITH LAG SCREWS OR THRO TO MASONRY: APPROVED TOGGLE-TYPE BOLTS A. EMT: ELECTRICAL METALLIC TUBING. EXPANSION ANCHOR FASTENERS ON SOLID MASC B. RMC: RIGID METAL CONDUIT. 3. TO CONCRETE: EXPANSION ANCHOR FASTENERS 1.4 PERFORMANCE REQUIREMENTS 4. TO STEEL: BEAM CLAMPS (MSS TYPE 19, 21, A. DESIGN SUPPORTS FOR MULTIPLE RACEWAYS CAPABLE OF SUPPORTING COMBINED MSS SP-69. WEIGHT OF SUPPORTED SYSTEMS AND ITS CONTENTS. 5. TO LIGHT STEEL: SHEET METAL SCREWS. 6. ITEMS MOUNTED ON HOLLOW WALLS AND NONST 1.5 QUALITY ASSURANCE MOUNT DISCONNECT SWITCHES, CONTROL ENCLOS A. COMPLY WITH NFPA 70. BOXES AND OTHER DEVICES ON SLOTTED-CHANN SUBSTRATE BY MEANS THAT MEET SEISMIC-REST PART 2 – PRODUCTS REQUIREMENTS. D. DRILL HOLES FOR EXPANSION ANCHORS IN C 2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS DEPTHS THAT AVOID REINFORCING BARS. STEEL SLOTTED SUPPORT SYSTEMS: COMPLY WITH MFMA-4, FACTORY-FABRICATED COMPONENTS FOR FIELD ASSEMBLY. 3.3 PAINTING MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE TOUCHUP: CLEAN AND APPLY TOUCHUP PAIN PRODUCTS BY ONE OF THE FOLLOWING: ABRADED AREAS OF SHOP PAINT ON MISCELLAN A. ALLIED TUBE & CONDUIT. B. GALVANIZED SURFACES: CLEAN BOLTED CONNEC COOPER B-LINE, INC.; A DIVISION OF COOPER INDUSTRIES. R APPLY GALVANIZING-REPAIR PAINT TO COMPLY W ERICO INTERNATIONAL CORPORATION. GS METALS CORP. END OF SECTION 260529 THOMAS & BETTS CORPORATION. UNISTRUT; TYCO INTERNATIONAL, LTD. SECTION 260533 - RACEWAY AND BOXES FOR ELECT G. WESANCO, INC. H. OR EQUAL. PART 1 – GENERAL 2. METALLIC COATINGS: HOT-DIP GALVANIZED AFTER FABRICATION AND APPLIED 1.1 RELATED DOCUMENTS ACCORDING TO MFMA-4. NONMETALLIC COATINGS: MANUFACTURER'S STANDARD PVC, POLYURETHANE, OR DRAWINGS AND GENERAL PROVISIONS OF THE Α. POLYESTER COATING APPLIED ACCORDING TO MFMA-4. AND SUPPLEMENTARY CONDITIONS AND DIVISIO APPLY TO THIS SECTION. PAINTED COATINGS: MANUFACTURER'S STANDARD PAINTED COATING APPLIED 4 ACCORDING TO MFMA-4. 5. CHANNEL DIMENSIONS: SELECTED FOR APPLICABLE LOAD CRITERIA. 1.2 SUMMARY B. CONDUIT AND CABLE SUPPORT DEVICES: STEEL HANGERS, CLAMPS, AND A. THIS SECTION INCLUDES RACEWAYS, FITTING ASSOCIATED FITTINGS, DESIGNED FOR TYPES AND SIZES OF RACEWAY OR CABLE CABINETS FOR ELECTRICAL WIRING. TO BE SUPPORTED. 1.3 DEFINITIONS MOUNTING, ANCHORING, AND ATTACHMENT COMPONENTS: ITEMS FOR FASTENING ELECTRICAL ITEMS OR THEIR SUPPORTS TO BUILDING SURFACES INCLUDE THE A. EMT: ELECTRICAL METALLIC TUBING. FOLLOWING: B. FMC: FLEXIBLE METAL CONDUIT. POWDER-ACTUATED FASTENERS: THREADED-STEEL STUD, FOR USE IN HARDENED C. LFMC: LIQUIDTIGHT FLEXIBLE METAL CONDUIT. PORTLAND CEMENT CONCRETE, STEEL, OR WOOD, WITH TENSION, SHEAR, AND 1.4 QUALITY ASSURANCE PULLOUT CAPACITIES APPROPRIATE FOR SUPPORTED LOADS AND BUILDING MATERIALS WHERE USED. A. ELECTRICAL COMPONENTS, DEVICES, AND ACCESS DEFINED IN NFPA 70, ARTICLE 100, BY A T MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE Α. AUTHORITIES HAVING JURISDICTION, AND MARKED PRODUCTS BY ONE OF THE FOLLOWING: B. COMPLY WITH NFPA 70. 1) HILTI INC. PART 2 - PRODUCTS 2) ITW RAMSET/RED HEAD; A DIVISION OF ILLINOIS TOOL WORKS, INC. 3) MKT FASTENING, LLC. 2.1 METAL CONDUIT AND TUBING 4) SIMPSON STRONG-TIE CO., INC.; MASTERSET FASTENING SYSTEMS UNIT. A. MANUFACTURERS: SUBJECT TO COMPLIANCE 5) OR EQUAL. PRODUCTS BY ONE OF THE FOLLOWING: MECHANICAL-EXPANSION ANCHORS: INSERT-WEDGE-TYPE, ZINC-COATED STEEL, AFC CABLE SYSTEMS, INC. FOR USE IN HARDENED PORTLAND CEMENT CONCRETE WITH TENSION, SHEAR, AND 1. PULLOUT CAPACITIES APPROPRIATE FOR SUPPORTED LOADS AND BUILDING ALFLEX INC. 2. MATERIALS IN WHICH USED. ALLIED TUBE & CONDUIT; A TYCO INTERNATIONAL 4. O-Z GEDNEY; A UNIT OF GENERAL SIGNAL. A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE 5. OR EQUAL. PRODUCTS BY ONE OF THE FOLLOWING: B. RIGID STEEL CONDUIT: ANSI C80.1. 1) COOPER B-LINE, INC.; A DIVISION OF COOPER INDUSTRIES. C. EMT: ANSI C80.3. 2) EMPIRE TOOL AND MANUFACTURING CO., INC. D. FMC: ZINC-COATED STEEL. 3) HILTI INC. E. LFMC: FLEXIBLE STEEL CONDUIT WITH PVC JACH 4) ITW RAMSET/RED HEAD; A DIVISION OF ILLINOIS TOOL WORKS, INC. F. FITTINGS FOR CONDUIT (INCLUDING ALL TYPES A EMT, AND CABLE: NEMA FB 1; LISTED FOR TYF 5) MKT FASTENING, LLC. WHICH USED, AND FOR APPLICATION AND ENVIRO 6) OR EQUAL. FITTINGS FOR EMT: STEEL OR DIE-CAST, SET-S 3. CONCRETE INSERTS: STEEL OR MALLEABLE-IRON, SLOTTED SUPPORT SYSTEM G. JOINT COMPOUND FOR RIGID STEEL CONDUIT UNITS SIMILAR TO MSS TYPE 18; COMPLYING WITH MFMA-4 OR MSS SP-58. CONNECTOR ASSEMBLIES, AND COMPOUNDED 4. CLAMPS FOR ATTACHMENT TO STEEL STRUCTURAL ELEMENTS: MSS SP-58, TYPE PROTECT THREADED RACEWAY JOINTS FROM (SUITABLE FOR ATTACHED STRUCTURAL ELEMENT. CONDUCTIVITY. THROUGH BOLTS: STRUCTURAL TYPE, HEX HEAD, AND HIGH STRENGTH. COMPLY WITH ASTM A 325. 2.2 BOXES, ENCLOSURES, AND CABINETS 6. TOGGLE BOLTS: ALL-STEEL SPRINGHEAD TYPE. A. MANUFACTURERS: SUBJECT TO COMPLIANCE 7. HANGER RODS: THREADED STEEL PRODUCTS BY ONE OF THE FOLLOWING: PART 3 – EXECUTION COOPER CROUSE-HINDS; DIV. OF COOPER INDU HUBBELL INCORPORATED; KILLARK ELECTRIC MAN 3. O-Z/GEDNEY; A UNIT OF GENERAL SIGNAL. 3.1 APPLICATION 4. RACO; A HUBBELL COMPANY. MAXIMUM SUPPORT SPACING AND MINIMUM HANGER ROD SIZE FOR RACEWAY: SPRING CITY ELECTRICAL MANUFACTURING COMPA 5 SPACE SUPPORTS FOR EMT AND RMC AS REQUIRED BY NFPA 70. MINIMUM ROD THOMAS & BETTS CORPORATION. SIZE SHALL BE 1/4 INCH IN DIAMETER. WALKER SYSTEMS, INC.; WIREMOLD COMPANY (TH B. MULTIPLE RACEWAYS OR CABLES: INSTALL TRAPEZE-TYPE SUPPORTS FABRICATED 8. OR EQUAL. WITH STEEL SLOTTED SUPPORT SYSTEM, SIZED SO CAPACITY CAN BE INCREASED BY AT LEAST 25 PERCENT IN FUTURE WITHOUT EXCEEDING SPECIFIED DESIGN B. SHEET METAL OUTLET AND DEVICE BOXES: NEW LOAD LIMITS. C. CAST-METAL OUTLET AND DEVICE BOXES: N SECURE RACEWAYS AND CABLES TO THESE SUPPORTS WITH CLAMPS. WITH GASKETED COVER. 1. C. SPRING-STEEL CLAMPS DESIGNED FOR SUPPORTING SINGLE CONDUITS WITHOUT D. SMALL SHEET METAL PULL AND JUNCTION BOXES BOLTS MAY BE USED FOR 1-1/2 INCH AND SMALLER RACEWAYS SERVING BRANCH PART 3 - EXECUTION CIRCUITS ABOVE SUSPENDED CEILINGS AND FOR FASTENING RACEWAYS TO TRAPEZE SUPPORTS. 3.1 RACEWAY APPLICATION A. OUTDOORS: APPLY RACEWAY PRODUCTS OTHERWISE INDICATED: 1. EXPOSED CONDUIT: RIGID STEEL CONDUIT. 2. CONNECTION TO VIBRATING EQUIPMENT: LFMC. 3. BOXES AND ENCLOSURES, ABOVEGROUND: NEM OTHERWISE NOTED. B. COMPLY WITH THE FOLLOWING INDOOR API INDICATED: 1. EXPOSED: EMT. 2. CONCEALED IN CEILINGS: EMT. 3. CONNECTION TO VIBRATING EQUIPMENT: FMC. 4. BOXES AND ENCLOSURES: NEMA 250, TYPE 1. MINIMUM RACEWAY SIZE: 3/4-INCH TRADE SIZI

- RACEWAY FITTINGS: COMPATIBLE WITH RACEWAYS AND SUITABLE FOR USE AND LOCATION.
- OTHERWISE INDICATED.
- E. DO NOT INSTALL ALUMINUM CONDUIT.

TO METHODS DESCRIBED IN NECA 1,		INSTALLATION KEEP RACEWAYS AT LEAST 6 INCHES AWAY FROM PARALLEL RUNS OF FLUES		T 3 - EXECUTION
INGS THROUGH STRUCTURE MEMBERS,	R	AND STEAM OR HOT-WATER PIPES. INSTALL HORIZONTAL RACEWAY RUNS ABOVE WATER AND STEAM PIPING. COMPLETE RACEWAY INSTALLATION BEFORE STARTING CONDUCTOR INSTALLATION.		INSTALLATION VERIFY IDENTITY OF EACH ITEM BEFORE FABRICATING AND INSTALLING IDENTIFICATION PRODUCTS.
NOT INDICATED, SELECT SIZES OF TE TO CARRY PRESENT AND FUTURE TS. MINIMUM STATIC DESIGN LOAD BE WEIGHT OF SUPPORTED	В. С.	SUPPORT RACEWAY INSTALLATION BEFORE STARTING CONDUCTOR INSTALLATION. SUPPORT RACEWAYS AS SPECIFIED IN DIVISION 26 SECTION "HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS."	В.	LOCATION: INSTALL IDENTIFICATION MATERIALS AND DEVICES AT LOCATIONS FOR MOST CONVENIENT VIEWING WITHOUT INTERFERENCE WITH OPERATION AND
INTED EQUIPMENT AND COMPONENTS:	D.	CONCEAL CONDUIT AND CABLES WITHIN FINISHED CEILINGS, UNLESS OTHERWISE INDICATED OR REQUIRED BY CONNECTION TO SURFACE MOUNTED EQUIPMENT.	C.	MAINTENANCE OF EQUIPMENT. APPLY IDENTIFICATION DEVICES TO SURFACES THAT REQUIRE FINISH AFTER COMPLETING FINISH WORK.
THEIR SUPPORTS TO BUILDING ETHODS UNLESS OTHERWISE ROUGH BOLTS.	E.	THREADED CONDUIT JOINTS, EXPOSED TO WET, DAMP, CORROSIVE, OR OUTDOOR CONDITIONS: APPLY LISTED COMPOUND TO THREADS OF RACEWAY AND FITTINGS BEFORE MAKING UP JOINTS. FOLLOW COMPOUND MANUFACTURER'S WRITTEN INSTRUCTIONS.	D.	SELF—ADHESIVE IDENTIFICATION PRODUCTS: CLEAN SURFACES BEFORE APPLICATION, USING MATERIALS AND METHODS RECOMMENDED BY MANUFACTURER OF IDENTIFICATION DEVICE.
TS ON HOLLOW MASONRY UNITS AND SONRY UNITS.	F.	RACEWAY TERMINATIONS AT LOCATIONS SUBJECT TO MOISTURE OR VIBRATION: USE INSULATING BUSHINGS TO PROTECT CONDUCTORS, INCLUDING CONDUCTORS SMALLER THAN NO. 4 AWG.	E. F.	ATTACH PLASTIC LABELS THAT ARE NOT SELF-ADHESIVE TYPE WITH MECHANICAL FASTENERS APPROPRIATE TO THE LOCATION AND SUBSTRATE. SYSTEM IDENTIFICATION COLOR-CODING BANDS FOR RACEWAYS AND CABLES:
1, 23, 25, OR 27) COMPLYING WITH	G.	INSTALL RACEWAY SEALING FITTINGS AT SUITABLE, APPROVED, AND ACCESSIBLE LOCATIONS AND FILL THEM WITH LISTED SEALING COMPOUND. INSTALL RACEWAY SEALING FITTINGS AT THE FOLLOWING POINTS:		EACH COLOR-CODING BAND SHALL COMPLETELY ENCIRCLE CABLE OR CONDUIT. PLACE ADJACENT BANDS OF TWO-COLOR MARKINGS IN CONTACT, SIDE BY SIDE. LOCATE BANDS AT CHANGES IN DIRECTION, AT PENETRATIONS OF WALLS AND FLOORS, AT 50-FOOT MAXIMUM INTERVALS IN STRAIGHT RUNS, AND AT 25-FOOT
STRUCTURAL BUILDING SURFACES: LOSURES, PULL AND JUNCTION	1. 2.	WHERE CONDUITS PASS FROM WARM TO COLD LOCATIONS. WHERE OTHERWISE REQUIRED BY NFPA 70.	G.	MAXIMUM INTERVALS IN CONGESTED AREAS. CABLE TIES: FOR ATTACHING TAGS. USE PLENUM RATED TYPE.
NNEL RACKS ATTACHED TO ESTRAINT STRENGTH AND ANCHORAGE	H.	FLEXIBLE CONDUIT CONNECTIONS: USE MAXIMUM OF 72 INCHES OF FLEXIBLE CONDUIT FOR EQUIPMENT SUBJECT TO VIBRATION, NOISE TRANSMISSION, OR MOVEMENT AND MOTORS.		IDENTIFICATION SCHEDULE ACCESSIBLE RACEWAYS AND METAL-CLAD CABLES, 600 V OR LESS, FOR BRANCH
CONCRETE AT LOCATIONS AND TO	1.	USE LFMC IN DAMP OR WET LOCATIONS NOT SUBJECT TO SEVERE PHYSICAL DAMAGE.		CIRCUITS 15 AMPERES OR GREATER AND 100V TO GROUND: IDENTIFY WITH SELF—ADHESIVE VINYL LABEL. INSTALL LABELS AT 30—FOOT MAXIMUM INTERVALS. POWER—CIRCUIT CONDUCTOR IDENTIFICATION, 600 V OR LESS: FOR
AINT ON BOLTED CONNECTIONS, AND	3.3 A.	PROTECTION PROVIDE FINAL PROTECTION AND MAINTAIN CONDITIONS THAT ENSURE COATINGS		CONDUCTORS IN PULL AND JUNCTION BOXES, USE COLOR-CODING CONDUCTOR TAPE TO IDENTIFY THE PHASE.
ANEOUS METAL. IECTIONS, AND ABRADED AREAS AND	1	AND FINISHES ARE WITHOUT DAMAGE OR DETERIORATION AT TIME OF SUBSTANTIAL COMPLETION.		COLOR-CODING FOR PHASE IDENTIFICATION, 600 V OR LESS: USE COLORS LISTED BELOW FOR BRANCH-CIRCUIT CONDUCTORS.
Ý WITH ASTM A 780.	2.	REPAIR DAMAGE TO GALVANIZED FINISHES WITH ZINC-RICH PAINT RECOMMENDED BY MANUFACTURER. REPAIR DAMAGE TO PAINT FINISHES WITH MATCHING TOUCHUP COATING RECOMMENDED BY MANUFACTURER.		COLOR SHALL BE FACTORY APPLIED OR FIELD APPLIED FOR SIZES LARGER THAN NO. 8 AWG, IF AUTHORITIES HAVING JURISDICTION PERMIT. COLORS FOR 208/120-V CIRCUITS:
CTRICAL SYSTEMS	END	OF SECTION 260533		PHASE A: BLACK. PHASE B: RED.
	SEC	TION 260553 – IDENTIFICATION FOR ELECTRICAL SYSTEMS	3) C.	PHASE C: BLUE. COLORS FOR 480/277–V CIRCUITS:
HE CONTRACT, INCLUDING GENERAL		T 1 — GENERAL	1) 2)	PHASE A: BROWN. PHASE B: ORANGE.
ISION 01 SPECIFICATION SECTIONS,		RELATED DOCUMENTS DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL	3)	PHASE C: YELLOW.
NGS, BOXES, ENCLOSURES, AND	1.2	AND SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS, APPLY TO THIS SECTION. SUMMARY	D.	FIELD-APPLIED, COLOR-CODING CONDUCTOR TAPE: APPLY IN HALF-LAPPED TURNS FOR A MINIMUM DISTANCE OF 6 INCHES FROM TERMINAL POINTS AND IN BOXES WHERE SPLICES OR TAPS ARE MADE. APPLY LAST TWO TURNS OF TAPE WITH NO TENSION TO PREVENT POSSIBLE UNWINDING. LOCATE BANDS TO AVOID
		SECTION INCLUDES:	C.	OBSCURING FACTORY CABLE MARKINGS. AUXILIARY ELECTRICAL SYSTEMS CONDUCTOR IDENTIFICATION: IDENTIFY
	1. 2. 3.	IDENTIFICATION FOR RACEWAYS. IDENTIFICATION OF POWER AND CONTROL CABLES. IDENTIFICATION FOR CONDUCTORS.	1.	FIELD-INSTALLED ALARM, CONTROL, AND SIGNAL CONNECTIONS. IDENTIFY CONDUCTORS, CABLES, AND TERMINALS IN ENCLOSURES AND AT
	4. 1.3	EQUIPMENT IDENTIFICATION LABELS.	2.	JUNCTIONS, TERMINALS, AND PULL POINTS. IDENTIFY BY SYSTEM AND CIRCUIT DESIGNATION. USE SYSTEM OF MARKER TAPE DESIGNATIONS THAT IS UNIFORM AND CONSISTENT
ESSORIES: LISTED AND LABELED AS TESTING AGENCY ACCEPTABLE TO		COMPLY WITH NFPA 70.	D	WITH SYSTEM USED BY MANUFACTURER FOR FACTORY-INSTALLED CONNECTIONS. EQUIPMENT IDENTIFICATION LABELS: ON EACH UNIT OF EQUIPMENT, INSTALL A
ED FOR INTENDED USE.	В.	ADHESIVE—ATTACHED LABELING MATERIALS, INCLUDING LABEL STOCKS, LAMINATING ADHESIVES, AND INKS USED BY LABEL PRINTERS, SHALL COMPLY WITH UL 969.		UNIQUE DESIGNATION LABEL THAT IS CONSISTENT WITH THE DESIGNATIONS ON PLAN.
		COORDINATION COORDINATE IDENTIFICATION NAMES, ABBREVIATIONS, COLORS, AND OTHER		LABELING INSTRUCTIONS: INDOOR EQUIPMENT: SELF-ADHESIVE, ENGRAVED, LAMINATED ACRYLIC OR
CE WITH REQUIREMENTS, PROVIDE		FEATURES WITH REQUIREMENTS IN OTHER SECTIONS REQUIRING IDENTIFICATION APPLICATIONS, DRAWINGS, SHOP DRAWINGS, MANUFACTURER'S WIRING DIAGRAMS, AND WITH THOSE REQUIRED BY CODES AND STANDARDS. USE CONSISTENT DESIGNATIONS THROUGHOUT PROJECT.	В.	MELAMINE LABEL. UNLESS OTHERWISE INDICATED, PROVIDE A SINGLE LINE OF TEXT WITH 1/2-INCH- HIGH LETTERS ON 1-1/2-INCH- HIGH LABEL; WHERE TWO LINES OF TEXT ARE REQUIRED, USE LABELS 2 INCHES HIGH. OUTDOOR EQUIPMENT: ENGRAVED, LAMINATED ACRYLIC OR MELAMINE LABEL.
NAL LTD. CO.	В. С.	COORDINATE INSTALLATION OF IDENTIFYING DEVICES WITH COMPLETION OF COVERING AND PAINTING OF SURFACES WHERE DEVICES ARE TO BE APPLIED. INSTALL IDENTIFYING DEVICES BEFORE INSTALLING ACOUSTICAL CEILINGS AND SIMILAR CONCEALMENT.	C.	UNLESS OTHERWISE INDICATED, PROVIDE A SINGLE LINE OF TEXT WITH 1/2-INCH- HIGH LETTERS ON 1-1/2-INCH- HIGH LABEL; WHERE TWO LINES OF TEXT ARE REQUIRED, USE LABELS 2 INCHES HIGH. UNLESS PROVIDED WITH SELF-ADHESIVE MEANS OF ATTACHMENT, FASTEN LABELS
	PAR	T 2 – PRODUCTS		WITH APPROPRIATE MECHANICAL FASTENERS THAT DO NOT CHANGE THE NEMA OR NRTL RATING OF THE ENCLOSURE.
	2.1 ⊿	POWER RACEWAY IDENTIFICATION MATERIALS COMPLY WITH ANSI A13.1 FOR MINIMUM SIZE OF LETTERS FOR LEGEND AND FOR	Α.	EQUIPMENT TO BE LABELED: ENCLOSED SWITCHES.
	в.	MINIMUM LENGTH OF COLOR FIELD FOR EACH RACEWAY SIZE. COLORS FOR RACEWAYS CARRYING CIRCUITS AT 600 V OR LESS:		PUSH-BUTTON STATIONS. OF SECTION 260553
AND FLEXIBLE AND LIQUIDTIGHT), YPE AND SIZE RACEWAY WITH IRONMENT IN WHICH INSTALLED.	1. 2.	BLACK LETTERS ON AN ORANGE FIELD. LEGEND: INDICATE VOLTAGE AND CIRCUIT/FEEDER IDENTIFICATIONS.	LND	OF SECTION 200333
-SCREW OR COMPRESSION TYPE.	C.	, SELF—ADHESIVE VINYL LABELS FOR RACEWAYS CARRYING CIRCUITS AT 600 V OR LESS: PREPRINTED, FLEXIBLE LABEL LAMINATED WITH A CLEAR, WEATHER— AND		
JIT: LISTED FOR USE IN CABLE D FOR USE TO LUBRICATE AND CORROSION AND ENHANCE THEIR		CHEMICAL-RESISTANT COATING AND MATCHING WRAPAROUND ADHESIVE TAPE FOR SECURING ENDS OF LEGEND LABEL.		
	2.2 A	METAL—CLAD CABLE IDENTIFICATION MATERIALS COMPLY WITH ANSI A13.1 FOR MINIMUM SIZE OF LETTERS FOR LEGEND AND FOR		
CE WITH REQUIREMENTS, PROVIDE	В.	MINIMUM LENGTH OF COLOR FIELD FOR EACH RACEWAY AND CABLE SIZE. COLORS FOR RACEWAYS CARRYING CIRCUITS AT 600 V AND LESS:		
DUSTRIES, INC.	1. 2.	BLACK LETTERS ON AN ORANGE FIELD. LEGEND: INDICATE VOLTAGE AND CIRCUIT/FEEDER IDENTIFICATION.		
IANUFACTURING CO. DIVISION. IPANY.	C.	SELF—ADHESIVE VINYL LABELS: PREPRINTED, FLEXIBLE LABEL LAMINATED WITH A CLEAR, WEATHER— AND CHEMICAL—RESISTANT COATING AND MATCHING WRAPAROUND ADHESIVE TAPE FOR SECURING ENDS OF LEGEND LABEL.		
(THE).		POWER AND CONTROL CABLE IDENTIFICATION MATERIALS		
EMA OS 1.	A.	COMPLY WITH ANSI A13.1 FOR MINIMUM SIZE OF LETTERS FOR LEGEND AND FOR MINIMUM LENGTH OF COLOR FIELD FOR EACH RACEWAY AND CABLE SIZE.		
NEMA FB 1, ALUMINUM, TYPE FD,	В.	SELF—ADHESIVE VINYL LABELS: PREPRINTED, FLEXIBLE LABEL LAMINATED WITH A CLEAR, WEATHER— AND CHEMICAL—RESISTANT COATING AND MATCHING WRAPAROUND ADHESIVE TAPE FOR SECURING ENDS OF LEGEND LABEL.		
KES: NEMA OS 1.		CONDUCTOR IDENTIFICATION MATERIALS COLOR-CODING CONDUCTOR TAPE: COLORED, SELF-ADHESIVE VINYL TAPE NOT		
		LESS THAN 3 MILS THICK BY 1 TO 2 INCHES WIDE.		
AS SPECIFIED BELOW, UNLESS		SELF—ADHESIVE, ENGRAVED, LAMINATED ACRYLIC OR MELAMINE LABEL: ADHESIVE BACKED, WITH WHITE LETTERS ON A BLACK BACKGROUND. MINIMUM LETTER HEIGHT SHALL BE 3/8 INCH.		
2. EMA 250, TYPE 3R UNLESS		CABLE TIES PLENUM-RATED CABLE TIES: SELF-EXTINGUISHING, UV STABILIZED, ONE PIECE,		
APPLICATIONS, UNLESS OTHERWISE	1	SELF LOCKING. MINIMUM WIDTH: 3/16 INCH.		
	1. 2. 3. 4.	TENSILE STRENGTH AT 73 DEG F, ACCORDING TO ASTM D 638: 7000 PSI. UL 94 FLAME RATING: 94V-0. TEMPERATURE RANGE: MINUS 50 TO PLUS 284 DEG F.		
1.	5.	COLOR: BLACK.		
SIZE. AYS AND SUITABLE FOR USE AND				PROFESSIONAL CERTIFICATION:

1. RIGID STEEL CONDUIT: USE THREADED RIGID STEEL CONDUIT FITTINGS, UNLESS

ITEN	М	BEFORE	FA	BRICATING	, A	AND	INSTAL	LING.	
TION	МА	TERIALS	AND	DEVICES	AT	LOC	ATIONS	FOR	



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Revisions		

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ANNAPOLIS, MARYLAND 21401

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| Date 2/24/16 REVIEW SET

Client:

CITY OF TAKOMA PARK

Location:				
7500	MA	APLE	A	VE
TAKON	ΛA	PAR	<	MD.

Project:

I.T. ROOM UPGRADE

CIRICAL

Drawn by A2ESG Project No.

15032.00

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Date

2/24/16

SECTION 260923 - LIGHTING CONTROL DEVICES PART 2 – PRODUCTS PART 1 – GENERAL 2.1 STRAIGHT BLADE RECEPTACLES 1.1 RELATED DOCUMENTS A. CONVENIENCE RECEPTACLES: 125 V. DUPLEX. NEMA WD 6 AND UL 498. A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS, APPLY TO AVAILABLE PRODUCTS: SUBJECT TO COMPLIANCE THIS SECTION. THAT MAY BE INCORPORATED INTO THE WORK THE FOLLOWING: 1.2 SUMMARY A. COOPER. A. THIS SECTION INCLUDES THE FOLLOWING LIGHTING CONTROL DEVICES: B. HUBBELL C. LEVITON. 1. INDOOR OCCUPANCY SENSORS. D. PASS & SEYMOUR. E. OR EQUAL. 1.3 DEFINITIONS 2.2 GFCI RECEPTACLES A. LED: LIGHT-EMITTING DIODE. B. PIR: PASSIVE INFRARED. A. GENERAL DESCRIPTION: STRAIGHT BLADE, NOI WITH NEMA WD 1, NEMA WD 6, UL 498, AND INDICATOR LIGHT THAT IS LIGHTED WHEN DEVICE 1.4 SUBMITTALS B. DUPLEX GFCI CONVENIENCE RECEPTACLES, 125 A. SHOP DRAWINGS: FOR EACH TYPE OF PRODUCT INDICATED. 1. AVAILABLE PRODUCTS: SUBJECT TO COMPLIANCE 1.5 QUALITY ASSURANCE THAT MAY BE INCORPORATED INTO THE WORK A. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS THE FOLLOWING: DEFINED IN NFPA 70, ARTICLE 100, BY A TESTING AGENCY ACCEPTABLE TO A. COOPER. AUTHORITIES HAVING JURISDICTION, AND MARKED FOR INTENDED USE. B. PASS & SEYMOUR. B. COMPLY WITH NFPA 70. C. OR EQUAL. PART 2 – PRODUCTS 2.3 OCCUPANCY SENSORS A. LONG-RANGE WALL-SWITCH SENSORS: 2.1 INDOOR OCCUPANCY SENSORS A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE 1. AVAILABLE PRODUCTS: SUBJECT TO COMPLIANCE PRODUCTS BY ONE OF THE FOLLOWING: THAT MAY BE INCORPORATED INTO THE WORK THE FOLLOWING: SENSOR SWITCH, INC. A. SENSOR SWITCH. INC. WATT STOPPER (THE) B. WATT STOPPER (THE). 3. OR EQUAL. C. OR EQUAL. B. GENERAL DESCRIPTION: WALL-MOUNTING, SOLID-STATE UNITS WITH INTEGRAL 2. DESCRIPTION: DUAL TECHNOLOGY, WITH RELAY UNIT. ULTRASONIC-TYPE SENSING, 120/277 V, ADJI UNLESS OTHERWISE INDICATED, TURN LIGHTS ON WHEN COVERED AREA IS MINUTES, 110-DEGREE FIELD OF VIEW, AND A OCCUPIED AND OFF WHEN UNOCCUPIED: WITH A TIME DELAY FOR TURNING LIGHTS SQ. FT. OFF, ADJUSTABLE OVER A MINIMUM RANGE OF 1 TO 30 MINUTES. DRY CONTACTS RATED FOR 20-A BALLAST LOAD AT 120- AND 277-V AC. FOR 2. 2.4 WALL PLATES FOR POWER OUTLETS 13-A TUNGSTEN AT 120-V AC, AND FOR 1 HP AT 120-V AC. A. SINGLE AND COMBINATION TYPES TO MATCH COF DUAL-TECHNOLOGY TYPE: WALL MOUNTING; DETECT OCCUPANCY BY USING A COMBINATION OF PIR AND ULTRASONIC DETECTION METHODS IN AREA OF PLATE-SECURING SCREWS: METAL WITH HEAD COVERAGE. PARTICULAR TECHNOLOGY OR COMBINATION OF TECHNOLOGIES THAT MATERIAL FOR FINISHED SPACES: SATIN-FINISH CONTROLS ON-OFF FUNCTIONS SHALL BE SELECTABLE IN THE FIELD BY MATERIAL FOR UNFINISHED SPACES: GALVANIZEI OPERATING CONTROLS ON UNIT. MATERIAL FOR DAMP LOCATIONS: CAST ALUMINU SENSITIVITY ADJUSTMENT: SEPARATE FOR EACH SENSING TECHNOLOGY. COVER, AND LISTED AND LABELED FOR USE IN 2. DETECTOR SENSITIVITY: DETECT OCCURRENCES OF 6-INCH MINIMUM MOVEMENT OF WET-LOCATION, WEATHERPROOF COVER PLATE ANY PORTION OF A HUMAN BODY THAT PRESENTS A TARGET OF NOT LESS THAN TYPE 3R WEATHER-RESISTANT, DIE-CAST ALUMIN 36 SQ. IN., AND DETECT A PERSON OF AVERAGE SIZE AND WEIGHT MOVING NOT LESS THAN 12 INCHES IN EITHER A HORIZONTAL OR A VERTICAL MANNER AT AN 2.5 FINISHES APPROXIMATE SPEED OF 12 INCHES/S. A. COLOR: PART 3 – EXECUTION 1. WIRING DEVICES CONNECTED TO NORMAL POWER 3.1 SENSOR INSTALLATION 2. WIRING DEVICES CONNECTED TO EMERGENCY PO A. INSTALL IN LOCATIONS TO ACHIEVE NOT LESS THAN 90 PERCENT COVERAGE OF PART 3 - EXECUTION AREAS INDICATED. DO NOT EXCEED COVERAGE LIMITS SPECIFIED IN MANUFACTURER'S WRITTEN INSTRUCTIONS. 3.1 INSTALLATION 3.2 WIRING INSTALLATION A. COORDINATION WITH OTHER TRADES: WIRING METHOD: COMPLY WITH DIVISION 26 SECTION "LOW-VOLTAGE ELECTRICAL 1. TAKE STEPS TO INSURE THAT DEVICES AND T NOT PLACE WALL FINISH MATERIALS OVER DEVIC POWER CONDUCTORS AND CABLES." MINIMUM CONDUIT SIZE SHALL BE 3/4 INCH. FOR BOXES WITH ROUTERS THAT ARE GUIDED E В. WIRING WITHIN ENCLOSURES: COMPLY WITH NECA 1. SEPARATE POWER-LIMITED BOXES. AND NONPOWER-LIMITED CONDUCTORS ACCORDING TO CONDUCTOR 2. KEEP OUTLET BOXES FREE OF PLASTER. DR MANUFACTURER'S WRITTEN INSTRUCTIONS. CEMENT, CONCRETE, DUST, PAINT, AND OTHER SIZE CONDUCTORS ACCORDING TO LIGHTING CONTROL DEVICE MANUFACTURER'S C. THE RACEWAY SYSTEM, CONDUCTORS, AND CABL WRITTEN INSTRUCTIONS, UNLESS OTHERWISE INDICATED. 3. INSTALL WIRING DEVICES AFTER ALL WALL PREPA SPLICES, TAPS, AND TERMINATIONS: MAKE CONNECTIONS ONLY ON NUMBERED COMPLETE. TERMINAL STRIPS IN JUNCTION, PULL, AND OUTLET BOXES; TERMINAL CABINETS; AND EQUIPMENT ENCLOSURES. B. CONDUCTORS: 1. DO NOT STRIP INSULATION FROM CONDUCTOR 3.3 FIELD QUALITY CONTROL SPLICED OR TERMINATED ON DEVICES. A. PERFORM THE FOLLOWING FIELD TESTS AND INSPECTIONS AND PREPARE TEST 2. STRIP INSULATION EVENLY AROUND THE CONDU **REPORTS:** THE PURPOSE. AVOID SCORING OR NICKING OF FROM STRANDED WIRE. AFTER INSTALLING SENSORS, AND AFTER ELECTRICAL CIRCUITRY HAS BEEN THE LENGTH OF FREE CONDUCTORS AT OUTLETS ENERGIZED, ADJUST AND TEST FOR COMPLIANCE WITH REQUIREMENTS. PROVISIONS OF NFPA 70, ARTICLE 300, WITHOUT 2. OPERATIONAL TEST: VERIFY OPERATION OF EACH LIGHTING CONTROL DEVICE, AND ADJUST TIME DELAYS. C. DEVICE INSTALLATION: B. LIGHTING CONTROL DEVICES THAT FAIL TESTS AND INSPECTIONS ARE DEFECTIVE 1. REPLACE ALL DEVICES THAT HAVE BEEN WORK. CONSTRUCTION OR THAT SHOW SIGNS THAT BUILDING FINISHING OPERATIONS WERE COMPLET END OF SECTION 260923 2. KEEP EACH WIRING DEVICE IN ITS PACKAGE OR TIME TO CONNECT CONDUCTORS. 3. DO NOT REMOVE SURFACE PROTECTION, SUCH A SECTION 262726 - WIRING DEVICES COVERS, UNTIL THE LAST POSSIBLE MOMENT. 4. CONNECT DEVICES TO BRANCH CIRCUITS USING PART 1 – GENERAL 6 INCHES IN LENGTH. 5. WHEN THERE IS A CHOICE, USE SIDE WIRING WI 1.1 RELATED DOCUMENTS TERMINALS. WRAP SOLID CONDUCTOR TIGHTLY A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND WAY AROUND TERMINAL SCREW. SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS, APPLY TO USE A TORQUE SCREWDRIVER WHEN A TORQUE THIS SECTION. BY THE MANUFACTURER. 7. WHEN CONDUCTORS LARGER THAN NO. 12 AWG 1.2 SUMMARY SPLICE NO. 12 AWG PIGTAILS FOR DEVICE CONN A. THIS SECTION INCLUDES THE FOLLOWING: TIGHTEN UNUSED TERMINAL SCREWS ON THE DE WHEN MOUNTING INTO METAL BOXES, REMOVE T 9. RECEPTACLES, RECEPTACLES WITH INTEGRAL GFCI, AND ASSOCIATED DEVICE PLATES. USED TO HOLD DEVICE MOUNTING SCREWS IN Y 2. WALL OCCUPANCY SENSORS. CONTACT. D. RECEPTACLE ORIENTATION: 1.3 DEFINITIONS 1. INSTALL GROUND PIN OF VERTICALLY MOUNT A. GFCI: GROUND-FAULT CIRCUIT INTERRUPTER. HORIZONTALLY MOUNTED RECEPTACLES TO THE B. PIGTAIL: SHORT LEAD USED TO CONNECT A DEVICE TO A BRANCH-CIRCUIT CONDUCTOR. ARRANGEMENT OF DEVICES: UNLESS OTHERWIS LONG DIMENSION VERTICAL AND WITH GROUNDI 1.4 SUBMITTALS TOP. GROUP ADJACENT DEVICES UNDER SINGLE A. SHOP DRAWINGS: FOR EACH TYPE OF PRODUCT INDICATED. 3.2 FIELD QUALITY CONTROL 1.5 QUALITY ASSURANCE A. TESTS FOR CONVENIENCE RECEPTACLES: A. SOURCE LIMITATIONS: OBTAIN EACH TYPE OF WIRING DEVICE AND ASSOCIATED GROUND IMPEDANCE: VALUES OF UP TO 2 OHI WALL PLATE THROUGH ONE SOURCE FROM A SINGLE MANUFACTURER. INSOFAR AS GFCI TRIP: TEST FOR TRIPPING VALUES SPECIFI THEY ARE AVAILABLE, OBTAIN ALL WIRING DEVICES AND ASSOCIATED WALL PLATES USING THE TEST PLUG, VERIFY THAT THE DEVICE FROM A SINGLE MANUFACTURER AND ONE SOURCE. SECURELY MOUNTED. B. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS 4. THE TESTS SHALL BE DIAGNOSTIC, INDICATING D DEFINED IN NFPA 70, ARTICLE 100, BY A TESTING AGENCY ACCEPTABLE TO RESISTANCE AT THE CIRCUIT BREAKER, POOR CO AUTHORITIES HAVING JURISDICTION, AND MARKED FOR INTENDED USE. CURRENT PATH. DEFECTIVE DEVICES. OR SIMILAR C. COMPLY WITH NFPA 70. CONDITIONS, REMOVE MALFUNCTIONING UNITS AN RETEST AS SPECIFIED ABOVE. END OF SECTION 262726

	SECTION 262813 - FUSES	PART 2 – PRODUCTS
. 20 A. COMPLY WITH NEMA WD 1,	PART 1 – GENERAL 1.1 RELATED DOCUMENTS	2.1 FUSIBLE SWITCHES A. MANUFACTURERS: SUBJECT
NCE WITH REQUIREMENTS, PRODUCTS INCLUDE, BUT ARE NOT LIMITED TO,	A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS, APPLY TO THIS SECTION.	PRODUCTS BY ONE OF THE FO 1. EATON ELECTRICAL INC.; CUTLE 2. GENERAL ELECTRIC COMPANY DISTRIBUTION.
	1.2 SUMMARY A. SECTION INCLUDES:	 SIEMENS ENERGY & AUTOMATIC SQUARE D; A BRAND OF SCHN
	1. CARTRIDGE FUSES RATED 600-V AC AND LESS FOR USE IN ENCLOSED SWITCHES.	5. OR EQUAL. B. TYPE HD, HEAVY DUTY, SINGLE
	1.3 QUALITY ASSURANCE A. SOURCE LIMITATIONS: OBTAIN FUSES, FOR USE WITHIN A SPECIFIC PRODUCT OR	UL 98 AND NEMA KS 1, HOI ACCOMMODATE CARTRIDGE FUS THREE PADLOCKS, AND INTE
ION—FEED—THROUGH TYPE. COMPLY ND UL 943, CLASS A, AND INCLUDE CE IS TRIPPED.	CIRCUIT, FROM SINGLE SOURCE FROM SINGLE MANUFACTURER. B. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION.	LISTED TO ACCEPT BOTH ALUM C. ACCESSORIES:
5 V, 20 A: NCE WITH REQUIREMENTS, PRODUCTS	C. COMPLY WITH NEMA FU 1 FOR CARTRIDGE FUSES. D. COMPLY WITH NFPA 70.	EQUIPMENT GROUND KIT: INT ALUMINUM GROUND CONDUCTO NEUTRAL KIT: INTERNALLY M
INCLUDE, BUT ARE NOT LIMITED TO,	1.4 COORDINATION	AND BONDED; LABELED FOR C 3. CLASS R FUSE KIT: PROVIDES
	A. COORDINATE FUSE RATINGS WITH UTILIZATION EQUIPMENT NAMEPLATE LIMITATIONS OF MAXIMUM FUSE SIZE AND WITH SYSTEM SHORT-CIRCUIT CURRENT LEVELS.	FUSES ARE SPECIFIED. 4. HOOKSTICK HANDLE: ALLOWS
	1.5 EXTRA MATERIALS A. FURNISH EXTRA MATERIALS THAT MATCH PRODUCTS INSTALLED AND THAT ARE	5. LUGS: COMPRESSION TYPE, MATERIAL.
NCE WITH REQUIREMENTS, PRODUCTS	PACKAGED WITH PROTECTIVE COVERING FOR STORAGE AND IDENTIFIED WITH LABELS DESCRIBING CONTENTS.	2.2 ENCLOSURES A. ENCLOSED SWITCHES: TO COM
INCLUDE, BUT ARE NOT LIMITED TO,	1. FUSES: EQUAL TO 10 PERCENT OF QUANTITY INSTALLED FOR EACH SIZE AND TYPE, BUT NO FEWER THAN TWO OF EACH SIZE AND TYPE.	LOCATION. 1. INDOOR, DRY AND CLEAN LOCA
	PART 2 – PRODUCTS	2. OUTDOOR LOCATIONS: NEMA 2 PART 3 – EXECUTION
I BOTH PASSIVE-INFRARED- AND	2.1 MANUFACTURERS A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE	3.1 EXAMINATION
OJUSTABLE TIME DELAY UP TO 30 A MINIMUM COVERAGE AREA OF 1200	PRODUCTS BY ONE OF THE FOLLOWING:	A. EXAMINE ELEMENTS AND SU COMPLIANCE WITH INSTALLATIC PERFORMANCE OF THE WORK.
	 COOPER BUSSMANN, INC. FERRAZ SHAWMUT, INC. LITTELFUSE, INC. 	B. PROCEED WITH INSTALLATION C CORRECTED.
ORRESPONDING WIRING DEVICES.	4. OR EQUAL.	3.2 INSTALLATION
COLOR TO MATCH PLATE FINISH. SHED STAINLESS STEEL. ZED STEEL.	2.2 CARTRIDGE FUSES A. CHARACTERISTICS: NEMA FU 1, NONRENEWABLE CARTRIDGE FUSES WITH VOLTAGE	A. INSTALL INDIVIDUAL WALL-MO UNLESS OTHERWISE INDICATED.
NUM WITH SPRING-LOADED LIFT N "WET LOCATIONS."	RATINGS CONSISTENT WITH CIRCUIT VOLTAGES. PART 3 – EXECUTION	B. INSTALL FUSES IN FUSIBLE DE3.3 FIELD QUALITY CONTROL
TES: NEMA 250, COMPLYING WITH MINUM COVER.	3.1 EXAMINATION	A. TESTS AND INSPECTIONS:
	A. EXAMINE FUSES BEFORE INSTALLATION. REJECT FUSES THAT ARE MOISTURE DAMAGED OR PHYSICALLY DAMAGED.	 PERFORM EACH VISUAL AND M IN NETA ACCEPTANCE TESTING CORRECT MALFUNCTIONING UI
ER SYSTEM: TO MATCH EXISTING.	B. EXAMINE HOLDERS TO RECEIVE FUSES FOR COMPLIANCE WITH INSTALLATION TOLERANCES AND OTHER CONDITIONS AFFECTING PERFORMANCE, SUCH AS REJECTION FEATURES.	 2. CORRECT MALFONCTIONING OF DEMONSTRATE COMPLIANCE; OT B. ENCLOSED SWITCHES WILL BI
POWER SYSTEM: TO MATCH EXISTING.	C. EXAMINE UTILIZATION EQUIPMENT NAMEPLATES AND INSTALLATION INSTRUCTIONS. INSTALL FUSES OF SIZES AND WITH CHARACTERISTICS APPROPRIATE FOR EACH	TESTS AND INSPECTIONS.
	PIECE OF EQUIPMENT. D. PROCEED WITH INSTALLATION ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.	A. ADJUST MOVING PARTS AND O LUBRICATE AS RECOMMENDED
	3.2 FUSE APPLICATIONS	END OF SECTION 262816
THEIR BOXES ARE PROTECTED. DO /ICE BOXES AND DO NOT CUT HOLES	A. CARTRIDGE FUSES:1. MOTOR BRANCH CIRCUITS: CLASS RK1, TIME DELAY.	
BY RIDING AGAINST OUTSIDE OF THE	3.3 INSTALLATION	
ER MATERIAL THAT MAY CONTAMINATE BLES.	A. INSTALL FUSES IN FUSIBLE DEVICES. ARRANGE FUSES SO RATING INFORMATION IS READABLE WITHOUT REMOVING FUSE.	
PARATION, INCLUDING PAINTING, IS	END OF SECTION 262813	
DRS UNTIL JUST BEFORE THEY ARE	SECTION 262816 – ENCLOSED SWITCHES PART 1 – GENERAL	
DUCTOR USING TOOLS DESIGNED FOR OF SOLID WIRE OR CUTTING STRANDS	1.1 RELATED DOCUMENTS	
TS FOR DEVICES SHALL MEET DUT PIGTAILS.	A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND OTHER DIVISION 01 SPECIFICATION SECTIONS,	
UT PIGTAILS.	APPLY TO THIS SECTION. 1.2 SUMMARY	
EN IN TEMPORARY USE DURING AT THEY WERE INSTALLED BEFORE ETE.	A. SECTION INCLUDES:	
R OTHERWISE PROTECTED UNTIL IT IS	 FUSIBLE SWITCHES. ENCLOSURES. 	
AS PLASTIC FILM AND SMUDGE	1.3 DEFINITIONS	
WITH BINDING-HEAD SCREW	A. NC: NORMALLY CLOSED. B. NO: NORMALLY OPEN.	
CLOCKWISE, 2/3 TO 3/4 OF THE	1.4 SUBMITTALS A. SHOP DRAWINGS: FOR EACH TYPE OF ENCLOSED SWITCH, ACCESSORY, AND	
E IS RECOMMENDED OR REQUIRED G ARE INSTALLED ON 20A CIRCUITS,	COMPONENT INDICATED. INCLUDE DIMENSIONED ELEVATIONS, SECTIONS, WEIGHTS, AND MANUFACTURERS' TECHNICAL DATA ON FEATURES, PERFORMANCE, ELECTRICAL	
NNECTIONS. DEVICE.	CHARACTERISTICS, RATINGS, ACCESSORIES, AND FINISHES. 1. ENCLOSURE TYPES AND DETAILS FOR TYPES OTHER THAN NEMA 250, TYPE 1.	
THE FIBER OR PLASTIC WASHERS YOKES, ALLOWING METAL-TO-METAL	 CURRENT AND VOLTAGE RATINGS. SHORT-CIRCUIT CURRENT RATINGS (INTERRUPTING AND WITHSTAND, AS APPROPRIATE). 	
NTED RECEPTACLES DOWN, AND ON E RIGHT.	 INCLUDE EVIDENCE OF NRTL LISTING FOR SERIES RATING OF INSTALLED DEVICES. DETAIL FEATURES, CHARACTERISTICS, RATINGS, AND FACTORY SETTINGS OF INDIVIDUAL OVERCURRENT PROTECTIVE DEVICES, ACCESSORIES, AND AUXILIARY 	
WISE INDICATED, MOUNT FLUSH, WITH DING TERMINAL OF RECEPTACLES ON	COMPONENTS.	
ELE, MULTIGANG PLATES.	 1.5 QUALITY ASSURANCE A. SOURCE LIMITATIONS: OBTAIN ENCLOSED SWITCHES AND CIRCUIT BREAKERS, OVERCURRENT PROTECTIVE DEVICES, COMPONENTS, AND ACCESSORIES, WITHIN SAME 	
	B. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES, WITHIN SAME B. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS	
OHMS ARE ACCEPTABLE. OFIED IN UL 1436 AND UL 943. ICE AND ITS OUTLET BOX ARE	DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION.	
DAMAGED CONDUCTORS, HIGH	C. COMPLY WITH NFPA 70. 1.6 COORDINATION	
CONNECTIONS, INADEQUATE FAULT AR PROBLEMS. CORRECT CIRCUIT AND REPLACE WITH NEW ONES, AND	A. COORDINATION A. COORDINATE LAYOUT AND INSTALLATION OF SWITCHES AND COMPONENTS WITH EQUIPMENT SERVED AND ADJACENT SURFACES. MAINTAIN REQUIRED WORKSPACE	
	CLEARANCES AND REQUIRED CLEARANCES FOR EQUIPMENT ACCESS DOORS AND PANELS.	

CT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE FOLLOWING: LER-HAMMER BUSINESS UNIT.

NY; GE CONSUMER & INDUSTRIAL – ELECTRICAL TION, INC.

HNEIDER ELECTRIC.

250, TYPE 3R.

GLE THROW, 240 OR 600-V AC, 1200 A AND SMALLER: IORSEPOWER RATED, WITH CLIPS OR BOLT PADS TO USES, LOCKABLE HANDLE WITH CAPABILITY TO ACCEPT TERLOCKED WITH COVER IN CLOSED POSITION. UL UMINUM AND COPPER CONDUCTORS.

INTERNALLY MOUNTED AND LABELED FOR COPPER AND TORS MOUNTED; INSULATED, CAPABLE OF BEING GROUNDED COPPER AND ALUMINUM NEUTRAL CONDUCTORS. DES REJECTION OF OTHER FUSE TYPES WHEN CLASS R WS USE OF A HOOKSTICK TO OPERATE THE HANDLE. PE, SUITABLE FOR NUMBER, SIZE, AND CONDUCTOR

COMPLY WITH ENVIRONMENTAL CONDITIONS AT INSTALLED CATIONS: NEMA 250, TYPE 1.

SURFACES TO RECEIVE ENCLOSED SWITCHES FOR TION TOLERANCES AND OTHER CONDITIONS AFFECTING ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN

IOUNTED SWITCHES WITH TOPS AT UNIFORM HEIGHT DEVICES.

MECHANICAL INSPECTION AND ELECTRICAL TEST STATED IG SPECIFICATION. UNITS ON-SITE, WHERE POSSIBLE, AND RETEST TO OTHERWISE, REPLACE WITH NEW UNITS AND RETEST. BE CONSIDERED DEFECTIVE IF THEY DO NOT PASS

OPERABLE COMPONENTS TO FUNCTION SMOOTHLY, AND D BY MANUFACTURER.

> A Squared Plus Engineering $S_{upport} G_{roup, LLC}$

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PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 36773, EXPIRATION DATE: 01-18-17

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	ONE PARK		250 1401 (410) 841-65 (410) 224-27	i95
Unauthorized rep Violators will be Written dimensior Contractors shall job and this offi	oduction for any pur subject to prosecutions on these drawings verify and be respo	pose is an infringeme n by fullest extent of shall have precedence	e over scale dimensions. ns and conditions on the	c.
Revisi	ons			
# Date 2/24/1	6 REVIEW	SFT		
		JEI		

Client:

CITY OF TAKOMA PARK

Location: 7500 MAPLE AVE TAKOMA PARK MD.

Project:

I.T. ROOM UPGRADE

` I RICAL

Drawn by A2ESG Project No.

15032.00

Date

2/24/16

SECTION 280513 - CONDUCTORS AND CABLES ISECTION 265100 - INTERIOR LIGHTING SECURITY PART 1 – GENERAL PART 1 – GENERAL 1.1 RELATED DOCUMENTS 1.1 RELATED DOCUMENTS A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS, APPLY TO A. DRAWINGS AND GENERAL PROVISIONS OF THE THIS SECTION. AND SUPPLEMENTARY CONDITIONS AND DIVISI APPLY TO THIS SECTION. 1.2 SUMMARY 1.2 SUMMARY A. SECTION INCLUDES: A. SECTION INCLUDES: 1. INTERIOR LIGHTING FIXTURES, LAMPS, AND DRIVERS. 1. FIRE ALARM (SUPPRESSION SYSTEM CONTROL/M 2. LIGHTING FIXTURE SUPPORTS. 2. IDENTIFICATION PRODUCTS. 1.3 DEFINITIONS 1.3 DEFINITIONS A. CRI: COLOR-RENDERING INDEX. A. LOW VOLTAGE: AS DEFINED IN NFPA 70 B. LUMEN: MEASURED OUTPUT OF LAMP AND LUMINAIRE, OR BOTH. OPERATING AT LESS THAN 50 V OR FOR R C. LUMINAIRE: COMPLETE LIGHTING FIXTURE, INCLUDING DRIVER HOUSING. POWER-LIMITED CIRCUITS. D. LED: LIGHT EMITTING DIODE. 1.4 QUALITY ASSURANCE 1.4 SUBMITTALS A. ELECTRICAL COMPONENTS, DEVICES, AND ACCESS A. SHOP DRAWINGS: FOR EACH TYPE OF LIGHTING FIXTURE, ARRANGED IN ORDER OF DEFINED IN NFPA 70, BY A QUALIFIED TEST FIXTURE DESIGNATION. INCLUDE DATA ON FEATURES, ACCESSORIES, FINISHES, AND INTENDED LOCATION AND APPLICATION. THE FOLLOWING: PART 2 – PRODUCTS PHYSICAL DESCRIPTION OF LIGHTING FIXTURE INCLUDING DIMENSIONS. 2. DRIVER, INCLUDING WARRANTY. 2.1 PATHWAYS 3. LIFE, OUTPUT (LUMENS AND CRI), AND ENERGY-EFFICIENCY DATA. A. CONDUIT AND BOXES: COMPLY WITH REQUIR 4. PHOTOMETRIC DATA AND ADJUSTMENT FACTORS BASED ON LABORATORY TESTS, "RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS COMPLYING WITH IESNA LIGHTING MEASUREMENTS TESTING & CALCULATION GUIDES, B. OUTLET BOXES SHALL BE NO SMALLER THAN 4 OF EACH LIGHTING FIXTURE TYPE. AND 2-1/2 INCHES DEEP WITH APPROPRIATE R 5. PHOTOMETRIC DATA CERTIFIED BY A MANUFACTURER'S LABORATORY WITH A SUIT THE INSTALLATION CONDITIONS. CURRENT ACCREDITATION UNDER THE NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM FOR ENERGY EFFICIENT LIGHTING PRODUCTS. 2.2 LOW AND CONTROL-VOLTAGE CABLES DETAIL EQUIPMENT ASSEMBLIES AND INDICATE DIMENSIONS, WEIGHTS, LOADS, A. COMPLY WITH REQUIREMENTS OF DIVISION REQUIRED CLEARANCES, METHOD OF FIELD ASSEMBLY, COMPONENTS, AND LOCATION ELECTRICAL POWER CABLES". AND SIZE OF EACH FIELD CONNECTION. WIRING DIAGRAMS. 2.3 FIRE ALARM (SUPPRESSION SYSTEM CONTROL/M 1.5 QUALITY ASSURANCE A. MANUFACTURERS: SUBJECT TO COMPLIANCE PRODUCTS BY ONE OF THE FOLLOWING: A. LUMINAIRE PHOTOMETRIC DATA TESTING LABORATORY QUALIFICATIONS: PROVIDED BY MANUFACTURERS' LABORATORIES THAT ARE ACCREDITED UNDER THE NATIONAL WEST PENN WIRE; A BRAND OF BELDEN INC. VOLUNTEER LABORATORY ACCREDITATION PROGRAM FOR ENERGY EFFICIENT LIGHTING OR EQUAL. PRODUCTS. GENERAL WIRE AND CABLE REQUIREMENTS: В. B. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS COMPLYING WITH NFPA 70, ARTICLE 760. DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION. C. SIGNALING LINE CIRCUITS: TWISTED, SHIELDED C. COMPLY WITH NFPA 70. SYSTEM MANUFACTURER. 1. CIRCUIT INTEGRITY CABLE: TWISTED SHIELDE 1.6 COORDINATION CLASSIFICATION CI, FOR POWER-LIMITED FIRE A. COORDINATE LAYOUT AND INSTALLATION OF LIGHTING FIXTURES AND SUSPENSION NRTL LISTED AND LABELED AS COMPLYING WITH SYSTEM WITH OTHER CONSTRUCTION THAT PENETRATES CEILINGS OR IS SUPPORTED 2-HOUR RATING. BY THEM, INCLUDING HVAC EQUIPMENT, FIRE-SUPPRESSION SYSTEM, AND PARTITION NON-POWER-LIMITED CIRCUITS: SOLID-COPP ASSEMBLIES. RATED, 75 DEG C, COLOR-CODED INSULATION. 1.7 WARRANTY LOW-VOLTAGE CIRCUITS: NO. 16 AWG, MINIMUM A. SPECIAL WARRANTY FOR LED DRIVERS: MINIMUM OF 5 YEARS. 2. LINE-VOLTAGE CIRCUITS: NO. 12 AWG, MINIMUN 2.4 IDENTIFICATION PRODUCTS PART 2 – PRODUCTS A. MANUFACTURERS: SUBJECT TO COMPLIANCE PRODUCTS BY ONE OF THE FOLLOWING: 2.1 MANUFACTURERS BRADY CORPORATION. A. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCT INDICATED ON DRAWINGS. HELLERMANNTYTON. 3. KROY LLC. 2.2 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS 4. OR EQUAL. RECESSED FIXTURES: COMPLY WITH NEMA LE 4 FOR CEILING COMPATIBILITY FOR B. COMPLY WITH UL 969 FOR A SYSTEM OF LABEL STOCKS, LAMINATING ADHESIVES, AND INKS USEI RECESSED FIXTURES. C. COMPLY WITH REQUIREMENTS IN DIVISION 26 SE B. METAL PARTS: FREE OF BURRS AND SHARP CORNERS AND EDGES. ELECTRICAL SYSTEMS." C. SHEET METAL COMPONENTS: STEEL UNLESS OTHERWISE INDICATED. FORM AND SUPPORT TO PREVENT WARPING AND SAGGING. PART 3 - EXECUTION D. DOORS, FRAMES, AND OTHER INTERNAL ACCESS: SMOOTH OPERATING, FREE OF LIGHT LEAKAGE UNDER OPERATING CONDITIONS, AND DESIGNED TO PERMIT 3.1 INSTALLATION OF PATHWAYS SERVICING WITHOUT USE OF TOOLS. DESIGNED TO PREVENT DOORS, FRAMES, LENSES, DIFFUSERS, AND OTHER COMPONENTS FROM FALLING ACCIDENTALLY A. COMPLY WITH REQUIREMENTS IN DIVISION 26 SE DURING SERVICING AND WHEN SECURED IN OPERATING POSITION. ELECTRICAL SYSTEMS." FOR INSTALLATION OF CC E. DIFFUSERS AND GLOBES: B. INSTALL MANUFACTURED CONDUIT SWEEPS AND ACRYLIC LIGHTING DIFFUSERS: 100 PERCENT VIRGIN ACRYLIC PLASTIC. HIGH 1 POSSIBLE. RESISTANCE TO YELLOWING AND OTHER CHANGES DUE TO AGING, EXPOSURE TO HEAT, AND UV RADIATION. 3.2 INSTALLATION OF HANGERS AND SUPPORTS A. LENS THICKNESS: AT LEAST 0.125 INCH MINIMUM UNLESS INDICATED OTHERWISE A. COMPLY WITH REQUIREMENTS IN DIVISION 26 SI ON DRAWINGS. FOR ELECTRICAL SYSTEMS." FOR INSTALLATION B. UV STABILIZED. CONDUCTORS AND CABLES. 2.3 LIGHTING FIXTURE SUPPORT COMPONENTS 3.3 WIRING METHOD A. COMPLY WITH DIVISION 26 SECTION "HANGERS AND SUPPORTS FOR ELECTRICAL INSTALL WIRING IN RACEWAYS. CONCEAL RA Α. SYSTEMS" FOR CHANNEL- AND ANGLE-IRON SUPPORTS AND NONMETALLIC UNFINISHED SPACES AND AS INDICATED. MINIM CHANNEL AND ANGLE SUPPORTS. INCH. WIRING SHALL NOT SHARE CONDUIT B. WIRES: ASTM A 641/A 641M, CLASS 3, SOFT TEMPER, ZINC-COATED STEEL, 12 SYSTEMS. GAGE. WIRING WITHIN ENCLOSURES: BUNDLE, LACE, A B. PART 3 – EXECUTION TERMINAL POINTS. USE LACING BARS AND DIST POWER-LIMITED AND NON-POWER-LIMITED CONE WRITING BY MANUFACTURER. INSTALL CONDUCTOR 3.1 INSTALLATION ANGLES TO SIDES AND BACK OF ENCLOSURE. A. LIGHTING FIXTURES: TERMINATED, SPLICED, OR INTERRUPTED IN ANY INTRUSION SYSTEM TO TERMINAL BLOCKS. MAR SET LEVEL, PLUMB, AND SQUARE WITH CEILINGS. SYSTEM'S WIRING DIAGRAMS. MAKE ALL CONNEC B. TEMPORARY LIGHTING: IF IT IS NECESSARY, AND APPROVED BY ARCHITECT, TO CRIMP-ON TERMINAL SPADE LUGS, PRESSURE-T USE PERMANENT LUMINAIRES FOR TEMPORARY LIGHTING, INSTALL AND ENERGIZE CONNECTORS. THE MINIMUM NUMBER OF LUMINAIRES NECESSARY. WHEN CONSTRUCTION IS SUFFICIENTLY COMPLETE, REMOVE THE TEMPORARY LUMINAIRES, DISASSEMBLE, 3.4 INSTALLATION OF CONDUCTORS AND CABLES CLEAN THOROUGHLY, INSTALL NEW LAMPS, AND REINSTALL. A. CONDUCTORS: SIZE ACCORDING TO SYSTEM MANUFACTURER'S WRITTEN C. LAY-IN CEILING LIGHTING FIXTURES SUPPORTS: USE GRID AS A SUPPORT INSTRUCTIONS UNLESS OTHERWISE INDICATED. ELEMENT. B. GENERAL REQUIREMENTS FOR CABLING: INSTALL CEILING SUPPORT SYSTEM WIRES, INDEPENDENT OF THE CEILING 1. 1. TERMINATE ALL CONDUCTORS. SUSPENSION DEVICES. FOR EACH FIXTURE. LOCATE NOT MORE THAN 6 INCHES CABLES/CONDUCTORS MAY NOT BE SPLICED. SECURE AND SUPPORT AT 2 FROM LIGHTING FIXTURE CORNERS. INTERVALS NOT EXCEEDING 30 INCHES AND NOT MORE THAN 6 INCHES FROM 2. SUPPORT CLIPS: FASTEN TO LIGHTING FIXTURES AND TO CEILING GRID MEMBERS CABINETS, BOXES, OUTLETS AND TERMINALS. AT OR NEAR EACH FIXTURE CORNER WITH CLIPS THAT ARE UL LISTED FOR THE 3. BUNDLE, LACE, AND TRAIN CONDUCTORS TO TERMINAL POINTS WITHOUT APPLICATION. EXCEEDING MANUFACTURER'S LIMITATIONS ON BENDING RADII. 3. INSTALL AT LEAST FOUR INDEPENDENT SUPPORT WIRES FROM STRUCTURE TO A 4. DO NOT INSTALL BRUISED, KINKED, SCORED, DEFORMED, OR ABRADED TAB ON LIGHTING FIXTURE. WIRE SHALL HAVE BREAKING STRENGTH OF THE CABLE/CONDUCTORS. DO NOT SPLICE CONDUCTORS/CABLE BETWEEN WEIGHT OF FIXTURE AT A SAFETY FACTOR OF 3. TERMINATION, TAP, OR JUNCTION POINTS. REMOVE AND DISCARD CONDUCTORS/CABLE IF DAMAGED DURING INSTALLATION AND REPLACE IT WITH D. CONNECT WIRING ACCORDING TO DIVISION 26 SECTION "LOW-VOLTAGE ELECTRICAL NEW CABLE. POWER CONDUCTORS AND CABLES." 3.2 IDENTIFICATION A. INSTALL LABELS WITH PANEL AND CIRCUIT NUMBERS ON CONCEALED JUNCTION AND OUTLET BOXES. COMPLY WITH REQUIREMENTS FOR IDENTIFICATION SPECIFIED IN DIVISION 26 SECTION "IDENTIFICATION FOR ELECTRICAL SYSTEMS." END OF SECTION 265100

S FOR ELECTRONIC SAFETY AND	C. SEPARATION FROM EMI SOURCES: 1. SEPARATION BETWEEN CONDUCTORS/CABLES IN GROUNDED METALLIC RACEWAYS	I
	AND UNSHIELDED POWER LINES OR ELECTRICAL EQUIPMENT SHALL BE AS FOLLOWS: A. ELECTRICAL EQUIPMENT RATING LESS THAN 2 KVA: A MINIMUM OF 2-1/2	
HE CONTRACT, INCLUDING GENERAL ISION 01 SPECIFICATION SECTIONS,	INCHES. B. ELECTRICAL EQUIPMENT RATING BETWEEN 2 AND 5 KVA: A MINIMUM OF 6	
	INCHES. C. ELECTRICAL EQUIPMENT RATING MORE THAN 5 KVA: A MINIMUM OF 12 INCHES.	
MONITORING) WIRE AND CABLE.	 SEPARATION BETWEEN CONDUCTORS/CABLES IN GROUNDED METALLIC RACEWAYS AND POWER LINES AND ELECTRICAL EQUIPMENT LOCATED IN GROUNDED METALLIC CONDUITS OR ENCLOSURES SHALL BE AS FOLLOWS: A. ELECTRICAL EQUIPMENT RATING LESS THAN 2 KVA: NO REQUIREMENT. 	
	B. ELECTRICAL EQUIPMENT RATING BETWEEN 2 AND 5 KVA: A MINIMUM OF 3 INCHES.	
) FOR CIRCUITS AND EQUIPMENT REMOTE-CONTROL AND SIGNALING	 C. ELECTRICAL EQUIPMENT RATING MORE THAN 5 KVA: A MINIMUM OF 6 INCHES. 3. SEPARATION BETWEEN CABLES AND ELECTRICAL MOTORS AND TRANSFORMERS, 5 KVA OR HP AND LARGER: A MINIMUM OF 48 INCHES. 	
ESSORIES: LISTED AND LABELED AS STING AGENCY, AND MARKED FOR	3.5 FIRE ALARM WIRING INSTALLATION A. COMPLY WITH NECA 1 AND NFPA 72.	
STING AGENCT, AND MARKED FOR	B. WIRING METHOD: INSTALL WIRING IN METAL RACEWAY ACCORDING TO DIVISION 26 SECTION "RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS."	
	1. FIRE ALARM CIRCUITS AND EQUIPMENT CONTROL WIRING ASSOCIATED WITH THE FIRE ALARM SYSTEM SHALL BE INSTALLED IN A DEDICATED RACEWAY SYSTEM.	
JIREMENTS IN DIVISION 26 SECTION	THIS SYSTEM SHALL NOT BE USED FOR ANY OTHER WIRE OR CABLE. C. WIRING WITHIN ENCLOSURES: SEPARATE POWER—LIMITED AND NON—POWER—LIMITED CONDUCTORS AS RECOMMENDED BY MANUFACTURER.	
4 INCHES WIDE, 4 INCHES HIGH, RAISED COVERS AS APPLICABLE TO	INSTALL CONDUCTORS PARALLEL WITH OR AT RIGHT ANGLES TO SIDES AND BACK OF THE ENCLOSURE. BUNDLE, LACE, AND TRAIN CONDUCTORS TO TERMINAL POINTS WITH NO EXCESS. CONNECT CONDUCTORS THAT ARE TERMINATED, SPLICED, OR INTERRUPTED IN ANY ENCLOSURE ASSOCIATED WITH THE FIRE ALARM SYSTEM TO TERMINAL BLOCKS. MARK EACH TERMINAL ACCORDING TO THE SYSTEM'S WIRING DIAGRAMS. MAKE ALL CONNECTIONS WITH APPROVED	
26 SECTION "CONTROL-VOLTAGE	CRIMP-ON TERMINAL SPADE LUGS, PRESSURE-TYPE TERMINAL BLOCKS, OR PLUG CONNECTORS.	
MONITORING) WIRE AND CABLE CE WITH REQUIREMENTS, PROVIDE	 D. CABLE TAPS: USE NUMBERED TERMINAL STRIPS IN JUNCTION, PULL, AND OUTLET BOXES, CABINETS, OR EQUIPMENT ENCLOSURES WHERE CIRCUIT CONNECTIONS ARE MADE. E. COLOR-CODING: COLOR-CODE FIRE ALARM CONDUCTORS DIFFERENTLY FROM 	
	THE NORMAL BUILDING POWER WIRING. USE ONE COLOR—CODE FOR ALARM CIRCUIT WIRING AND ANOTHER FOR SUPERVISORY CIRCUITS. COLOR—CODE AUDIBLE ALARM—INDICATING CIRCUITS DIFFERENTLY FROM ALARM—INITIATING	
NRTL LISTED AND LABELED AS	CIRCUITS. USE DIFFERENT COLORS FOR VISIBLE ALARM-INDICATING DEVICES. PAINT FIRE ALARM SYSTEM JUNCTION BOXES AND COVERS RED. 3.6 POWER AND CONTROL-CIRCUIT CONDUCTORS	
D PAIR, SIZE AS RECOMMENDED BY DED PAIR, NFPA 70, ARTICLE 760,	A. 120–V POWER WIRING: INSTALL ACCORDING TO DIVISION 26 SECTION "LOW–VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES" UNLESS	
ALARM SIGNAL SERVICE TYPE FPL. ITH UL 1424 AND UL 2196 FOR A	OTHERWISE INDICATED. B. FOR CONTROL-CIRCUIT CONDUCTORS, INSTALL ACCORDING TO DIVISION 26 SECTION "CONTROL-VOLTAGE ELECTRICAL POWER CABLES" UNLESS OTHERWISE INDICATED.	
OPPER CONDUCTORS WITH 600-V	3.7 CONNECTIONS	
UM. UM.	A. COMPLY WITH OTHER REQUIREMENTS IN DIVISION 28 SECTIONS FOR CONNECTING, TERMINATING, AND IDENTIFYING WIRES AND CABLES.	
CE WITH REQUIREMENTS, PROVIDE	3.8 FIRESTOPPING A. COMPLY WITH REQUIREMENTS IN DIVISION 07 SECTION "PENETRATION FIRESTOPPING."	
	3.9 GROUNDING A. FOR LOW-VOLTAGE WIRING AND CABLING, COMPLY WITH REQUIREMENTS IN	
BELING MATERIALS, INCLUDING LABEL SED BY LABEL PRINTERS.	DIVISION 26 SECTION "GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS."	
SECTION IDENTIFICATION FOR	A. COMPLY WITH REQUIREMENTS FOR IDENTIFICATION SPECIFIED IN DIVISION 26 SECTION "IDENTIFICATION FOR ELECTRICAL SYSTEMS."	
	3.11 FIELD QUALITY CONTROL A. TESTING AGENCY: ENGAGE A QUALIFIED TESTING AGENCY TO PERFORM TESTS	
SECTION "RACEWAY AND BOXES FOR CONDUITS.	AND INSPECTIONS. B. END-TO-END CABLING WILL BE CONSIDERED DEFECTIVE IF IT DOES NOT PASS	
) LONG-RADIUS ELBOWS WHENEVER	TESTS AND INSPECTIONS. END OF SECTION 280513	
SECTION "HANGERS AND SUPPORTS ON OF SUPPORTS FOR PATHWAYS,		
RACEWAYS AND WIRING EXCEPT IN IIMUM CONDUIT SIZE SHALL BE 3/4 JIT WITH OTHER BUILDING WIRING		
AND TRAIN CONDUCTORS TO ISTRIBUTION SPOOLS. SEPARATE NDUCTORS AS RECOMMENDED IN CTORS PARALLEL WITH OR AT RIGHT		
CONNECT CONDUCTORS THAT ARE IY ENCLOSURE ASSOCIATED WITH ARK EACH TERMINAL ACCORDING TO NECTIONS WITH APPROVED		
-TYPE TERMINAL BLOCKS, OR PLUG		

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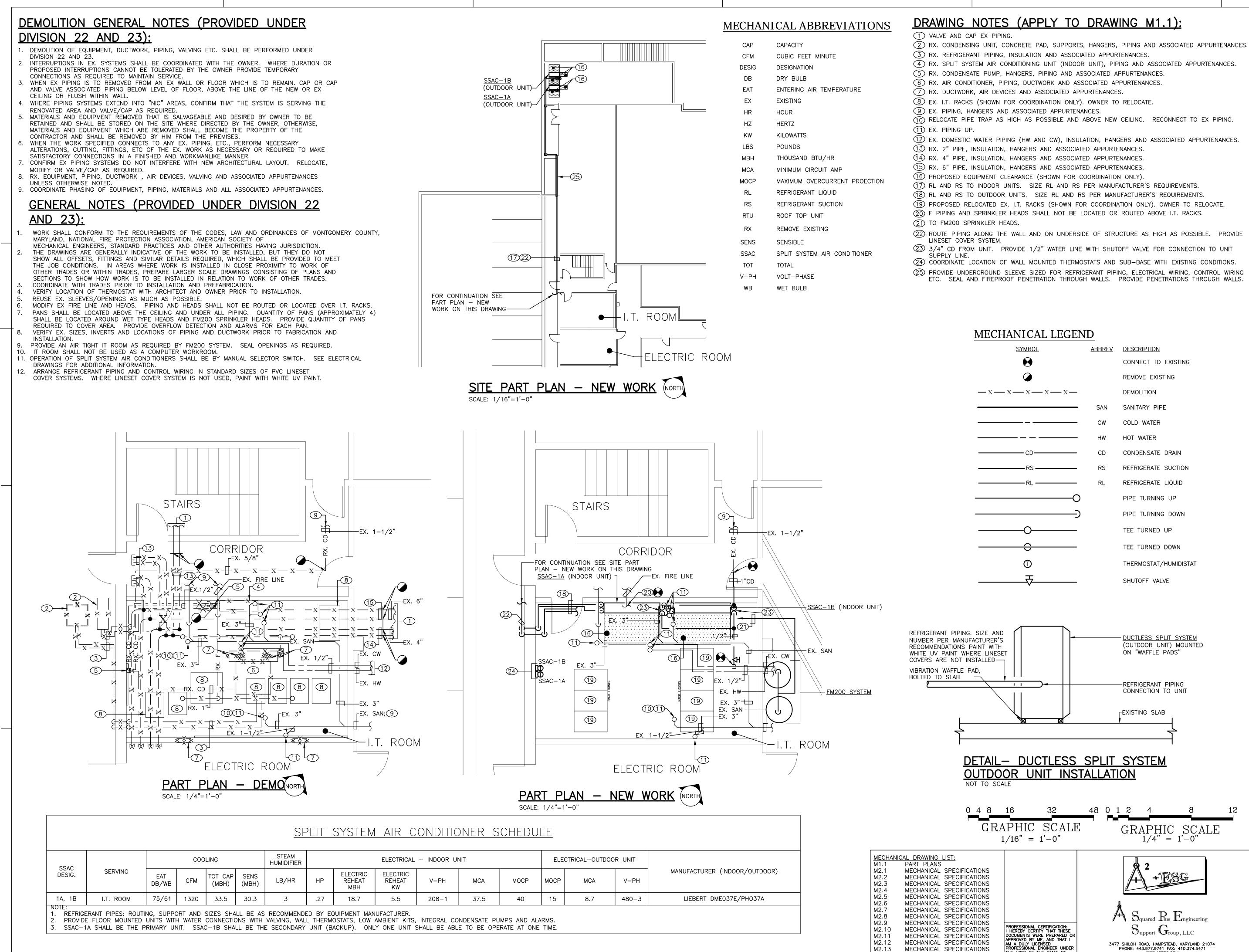
2.6 NOTIFICATION APPLIANCES SECTION 283112 - SUPPRESSION SYSTEM MONITORING/CONTROL SYSTEM A. GENERAL REQUIREMENTS FOR NOTIFICATION APPLIANCES: CONNECTED TO PART 1 – GENERAL NOTIFICATION APPLIANCE SIGNAL CIRCUITS, EQUIPPED FOR MOUNTING AS INDICATED AND WITH SCREW TERMINALS FOR SYSTEM CONNECTIONS. 1.1 RELATED DOCUMENTS COMBINATION DEVICES: FACTORY-INTEGRATED AUDIBLE AND VISIBLE DEVICES IN A A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SINGLE-MOUNTING ASSEMBLY, EQUIPPED FOR MOUNTING AS INDICATED AND WITH SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS, APPLY TO SCREW TERMINALS FOR SYSTEM CONNECTIONS. EACH COMPONENT SHALL ADHERE THIS SECTION. TO THE REQUIREMENTS INDICATED HEREIN. 1.2 SUMMARY B. HORNS: ELECTRIC-VIBRATING-POLARIZED TYPE, 24-V DC; WITH PROVISION FOR HOUSING THE OPERATING MECHANISM BEHIND A RED GRILLE. COMPLY WITH A. SECTION INCLUDES: UL 464. HORNS SHALL PRODUCE A SOUND-PRESSURE LEVEL OF 90 DBA, CONTROL UNIT. MEASURED 10 FEET FROM THE HORN, USING THE CODED SIGNAL PRESCRIBED IN 1. UL 464 TEST PROTOCOL. 2. ABORT PUSHBUTTON STATIONS. C. VISIBLE NOTIFICATION APPLIANCES: XENON STROBE LIGHTS COMPLY WITH UL 1971, 3. SYSTEM SMOKE DETECTORS. WITH CLEAR OR NOMINAL WHITE POLYCARBONATE LENS MOUNTED ON AN ALUMINUM 4. NOTIFICATION APPLIANCES. FACEPLATE. THE WORD "FIRE" IS ENGRAVED IN MINIMUM 1-INCH HIGH LETTERS ON THE LENS. 1.3 DEFINITIONS 1. RATED LIGHT OUTPUT: A. LED: LIGHT-EMITTING DIODE. A. 15 CD MINIMUM. 1.4 SYSTEM DESCRIPTION 2. MOUNTING: WALL MOUNTED UNLESS OTHERWISE INDICATED. A. NON-CODED SYSTEM, DEDICATED TO FIRE-ALARM SERVICE ONLY. 3. FLASHING SHALL BE IN A TEMPORAL PATTERN, SYNCHRONIZED WITH OTHER UNITS. 4. STROBE LEADS: FACTORY CONNECTED TO SCREW TERMINALS. 1.5 SUBMITTALS 5. MOUNTING FACEPLATE: FACTORY FINISHED, RED. A. GENERAL SUBMITTAL REQUIREMENTS: PART 3 - EXECUTION WHERE POSSIBLE, SUBMITTALS SHALL BE APPROVED BY AUTHORITIES HAVING 3.1 EQUIPMENT INSTALLATION JURISDICTION (AHJ) PRIOR TO SUBMITTING THEM TO ARCHITECT AND PRIOR TO SYSTEM ROUGH-INS. A. AS APPLICABLE COMPLY WITH NFPA 72 FOR INSTALLATION OF EQUIPMENT/DEVICES. SHOP DRAWINGS: FOR EACH TYPE OF PRODUCT INDICATED. INCLUDE PLANS, B. CONNECTING TO EXISTING EQUIPMENT: VERIFY THAT EXISTING FIRE-ALARM SYSTEM IS OPERATIONAL BEFORE MAKING CHANGES OR CONNECTIONS. ELEVATIONS, SECTIONS, DETAILS, AND ATTACHMENTS TO OTHER WORK. INCLUDE VOLTAGE DROP CALCULATIONS FOR NOTIFICATION APPLIANCE CIRCUITS. CONNECT NEW SYSTEM TO THE EXISTING SYSTEM. 2. INCLUDE BATTERY SIZE CALCULATIONS. 2. EXPAND, MODIFY, AND SUPPLEMENT THE EXISTING CONTROL/SYSTEM AS INCLUDE PERFORMANCE PARAMETERS AND INSTALLATION DETAILS FOR EACH 3. NECESSARY TO EXTEND THE EXISTING FUNCTIONS TO THE NEW POINTS. NEW DETECTOR. COMPONENTS SHALL BE CAPABLE OF MERGING WITH THE EXISTING CONFIGURATION 4. INCLUDE FLOOR PLANS TO INDICATE FINAL OUTLET LOCATIONS SHOWING ZONE WITHOUT DEGRADING THE PERFORMANCE OF EITHER SYSTEM. DESIGNATION OF EACH DEVICE. SHOW SIZE AND ROUTE OF CABLE AND CONDUITS. C. SMOKE-DETECTOR SPACING: C. QUALIFICATION DATA: FOR QUALIFIED INSTALLER. 1. COMPLY WITH NFPA 72, "SMOKE-SENSING FIRE DETECTORS" SECTION IN THE "INITIATING DEVICES" CHAPTER, FOR SMOKE-DETECTOR SPACING. 1.6 QUALITY ASSURANCE LIGHTING FIXTURES: LOCATE DETECTORS NOT CLOSER THAN 12 INCHES FROM ANY A. INSTALLER QUALIFICATIONS: PERSONNEL SHALL BE TRAINED AND CERTIFIED BY 2. PART OF A LIGHTING FIXTURE. MANUFACTURER FOR INSTALLATION OF SYSTEM REQUIRED FOR THIS PROJECT. D. ALARM-INDICATING DEVICES: INSTALL AT HEIGHT REQUIRED BY NFPA 72. B. SOURCE LIMITATIONS FOR SYSTEM AND COMPONENTS: OBTAIN E. CONTROL UNITS: SURFACE MOUNTING, WITH TOPS OF CABINETS NOT MORE THAN SYSTEM/COMPONENTS FROM SINGLE SOURCE FROM SINGLE MANUFACTURER. 72 INCHES ABOVE THE FINISHED FLOOR. SYSTEM SHALL BE CAPABLE OF INTERFACING WITH THE BUILDING'S EXISTING FIRE ALARM SYSTEM AS DESCRIBED ON THE DRAWINGS. 3.2 CONNECTIONS ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS A. COORDINATE, MAKE AND TEST CONNECTIONS TO SUPPRESSION SYSTEM'S ACTUATING DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR VALVE/EQUIPMENT AND VERIFY ITS OPERATION AS INTENDED. PROVIDE AND INTENDED LOCATION AND APPLICATION. D. COMPLY WITH NFPA 70. INSTALL ANY/ALL REQUIRED INTERFACE DEVICES. 3.3 IDENTIFICATION PART 2 – PRODUCTS A. IDENTIFY SYSTEM COMPONENTS, WIRING, CABLING, AND TERMINALS. COMPLY WITH REQUIREMENTS FOR IDENTIFICATION SPECIFIED IN DIVISION 26 SECTION 2.1 MANUFACTURERS "IDENTIFICATION FOR ELECTRICAL SYSTEMS." A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE B. INSTALL FRAMED INSTRUCTIONS IN A LOCATION VISIBLE FROM CONTROL UNIT. PRODUCTS BY ONE OF THE FOLLOWING: 1. FARADAY. 3.4 GROUNDING 2. FIRE-LITE ALARMS. A. GROUND CONTROL UNIT AND ASSOCIATED CIRCUITS; COMPLY WITH IEEE 1100. 3. SILENT KNIGHT. INSTALL A GROUND WIRE FROM MAIN SERVICE GROUND TO CONTROL UNIT. 4. OR EQUAL. 3.5 FIELD QUALITY CONTROL 2.2 SYSTEMS OPERATIONAL DESCRIPTION A. FIELD TESTS SHALL BE WITNESSED BY ARCHITECT, OWNER AND AUTHORITIES HAVING A. SEE DRAWINGS FOR MINIMUM SYSTEM FUNCTION/OPERATION REQUIREMENTS. JURISDICTION. B. PERFORM TESTS AND INSPECTIONS. 2.3 CONTROL UNIT MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY-AUTHORIZED SERVICE A. GENERAL REQUIREMENTS FOR CONTROL UNIT: REPRESENTATIVE TO INSPECT COMPONENTS, ASSEMBLIES, AND EQUIPMENT 1. MODULAR, POWER-LIMITED DESIGN WITH ELECTRONIC MODULES, UL 864 LISTED. INSTALLATIONS, INCLUDING CONNECTIONS, AND TO ASSIST IN TESTING. A. INCLUDE A REAL-TIME CLOCK FOR TIME ANNOTATION OF EVENTS. C. TESTS AND INSPECTIONS: B. ALPHANUMERIC DISPLAY AND SYSTEM CONTROLS: DISPLAY ALARM, SUPERVISORY, 1. VISUAL INSPECTION: CONDUCT THE VISUAL INSPECTION PRIOR TO TESTING. AND COMPONENT STATUS MESSAGES AND THE PROGRAMMING AND CONTROL MENU. A. INSPECTION SHALL BE BASED ON COMPLETED RECORD DRAWINGS AND SYSTEM ANNUNCIATOR AND DISPLAY: LIQUID-CRYSTAL TYPE, ONE LINE OF 40 DOCUMENTATION THAT IS REQUIRED BY NFPA 72 IN ITS "COMPLETION DOCUMENTS, CHARACTERS, MINIMUM. PREPARATION" TABLE IN THE "DOCUMENTATION" SECTION OF THE "FUNDAMENTALS C. CIRCUITS: OF FIRE ALARM SYSTEMS" CHAPTER. B. COMPLY WITH "VISUAL INSPECTION FREQUENCIES" TABLE IN THE "INSPECTION" 1. NO FEWER THAN FIVE INITIATING DEVICE CIRCUITS: SECTION OF THE "INSPECTION, TESTING AND MAINTENANCE" CHAPTER IN NFPA 72; A. FOUR CIRCUITS, NFPA 72, CLASS B. RETAIN THE "INITIAL/REACCEPTANCE" COLUMN AND LIST ONLY THE INSTALLED COMPONENTS. 2. NO FEWER THAN TWO NOTIFICATION APPLIANCE CIRCUITS: NFPA 72, CLASS B, STYLE Y. 2. SYSTEM TESTING: COMPLY WITH "TEST METHODS" TABLE IN THE "TESTING" SECTION OF THE "INSPECTION, TESTING, AND MAINTENANCE" CHAPTER IN NFPA 72. D. PRIMARY POWER: 24-V DC OBTAINED FROM 120-V AC SERVICE AND A POWER-SUPPLY MODULE. INITIATING DEVICES, SUPPRESSION SYSTEM ACTUATING 3. TEST AUDIBLE APPLIANCES FOR THE PUBLIC OPERATING MODE ACCORDING TO VALVE, NOTIFICATION APPLIANCES, SIGNALING LINES, TROUBLE SIGNALS AND MANUFACTURER'S WRITTEN INSTRUCTIONS. PERFORM THE TEST USING A PORTABLE SUPERVISORY SHALL BE POWERED BY THE 24-V DC SOURCE. SOUND-LEVEL METER COMPLYING WITH TYPE 2 REQUIREMENTS IN ANSI S1.4. E. SECONDARY POWER: 24-V DC SUPPLY SYSTEM WITH BATTERIES, AUTOMATIC 4. FACTORY-AUTHORIZED SERVICE REPRESENTATIVE SHALL PREPARE THE "FIRE ALARM BATTERY CHARGER, AND AUTOMATIC TRANSFER SWITCH. SYSTEM RECORD OF COMPLETION" IN THE "DOCUMENTATION" SECTION OF THE BATTERIES: SEALED LEAD CALCIUM. 1. "FUNDAMENTALS OF FIRE ALARM SYSTEMS" CHAPTER IN NFPA 72 AND THE "INSPECTION AND TESTING FORM" IN THE "RECORDS" SECTION OF THE F. INSTRUCTIONS: COMPUTER PRINTOUT OR TYPEWRITTEN INSTRUCTION CARD "INSPECTION, TESTING AND MAINTENANCE" CHAPTER IN NFPA 72. MOUNTED BEHIND A PLASTIC OR GLASS COVER IN A STAINLESS-STEEL OR ALUMINUM FRAME. INCLUDE INTERPRETATION AND DESCRIBE APPROPRIATE D. FIRE-ALARM SYSTEM WILL BE CONSIDERED DEFECTIVE IF IT DOES NOT PASS TESTS RESPONSE FOR DISPLAYS AND SIGNALS. BRIEFLY DESCRIBE THE FUNCTIONAL AND INSPECTIONS. OPERATION OF THE SYSTEM UNDER NORMAL, ALARM, AND TROUBLE CONDITIONS. E. PREPARE TEST AND INSPECTION REPORTS. 2.4 ABORT PUSHBUTTON STATIONS 3.6 DEMONSTRATION A. GENERAL REQUIREMENTS: RAISED-LETTER OPERATING INSTRUCTIONS IN A. TRAIN OWNER'S MAINTENANCE PERSONNEL TO ADJUST, OPERATE, AND MAINTAIN CONTRASTING COLOR TO HOUSING/FACEPLATE: SHALL SHOW VISIBLE INDICATION OF SYSTEM. OPERATION; AND SHALL BE MOUNTED ON 2-GANG BOX. IF SURFACE MOUNTED, PROVIDE MANUFACTURER'S SURFACE BACK BOX. END OF SECTION 283112 MOMENTARY MUSHROOM PUSHBUTTON TYPE. 2. INDOOR PROTECTIVE SHIELD: FACTORY-FABRICATED CLEAR PLASTIC ENCLOSURE HINGED AT THE TOP TO PERMIT LIFTING FOR ACCESS TO INITIATE. 2.5 SYSTEM SMOKE DETECTORS A. GENERAL REQUIREMENTS FOR SYSTEM SMOKE DETECTORS: 1. OPERATING AT 24-V DC, NOMINAL. 2. BASE MOUNTING: DETECTOR AND ASSOCIATED ELECTRONIC COMPONENTS SHALL BE MOUNTED IN A TWIST-LOCK MODULE THAT CONNECTS TO A FIXED BASE. PROVIDE TERMINALS IN THE FIXED BASE FOR CONNECTION TO BUILDING WIRING. SELF-RESTORING: DETECTORS DO NOT REQUIRE RESETTING OR READJUSTMENT 3. AFTER ACTUATION TO RESTORE THEM TO NORMAL OPERATION. 4. INTEGRAL VISUAL-INDICATING LIGHT: LED TYPE INDICATING DETECTOR HAS OPERATED AND POWER-ON STATUS. B. PHOTOELECTRIC SMOKE DETECTORS: COMPLY WITH UL 268.

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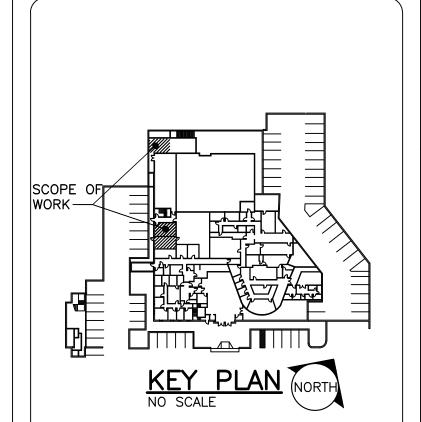
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2. PROVIDE	ERANT PIPES: ROUTI E FLOOR MOUNTED A SHALL BE THE P	UNITS WIT	H WATER	CONNECTIO	ONS WITH	VALVING, WAL	L THERM	OSTATS, LOW	AMBIENT KITS,		

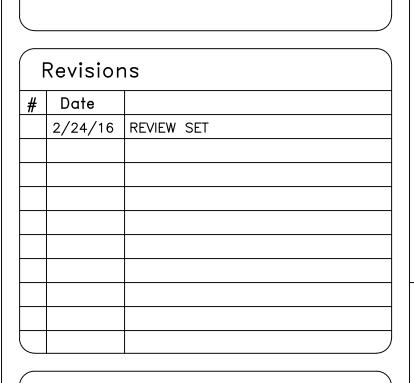
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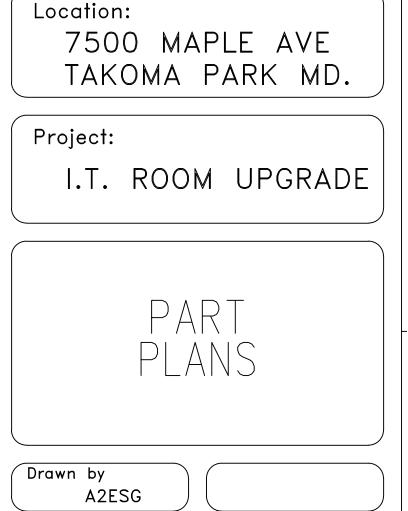
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Client: CITY OF TAKOMA PARK



Project No. 15032.00

2/24/16

Date

SECTION 211313 - WET PIPE SPRINKLER SYSTEMS D. EQUIPMENT AND PIPING DELIVERED TO THE JOB SITE SHALL BE STORED UNDER ROOF OR OTHER APPROVED COVERING, ON PEDESTALS ABOVE THE GROUND. ENCLOSURES SHALL BE WEATHERPROOF. PIPE SHALL BE FITTED WITH END CAPS OR SEALS TO PREVENT MOISTURE PART 1 – GENERAL AND DEBRIS FROM ENTERING PIPE. FOLLOW WRITTEN INSTRUCTIONS AND RECOMMENDATIONS OF THE MANUFACTURER AND REQUIREMENTS OF THE ARCHITECT IN LUBRICATION, .1 RELATED DOCUMENTS PROTECTION, AND MAINTENANCE OF EQUIPMENT DURING STORAGE. A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND . IF MATERIALS OR EQUIPMENT ARE FOUND TO BE IN POOR CONDITION AT THE TIME OF SUPPLEMENTARY CONDITIONS, APPLY TO THE WORK UNDER DIVISIONS 21 THROUGH 28. BEING INSTALLED, THE ARCHITECT MAY, AT HIS DISCRETION, ORDER THE CONTRACTOR TO FURNISH AND INSTALL NEW EQUIPMENT OR MATERIALS AT NO COST TO THE OWNER. B. REFERENCES 1.10 COORDINATION 1. 2015 INTERNATIONAL BUILDING CODE 2. 2015 INTERNATIONAL MECHANICAL CODE A. ARRANGE FOR PIPE SPACES, CHASES, SLOTS, AND OPENINGS IN BUILDING STRUCTURE 3. 2012 INTERNATIONAL EXISTING BUILDING CODE DURING PROGRESS OF CONSTRUCTION, TO ALLOW FOR FIRE PROTECTION INSTALLATIONS. B. COORDINATE INSTALLATION OF REQUIRED SUPPORTING DEVICES AND SET SLEEVES IN 4. 2011 WSSC PLUMBING CODE 5. 2015 INTERNATIONAL ENERGY CONSERVATION CODE OTHER STRUCTURAL COMPONENTS AS THEY ARE CONSTRUCTED. 6. NFPA STANDARDS 1.11 VARIANCES 7. ASHRAE HANDBOOKS AND MANUALS 8. SMACNA MANUALS A. WHERE CONFLICTS EXIST WITHIN THE CONTRACT DOCUMENTS, REQUEST CLARIFICATION 9. COUNTY AMENDMENTS PRIOR TO THE SUBMISSION OF A BID. IF CLARIFICATION IS NOT REQUESTED, PROVIDE THE WORK REPRESENTING THE HIGHER COST AND QUALITY. I.2 SUMMARY 1.12 MATERIALS AND WORKMANSHIP A. THE WORK UNDER THIS SECTION OF THE SPECIFICATION SHALL INCLUDE THE FURNISHING OF LABOR, MATERIALS AND EQUIPMENT FOR THE INSTALLATION OF COMPLETE SYSTEM TO A. ITEMS SHOWN AND NOT SPECIFICALLY CALLED FOR, OR ITEMS SPECIFIED AND NOT PROVIDE CONTINUOUS AND SATISFACTORY SERVICE. SPECIFICALLY INDICATED OR DETAILED ON THE DRAWINGS, OR ITEMS NEITHER SPECIFIED NOR SHOWN, BUT WHICH ARE REASONABLY INCIDENTAL TO AND COMMONLY REQUIRED. 1.3 SYSTEM DESCRIPTIONS B. FURNISH THE SERVICES OF AN EXPERIENCED FULL TIME FIELD SUPERINTENDENT WHO A. WET-PIPE SPRINKLER SYSTEM: AUTOMATIC SPRINKLERS ARE ATTACHED TO PIPING SHALL BE CONSTANTLY IN CHARGE OF THE INSTALLATION OF WORK PROVIDED UNDER THIS CONTAINING WATER AND THAT IS CONNECTED TO WATER SUPPLY THROUGH ALARM VALVE. DIVISION. SUPERINTENDENT SHALL HAVE DEMONSTRATED EXPERIENCE WITH PROJECTS OF WATER DISCHARGES IMMEDIATELY FROM SPRINKLERS WHEN THEY ARE OPENED COMPARABLE SIZE AND COMPLEXITY AND SHALL BE APPROVED BY THE ARCHITECT. SPRINKLERS OPEN WHEN HEAT MELTS FUSIBLE LINK OR DESTROYS FRANGIBLE DEVICE. C. THE QUALITY OF WORKMANSHIP REQUIRED IN THE EXECUTION OF THE WORK SHALL BE THE FINEST AND HIGHEST OBTAINABLE, WORKING WITH THE MATERIALS SPECIFIED. .4 PERFORMANCE REQUIREMENTS WORKMANSHIP SHALL BE SATISFACTORY TO THE ARCHITECT AND HIS DECISION AS TO ACCEPTABLE QUALITY IS FINAL. A. STANDARD-PRESSURE PIPING SYSTEM COMPONENT: LISTED FOR 175-PSIG MINIMUM WORKING PRESSURE. 1.13 DRAWINGS 1.5 SUBMITTALS A. THE CONTRACT DRAWINGS ARE GENERALLY INDICATIVE OF THE WORK TO BE INSTALLED, BUT THEY DO NOT SHOW ALL OFFSETS, FITTINGS AND SIMILAR DETAILS REQUIRED, WHICH A. SUBMITTAL REVIEW BY THE ENGINEER IS INTENDED TO ASSIST CONTRACTOR IN HIS ABILITY SHALL BE PROVIDED TO MEET THE JOB CONDITIONS. IN AREAS WHERE WORK IS TO COMPLY WITH THE CONTRACT DOCUMENTS. REVIEW OF SUBMITTAL IS ONLY FOR INSTALLED IN CLOSE PROXIMITY TO WORK OF OTHER TRADES OR WITHIN TRADES COVERED GENERAL CONFORMANCE WITH THE DESIGN CONCEPT AS GIVEN IN CONTRACT DOCUMENTS. BY THIS DIVISION OF THE SPECIFICATIONS, PREPARE LARGER SCALE DRAWINGS CONSISTING WHERE CONTRACTOR SUBMITTALS DO NOT CLEARLY INDICATE THE INTENDED MATERIALS OF PLANS AND SECTIONS TO SHOW HOW WORK IS TO BE INSTALLED IN RELATION TO FOR USE, THEY MAY BE RETURNED WITHOUT REVIEW OR BE REJECTED. WHERE WORK OF OTHER TRADES. DIFFERENCES BETWEEN CONTRACT DOCUMENTS AND SUBMITTALS ARE NOT NOTED, CONTRACTOR SHALL COMPLY WITH REQUIREMENTS OF CONTRACT DOCUMENTS. B. BEFORE FABRICATING AND INSTALLING THE WORK, THE CONTRACTOR SHALL CALL THE CONTRACTOR ACCEPTS ALL RESPONSIBILITY FOR QUANTITIES, DIMENSIONS, DETAILS, CONDITION TO THE ATTENTION OF THE ARCHITECT FOR DIRECTION OF ANY MATERIALS COORDINATION OF TRADES AND JOB SAFETY. AND/OR EQUIPMENT INACCESSIBLE OR IMPRACTICAL. WHEN REQUESTED BY THE ARCHITECT B. DEFINITION: A DETAILED DRAWING OF THE PROPOSED DEPARTURE DUE TO FIELD CONDITIONS, OR THEIR CAUSES, SHALL BE SUBMITTED BY THE CONTRACTOR FOR APPROVAL. THE 1. ACTION SUBMITTALS: SUBMIT TO ENGINEER FOR REVIEW. ARCHITECT SHALL MAKE FINAL WRITTEN DECISIONS AS TO THE CONDITIONS, WHICH 2. INFORMATIONAL SUBMITTALS: PROVIDE SUBMITTALS IN OPERATIONAL AND MAINTENANCE REQUIRE THE CHANGING OF WORK. MANUALS. C. CONTRACTOR SHALL COORDINATE WITH THE OTHER TRADES PRIOR TO FABRICATION AND C. PROCESSING TIME: ALLOW TIME FOR SUBMITTAL REVIEW, INCLUDING TIME FOR INSTALLATION. COORDINATION WITH TRADES PRIOR TO INSTALLATION, FABRICATION AND RESUBMITTALS, AS FOLLOWS. TIME FOR REVIEW SHALL COMMENCE ON ENGINEER'S ORDERING. RECEIPT OF SUBMITTAL. 1. INITIAL REVIEW: ALLOW 20 WORKING (BUSINESS) DAYS FOR INITIAL REVIEW OF EACH 1.14 RECORD DRAWING SUBMITTAL. ALLOW ADDITIONAL TIME IF COORDINATION WITH SUBSEQUENT SUBMITTALS IS REQUIRED. ENGINEER WILL ADVISE ARCHITECT WHEN A SUBMITTAL BEING A. SEE DIVISION 1, FOR GENERAL REQUIREMENTS. PROCESSED MUST BE DELAYED FOR COORDINATION. B. CAREFULLY RECORD THE ACTUAL LOCATIONS OF EACH PIECE OF EQUIPMENT, CONTROL 2. RESUBMITTAL REVIEW: ALLOW 15 WORKING (BUSINESS) DAYS FOR EACH DEVICES, PIPE, VALVES, DUCTS, ETC. AND WORK WHEN DIFFERENT FROM THE CONTACT RESUBMITTAL. DRAWINGS. 3. ENGINEER WILL REVIEW AN INITIAL SUBMITTAL AND ONE (1) RESUBMITTAL. ANY 1.15 INFORMATION AVAILABLE TO BIDDERS ADDITIONAL REVIEWS SHALL BE BILLED TO THE GENERAL CONTRACTOR ON AN HOURLY BASIS AT THE ENGINEERS CURRENT BILLING RATES AND WILL NOT BE RETURNED TO A. THIS ARTICLE AND THE FOLLOWING FLOW TEST DATA AND WATER SUPPLY CALCULATIONS THE GENERAL CONTRACTOR UNTIL PAYMENT HAS BEEN RECEIVED. THIS SHALL NOT BE ARE MADE AVAILABLE FOR THE BIDDER'S CONVENIENCE AND ARE NOT PART OF THE CAUSE FOR ANY DELAY CLAIMS OR ADDITIONAL COMPENSATION CLAIMS BY THE CONTRACT DOCUMENTS AND DO NOT RELIEVE THE BIDDERS FROM PERFORMING THEIR OWN INVESTIGATION TO DETERMINE THE ACCURACY OF THE INFORMATION. GENERAL CONTRACTOR TO THE OWNER. 1. FLOW TEST DATA-NOT AVAILABLE 1.6 ACTION SUBMITTALS A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED INCLUDE RATED CAPACITIES, 1.16 QUALITY ASSURANCE OPERATING CHARACTERISTICS, ELECTRICAL CHARACTERISTICS, AND FURNISHED SPECIALTIES A. INSTALLER QUALIFICATIONS: AND ACCESSORIES. 1. INSTALLER'S RESPONSIBILITIES INCLUDE DESIGNING, FABRICATING, AND INSTALLING B. SHOP DRAWINGS: FOR WET-PIPE SPRINKLER SYSTEMS. INCLUDE PLANS, ELEVATIONS, SECTIONS, DETAILS, AND ATTACHMENTS TO OTHER WORK. SPRINKLER SYSTEMS. 1. WIRING DIAGRAMS: FOR POWER, SIGNAL, AND CONTROL WIRING. B. WELDING QUALIFICATIONS: QUALIFY PROCEDURES AND OPERATORS ACCORDING TO ASME BOILER AND PRESSURE VESSEL CODE. 2. A SPRINKLER SYSTEM PIPING DIAGRAM SHALL BE SUBMITTED TO THE ARCHITECT FOR REVIEW BEFORE AND AFTER GOVERNMENTAL AND REGULATORY AGENCY APPROVALS HAVE BEEN OBTAINED. APPROVAL AGENCIES SHALL INCLUDE THE LOCAL FIRE 1.17 PROJECT CONDITIONS DEPARTMENT AND THE STATE FIRE MARSHAL'S OFFICE. NO INSTALLATION OF THE A. INTERRUPTION OF EXISTING SPRINKLER SERVICE: DO NOT INTERRUPT SPRINKLER SERVICE SYSTEM SHALL BE MADE UNTIL APPROVAL IS OBTAINED. SYSTEM SHOWN ON THE TO FACILITIES OCCUPIED BY OWNER OR OTHERS UNLESS PERMITTED UNDER THE CONTRACT DRAWINGS IS SCHEMATIC AND IS INTENDED FOR USE AS A GUIDE. FOLLOWING CONDITIONS AND THEN ONLY AFTER ARRANGING TO PROVIDE TEMPORARY 3. SYSTEM MAY BE HYDRAULICALLY DESIGNED. COMPUTER READOUT SHEETS SHALL BE SPRINKLER SERVICE ACCORDING TO REQUIREMENTS INDICATED: SUBMITTED AS REQUIRED FOR APPROVAL AND PERMIT PURPOSES. 1. NOTIFY ARCHITECT AND OWNER NO FEWER THAN SEVEN DAYS IN ADVANCE OF PROPOSED INTERRUPTION OF SPRINKLER SERVICE. 1.7 INFORMATIONAL SUBMITTAL 2. DO NOT PROCEED WITH INTERRUPTION OF SPRINKLER SERVICE WITHOUT ARCHITECT'S A. PROVIDE INFORMATIONAL SUBMITTALS IN OPERATION AND MAINTENANCE MANUALS IN WRITTEN PERMISSION. ADDITION TO ACTION SUBMITTALS AND SECTION 017823 "OPERATION AND MAINTENANCE DATA" 1.18 FIRESTOPPING B. OPERATION AND MAINTENANCE DATA: FOR SPRINKLER SPECIALTIES TO INCLUDE IN A. SYSTEM DESCRIPTION EMERGENCY, OPERATION, AND MAINTENANCE MANUALS. 1. FIRESTOPPING SHALL CONSIST OF FURNISHING AND INSTALLING A MATERIAL OR I.8 GENERAL WALLS, BARRIERS, PARTITIONS, FLOORS, FLOOR/CEILING/ROOF ASSEMBLIES, INCLUDING A. REGULATORY REQUIREMENTS 1. WORK SHALL CONFORM TO THE REQUIREMENTS OF THE CODES, LAWS AND ORDINANCES OF MONTGOMERY COUNTY, MARYLAND, NATIONAL FIRE PROTECTION ASSOCIATION, AMERICAN SOCIETY OF MECHANICAL ENGINEERS AND OTHER AUTHORITIES CONTRACTION, WIND, OR SEISMIC MOVEMENT; FIRESTOPPING MATERIALS SHALL NOT HAVING JURISDICTION. INTERFERE WITH REQUIRED MOVEMENT OF JOINTS. 2. COMPLY WITH APPLICABLE CODES, LAWS, STANDARD PRACTICES. B. STORAGE AND DELIVERY 3. COMPLY WITH THE STANDARDS OF GOOD PRACTICE AS OUTLINED IN THE ASHRAE 1. MATERIALS SHALL BE DELIVERED IN THE ORIGINAL UN-OPENED PACKAGES OR GUIDE. THE SHEET METAL AND AIR CONDITIONING CONTRACTOR'S ASSOCIATION'S "DUCT CONTAINERS SHOWING NAMES OF THE MANUFACTURER AND THE BRAND NAME OF THE MANUAL", AND THE APPRENTICE TRAINING MANUAL OF THE STEAM FITTERS UNION. PRODUCT. MATERIALS SHALL BE STORED OFF THE GROUND AND SHALL BE PROTECTED B. REGULATORY REQUIREMENTS OF THE FIRE PROTECTION SYSTEM SHALL BE IN COMPLIANCE FROM DAMAGE AND EXPOSURE TO ELEMENTS. DAMAGED OR DETERIORATED MATERIALS WITH THE RULES AND REGULATIONS OF THE FIRE DEPARTMENT AND THE STATE FIRE SHALL BE REMOVED FROM THE SITE. MARSHAL AND IN ACCORDANCE WITH THE FOLLOWING: C. FIRESTOPPING MATERIALS 1. FIRESTOPPING MATERIALS SHALL CONSIST OF COMMERCIALLY MANUFACTURED PRODUCTS 1. BUILDING CODE COMPLYING WITH THE FOLLOWING MINIMUM REQUIREMENTS: 2. NFPA 101 - LIFE SAFETY CODE 3. NFPA STANDARDS 4. NFPA 13 HUMANS AT ALL STAGES OF THE APPLICATION AND PERFORMANCE OF THE C. FIRE ALARM SYSTEM AND ASSOCIATED WIRING ARE SPECIFIED UNDER DIVISION 28. MATERIALS. COORDINATE CHANGES TO THE FIRE ALARM SYSTEM DUE TO CHANGES IN THE SPRINKLER b. FIRE RESISTANCE RATING: FIRESTOPPING WILL NOT BE REQUIRED TO HAVE A SYSTEM LAYOUT FROM THAT SHOWN ON THE CONTRACT DOCUMENTS. GREATER FIRE RESISTANCE RATING THAN THAT OF THE ASSEMBLY IN WHICH IT IS D. GIVE NECESSARY NOTICES AND OBTAIN REQUIRED PERMITS. PAY FEES AND OTHER COSTS, INCLUDING UTILITY CONNECTIONS OR EXTENSIONS IN CONNECTION WITH THE WORK. GAPS SUCH AS THE CONSTRUCTION IN WHICH THEY OCCUR. FILE NECESSARY PLANS, PREPARE DOCUMENTS AND OBTAIN NECESSARY APPROVALS OF GOVERNMENTAL AGENCIES HAVING JURISDICTION. OBTAIN REQUIRED CERTIFICATES OF 1.19 WARRANTY INSPECTION AND DELIVER SAME TO THE ARCHITECT BEFORE REQUEST FOR ACCEPTANCE AND FINAL PAYMENT FOR THE WORK. A. SEE DIVISION 1 AND GENERAL CONDITIONS FOR GENERAL REQUIREMENTS B. PROVIDE SERVICE OF THE EQUIPMENT MANUFACTURER OR HIS AUTHORIZED 1.9 DELIVERY, STORAGE, AND HANDLING REPRESENTATIVE, IF REQUIRED TO ACHIEVE SPECIFIED PERFORMANCE OF EQUIPMENT A. DELIVER PIPES AND TUBES WITH FACTORY-APPLIED END CAPS. MAINTAIN END CAPS PROVIDED. THROUGH SHIPPING, STORAGE, AND HANDLING TO PREVENT PIPE END DAMAGE AND TO C. REPAIRS AND REPLACEMENTS: IF THE OWNER FINDS WORK THAT IS DEFECTIVE, INFERIOR PREVENT ENTRANCE OF DIRT, DEBRIS, AND MOISTURE. OR NOT IN COMPLIANCE WITH THE CONTRACT DURING THE GUARANTEE PERIOD THE B. SUPPORT TO PREVENT SAGGING AND BENDING OWNER WILL INFORM THE CONTRACTOR IN WRITING. THE CONTRACTOR SHALL PROMPTLY PERFORM THE FOLLOWING AT NO ADDITIONAL COST TO THE OWNER: C. PROPER AND SUITABLE TOOLS, EQUIPMENT AND APPLIANCES FOR THE SAFE AND 1. REPLACE ALL DEFECTIVE WORK IN A SATISFACTORY MANNER. CONVENIENT HANDLING AND PLACING OF MATERIALS AND EQUIPMENT SHALL BE USED.

DURING LOADING, UNLOADING, AND PLACING, CARE SHALL BE TAKEN IN HANDLING THE EQUIPMENT AND MATERIALS SO THAT NO EQUIPMENT OR MATERIALS, INCLUDING OWNER

FURNISHED, ARE DAMAGED.

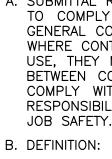
- COMBINATION OF MATERIALS TO FORM AN EFFECTIVE BARRIER AGAINST THE SPREAD OF 3.7 FIELD QUALITY CONTROL FLAME, SMOKE, AND GASES, AND MAINTAIN THE INTEGRITY OF FIRE RESISTANCE RATE THROUGH PENETRATIONS AND CONSTRUCTION JOINTS. THROUGH-PENETRATIONS INCLUDE THE ANNULAR SPACES AROUND PIPES, TUBES, CONDUITS, WIRES, CABLES, AND VENTS. CONSTRUCTION JOINTS INCLUDE THOSE USED TO ACCOMMODATE EXPANSION.
- a. FIRE HAZARD CLASSIFICATION: MATERIAL SHALL HAVE A FLAME SPREAD OF 25 OR LESS, AND A SMOKE DEVELOPED RATING OR 50 OR LESS, WHEN TESTED IN ACCORDANCE WITH ASTM E 84 OR UL 723. MATERIALS SHALL BE NON-TOXIC TO
- BEING INSTALLED WITHIN. FIRE RESISTANCE RATINGS OF CONSTRUCTION JOINTS, AND

- 2. CORRECT ALL DAMAGE TO THE BUILDING OR CONTENTS WHICH OCCURRED DUE TO THE EFFECTIVE WORK.
- D. THE OWNER MAY CHOOSE TO HAVE DEFECTIVE WORK CORRECTED AT THE EXPENSE OF THE CONTRACTOR IF THE CONTRACTOR FAILS TO PROCEED PROMPTLY TO REPAIR DEFECTIVE WORK IN AN ACCORDANCE WITH THIS GUARANTEE.
- PART 2 PRODUCTS
- 2.1 PIPING
- A. PIPING SHALL BE AS PER NFPA 13.
- 2.2 VALVES
- A. VALVES ON FIRE PROTECTION SYSTEM SHALL BE FACTORY MUTUAL STAMPED.
- 2.3 SPRINKLERS
- A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
- 1. VIKING CORPORATION
- 2. RELIABLE AUTOMATIC SPRINKLER CO., INC.
- 3. TYCO FIRE & BUILDING PRODUCTS LP. 4. VICTAULIC COMPANY.
- 5. VIKING CORPORATION
- B. CEILING SPRINKLER HEADS (QUICK RESPONSE) SHALL BE CHROME PLATED PENDANT HEADS FOR INSTALLATION ON A SUSPENDED CEILING SYSTEM. CEILING HEADS SHALL HAVE FULL 360 DEGREE SPRAY PATTERN PROVIDED WITH FUSIBLE LINKS. PROVIDE SPRINKLER HEAD GUARDS AS REQUIRED BY NFPA. SPRINKLER HEAD GUARDS SHALL NOT INTERFERE WITH SPRINKLER HEAD PERFORMANCE.
- 3.1 EXISTING CONDITIONS

PART 3 - EXECUTION

- A. VISIT THE SITE AND BECOME FAMILIAR WITH EXISTING CONDITIONS. MODIFICATIONS TO WORK REQUIRED TO ALLOW FOR EXISTING CONDITIONS SHALL BE PROVIDED. SUBMIT PROPOSED MODIFICATIONS TO THE ARCHITECT FOR APPROVAL PRIOR TO INSTALLATION.
- RELOCATE EXISTING HANGERS AND SUPPORTS WHERE NECESSARY TO INSTALL NEW WORK. MAXIMUM SPACING REQUIREMENTS SHALL APPLY FOR RELOCATED SUPPORTS. C. COORDINATE INTERRUPTIONS IN SERVICE OF EXISTING SYSTEMS WITH THE OWNER.
- PROVIDE TEMPORARY CONNECTIONS TO MAINTAIN OPERATION OF EXISTING SYSTEMS. D. SPRINKLER PIPING OR HEADS SHALL NOT BE LOCATED ABOVE IT RACKS. RACK LOCATIONS SHALL BE COORDINATED WITH ARCHITECT OR OWNER PRIOR TO INSTALLATION.
- 3.2 GENERAL
- A. MODIFY EXISTING SPRINKLER SYSTEM TO ACCOMMODATE NEW ARCHITECTURAL LAYOUT. COORDINATE LAYOUT AND INSTALLATION OF SPRINKLERS WITH OTHER CONSTRUCTION THAT PENETRATES CEILINGS, INCLUDING BUT NOT LIMITED TO: LIGHT FIXTURES, HVAC EQUIPMENT, EXISTING PIPING AND PARTITION ASSEMBLIES.
- B. SPRINKLER SHALL BE AN AUTOMATIC WET PIPE SYSTEM COMPLETE WITH PIPING, SPRINKLER HEADS, VALVES, ACCESSORIES, HANGERS, GUARDS, ETC. SYSTEM SHALL BE GENERALLY CLASSIFIED LIGHT HAZARD.
- C. PIPING LOCATIONS SHALL BE COORDINATED AND FIELD MEASURED TO ENSURE PROPER D. EXAMINE ROUGHING-IN FOR FIRE-SUPPRESSION PIPING SYSTEMS TO VERIFY ACTUAL
- LOCATIONS OF PIPING CONNECTIONS BEFORE FIRE-PUMP INSTALLATION. E. PROCEED WITH INSTALLATION ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN
- CORRECTED. 3.3 PIPING INSTALLATION
- A. PIPING STANDARD: COMPLY WITH REQUIREMENTS FOR INSTALLATION OF SPRINKLER PIPING IN NFPA 13.
- B. USE LISTED FITTINGS TO MAKE CHANGES IN DIRECTION, BRANCH TAKEOFFS FROM MAINS, AND REDUCTIONS IN PIPE SIZES. C. INSTALL HANGERS AND SUPPORTS FOR SPRINKLER SYSTEM PIPING ACCORDING TO
- NFPA 13. COMPLY WITH REQUIREMENTS FOR HANGER MATERIALS IN NFPA 13. 3.4 VALVE AND SPECIALTIES INSTALLATION
- A. INSTALL LISTED FIRE-PROTECTION VALVES, TRIM AND DRAIN VALVES, SPECIALTY VALVES AND TRIM, CONTROLS, AND SPECIALTIES ACCORDING TO NFPA 13 AND AUTHORITIES HAVING JURISDICTION.
- 3.5 SPRINKLER INSTALLATION
- A. INSTALL SPRINKLERS IN SUSPENDED CEILINGS IN CENTER OF ACOUSTICAL CEILING PANELS.
- B. DO NOT INSTALL WET-TYPE SPRINKLERS IN AREAS SUBJECT TO FREEZING.
- C. INSTALL SPRINKLERS INTO BRACKET ON CEILING GRID
- 3.6 IDENTIFICATION
- A. INSTALL LABELING AND PIPE MARKERS ON EQUIPMENT AND PIPING ACCORDING TO REQUIREMENTS IN NFPA 13.
- B. IDENTIFY SYSTEM COMPONENTS, WIRING, CABLING, AND TERMINALS. COMPLY WITH REQUIREMENTS FOR IDENTIFICATION IN DIVISION 26 SECTION "IDENTIFICATION FOR ELECTRICAL SYSTEMS."
- A. PERFORM TESTS AND INSPECTIONS.
- B. TESTS AND INSPECTIONS:
- 1. LEAK TEST: AFTER INSTALLATION, CHARGE SYSTEMS AND TEST FOR LEAKS. REPAIR LEAKS AND RETEST UNTIL NO LEAKS EXIST
- 2. TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT 3. FLUSH, TEST, AND INSPECT SPRINKLER SYSTEMS ACCORDING TO NFPA 13, "SYSTEMS
- ACCEPTANCE" CHAPTER. C. SPRINKLER PIPING SYSTEM WILL BE CONSIDERED DEFECTIVE IF IT DOES NOT PASS TESTS
- AND INSPECTIONS. D. PREPARE TEST AND INSPECTION REPORTS.
- 3.8 CLEANING
- A. CLEAN DIRT AND DEBRIS FROM SPRINKLERS.
- B. REMOVE AND REPLACE SPRINKLERS WITH PAINT OTHER THAN FACTORY FINISH.
- 3.9 SPRINKLER SCHEDULE
- A. USE SPRINKLER TYPES IN SUBPARAGRAPHS BELOW FOR THE FOLLOWING APPLICATIONS:
- 1. ROOMS WITH SUSPENDED CEILINGS: PENDENT SPRINKLERS. B. PROVIDE SPRINKLER TYPES IN SUBPARAGRAPHS BELOW WITH FINISHES INDICATED.
- 1. PENDENT SPRINKLERS: CHROME PLATED IN FINISHED SPACES EXPOSED TO VIEW; WAX COATED WHERE EXPOSED TO ACIDS, CHEMICALS, OR OTHER CORROSIVE FUMES.
- 3.10 STARTUP SERVICE
- A. ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO PERFORM STARTUP SERVICE.
- 1. COMPLETE INSTALLATION AND STARTUP CHECKS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.
- END OF SECTION 211313

RELEASE. PRESSURE. 1.4 SUBMITTALS



2. INFORMATIONAL SUBMITTALS: PROVIDE SUBMITTALS IN OPERATIONAL AND MAINTENANCE MANUALS. C. PROCESSING TIME: ALLOW TIME FOR SUBMITTAL REVIEW, INCLUDING TIME FOR RESUBMITTALS, AS FOLLOWS. TIME FOR REVIEW SHALL COMMENCE ON ENGINEER'S RECEIPT OF SUBMITTAL.

- 1.5 ACTION SUBMITTALS A. COORDINATION DRAWINGS:

SECTION 212200 - CLEAN AGENT FIRE EXTINGUISHING SYSTEM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS, APPLY TO THE WORK UNDER DIVISIONS 21 THROUGH 28. B. REFERENCES

1. 2015 INTERNATIONAL BUILDING CODE 2. 2015 INTERNATIONAL MECHANICAL CODE 3. 2012 INTERNATIONAL EXISTING BUILDING CODE 4. 2011 WSSC PLUMBING CODE 5. 2015 INTERNATIONAL ENERGY CONSERVATION CODE

6. NFPA STANDARDS 7. ASHRAE HANDBOOKS AND MANUALS

8. SMACNA MANUALS

UNITS

1.2 SUMMARY

9. COUNTY AMENDMENTS

10. THE STANDARDS LISTED, AS WELL AS ALL OTHER APPLICABLE CODES, STANDARDS, AND GOOD ENGINEERING PRACTICES, SHALL BE USED AS "MINIMUM" DESIGN STANDARDS. a. NFPA 2001 - STANDARD FOR CLEAN AGENT FIRE EXTINGUISHING SYSTEMS b. NFPA 70 - NATIONAL ELECTRICAL CODE

c. NFPA 72 - NATIONAL FIRE ALARM CODE

d. UL 2166 - STANDARD FOR HALOCARBON CLEAN AGENT EXTINGUISHING SYSTEM e. FACTORY MUTUAL APPROVAL GUIDE

f. REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION (AHJ)

A. THE WORK UNDER THIS SECTION OF THE SPECIFICATION SHALL INCLUDE THE REQUIREMENTS FOR THE DESIGN AND INSTALLATION OF AN ENGINEERED TOTAL FLOODING FIRE SUPPRESSION SYSTEM (FM-200) WITH AUTOMATIC DETECTION AND CONTROL. THE WORK DESCRIBED IN THE SPECIFICATION INCLUDES ENGINEERING, LABOR, MATERIALS, EQUIPMENT, SERVICES REQUIRED TO INSTALL AND TEST THE SUPPRESSION SYSTEM FOR A COMPLETE SYSTEM TO PROVIDE CONTINUOUS AND SATISFACTORY SERVICE.

1.3 SYSTEM DESCRIPTIONS

1. THE SYSTEM SHALL BE A TOTAL FLOODING SUPPRESSION SYSTEM SUPPLIED BY A SYSTEM HARDWARE MANUFACTURER APPROVED BY DUPONT.

2. THE SYSTEM SHALL PROVIDE AN FM-200 AGENT MINIMUM DESIGN CONCENTRATION OF 7.0% BY VOLUME FOR CLASS A HAZARDS AND 8.7% BY VOLUME FOR CLASS B HAZARDS, IN ALL AREAS AND/OR PROTECTED SPACES, AT THE MINIMUM ANTICIPATED TEMPERATURE WITHIN THE PROTECTED AREA. SYSTEM DESIGNS SHALL NOT EXCEED 10.5% FOR NORMALLY OCCUPIED SPACES, ADJUSTED FOR MAXIMUM SPACE TEMPERATURE ANTICIPATED, WITH PROVISIONS FOR ROOM EVACUATION PRIOR TO AGENT

3. THE SYSTEM DISCHARGE TIME SHALL NOT EXCEED 10 SECONDS IN ACCORDANCE WITH THE NFPA 2001 STANDARD FOR CLEAN AGENT FIRE EXTINGUISHING SYSTEMS. 4. THE SUPPRESSION SYSTEM SHALL INCLUDE A DETECTION AND CONTROL SYSTEM WITH PROVISION FOR BOTH PRE-ALARM AND AUTOMATIC AGENT RELEASE.

5. THE SYSTEM SHALL BE ACTUATED BY PHOTOELECTRIC DETECTORS. THE DETECTION SYSTEM SHALL EMPLOY CROSS-ZONED DETECTION, AS SPECIFIED BY THE HARDWARE MANUFACTURER AND THE APPROPRIATE AUTHORITY HAVING JURISDICTION. IN THE CASE OF CROSS-ZONE DETECTION, A SINGLE DETECTOR ACTIVATION SHALL CAUSE AN ALARM SIGNAL TO BE GENERATED; A SECOND DETECTOR ACTIVATION SHALL GENERATE A PRE-DISCHARGE SIGNAL AND START THE PRE-DISCHARGE CONDITION.

6. FM-200 SHALL BE STORED IN MODULAR OR CENTRAL STORAGE STEEL ALLOY CONTAINERS COMPLIANT WITH DOT SPECIFICATION 4BA OR 4BW. THE STORAGE CONTAINERS SHALL BE EQUIPPED WITH SAFETY RUPTURE DISKS AND EACH CONTAINER SHALL HAVE A PRESSURE GAUGE TO PROVIDE VISUAL SUPERVISION OF THE CONTAINER

A. SUBMITTAL REVIEW BY THE ENGINEER IS INTENDED TO ASSIST CONTRACTOR IN HIS ABILITY TO COMPLY WITH THE CONTRACT DOCUMENTS. REVIEW OF SUBMITTAL IS ONLY FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPT AS GIVEN IN CONTRACT DOCUMENTS WHERE CONTRACTOR SUBMITTALS DO NOT CLEARLY INDICATE THE INTENDED MATERIALS FOR USE, THEY MAY BE RETURNED WITHOUT REVIEW OR BE REJECTED. WHERE DIFFERENCES BETWEEN CONTRACT DOCUMENTS AND SUBMITTALS ARE NOT NOTED, CONTRACTOR SHALL COMPLY WITH REQUIREMENTS OF CONTRACT DOCUMENTS. CONTRACTOR ACCEPTS ALL RESPONSIBILITY FOR QUANTITIES, DIMENSIONS, DETAILS, COORDINATION OF TRADES AND

1. ACTION SUBMITTALS: SUBMIT TO ENGINEER FOR REVIEW.

1. INITIAL REVIEW: ALLOW 20 WORKING (BUSINESS) DAYS FOR INITIAL REVIEW OF EACH SUBMITTAL. ALLOW ADDITIONAL TIME IF COORDINATION WITH SUBSEQUENT SUBMITTALS IS REQUIRED. ENGINEER WILL ADVISE ARCHITECT WHEN A SUBMITTAL BEING PROCESSED MUST BE DELAYED FOR COORDINATION.

2. RESUBMITTAL REVIEW: ALLOW 15 WORKING (BUSINESS) DAYS FOR EACH RESUBMITTAL. 3. ENGINEER WILL REVIEW AN INITIAL SUBMITTAL AND ONE (1) RESUBMITTAL. ANY ADDITIONAL REVIEWS SHALL BE BILLED TO THE GENERAL CONTRACTOR ON AN HOURLY BASIS AT THE ENGINEERS CURRENT BILLING RATES AND WILL NOT BE RETURNED TO THE GENERAL CONTRACTOR UNTIL PAYMENT HAS BEEN RECEIVED. THIS SHALL NOT BE CAUSE FOR ANY DELAY CLAIMS OR ADDITIONAL COMPENSATION CLAIMS BY THE GENERAL CONTRACTOR TO THE OWNER.

1. SPRINKLER SYSTEMS, DRAWN TO SCALE, SHALL INCLUDE

a. PLANS, ELEVATIONS, SECTIONS AND DETAILS SUCH AS BUT NOT LIMITED TO: 1) METHOD OF ATTACHING HANGERS TO BUILDING STRUCTURE.

2) CONTROLS AND ALARMS.

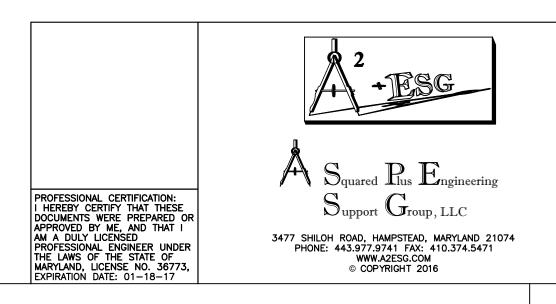
3) EXTINGUISHING-AGENT CONTAINERS, PIPING, CONTROL PANEL, MANUAL PULL STATIONS, ABORT STATIONS, DISCHARGE NOZZLES, DETECTORS, AUDIBLE/VISUAL ALARMS AND ACCESSORIES.

4) EQUIPMENT AND FURNISHINGS.

5) COORDINATED WITH EACH OTHER, USING INPUT FROM INSTALLERS OF THE ITEMS INVOLVED: a) PIPING.

b) ITEMS PENETRATING CEILING SUCH AS BUT NOT LIMITED TO: LIGHTING

FIXTURES, WET TYPE SPRINKLER HEADS, ETC. b. INDICATE COMPLIANCE WITH PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INCLUDING ANALYSIS DATA.



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		 INCLUDE DESIGN CALCULATIONS FOR WEIGHT, VOLUME, AND CONCENTRATION OF EXTINGUISHING AGENT REQUIRED FOR EACH HAZARD AREA. HYDRAULIC FLOW CALCULATIONS, FROM A UL LISTED COMPUTER PROGRAM, SHALL BE PROVIDED FOR ALL ENGINEERED FM-200 SUPPRESSION SYSTEMS. CALCULATION SHEET(S) MUST INCLUDE THE MANUFACTURERS NAME AND UL LISTING NUMBER FOR VERIFICATION. THE FLOW CALCULATIONS SHALL DETAIL PRESSURE CHANGES, FLOW RATES, PIPE SIZES AND LENGTHS, AND NOZZLE SIZES. THE AGENT DISCHARGE TIME MUST BE SHOWN AND DETAILED BY ZONE. DETAIL EQUIPMENT ASSEMBLIES AND INDICATE DIMENSIONS, WEIGHTS, LOADS, REQUIRED CLEARANCES, METHOD OF FIELD ASSEMBLY, COMPONENTS, AND LOCATION AND SIZE OF EACH FIELD CONNECTION. 	 B. BEFORE FABRICATING AND INSTALLING THE WO CONDITION TO THE ATTENTION OF THE ARCHIT AND/OR EQUIPMENT INACCESSIBLE OR IMPRAG A DETAILED DRAWING OF THE PROPOSED DEP CAUSES, SHALL BE SUBMITTED BY THE CONTI MAKE FINAL WRITTEN DECISIONS AS TO THE O OF WORK. C. CONTRACTOR SHALL COORDINATE WITH THE O INSTALLATION. COORDINATION WITH TRADES F ORDERING.
		 WIRING DIAGRAMS: FOR POWER, SIGNAL, AND CONTROL WIRING. A COMPLETE SEQUENCE OF OPERATION SHALL BE SUBMITTED DETAILING ALL ALARM DEVICES, SHUTDOWN FUNCTIONS, REMOTE SIGNALING, DAMPER OPERATION, TIME DELAY AND AGENT DISCHARGE FOR EACH ZONE OR SYSTEM. 	1.14 RECORD DRAWING A. SEE DIVISION 1, FOR GENERAL REQUIREMENTS B. CAREFULLY RECORD THE ACTUAL LOCATIONS (
	B.	ITEM PIPING DIAGRAM SHALL BE SUBMITTED TO THE ARCHITECT FOR REVIEW BEFORE AND AFTER GOVERNMENTAL AND REGULATORY AGENCY APPROVALS HAVE BEEN OBTAINED. APPROVAL AGENCIES SHALL INCLUDE THE LOCAL FIRE DEPARTMENT AND THE STATE FIRE MARSHAL'S OFFICE. NO INSTALLATION OF THE SYSTEM SHALL BE MADE UNTIL APPROVAL IS OBTAINED. SYSTEM SHOWN ON THE CONTRACT DRAWINGS IS SCHEMATIC AND IS INTENDED FOR USE AS A GUIDE.	DEVICES, PIPE, VALVES, ETC. AND WORK WHE 1.15 QUALITY ASSURANCE A. INSTALLER QUALIFICATIONS: 1. INSTALLER'S RESPONSIBILITIES INCLUDE DE
	1.6	FIELD QUALITY-CONTROL REPORTS. INFORMATIONAL SUBMITTAL PROVIDE INFORMATIONAL SUBMITTALS IN OPERATION AND MAINTENANCE MANUALS IN ADDITION TO ACTION SUBMITTALS AND SECTION 017823 "OPERATION AND MAINTENANCE DATA".	SYSTEMS. 2. THE INSTALLING CONTRACTOR SHALL E HARDWARE SUPPLIER TO DESIGN, INSTA SYSTEMS. 3. THE INSTALLING CONTRACTOR SHALL EMPL LEVEL IN OR ABOVE WILL BE BESED
	В.	OPERATION AND MAINTENANCE DATA: FOR CLEAN AGENT SYSTEM TO INCLUDE IN EMERGENCY, OPERATION, AND MAINTENANCE MANUALS.	LEVEL II OR ABOVE, WHO WILL BE RESPO 4. THE INSTALLING CONTRACTOR SHALL BE THE INSTALLATION OF AUTOMATIC CLEA SYSTEMS IN STRICT ACCORDANCE WITH AL 5. THE INSTALLING CONTRACTOR MUST HAVE
	17	 CHECKLISTS AND PROCEDURES FOR EMERGENCY SITUATIONS, TROUBLESHOOTING TECHNIQUES, MAINTENANCE OPERATIONS AND PROCEDURES SHALL BE INCLUDED IN THE MANUAL. GENERAL 	EXPERIENCE IN THE DESIGN, INSTALLATION FIRE SUPPRESSION SYSTEMS. A LIST OF PROVIDED ON REQUEST,
		REGULATORY REQUIREMENTS 1. WORK SHALL CONFORM TO THE REQUIREMENTS OF THE CODES, LAWS AND ORDINANCES OF MONTGOMERY COUNTY, MARYLAND, NATIONAL FIRE PROTECTION ASSOCIATION, AMERICAN SOCIETY OF MECHANICAL ENGINEERS AND OTHER AUTHORITIES HAVING JURISDICTION.	 6. THE INSTALLING CONTRACTOR SHALL MAIL RECHARGING STATION. THE INSTALLING ABILITY TO RECHARGE THE LATEST CLEAL DISCHARGE. INCLUDE THE AMOUNT OF BU 7. THE INSTALLING CONTRACTOR SHALL BE A CLEAN AGENT SYSTEM EQUIPMENT SO AVAILABLE FROM INVENTORY. 8. THE INSTALLING CONTRACTOR SHALL SHOP
	В.	 COMPLY WITH APPLICABLE CODES, LAWS, STANDARD PRACTICES. COMPLY WITH THE STANDARDS OF GOOD PRACTICE AS OUTLINED IN THE ASHRAE GUIDE, THE SHEET METAL AND AIR CONDITIONING CONTRACTOR'S ASSOCIATION'S "DUCT MANUAL", AND THE APPRENTICE TRAINING MANUAL OF THE STEAM FITTERS UNION. REGULATORY REQUIREMENTS OF THE FIRE PROTECTION SYSTEM SHALL BE IN COMPLIANCE WITH THE RULES AND REGULATIONS OF THE FIRE DEPARTMENT AND THE STATE FIRE MARSHAL AND IN ACCORDANCE WITH THE FOLLOWING: 	 ON A TWENTY-FOUR-HOUR-A-DAY, SEVEL B. ELECTRICAL COMPONENTS, DEVICES, AND ACCI IN NFPA 70, BY A QUALIFIED TESTING AGENC' APPLICATION. C. FM GLOBAL COMPLIANCE: PROVIDE COMPONE LISTED IN FM GLOBAL'S "APPROVAL GUIDE."
		1. BUILDING CODE 2. NFPA 101 – LIFE SAFETY CODE 3. NFPA STANDARDS	D. UL COMPLIANCE: PROVIDE EQUIPMENT LISTEE DIRECTORY." 1.16 EQUIPMENT SUPPORTS
		4. NFPA 13 FIRE ALARM SYSTEM AND ASSOCIATED WIRING ARE SPECIFIED UNDER DIVISION 28. GIVE NECESSARY NOTICES AND OBTAIN REQUIRED PERMITS. PAY FEES AND OTHER COSTS INCLUDING UTILITY CONNECTIONS OR EXTENSIONS IN CONNECTION WITH THE WORK. FILE NECESSARY PLANS, PREPARE DOCUMENTS AND OBTAIN NECESSARY APPROVALS OF GOVERNMENTAL AGENCIES HAVING JURISDICTION. OBTAIN REQUIRED CERTIFICATES OF INSPECTION AND DELIVER SAME TO THE ARCHITECT BEFORE REQUEST FOR ACCEPTANCE	 A. PROVIDE SUPPORTS, CURBS AND BASES FOR SATISFACTORY INSTALLATION AND OPERATION O BOLTS. 1.17 FIRESTOPPING
_		AND FINAL PAYMENT FOR THE WORK. DELIVERY, STORAGE, AND HANDLING DELIVER PIPES AND TUBES WITH FACTORY—APPLIED END CAPS. MAINTAIN END CAPS THROUGH SHIPPING, STORAGE, AND HANDLING TO PREVENT PIPE END DAMAGE AND TO PREVENT ENTRANCE OF DIRT, DEBRIS, AND MOISTURE.	 A. SYSTEM DESCRIPTION 1. FIRESTOPPING SHALL CONSIST OF FU COMBINATION OF MATERIALS TO FORM AN FLAME, SMOKE, AND GASES, AND MAINT/ WALLS, BARRIERS, PARTITIONS, FLOORS,
		SUPPORT TO PREVENT SAGGING AND BENDING. PROPER AND SUITABLE TOOLS, EQUIPMENT AND APPLIANCES FOR THE SAFE AND CONVENIENT HANDLING AND PLACING OF MATERIALS AND EQUIPMENT SHALL BE USED. DURING LOADING, UNLOADING, AND PLACING, CARE SHALL BE TAKEN IN HANDLING THE EQUIPMENT AND MATERIALS SO THAT NO EQUIPMENT OR MATERIALS, INCLUDING OWNER FURNISHED, ARE DAMAGED.	THROUGH PENETRATIONS AND CONSTRUCT THE ANNULAR SPACES AROUND PIPES, T CONSTRUCTION JOINTS INCLUDE THO CONTRACTION, WIND, OR SEISMIC MOVE INTERFERE WITH REQUIRED MOVEMENT OF B. STORAGE AND DELIVERY
	D.	EQUIPMENT AND PIPING DELIVERED TO THE JOB SITE SHALL BE STORED UNDER ROOF OR OTHER APPROVED COVERING, ON PEDESTALS ABOVE THE GROUND. ENCLOSURES SHALL BE WEATHERPROOF. PIPE SHALL BE FITTED WITH END CAPS OR SEALS TO PREVENT MOISTURE AND DEBRIS FROM ENTERING PIPE. FOLLOW WRITTEN INSTRUCTIONS AND RECOMMENDATIONS OF THE MANUFACTURER AND REQUIREMENTS OF THE ARCHITECT IN LUBRICATION, PROTECTION, AND MAINTENANCE OF EQUIPMENT DURING STORAGE.	1. MATERIALS SHALL BE DELIVERED IN CONTAINERS SHOWING NAMES OF THE M PRODUCT. MATERIALS SHALL BE STORED FROM DAMAGE AND EXPOSURE TO ELEM SHALL BE REMOVED FROM THE SITE.
	E.	IF MATERIALS OR EQUIPMENT ARE FOUND TO BE IN POOR CONDITION AT THE TIME OF BEING INSTALLED, THE ARCHITECT MAY, AT HIS DISCRETION, ORDER THE CONTRACTOR TO FURNISH AND INSTALL NEW EQUIPMENT OR MATERIALS AT NO COST TO THE OWNER.	C. FIRESTOPPING MATERIALS 1. FIRESTOPPING MATERIALS SHALL CONSIST COMPLYING WITH THE FOLLOWING MINIMUM
	A.	COORDINATION ARRANGE FOR PIPE SPACES, CHASES, SLOTS, AND OPENINGS IN BUILDING STRUCTURE DURING PROGRESS OF CONSTRUCTION, TO ALLOW FOR FIRE PROTECTION INSTALLATIONS. COORDINATE INSTALLATION OF REQUIRED SUPPORTING DEVICES AND SET SLEEVES IN OTHER STRUCTURAL COMPONENTS AS THEY ARE CONSTRUCTED.	 a. FIRE HAZARD CLASSIFICATION: MATERIAL LESS, AND A SMOKE DEVELOPED F ACCORDANCE WITH ASTM E 84 OR U HUMANS AT ALL STAGES OF THE MATERIALS. b. FIRE RESISTANCE RATING: FIRESTOPPING
		VARIANCES WHERE CONFLICTS EXIST WITHIN THE CONTRACT DOCUMENTS, REQUEST CLARIFICATION PRIOR TO THE SUBMISSION OF A BID. IF CLARIFICATION IS NOT REQUESTED, PROVIDE THE WORK REPRESENTING THE HIGHER COST AND QUALITY.	GREATER FIRE RESISTANCE RATING THA BEING INSTALLED WITHIN. FIRE RESISTA DESCRIBED IN PART 1 ARTICLE "SYSTEM CONSTRUCTION IN WHICH THEY OCCUR.
		MATERIALS AND WORKMANSHIP ITEMS SHOWN AND NOT SPECIFICALLY CALLED FOR, OR ITEMS SPECIFIED AND NOT SPECIFICALLY INDICATED OR DETAILED ON THE DRAWINGS, OR ITEMS NEITHER SPECIFIED NOR SHOWN, BUT WHICH ARE REASONABLY INCIDENTAL TO AND COMMONLY REQUIRED.	1.18 WARRANTY A. SEE DIVISION 1 AND GENERAL CONDITIONS FO B. PROVIDE SERVICE OF THE EQUIPMENT MANUFA
		FURNISH THE SERVICES OF AN EXPERIENCED FULL TIME FIELD SUPERINTENDENT WHO SHALL BE CONSTANTLY IN CHARGE OF THE INSTALLATION OF WORK PROVIDED UNDER THIS DIVISION. SUPERINTENDENT SHALL HAVE DEMONSTRATED EXPERIENCE WITH PROJECTS OF COMPARABLE SIZE AND COMPLEXITY AND SHALL BE APPROVED BY THE ARCHITECT. THE QUALITY OF WORKMANSHIP REQUIRED IN THE EXECUTION OF THE WORK SHALL BE THE FINEST AND HIGHEST OBTAINABLE, WORKING WITH THE MATERIALS SPECIFIED. WORKMANSHIP SHALL BE SATISFACTORY TO THE ARCHITECT AND HIS DECISION AS TO	IF REQUIRED TO ACHIEVE SPECIFIED PERFORM C. DURING THE WARRANTY PERIOD, PROVIDE LAB MANUFACTURER'S WRITTEN INSTRUCTIONS FOR START OF WARRANTY PERIOD, PROVIDE TO TH REQUIRED MAINTENANCE OPERATIONS TO BE F AND REQUIRED PERIODICALLY THEREAFTER FO THEREAFTER, MONTHLY REPORTS SHALL BE S ACTUAL SERVICE PERFORMED.
		ACCEPTABLE QUALITY IS FINAL. MAINTENANCE MATERIAL FURNISH EXTRA MATERIALS THAT MATCH PRODUCTS INSTALLED AND THAT ARE PACKAGED WITH PROTECTIVE COVERING FOR STORAGE AND IDENTIFIED WITH LABELS DESCRIBING	D. REPAIRS AND REPLACEMENTS: IF THE OWNEF OR NOT IN COMPLIANCE WITH THE CONTRACT WILL INFORM THE CONTRACTOR IN WRITING. THE FOLLOWING AT NO ADDITIONAL COST TO 1. REPLACE ALL DEFECTIVE WORK IN A SATIS
		CONTENTS. DELIVER EXTRA MATERIALS TO OWNER. 1. DETECTION DEVICES: NOT LESS THAN 20 PERCENT OF AMOUNT OF EACH TYPE INSTALLED.	2. CORRECT ALL DAMAGE TO THE BUILDING DEFECTIVE WORK.D. THE OWNER MAY CHOOSE TO HAVE DEFECTIVE
		 CONTAINER VALVES: NOT LESS THAN 10 PERCENT OF AMOUNT OF EACH SIZE AND TYPE INSTALLED. NOZZLES: NOT LESS THAN 20 PERCENT OF AMOUNT OF EACH TYPE INSTALLED. EXTINGUISHING AGENT: NOT LESS THAN 100 PERCENT OF AMOUNT INSTALLED IN LARGEST HAZARD AREA. INCLUDE PRESSURE-RATED CONTAINERS WITH VALVES. 	CONTRACTOR IF THE CONTRACTOR FAILS TO F WORK IN AN ACCORDANCE WITH THIS GUARAN PART 2 – PRODUCTS
		DRAWINGS	2.1 GENERAL REQUIREMENTS
	A.	THE CONTRACT DRAWINGS ARE GENERALLY INDICATIVE OF THE WORK TO BE INSTALLED, BUT THEY DO NOT SHOW ALL OFFSETS, FITTINGS AND SIMILAR DETAILS REQUIRED, WHICH SHALL BE PROVIDED TO MEET THE JOB CONDITIONS. IN AREAS WHERE WORK IS INSTALLED IN CLOSE PROXIMITY TO WORK OF OTHER TRADES OR WITHIN TRADES COVERED BY THIS DIVISION OF THE SPECIFICATIONS, PREPARE LARGER SCALE DRAWINGS CONSISTING OF PLANS AND SECTIONS TO SHOW HOW WORK IS TO BE INSTALLED IN RELATION TO	 A. THE FM-200 SUPPRESSION SYSTEM SHALL B MANUFACTURER (OEM). B. ALL COMPONENTS SHALL BE UL LISTED AND/ COMPONENTS OF A SYSTEM.
1			2.2 SYSTEM HARDWARE MANUFACTURERS

WORK OF OTHER TRADES.

A. SYSTEM HARDWARE MANUFACTURERS ARE LISTED BELOW:

- NG AND INSTALLING THE WORK, THE CONTRACTOR SHALL CALL THE ATTENTION OF THE ARCHITECT FOR DIRECTION OF ANY MATERIALS IT INACCESSIBLE OR IMPRACTICAL. WHEN REQUESTED BY THE ARCHITECT NG OF THE PROPOSED DEPARTURE DUE TO FIELD CONDITIONS. OR THEIR SUBMITTED BY THE CONTRACTOR FOR APPROVAL. THE ARCHITECT SHALL EN DECISIONS AS TO THE CONDITIONS, WHICH REQUIRE THE CHANGING
- LL COORDINATE WITH THE OTHER TRADES PRIOR TO FABRICATION AND ORDINATION WITH TRADES PRIOR TO INSTALLATION, FABRICATION AND
- OR GENERAL REQUIREMENTS. RD THE ACTUAL LOCATIONS OF EACH PIECE OF EQUIPMENT, CONTROL LVES, ETC. AND WORK WHEN DIFFERENT FROM THE CONTACT DRAWINGS.
- ESPONSIBILITIES INCLUDE DESIGNING, FABRICATING, AND INSTALLING
- IG CONTRACTOR SHALL BE TRAINED BY THE SUPPRESSION SYSTEM PPLIER TO DESIGN, INSTALL, TEST AND MAINTAIN FIRE SUPPRESSION
- CONTRACTOR SHALL EMPLOY A NICET CERTIFIED SYSTEM DESIGNER, BOVE, WHO WILL BE RESPONSIBLE FOR THE PROJECT.
- CONTRACTOR SHALL BE AN EXPERIENCED FIRM REGULARLY ENGAGED IN TION OF AUTOMATIC CLEAN AGENT, OR SIMILAR, FIRE SUSPENSIONS FRICT ACCORDANCE WITH ALL APPLICABLE CODES AND STANDARDS.
- CONTRACTOR MUST HAVE A MINIMUM OF FIVE (5) YEARS OF THE DESIGN, INSTALLATION AND TESTING OF CLEAN AGENT, OR SIMILAR, SION SYSTEMS. A LIST OF SYSTEMS NATURE AND SCOPE SHALL BE
- G CONTRACTOR SHALL MAINTAIN, OR HAVE ACCESS TO, A CLEAN AGENT STATION. THE INSTALLING CONTRACTOR SHALL PROVIDE PROOF OF HIS CHARGE THE LATEST CLEAN AGENT SYSTEM WITHIN 24 HOURS AFTER A CLUDE THE AMOUNT OF BULK AGENT STORAGE AVAILABLE.
- CONTRACTOR SHALL BE AN AUTHORIZED STOCKING DISTRIBUTOR OF THE SYSTEM EQUIPMENT SO THAT IMMEDIATE REPLACEMENT PARTS ARE
- G CONTRACTOR SHALL SHOW PROOF OF EMERGENCY SERVICE AVAILABLE FOUR-HOUR-A-DAY, SEVEN-DAY-A-WEEK BASIS.
- NENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND
- IANCE: PROVIDE COMPONENTS THAT ARE FM APPROVED AND THAT ARE
- PROVIDE EQUIPMENT LISTED IN UL'S "FIRE PROTECTION EQUIPMENT
- , CURBS AND BASES FOR EQUIPMENT, AS NECESSARY FOR ALLATION AND OPERATION OF EQUIPMENT. FURNISH AND SET ANCHOR
- SHALL CONSIST OF FURNISHING AND INSTALLING A MATERIAL OR OF MATERIALS TO FORM AN EFFECTIVE BARRIER AGAINST THE SPREAD OF AND GASES, AND MAINTAIN THE INTEGRITY OF FIRE RESISTANCE RATE RS, PARTITIONS, FLOORS, FLOOR/CEILING/ROOF ASSEMBLIES, INCLUDING ETRATIONS AND CONSTRUCTION JOINTS. THROUGH-PENETRATIONS INCLUDE
- SPACES AROUND PIPES, TUBES, CONDUITS, WIRES, CABLES, AND VENTS, JOINTS INCLUDE THOSE USED TO ACCOMMODATE EXPANSION, WIND, OR SEISMIC MOVEMENT; FIRESTOPPING MATERIALS SHALL NOT H REQUIRED MOVEMENT OF JOINTS.
- IALL BE DELIVERED IN THE ORIGINAL UN-OPENED PACKAGES OR HOWING NAMES OF THE MANUFACTURER AND THE BRAND NAME OF THE ERIALS SHALL BE STORED OFF THE GROUND AND SHALL BE PROTECTED AND EXPOSURE TO ELEMENTS. DAMAGED OR DETERIORATED MATERIALS
- MATERIALS SHALL CONSIST OF COMMERCIALLY MANUFACTURED PRODUCTS TH THE FOLLOWING MINIMUM REQUIREMENTS:
- D CLASSIFICATION: MATERIAL SHALL HAVE A FLAME SPREAD OF 25 OR A SMOKE DEVELOPED RATING OR 50 OR LESS, WHEN TESTED IN WITH ASTM E 84 OR UL 723. MATERIALS SHALL BE NON-TOXIC TO ALL STAGES OF THE APPLICATION AND PERFORMANCE OF THE
- ANCE RATING: FIRESTOPPING WILL NOT BE REQUIRED TO HAVE A RE RESISTANCE RATING THAN THAT OF THE ASSEMBLY IN WHICH IT IS LLED WITHIN. FIRE RESISTANCE RATINGS OF CONSTRUCTION JOINTS, AS IN PART 1 ARTICLE "SYSTEM DESCRIPTION" AND GAPS SUCH AS THE
- ND GENERAL CONDITIONS FOR GENERAL REQUIREMENTS. OF THE EQUIPMENT MANUFACTURER OR HIS AUTHORIZED REPRESENTATIVE,
- CHIEVE SPECIFIED PERFORMANCE OF EQUIPMENT PROVIDED. ANTY PERIOD, PROVIDE LABOR AND MATERIALS IN ACCORDANCE WITH WRITTEN INSTRUCTIONS FOR SERVICE AND MAINTENANCE. PRIOR TO THE TY PERIOD, PROVIDE TO THE ARCHITECT FOR APPROVAL, A SCHEDULE OF ANCE OPERATIONS TO BE PERFORMED DURING THE WARRANTY PERIOD RIODICALLY THEREAFTER FOR EACH SYSTEM AND ITEM OF EQUIPMENT. THLY REPORTS SHALL BE SUBMITTED TO THE OWNER FOR DESCRIBING
- ACEMENTS: IF THE OWNER FINDS WORK THAT IS DEFECTIVE, INFERIOR IANCE WITH THE CONTRACT DURING THE GUARANTEE PERIOD THE OWNER CONTRACTOR IN WRITING. THE CONTRACTOR SHALL PROMPTLY PERFORM NO ADDITIONAL COST TO THE OWNER:
- DEFECTIVE WORK IN A SATISFACTORY MANNER. DAMAGE TO THE BUILDING OR CONTENTS WHICH OCCURRED DUE TO THE
- CHOOSE TO HAVE DEFECTIVE WORK CORRECTED AT THE EXPENSE OF THE IE CONTRACTOR FAILS TO PROCEED PROMPTLY TO REPAIR DEFECTIVE RDANCE WITH THIS GUARANTEE
- PRESSION SYSTEM SHALL BE SUPPLIED BY AN ORIGINAL EQUIPMENT SHALL BE UL LISTED AND/OR FM APPROVED AS COMPATIBLE

- 1. AMEREX CORPORATION, 7595 GADSDEN HIGHWAY, TRUSSVILLE, AL 35173-0081 USA 2. CHEMETRON FIRE SYSTEMS, 4801 SOUTHWICK DRIVE, 3RD FLOOR, MATTESON, IL 60443 USA
- 3. FENWAL PROTECTION SYSTEMS, 400 MAIN STREET, ASHLAND, MA 01721 USA
- 4. FIKE PROTECTION SYSTEMS, 704 SOUTH 10TH ST, BLUE SPRINGS, MO 64013 USA KIDDE FIRE SYSTEMS, 400 MAIN STREET, ASHLAND, MA 01721 USA
- KIDDE FIRE PROTECTION, BELVUE ROAD, NORTHOLT, MIDDLESEX, UB5 5QW, UK
- KIDDE DEUGRA, D040832 RATINGEN, HALSKESSTRASSE 30, GERMANY
- 8. MACRON SAFETY SYSTEMS (UK), LTD., WOODLANDS ROAD, GUILFORD, SURREY, GU1 1RN. UK
- 9. TYCO ELECTRONIC PRODUCTS GROUP, UNIT 3 PROSPECTOR BUSINESS PARK, LANGSTON ROAD, LOUGHTON, ESSEX, 1G10 3TR, UK
- 10. TYCO SUPPRESSION SYSTEMS, PYROCHEM DIVISION, ONE STANTON STREET, MARINETTE, WI 54143 USA
- 2.3 AGENT STORAGE AND DISTRIBUTION
- A. THE FIRE SUPPRESSION AGENT SHALL MEET THE REQUIREMENTS OF UL COMPONENT RECOGNITION AND THE REQUIREMENTS OF NFPA 2001.
- B. SHALL BE STORED IN MODULAR OR CENTRAL STORAGE STEEL ALLOY CONTAINERS COMPLIANT WITH DOT SPECIFICATION 4BA OR 4BW, AND SHALL BE EQUIPPED WITH SAFETY RUPTURE DISKS. CONTAINERS SHALL BE SUPER-PRESSURIZED WITH DRY NITROGEN TO AN OPERATING PRESSURE OF 360 PSIG AT 70 OF.
- C. EACH SYSTEM SHALL HAVE ITS OWN SUPPLY OF CLEAN AGENT.
- D. EACH SUPPLY SHALL BE LOCATED WITHIN THE HAZARD AREA, OR AS NEAR AS POSSIBLE, TO REDUCE THE AMOUNT OF PIPE AND FITTINGS REQUIRED TO INSTALL THE SYSTEM.
- E. ENGINEERED DISCHARGE NOZZLES SHALL BE PROVIDED WITHIN THE MANUFACTURER'S GUIDELINES TO DISTRIBUTE THE AGENT THROUGHOUT THE PROTECTED SPACES. THE NOZZLES SHALL BE DESIGNED TO PROVIDE PROPER AGENT QUANTITY AND DISTRIBUTION AND SHALL BE UL LISTED AND/OR FM APPROVED. NOZZLE SPACINGS SHALL BE IN ACCORDANCE WITH THE UL LISTING AND/OR FM APPROVAL.
- F. DISTRIBUTION PIPING AND FITTINGS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS, NFPA 2001, AND APPROVED PIPING STANDARDS AND GUIDELINES. FERROUS PIPING. BLACK OR GALVANIZED. CONFORMING TO ASTM A-53 OR A-106, OR OTHER MATERIALS CONFORMING TO THESE STRENGTH REQUIREMENTS SHALL BE USED. PIPE WALL THICKNESS SHALL BE CALCULATED IN ACCORDANCE WITH ANSI B-31.1, POWER PIPING CODE. ALL DISTRIBUTION PIPING SHALL BE INSTALLED BY QUALIFIED INDIVIDUALS USING ACCEPTED PRACTICES AND QUALITY PROCEDURES. ALL PIPING SHALL BE ADEQUATELY SUPPORTED AND ANCHORED AT ALL DIRECTIONAL CHANGES AND NOZZLE LOCATIONS
- G. ALL PIPING SHALL BE THOROUGHLY REAMED AFTER CUTTING, AND ALL OIL AND/OR CHIPS SHALL BE REMOVED. PIPE THREADS SHALL BE COATED WITH TEFLON TAPE OR AN APPROPRIATE JOINT COMPOUND APPLIED TO THE MALE THREAD ONLY.
- 2.4 VALVES
- A. GENERAL VALVE REQUIREMENTS:
- 1. UL LISTED OR FM APPROVED FOR USE IN FIRE-PROTECTION SYSTEMS. 2. COMPATIBLE WITH TYPE OF CLEAN AGENT USED.
- B. CONTAINER VALVES: WITH RUPTURE DISC OR SOLENOID AND MANUAL-RELEASE LEVER, CAPABLE OF IMMEDIATE AND TOTAL AGENT DISCHARGE AND SUITABLE FOR INTENDED FLOW CAPACITY.
- C. VALVES IN SECTIONS OF CLOSED PIPING AND MANIFOLDS: FABRICATE TO PREVENT
- ENTRAPMENT OF LIQUID, OR INSTALL VALVE AND SEPARATE PRESSURE RELIEF DEVICE.
- D. VALVES IN MANIFOLDS: CHECK VALVE; INSTALLED TO PREVENT LOSS OF EXTINGUISHING AGENT WHEN CONTAINER IS REMOVED FROM MANIFOLD.
- 2.5 EXTINGUISHING-AGENT CONTAINERS
- A. DESCRIPTION: STEEL TANKS COMPLYING WITH ASME BOILER AND PRESSURE VESSEL CODE: SECTION VIII, FOR UNFIRED PRESSURE VESSELS. INCLUDE MINIMUM WORKING-PRESSURE RATING THAT MATCHES SYSTEM CHARGING PRESSURE, VALVE, PRESSURE SWITCH, AND PRESSURE GAGE.
- 1. FINISH: RED, ENAMEL OR EPOXY PAINT.
- MANIFOLD: FABRICATE WITH VALVES, PRESSURE SWITCHES, AND CONNECTIONS FOR
- MULTIPLE STORAGE CONTAINERS 3. MANIFOLD: FABRICATE WITH VALVES, PRESSURE SWITCHES, SELECTOR SWITCH, AND
- CONNECTIONS FOR MULTIPLE STORAGE CONTAINERS.
- 4. STORAGE-TANK BRACKETS: FACTORY-FABRICATED RETAINING BRACKETS CONSISTING OF STEEL STRAPS AND CHANNELS; SUITABLE FOR CONTAINER SUPPORT, MAINTENANCE, AND TANK REFILLING OR REPLACEMENT.
- 2.6 CONTROL PANEL
- A. THE CONTROL SYSTEM AND ITS COMPONENTS SHALL BE UL LISTED AND/OR FM APPROVED, AND SHALL CONFORM TO THE SPECIFICATIONS OF THE CONTROL PANEL MANUFACTURER.
- B. THE CONTROL SYSTEM SHALL BE CAPABLE OF SUPPORTING CROSS-ZONE DETECTION.
- C. SEE DIVISION 28 FOR ADDITIONAL INFORMATION.
- 2.7 DETECTORS
- A. THE DETECTORS SHALL BE SPACED AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND THE GUIDELINES OF NFPA 72.
- B. THE DETECTION SYSTEM SHALL EMPLOY CROSS-ZONED DETECTION, IN THE CASE OF CROSS-ZONE DETECTION, A SINGLE DETECTOR ACTIVATION SHALL CAUSE AN ALARM SIGNAL TO BE GENERATED; A SECOND DETECTOR ACTIVATION SHALL GENERATE A PRE-DISCHARGE SIGNAL AND START THE PRE-DISCHARGE CONDITION.
- C. SEE DIVISION 28 FOR ADDITIONAL INFORMATION.
- 2.8 MANUAL RELEASE
- A. A MANUAL RELEASE STATION SHALL BE LOCATED AT EACH EXIT FROM THE PROTECTED HAZARD.
- B. SEE DIVISION 28 FOR ADDITIONAL INFORMATION.
- 2.9 ABORT STATIONS
- A. AN ABORT SWITCH SHALL BE PROVIDED AT EACH EXIT POINT.
- B. SEE DIVISION 28 FOR ADDITIONAL INFORMATION.
- 2.10 AUDIBLE AND VISUAL ALARMS
- A. ELECTRICALLY ACTUATED FIRE ALARMS, BOTH AUDIBLE AND VISIBLE, SHALL BE FURNISHED AND INSTALLED. ALL ALARM DEVICES SHALL BE UL LISTED AND/OR FM APPROVED. B. ALARMS SHALL BE ADEQUATE TO ALERT PERSONNEL LOCATED IN THE PROTECTED AREAS.
- C. PROVIDE AN ADVISORY SIGN AT EACH LOCATION.
- D. SEE DIVISION 28 FOR ADDITIONAL INFORMATION.
- 2.11 CAUTION AND ADVISORY SIGNS
 - a) CAUTION AND ADVISORY SIGNS ARE REQUIRED AT EACH ENTRANCE TO A PROTECTED SPACE, AND AT EACH MANUAL DISCHARGE STATION. b) A FLASHING LIGHT SIGN IS REQUIRED OVER EACH EXIT FROM A PROTECTED SPACE.
- 2.12 SYSTEM AND CONTROL WIRING
- A. ALL SYSTEMS WIRING SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
- B. ALL WIRING SHALL BE INSTALLED BY QUALIFIED INDIVIDUALS TO CONFORM TO THE NATIONAL ELECTRIC CODE, ARTICLE 725, AND ARTICLE 760, EXCEPT AS OTHERWISE PERMITTED FOR LIMITED ENERGY CIRCUITS, AS DESCRIBED IN NFPA 72. WIRING INSTALLATION SHALL MEET ALL LOCAL, STATE, PROVINCE AND/OR COUNTRY CODES.
- C. SEE DIVISION 28 FOR ADDITIONAL INFORMATION.

3.7 SYSTEM INSPECTIONS

- 3.6 FIELD QUALITY CONTROL
- INSPECTIONS.
- C. PERFORM TESTS AND INSPECTIONS.
- D. TESTS AND INSPECTIONS:

PART 3 – EXECUTION

3.1 EXISTING CONDITIONS

A. VISIT THE SITE AND BECOME FAMILIAR WITH EXISTING CONDITIONS. MODIFICATIONS TO WORK REQUIRED TO ALLOW FOR EXISTING CONDITIONS SHALL BE PROVIDED. SUBMIT PROPOSED MODIFICATIONS TO THE ARCHITECT FOR APPROVAL PRIOR TO INSTALLATION. B. RELOCATE EXISTING HANGERS AND SUPPORTS WHERE NECESSARY TO INSTALL NEW WORK. MAXIMUM SPACING REQUIREMENTS SHALL APPLY FOR RELOCATED SUPPORTS.

C. COORDINATE INTERRUPTIONS IN SERVICE OF EXISTING SYSTEMS WITH THE OWNER. PROVIDE TEMPORARY CONNECTIONS TO MAINTAIN OPERATION OF EXISTING SYSTEMS.

3.2 EXAMINATION A. EXAMINE AREAS AND CONDITIONS, WITH INSTALLER PRESENT, FOR COMPLIANCE WITH HAZARD-AREA LEAKAGE REQUIREMENTS, INSTALLATION TOLERANCES, AND OTHER CONDITIONS AFFECTING WORK PERFORMANCE.

B. PROCEED WITH INSTALLATION ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.

3.3 CLEAN-AGENT PIPING INSTALLATION

A. INSTALL CLEAN-AGENT EXTINGUISHING PIPING AND OTHER COMPONENTS LEVEL AND PLUMB, ACCORDING TO MANUFACTURERS' WRITTEN INSTRUCTIONS.

B. INSTALL EXTINGUISHING-AGENT CONTAINERS ANCHORED TO SUBSTRATE. C. INSTALL PIPE AND FITTINGS, VALVES, AND DISCHARGE NOZZLES ACCORDING TO REQUIREMENTS LISTED IN NFPA 2001, SECTION "DISTRIBUTION."

1. INSTALL VALVES DESIGNED TO PREVENT ENTRAPMENT OF LIQUID. OR INSTALL PRESSURE RELIEF DEVICES IN VALVED SECTIONS OF PIPING SYSTEMS.

2. SUPPORT PIPING USING SUPPORTS AND METHODS ACCORDING TO NFPA 13. 3. INSTALL CONTROL PANELS, DETECTION SYSTEM COMPONENTS, ALARMS, AND ACCESSORIES, COMPLYING WITH REQUIREMENTS OF NFPA 2001, SECTION "DETECTION, ACTUATION, AND CONTROL SYSTEMS," AS REQUIRED FOR SUPERVISED SYSTEM APPLICATION.

3.4 CONNECTIONS

A. DRAWINGS INDICATE GENERAL ARRANGEMENT OF PIPING, FITTINGS, AND SPECIALTIES. B. WHERE INSTALLING PIPING ADJACENT TO EQUIPMENT, ALLOW SPACE FOR SERVICE AND MAINTENANCE.

C. CONNECT ELECTRICAL DEVICES TO CONTROL PANEL AND TO BUILDING'S FIRE-ALARM SYSTEM. COORDINATE WITH OTHER TRADES.

3.5 IDENTIFICATION

A. IDENTIFY SYSTEM COMPONENTS AND EQUIPMENT. COMPLY WITH REQUIREMENTS FOR IDENTIFICATION SPECIFIED IN SECTION 260553 "IDENTIFICATION FOR ELECTRICAL SYSTEMS." B. IDENTIFY PIPING, EXTINGUISHING-AGENT CONTAINERS, OTHER EQUIPMENT, AND PANELS ACCORDING TO NFPA 2001.

C. INSTALL SIGNS AT ENTRY DOORS FOR PROTECTED AREAS TO WARN OCCUPANTS THAT THEY ARE ENTERING A ROOM PROTECTED WITH A CLEAN-AGENT FIRE-EXTINGUISHING SYSTEM. D. INSTALL SIGNS AT ENTRY DOORS TO ADVISE PERSONS OUTSIDE THE ROOM THE MEANING OF THE HORN(S), BELL(S), AND STROBE LIGHT(S) OUTSIDE THE PROTECTED SPACE.

A. TESTING AGENCY: ENGAGE A QUALIFIED TESTING AGENCY TO PERFORM TESTS AND

B. MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT, TEST, AND ADJUST COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS.

1. MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS, AND TO ASSIST IN TESTING.

1. AFTER INSTALLING CLEAN-AGENT EXTINGUISHING PIPING SYSTEM AND AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, TEST FOR COMPLIANCE WITH REQUIREMENTS. 2. PERFORM EACH ELECTRICAL TEST AND VISUAL AND MECHANICAL INSPECTION STATED IN NETA ATS, SECTIONS "INSPECTION AND TEST PROCEDURES" AND "SYSTEM FUNCTION TESTS." CERTIFY COMPLIANCE WITH TEST PARAMETERS. 3. LEAK TEST: AFTER INSTALLATION, CHARGE SYSTEM AND TEST FOR LEAKS. REPAIR

LEAKS AND RETEST UNTIL NO LEAKS EXIST 4. OPERATIONAL TEST: AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, START UNITS TO CONFIRM PROPER MOTOR ROTATION AND UNIT OPERATION. REMOVE

MALFUNCTIONING UNITS, REPLACE WITH NEW UNITS, AND RETEST 5. TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT.

E. UNITS WILL BE CONSIDERED DEFECTIVE IF THEY DO NOT PASS TESTS AND INSPECTIONS. F. PREPARE TEST AND INSPECTION REPORTS.

G. THE FINAL TEST AND ACCEPTANCE SHALL BE CONDUCTED IN THE PRESENCE OF THE SYSTEM OWNER'S REPRESENTATIVE AND GOVERNING AUTHORITIES.

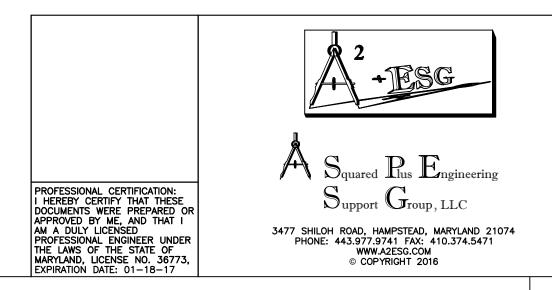
1. TESTS SHALL DEMONSTRATE THAT THE ENTIRE CONTROL SYSTEM FUNCTIONS AS INTENDED. AUTOMATIC DISCHARGE, MANUAL DISCHARGE, EQUIPMENT SHUTDOWN, AND ALARM DEVICES SHALL BE TESTED. 2. ALL CONTAINERS AND DISTRIBUTION PIPING SHALL BE CHECKED FOR PROPER MOUNTING

AND INSTALLATION. 3. ALL ELECTRICAL WIRING SHALL BE TESTED FOR PROPER CONNECTION, CONTINUITY AND RESISTANCE TO EARTH.

4. ROOM INTEGRITY TESTS SHALL BE CONDUCTED IN ACCORDANCE WITH NFPA 2001. 5. AN INSPECTION SHALL BE MADE TO ENSURE THAT ALL REQUIRED DAMPERS, DOOR BOTTOM SEALS, WEATHER-STRIPPING, CAULKING AND FOAM SEALANT HAVE BEEN INSTALLED AND THAT THE AREAS PROTECTED SHALL CONTAIN THE FM-200® FOR 10

MINUTES. 6. THE PIPING SHALL BE PNEUMATICALLY TESTED IN A CLOSED CIRCUIT FOR A PERIOD OF 10 MINUTES AT 50 PSIG; AT THE END OF 10 MINUTES, THE PRESSURE DROP SHALL NOT EXCEED 20 PERCENT OF THE TEST PRESSURE. 7. A FLOW TEST EMPLOYING NITROGEN SHALL BE PERFORMED ON THE PIPING NETWORK TO VERIFY THAT FLOW IS CONTINUOUS AND THE PIPING AND NOZZLES UNOBSTRUCTED.

A. THE INSTALLING CONTRACTOR SHALL PROVIDE INSPECTIONS, OF EACH SYSTEM INSTALLED UNDER THIS CONTRACT, DURING THE SYSTEM HARDWARE MANUFACTURER'S WARRANTY PERIOD. INSPECTIONS SHALL BE CONDUCTED IN ACCORDANCE WITH THE MANUFACTURER'S GUIDELINES AND THE RECOMMENDATIONS OF NFPA 2001.



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Revisions # | Date 2/24/16 | REVIEW SET

Client: CITY OF TAKOMA PARK

Location: 7500 MAPLE AVE TAKOMA PARK MD.

Project:

I.T. ROOM UPGRADE

MECHANICAL SPECIFICATIONS

Drawn by A2ESG Project No.

Date 2/24/16 15032.00

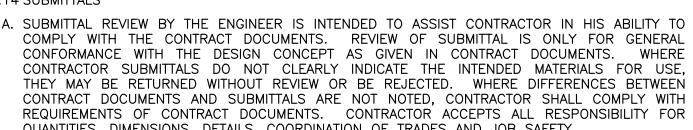
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3.8 CLEANING 1.8 WARRANTY A. EACH PIPE SECTION SHALL BE CLEANED INTERNALLY AFTER PREPARATION AND BEFORE ASSEMBLY BY MEANS OF SWABBING, USING A SUITABLE NONFLAMMABLE CLEANER. PIPE NETWORK SHALL BE FREE OF PARTICULATE MATTER AND OIL RESIDUE BEFORE INSTALLING CONNECTION WITH THE WARRANTY OF THESE ITEMS. NOZZLES OR DISCHARGE DEVICES. B. SEE DIVISION 1 AND GENERAL CONDITIONS FOR GENERAL REQUIREMENTS. C. PROVIDE SERVICE OF THE EQUIPMENT MANUFACTURER OR HIS AUTHORIZED REPRESENTATIVE, PART 2 – PRODUCTS 3.9 SYSTEM FILLING IF REQUIRED TO ACHIEVE SPECIFIED PERFORMANCE OF EQUIPMENT PROVIDED. A. PREPARATION: D. DURING THE WARRANTY PERIOD, SERVICE EQUIPMENT PROVIDED. PROVIDE LABOR AND 2.1 PRODUCTS TO BE USED 1. VERIFY THAT PIPING SYSTEM INSTALLATION IS COMPLETED AND CLEANED 2. CHECK FOR COMPLETE ENCLOSURE INTEGRITY. B. FILLING PROCEDURES: 1. FILL EXTINGUISHING-AGENT CONTAINERS WITH EXTINGUISHING AGENT, AND PRESSURIZE TO CHARGING PRESSURE. SHALL BE GIVEN TO OWNER PRIOR TO WORK REQUIRED. 2. INSTALL FILLED EXTINGUISHING-AGENT CONTAINERS. 3. ENERGIZE CIRCUITS. 4. ADJUST OPERATING CONTROLS. 3.10 DEMONSTRATION SYSTEMS DURING THIS GUARANTY PERIOD. A. ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO TRAIN OWNER'S MAINTENANCE PERSONNEL TO ADJUST, OPERATE, AND MAINTAIN CLEAN-AGENT FIRE-EXTINGUISHING SYSTEMS. FOLLOWING AT NO ADDITIONAL COST TO THE OWNER: B. THE TRAINING SHALL ADDRESS EMERGENCY PROCEDURES, ABORT FUNCTIONS, CONTROL PANEL OPERATION, TROUBLESHOOTING AND SAFETY REQUIREMENTS. 1. REPLACE ALL DEFECTIVE WORK IN A SATISFACTORY MANNER. 2. CORRECT ALL DAMAGE TO THE BUILDING OR CONTENTS WHICH OCCURRED DUE TO THE END OF SECTION 212200 DEFECTIVE WORK. SECTION 220500-COMMON WORK RESULTS FOR PLUMBING IN AN ACCORDANCE WITH THIS GUARANTEE PART 1 – GENERAL 1.9 MATERIALS AND WORKMANSHIP 1.1 RELATED DOCUMENTS A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS, APPLY TO THE WORK UNDER DIVISIONS 21 THROUGH 28. **B. REFERENCES** 1. 2015 INTERNATIONAL BUILDING CODE SIZE AND COMPLEXITY AND SHALL BE APPROVED BY THE ARCHITECT 2. 2015 INTERNATIONAL MECHANICAL CODE 3. 2012 INTERNATIONAL EXISTING BUILDING CODE 4. 2011 WSSC PLUMBING CODE 5. 2015 INTERNATIONAL ENERGY CONSERVATION CODE IS FINAL. 6. NFPA STANDARDS 1.10 EQUIPMENT START-UP AND INITIAL OPERATION 7. ASHRAE HANDBOOKS AND MANUALS 8. SMACNA MANUALS 9. COUNTY AMENDMENTS 1.2 DEFINITIONS CONSIDERATIONS. A. "PIPING" INCLUDES PIPE, FITTINGS, VALVES, HANGERS, AND OTHER ACCESSORIES THAT COMPRISE A B. PARTICULAR CARE SHALL BE TAKEN TO VERIFY THAT EQUIPMENT IS COMPLETELY ASSEMBLED SYSTEM. FILLED TO THE CORRECT LEVEL WITH THE RECOMMENDED LUBRICANT. B. FINISHED SPACES: SPACES OTHER THAN MECHANICAL AND ELECTRICAL EQUIPMENT ROOMS, FURRED SPACES, PIPE CHASES, UNHEATED SPACES IMMEDIATELY BELOW ROOF, SPACES ABOVE CEILINGS, UNEXCAVATED SPACES, CRAWLSPACES, AND TUNNELS. EQUIPMENT PROVIDED UNDER THIS DIVISION. C. EXPOSED, INTERIOR INSTALLATIONS: EXPOSED TO VIEW INDOORS. EXAMPLES INCLUDE FINISHED OCCUPIED SPACES AND MECHANICAL EQUIPMENT ROOMS. 1.11 DRAWINGS D. CONCEALED, INTERIOR INSTALLATIONS: CONCEALED FROM VIEW AND PROTECTED FROM PHYSICAL CONTACT BY BUILDING OCCUPANTS. EXAMPLES INCLUDE ABOVE CEILINGS AND IN CHASES. 1.3 QUALITY ASSURANCE A. STEEL SUPPORT WELDING: QUALIFY PROCESSES AND OPERATORS ACCORDING TO AWS D1.1, "STRUCTURAL WELDING CODE-STEEL." TRADES. B. STEEL PIPE WELDING: QUALIFY PROCESSES AND OPERATORS ACCORDING TO ASME BOILER AND PRESSURE VESSEL CODE: SECTION IX, "WELDING AND BRAZING QUALIFICATIONS." 1. COMPLY WITH PROVISIONS IN ASME B31 SERIES, "CODE FOR PRESSURE PIPING." 2. CERTIFY THAT EACH WELDER HAS PASSED AWS QUALIFICATION TESTS FOR WELDING PROCESSES INVOLVED AND THAT CERTIFICATION IS CURRENT. 1.4 GENERAL INSTALLATION. A. REGULATORY REQUIREMENTS 1.12 RECORD DRAWING 1. WORK SHALL CONFORM TO THE REQUIREMENTS OF THE CODES, LAWS AND ORDINANCES OF A. SEE DIVISION 1, FOR GENERAL REQUIREMENTS MONTGOMERY COUNTY, MARYLAND, NATIONAL FIRE PROTECTION ASSOCIATION, AMERICAN SOCIETY OF MECHANICAL ENGINEERS AND OTHER AUTHORITIES HAVING JURISDICTION. 2. COMPLY WITH APPLICABLE CODES, LAWS, STANDARD PRACTICES. CONTACT DRAWINGS. 3. COMPLY WITH THE STANDARDS OF GOOD PRACTICE AS OUTLINED IN THE ASHRAE GUIDE. THE SHEET METAL AND AIR CONDITIONING CONTRACTOR'S ASSOCIATION'S "DUCT MANUAL", AND THE 1.13 OPERATING AND MAINTENANCE INSTRUCTIONS APPRENTICE TRAINING MANUAL OF THE STEAM FITTERS UNION. B. GIVE NECESSARY NOTICES AND OBTAIN REQUIRED PERMITS. PAY FEES AND OTHER COSTS, A. SEE DIVISION 1 FOR GENERAL REQUIREMENTS OF DEMONSTRATION AND TRAINING. INCLUDING UTILITY CONNECTIONS OR EXTENSIONS IN CONNECTION WITH THE WORK. FILE NECESSARY PLANS, PREPARE DOCUMENTS AND OBTAIN NECESSARY APPROVALS OF GOVERNMENTAL AGENCIES HAVING JURISDICTION. OBTAIN REQUIRED CERTIFICATES OF INSPECTION AND DELIVER SAME TO THE ARCHITECT BEFORE REQUEST FOR ACCEPTANCE AND FINAL PAYMENT FOR THE WORK. C. THE INSTRUCTOR SHALL BE THOROUGHLY FAMILIAR WITH PARTS OF THE INSTALLATION ON 1.5 DELIVERY, STORAGE, AND HANDLING WHEREVER NECESSARY AND AS SPECIFIED. A. DELIVER PIPES AND TUBES WITH FACTORY-APPLIED END CAPS. MAINTAIN END CAPS THROUGH SHIPPING, STORAGE, AND HANDLING TO PREVENT PIPE END DAMAGE AND TO PREVENT ENTRANCE D. INSTRUCTIONS SHALL INCLUDE A GENERAL DESCRIPTION OF EACH SYSTEM TOGETHER WITH OF DIRT, DEBRIS, AND MOISTURE. B. STORE PLASTIC PIPES PROTECTED FROM DIRECT SUNLIGHT. SUPPORT TO PREVENT SAGGING AND BENDING. C. PROPER AND SUITABLE TOOLS, EQUIPMENT AND APPLIANCES FOR THE SAFE AND CONVENIENT HANDLING AND PLACING OF MATERIALS AND EQUIPMENT SHALL BE USED. DURING LOADING, UNLOADING, AND PLACING, CARE SHALL BE TAKEN IN HANDLING THE EQUIPMENT AND MATERIALS SO THAT NO EQUIPMENT OR MATERIALS, INCLUDING OWNER FURNISHED, ARE DAMAGED. MAINTENANCE SCHEDULE FOR SAME SHALL BE INCLUDED. D. MECHANICAL EQUIPMENT DELIVERED TO THE JOB SITE SHALL BE STORED UNDER ROOF OR OTHER APPROVED COVERING, ON PEDESTALS ABOVE THE GROUND. ENCLOSURES FOR EQUIPMENT SHALL IN DIVISION 1. BE WEATHERPROOF. ANY MOTORS INVOLVED IN THE WORK THAT ARE NOT TOTALLY ENCLOSED AND ELECTRICAL/ELECTRONIC COMPONENTS SHALL BE STORED IN A HEATED AREA WITH A MINIMUM .14 SUBMITTALS TEMPERATURE OF 50 DEG. F. VALVES SHALL BE STORED UNDER ROOF ON WOOD PEDESTALS ¹ ABOVE GROUND. PIPE FOR PROJECT USE SHALL BE STORED ABOVE GRADE IN SUCH A MANNER TO PREVENT ENTRANCE OF FOREIGN MATERIALS. PIPE SHALL BE FITTED WITH END CAPS OR SEALS TO PREVENT MOISTURE AND DEBRIS FROM ENTERING PIPE. INSULATION SHALL BE STORE UNDER ROOF OR IN TRAILERS, ADEQUATELY PROTECTED FROM THE WEATHER. FOLLOW WRITTEN INSTRUCTIONS AND RECOMMENDATIONS OF THE MANUFACTURER AND REQUIREMENTS OF THE ARCHITECT IN LUBRICATION, PROTECTION, AND MAINTENANCE OF EQUIPMENT DURING STORAGE. E. IF MATERIALS OR EQUIPMENT ARE FOUND TO BE IN POOR CONDITION AT THE TIME OF BEING QUANTITIES, DIMENSIONS, DETAILS, COORDINATION OF TRADES AND JOB SAFETY. INSTALLED, THE ARCHITECT MAY, AT HIS DISCRETION, ORDER THE CONTRACTOR TO FURNISH AND INSTALL NEW EQUIPMENT OR MATERIALS AT NO COST TO THE OWNER. **B. DEFINITION:** 1.6 COORDINATION 1. ACTION SUBMITTALS: SUBMIT TO ENGINEER FOR REVIEW. A. ARRANGE FOR PIPE SPACES, CHASES, SLOTS, AND OPENINGS IN BUILDING STRUCTURE DURING 2. INFORMATIONAL SUBMITTALS: PROVIDE SUBMITTALS IN OPERATIONAL AND MAINTENANCE PROGRESS OF CONSTRUCTION, TO ALLOW FOR PLUMBING INSTALLATIONS. MANUALS. B. COORDINATE INSTALLATION OF REQUIRED SUPPORTING DEVICES AND SET SLEEVES IN OTHER C. PROCESSING TIME: ALLOW TIME FOR SUBMITTAL REVIEW, INCLUDING TIME FOR RESUBMITTALS, N. FIRE-BARRIER PENETRATIONS: MAINTAIN INDICATED FIRE RATING OF WALLS, PARTITIONS, STRUCTURAL COMPONENTS AS THEY ARE CONSTRUCTED. AS FOLLOWS. TIME FOR REVIEW SHALL COMMENCE ON ENGINEER'S RECEIPT OF SUBMITTAL. C. COORDINATE REQUIREMENTS FOR ACCESS PANELS AND DOORS FOR PLUMBING ITEMS REQUIRING ACCESS THAT ARE CONCEALED BEHIND FINISHED SURFACES. ACCESS PANELS AND DOORS ARE SPECIFIED IN DIVISION 08 SECTION "ACCESS DOORS AND FRAMES." MUST BE DELAYED FOR COORDINATION. 1.7 VARIANCES 2. RESUBMITTAL REVIEW: ALLOW 15 WORKING (BUSINESS) DAYS FOR EACH RESUBMITTAL. A. WHERE CONFLICTS EXIST WITHIN THE CONTRACT DOCUMENTS, REQUEST CLARIFICATION PRIOR TO THE SUBMISSION OF A BID. IF CLARIFICATION IS NOT REQUESTED. PROVIDE THE WORK

REPRESENTING THE HIGHER COST AND QUALITY.

A. CERTAIN ITEMS OF EQUIPMENT SHALL BE WARRANTED FOR A LONGER TIME THAN THE GENERAL WARRANTY PERIOD. PROVIDE FOR SERVICE OR REPLACEMENT REQUIRED IN

- MATERIALS IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS FOR SERVICE AND APPROVAL, A SCHEDULE OF REQUIRED MAINTENANCE OPERATIONS TO BE PERFORMED DURING THE WARRANTY PERIOD AND REQUIRED PERIODICALLY THEREAFTER FOR EACH SYSTEM AND ITEM OF EQUIPMENT. THEREAFTER, MONTHLY REPORTS SHALL BE SUBMITTED TO THE OWNER FOR DESCRIBING ACTUAL SERVICE PERFORMED. FORTY-EIGHT (48) HOURS ADVANCE NOTICE
- E. ALL EQUIPMENT, LABOR AND SYSTEMS SHALL BE GUARANTEED BY THE CONTRACTOR FOR PERIOD OF TWO YEARS MINIMUM UNLESS OTHERWISE NOTED AFTER THE DATE OF SUBSTANTIAL COMPLETION PER REQUIREMENTS OF DGS PROCEDURES MANUAL. CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ALL REPAIRS AND ADJUSTMENTS TO EQUIPMENT AND
- F. REPAIRS AND REPLACEMENTS: IF THE OWNER FINDS WORK THAT IS DEFECTIVE, INFERIOR OR NOT IN COMPLIANCE WITH THE CONTRACT DURING THE GUARANTEE PERIOD THE OWNER WILL INFORM THE CONTRACTOR IN WRITING. THE CONTRACTOR SHALL PROMPTLY PERFORM THE
- G. THE OWNER MAY CHOOSE TO HAVE DEFECTIVE WORK CORRECTED AT THE EXPENSE OF THE CONTRACTOR IF THE CONTRACTOR FAILS TO PROCEED PROMPTLY TO REPAIR DEFECTIVE WORK
- A. ITEMS SHOWN AND NOT SPECIFICALLY CALLED FOR, OR ITEMS SPECIFIED AND NOT SPECIFICALLY INDICATED OR DETAILED ON THE DRAWINGS, OR ITEMS NEITHER SPECIFIED NOR SHOWN, BUT WHICH ARE REASONABLY INCIDENTAL TO AND COMMONLY REQUIRED.
- B. FURNISH THE SERVICES OF AN EXPERIENCED FULL TIME FIELD SUPERINTENDENT WHO SHALL BE CONSTANTLY IN CHARGE OF THE INSTALLATION OF WORK PROVIDED UNDER THIS DIVISION. SUPERINTENDENT SHALL HAVE DEMONSTRATED EXPERIENCE WITH PROJECTS OF COMPARABLE C. FIRESTOPPING MATERIALS
- C. THE QUALITY OF WORKMANSHIP REQUIRED IN THE EXECUTION OF THE WORK SHALL BE THE FINEST AND HIGHEST OBTAINABLE, WORKING WITH THE MATERIALS SPECIFIED. WORKMANSHIP SHALL BE SATISFACTORY TO THE ARCHITECT AND HIS DECISION AS TO ACCEPTABLE QUALITY
- A. NO EQUIPMENT SHALL BE OPERATED FOR TESTING OR TRIAL USE UNTIL THERE HAS BEEN FULL COMPLIANCE WITH THE EQUIPMENT MANUFACTURERS' SPECIFICATIONS AND INSTRUCTIONS FOR LUBRICATION, ALIGNMENT, DIRECTION OF ROTATION, BALANCE, AND OTHER APPLICABLE
- AND PROPERLY LUBRICATED, AND GREASE AND OIL CASES AND RESERVOIRS HAVE BEEN 3.1 EXISTING CONDITIONS
- C. WHERE SPECIFIED, PROVIDE SERVICES OF THE MANUFACTURER OR HIS AUTHORIZED REPRESENTATIVE TO WITNESS, SUPERVISE, OR ASSIST IN THE INSTALLATION AND START-UP
- A. THE CONTRACT DRAWINGS ARE GENERALLY INDICATIVE OF THE WORK TO BE INSTALLED. BUT C. COORDINATE INTERRUPTIONS IN SERVICE OF EXISTING SYSTEMS WITH THE OWNER. PROVIDE THEY DO NOT SHOW ALL OFFSETS, FITTINGS AND SIMILAR DETAILS REQUIRED, WHICH SHALL CLOSE PROXIMITY TO WORK OF OTHER TRADES OR WITHIN TRADES COVERED BY THIS DIVISION OF THE SPECIFICATIONS, PREPARE LARGER SCALE DRAWINGS CONSISTING OF PLANS AND SECTIONS TO SHOW HOW WORK IS TO BE INSTALLED IN RELATION TO WORK OF OTHER 3.2 MANNER OF INSTALLATION
- B. BEFORE FABRICATING AND INSTALLING THE WORK, THE CONTRACTOR SHALL CALL THE CONDITION TO THE ATTENTION OF THE ARCHITECT FOR DIRECTION OF ANY MATERIALS AND/OR EQUIPMENT INACCESSIBLE OR IMPRACTICAL. WHEN REQUESTED BY THE ARCHITECT A DETAILED DRAWING OF THE PROPOSED DEPARTURE DUE TO FIELD CONDITIONS, OR THEIR CAUSES. FINAL WRITTEN DECISIONS AS TO THE CONDITIONS, WHICH REQUIRE THE CHANGING OF WORK. C. CONTRACTOR SHALL COORDINATE WITH THE OTHER TRADES PRIOR TO FABRICATION AND
- B. CAREFULLY RECORD THE ACTUAL LOCATIONS OF EACH PIECE OF CONCEALED EQUIPMENT. CONTROL DEVICES, PIPE, VALVES, UNITS, ETC., AND WORK WHEN DIFFERENT FROM THE
- B. UPON COMPLETION OF WORK AND OF TESTS, FURNISH THE NECESSARY SKILLED LABOR AND HELPERS FOR OPERATING AND DEMONSTRATING THE SYSTEMS AND EQUIPMENT.
- WHICH HE IS TO GIVE INSTRUCTION AND SHALL BE TRAINED IN OPERATING THEORY AS WELL F. INSTALL PIPING AT INDICATED SLOPES. AS PRACTICAL OPERATION AND MAINTENANCE WORK. EMPLOY FACTORY TRAINED INSTRUCTORS
- THE BUILDING PERSONNEL FOR OPERATING AND MAINTAINING EACH SYSTEM. THE
- INSTRUCTIONS SHALL INCLUDE THE NAME OR LABEL, LOCATION, AND FUNCTION OF OPERATING EQUIPMENT AND CONTROLS. OPERATING MODES AND THE PROCEDURES FOR INDEXING EACH MODE SHALL BE CLEARLY DESCRIBED. INCLUDE LUBRICATION CHARTS AND SCHEDULES OF K. INSTALL ESCUTCHEONS FOR PENETRATIONS OF WALLS, CEILINGS, AND FLOORS. FREQUENCY OF LUBRICATION FOR EQUIPMENT, DESIGNATING EACH POINT OF LUBRICATION AND
- OF THE SERVICE ORGANIZATIONS FOR EACH ITEMS OF EQUIPMENT AND A TYPEWRITTEN
- . PROVIDE OPERATION AND MAINTENANCE MANUALS AND RECORD PRODUCT DATA AS SPECIFIED



SUBMITTAL. ALLOW ADDITIONAL TIME IF COORDINATION WITH SUBSEQUENT SUBMITTALS IS

- 3. ENGINEER WILL REVIEW AN INITIAL SUBMITTAL AND ONE (1) RESUBMITTAL. ANY ADDITIONAL 3.4 PIPING JOINT CONSTRUCTION REVIEWS SHALL BE BILLED TO THE GENERAL CONTRACTOR ON AN HOURLY BASIS AT THE ENGINEERS CURRENT BILLING RATES AND WILL NOT BE RETURNED TO THE GENERAL CONTRACTOR UNTIL PAYMENT HAS BEEN RECEIVED. THIS SHALL NOT BE CAUSE FOR ANY DELAY CLAIMS OR ADDITIONAL COMPENSATION CLAIMS BY THE GENERAL CONTRACTOR TO B. REAM ENDS OF PIPES AND TUBES AND REMOVE BURRS. BEVEL PLAIN ENDS OF STEEL PIPE. THE OWNER.
- MAINTENANCE. PRIOR TO THE START OF WARRANTY PERIOD, PROVIDE TO THE ARCHITECT FOR A. ITEMS ARE SPECIFIED BY DESIGNATIONS SUCH AS TRADE NAME, MANUFACTURER'S NAME CATALOG NUMBER AND INDICATE THE CAPACITY AND QUALITY OF THE PRODUCTS OR E. BRAZED JOINTS: CONSTRUCT JOINTS ACCORDING TO AWS'S "BRAZING HANDBOOK," "PIPE AND MATERIALS TO BE USED ON THIS PROJECT.
 - B. ONLY PRODUCTS INDICATED ON CONTRACT DOCUMENTS BY NAME AND MODEL NUMBER HAVE BEEN COORDINATED WITH OTHER TRADES. COORDINATE ITEMS OF OTHER MANUFACTURER WITH OTHER TRADES.
 - C. THE WORK UNDER THIS SECTION OF THE SPECIFICATION SHALL INCLUDE THE FURNISHING OF LABOR, MATERIALS AND EQUIPMENT FOR THE INSTALLATION OF COMPLETE PLUMBING SYSTEM TO PROVIDE CONTINUOUS AND SATISFACTORY SERVICE.
 - 2.2 FIRESTOPPING
 - A. SYSTEM DESCRIPTION
 - 1. FIRESTOPPING SHALL CONSIST OF FURNISHING AND INSTALLING A MATERIAL OR COMBINATION OF MATERIALS TO FORM AN EFFECTIVE BARRIER AGAINST THE SPREAD OF FLAME, SMOKE, AND GASES, AND MAINTAIN THE INTEGRITY OF FIRE RESISTANCE RATE WALLS, BARRIERS, PARTITIONS, FLOORS, FLOOR/CEILING/ROOF ASSEMBLIES, INCLUDING THROUGH PENETRATIONS AND CONSTRUCTION JOINTS. THROUGH–PENETRATIONS INCLUDE THE ANNULAR SPACES AROUND PIPES, TUBES, CONDUITS, WIRES, CABLES, AND VENTS. CONSTRUCTION JOINTS INCLUDE THOSE USED TO ACCOMMODATE EXPANSION, CONTRACTION, WIND, OR SEISMIC MOVEMENT; FIRESTOPPING MATERIALS SHALL NOT INTERFERE WITH 3.6 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS REQUIRED MOVEMENT OF JOINTS
 - B. STORAGE AND DELIVERY
 - 1. MATERIALS SHALL BE DELIVERED IN THE ORIGINAL UN-OPENED PACKAGES OR CONTAINERS SHOWING NAMES OF THE MANUFACTURER AND THE BRAND NAME OF THE PRODUCT MATERIALS SHALL BE STORED OFF THE GROUND AND SHALL BE PROTECTED FROM DAMAGE AND EXPOSURE TO ELEMENTS. DAMAGED OR DETERIORATED MATERIALS SHALL BE REMOVED FROM THE SITE.

 - 1. FIRESTOPPING MATERIALS SHALL CONSIST OF COMMERCIALLY MANUFACTURED PRODUCTS 3.7 PAINTING COMPLYING WITH THE FOLLOWING MINIMUM REQUIREMENTS:
 - 2. FIRE HAZARD CLASSIFICATION: MATERIAL SHALL HAVE A FLAME SPREAD OF 25 OR LESS, AND A SMOKE DEVELOPED RATING OR 50 OR LESS, WHEN TESTED IN ACCORDANCE WITH ASTM E 84 OR UL 723. MATERIALS SHALL BE NON-TOXIC TO HUMANS AT ALL STAGES OF THE APPLICATION AND PERFORMANCE OF THE MATERIALS
 - 3. FIRE RESISTANCE RATING: FIRESTOPPING WILL NOT BE REQUIRED TO HAVE A GREATER FIRE RESISTANCE RATING THAN THAT OF THE ASSEMBLY IN WHICH IT IS BEING INSTALLED WITHIN. FIRE RESISTANCE RATINGS OF CONSTRUCTION JOINTS AND GAPS SUCH AS THE CONSTRUCTION IN WHICH THEY OCCUR.
 - PART 3 EXECUTION

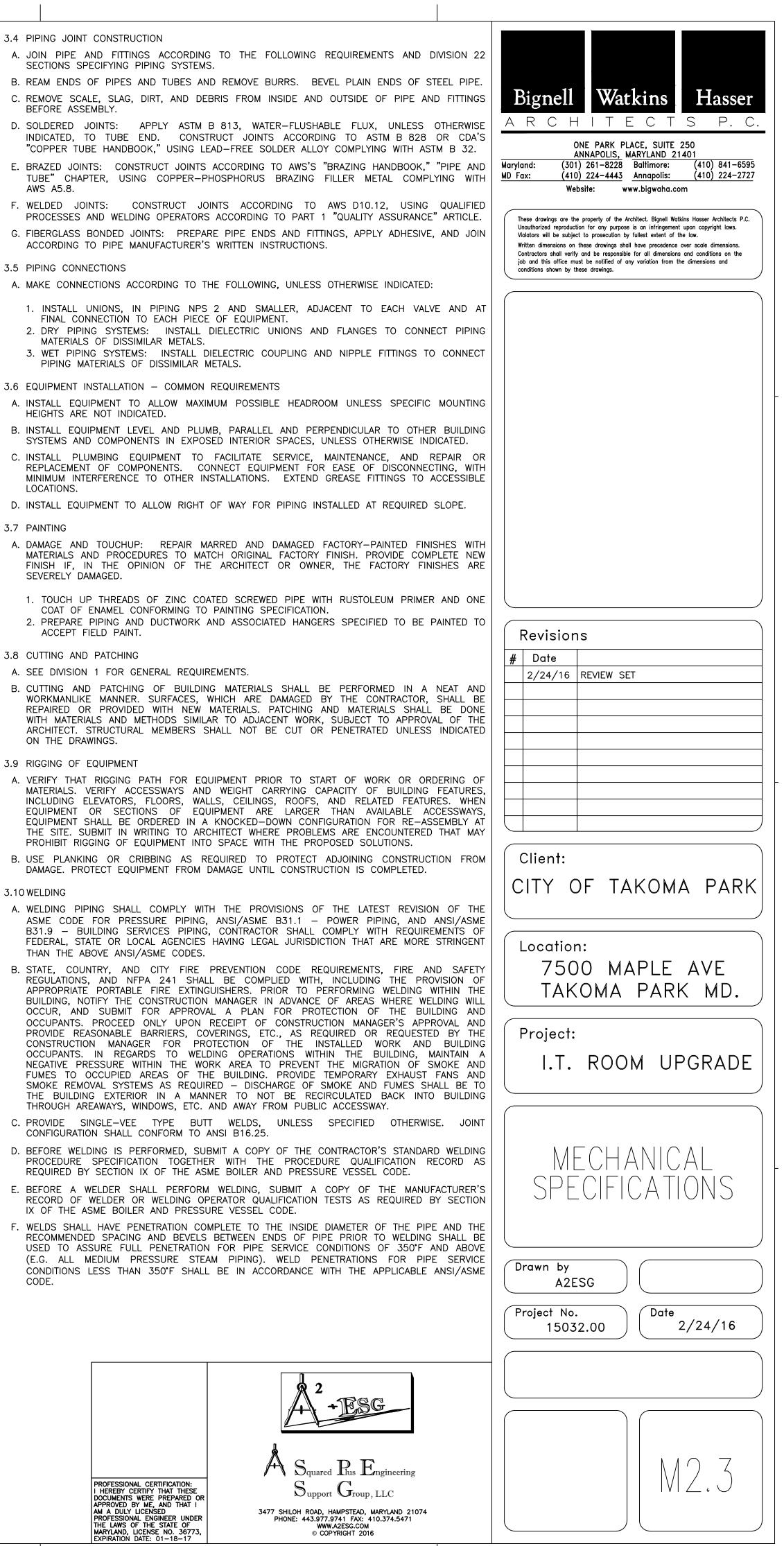
 - A. VISIT THE SITE AND BECOME FAMILIAR WITH EXISTING CONDITIONS. MODIFICATIONS TO WORK REQUIRED TO ALLOW FOR EXISTING CONDITIONS SHALL BE PROVIDED. SUBMIT PROPOSED MODIFICATIONS TO THE ARCHITECT FOR APPROVAL PRIOR TO INSTALLATION.
 - B. RELOCATE EXISTING HANGERS AND SUPPORTS WHERE NECESSARY TO INSTALL NEW WORK. MAXIMUM SPACING REQUIREMENTS SHALL APPLY FOR RELOCATED SUPPORTS.
 - TEMPORARY CONNECTIONS TO MAINTAIN OPERATION OF EXISTING SYSTEMS.
- BE PROVIDED TO MEET THE JOB CONDITIONS. IN AREAS WHERE WORK IS INSTALLED IN D. VERIFY EXISTING PIPING LOCATIONS AND INVERTS PRIOR TO ANY WORK OR INSTALLATION.

 - A. PIPING SHALL BE INSTALLED TO PRESERVE ACCESS TO VALVES AND EQUIPMENT. VALVES AND EQUIPMENT WHICH REQUIRE FREQUENT SERVICE, ADJUSTMENT OR CONTROL AND WHICH CANNOT BE LOCATED IN A READILY ACCESSIBLE AND SAFE PLACE, SHALL BE PROVIDED WITH EXTENSION DEVICES AND REMOTE OPERATORS, AS NECESSARY AND AS ACCEPTED FOR USE BY THE ARCHITECT.
- SHALL BE SUBMITTED BY THE CONTRACTOR FOR APPROVAL. THE ARCHITECT SHALL MAKE B. PIPING SHALL BE RUN TO FOLLOW THE LINES OF THE BUILDING AND TO ALLOW THE MAXIMUM HEADROOM CONSISTENT WITH PROPER PITCH. PIPING SUBJECT TO THERMAL EXPANSION SHALL BE ARRANGED TO PERMIT MOVEMENT WITHOUT DAMAGE TO THE PIPING, DUCTWORK AND EQUIPMENT.
 - 3.3 PIPING SYSTEMS COMMON REQUIREMENTS
 - A. INSTALL PIPING ACCORDING TO THE FOLLOWING REQUIREMENTS AND DIVISION 22 SECTIONS SPECIFYING PIPING SYSTEMS.
 - B. INSTALL PIPING IN CONCEALED LOCATIONS, UNLESS OTHERWISE INDICATED AND EXCEPT IN EQUIPMENT ROOMS AND SERVICE AREAS.
 - C. INSTALL PIPING INDICATED TO BE EXPOSED AND PIPING IN FOUIPMENT ROOMS AND SERVICE AREAS AT RIGHT ANGLES OR PARALLEL TO BUILDING WALLS. DIAGONAL RUNS ARE PROHIBITED UNLESS SPECIFICALLY INDICATED OTHERWISE.
 - D. INSTALL PIPING ABOVE ACCESSIBLE CEILINGS TO ALLOW SUFFICIENT SPACE FOR CEILING PANEL REMOVAL
 - E. INSTALL PIPING TO PERMIT VALVE SERVICING.

 - G. INSTALL PIPING FREE OF SAGS AND BENDS.
 - H. INSTALL FITTINGS FOR CHANGES IN DIRECTION AND BRANCH CONNECTIONS.
- SPECIFIC INSTRUCTIONS DESCRIBING ROUTINE AND EMERGENCY PROCEDURES REQUIRED OF I. INSTALL PIPING TO ALLOW APPLICATION OF INSULATION.
 - J. SELECT SYSTEM COMPONENTS WITH PRESSURE RATING EQUAL TO OR GREATER THAN SYSTEM OPERATING PRESSURE.
- TYPE OF LUBRICATION TO BE USED. LISTINGS OF NAMES, ADDRESSES, AND PHONE NUMBERS L. INSTALL SLEEVES FOR PIPES PASSING THROUGH CONCRETE AND MASONRY WALLS. M. INSTALL SLEEVES FOR PIPES PASSING THROUGH CONCRETE AND MASONRY WALLS, GYPSUM-BOARD PARTITIONS.
 - 1. CUT SLEEVES TO LENGTH FOR MOUNTING FLUSH WITH BOTH SURFACES.
 - a. EXCEPTION: EXTEND SLEEVES INSTALLED IN FLOORS OF MECHANICAL EQUIPMENT AREAS OR OTHER WET AREAS 2 INCHES ABOVE FINISHED FLOOR LEVEL. EXTEND CAST-IRON SLEEVE FITTINGS BELOW FLOOR SLAB AS REQUIRED TO SECURE CLAMPING RING IF RING IS SPECIFIED.
 - 2. INSTALL SLEEVES THAT ARE LARGE ENOUGH TO PROVIDE 1/4-INCH ANNULAR CLEAR SPACE BETWEEN SLEEVE AND PIPE OR PIPE INSULATION TO PASS FREELY. USE THE FOLLOWING SLEEVE MATERIALS:
 - a. STEEL PIPE SLEEVES: FOR PIPES SMALLER THAN NPS 6.
 - b. STACK SLEEVE FITTINGS: FOR PIPES PENETRATING FLOORS WITH MEMBRANE WATERPROOFING. SECURE FLASHING BETWEEN CLAMPING FLANGES. INSTALL SECTION OF CAST-IRON SOIL PIPE TO EXTEND SLEEVE TO 2 INCHES ABOVE FINISHED FLOOR LEVEL. REFER TO DIVISION 07 SECTION "SHEET METAL FLASHING AND TRIM" FOR FLASHING.
 - 1) SEAL SPACE OUTSIDE OF SLEEVE FITTINGS WITH GROUT.
- CEILINGS, AND FLOORS AT PIPE PENETRATIONS. SEAL PIPE PENETRATIONS WITH FIRESTOP MATERIALS. REFER TO DIVISION 07 SECTION "PENETRATION FIRESTOPPING" FOR MATERIALS. . INITIAL REVIEW: ALLOW 20 WORKING (BUSINESS) DAYS FOR INITIAL REVIEW OF EACH O. VERIFY FINAL EQUIPMENT LOCATIONS FOR ROUGHING-IN.
- REQUIRED. ENGINEER WILL ADVISE ARCHITECT WHEN A SUBMITTAL BEING PROCESSED P. REFER TO EQUIPMENT SPECIFICATIONS IN OTHER SECTIONS OF THESE SPECIFICATIONS FOR ROUGHING-IN REQUIREMENTS.

CODE.

- 3.10 WELDING
- ON THE DRAWINGS. 3.9 RIGGING OF EQUIPMENT



- G. VISUAL AND NONDESTRUCTIVE EXAMINATIONS SHALL BE PERFORMED TO DETECT THE SURFACE 1.6 DELIVERY, STORAGE, AND HANDLING AND INTERNAL DISCONTINUITIES IN COMPLETED WELDS BY AN INDEPENDENT TESTING AGENCY D. PREPARE VALVES FOR SHIPPING AS FOLLOW HIRED BY THE CONSTRUCTION MANAGER. THE CONTRACTOR SHALL FULLY COOPERATE WITH AN INDEPENDENT TESTING AGENCY SO THAT WELDS CAN BE EXAMINED BY THE INDEPENDENT TESTING AGENCY. THE TYPES AND EXTENT OF NON-DESTRUCTIVE EXAMINATIONS REQUIRED FOR PIPE WELDS ARE AS SHOWN IN TABLE 136.4 OF ASME CODE FOR PRESSURE PIPING, ANSI/ASME B31.1 - POWER PIPING AND AS CONTAINED HEREIN. IF REQUIREMENTS FOR VISUAL AND NONDESTRUCTIVE EXAMINATIONS ARE TO BE OTHER THAN CONTAINED HEREIN. THE DEGREE OF EXAMINATION AND BASIS OF REJECTION SHALL BE A MATTER OF PRIOR WRITTEN AGREEMENT BETWEEN THE CONSTRUCTION MANAGER AND THE INDEPENDENT TESTING AGENCY. B. USE THE FOLLOWING PRECAUTIONS DURING THE EXTENT OF VISUAL AND NON-DESTRUCTIVE EXAMINATIONS SHALL BE AS FOLLOWS:
- 1. THE INDEPENDENT TESTING AGENCY SHALL TEST A MINIMUM OF 10% OF THE TOTAL LENGTH OR NUMBER OF PIPING WELDS BY UTILIZING RADIOGRAPH, ULTRASONIC TESTING, SECTIONING OR A COMBINATION OF THESE METHODS AS DETERMINED BY THE INDEPENDENT TESTING AGENCY. IF A RANDOM WELD TEST REVEALS THAT A WELD FAILS TO MEET THE MINIMUM QUALITY REQUIREMENTS, AN ADDITIONAL 10 PERCENT OF THE WELDS IN THAT PART 2 - PRODUCTS SAME GROUP SHALL BE TESTED AT THE CONTRACTOR'S EXPENSE AND AT NO ADDITIONAL COST TO THE OWNER. IF THE ADDITIONAL WELDS EXAMINED MEET THE QUALITY 2.1 GENERAL REQUIREMENTS FOR VALVES REQUIREMENTS, THE ENTIRE GROUP OF WELDS REPRESENTED SHALL BE ACCEPTED AND THE DEFECTIVE WELDS SHALL BE REPAIRED. IF ANY OF THE ADDITIONAL WELDS EXAMINED C. REFER TO VALVE SCHEDULE ARTICLES FOR ALSO FAIL TO MEET THE QUALITY REQUIREMENTS AS DETERMINED BY THE INDEPENDENT TESTING AGENCY, THAT ENTIRE GROUP OF WELDS SHALL BE REJECTED. REMOVE AND RE-WELD REJECTED WELDS OR EXAMINE REJECTED WELDS (AT THE CONTRACTOR'S EXPENSE AND AT NO ADDITIONAL COST TO THE OWNER) AND REMOVE AND RE-WELD E. CHAIN OPERATORS REQUIRED ON ALL VALVE DEFECTS.
- 2. WELDS SHALL BE VISUALLY EXAMINED AS FOLLOWS:
- a. BEFORE WELDING FOR COMPLIANCE TO THE QUALIFIED WELDING PROCEDURE.
- b. DURING WELDING FOR CONFORMANCE TO THE QUALIFIED WELDING PROCEDURE.
- c. AFTER WELDING FOR CRACKS, CONTOUR AND FINISH, BEAD REINFORCEMENT, B. PROVIDE ZONE SHUT-OFF VALVES AT ALL UNDERCUTTING, OVERLAP, AND SIZE OF FILLET WELDS.
- 3. WELDS DETERMINED TO BE UNACCEPTABLE SHALL BE REMOVED AND REPLACED BY THE CONTRACTOR, AT NO ADDITIONAL COST TO THE OWNER, IN ACCORDANCE WITH THE D. ISOLATION VALVES SHALL BE PROVIDED FOR APPLICABLE STANDARDS. REPAIR DEFECTS DISCOVERED BETWEEN WELD PASSES BEFORE ADDITIONAL WELD MATERIAL IS DEPOSITED. WHEREVER A DEFECT IS REMOVED, AND REPAIR E. VALVE SIZES: SAME AS UPSTREAM PIPING BY WELDING IS NOT REQUIRED, THE AFFECTED AREA SHALL BE BLENDED INTO THE F. VALVES IN INSULATED PIPING: WITH 2-INCH SURROUNDING SURFACE ELIMINATING SHARP NOTCHES, CREVICES, OR THE SAME TEST METHODS THAT FIRST REVEALED THE DEFECT TO ENSURE THAT THE DEFECT HAS BEEN ELIMINATED. AFTER RE-WELDING, RE-EXAMINE THE REPAIRED AREA BY THE SAME TEST METHODS ORIGINALLY USED FOR THAT AREA. FOR REPAIRS TO BASE MATERIAL, THE MINIMUM EXAMINATION SHALL BE THE SAME AS REQUIRED FOR BUTT WELDS. INDICATION OF A DEFECT SHALL BE REGARDED AS A DEFECT UNLESS RE-EVALUATION BY NON-DESTRUCTIVE EXAMINATION TESTING OR BY SURFACE CONDITIONING SHOWS THAT NO UNACCEPTABLE INDICATIONS ARE PRESENT. THE USE OF FOREIGN MATERIAL TO MASK, FILL IN, SEAL, OR DISGUISE WELDING DEFECTS WILL NOT BE PERMITTED.
- H. PIPE WELDS SHALL NOT BE COVERED PRIOR TO EXAMINATION BY THE INDEPENDENT TESTING AGENCY. SHOULD THE INDEPENDENT TESTING AGENCY ENCOUNTER PIPE JOINTS THAT ARE COVERED, CONTRACTOR SHALL REMOVE COVERING AND REPLACE WITH NEW COVERING, AT NO ADDITIONAL COST TO THE OWNER, FOLLOWING EXAMINATION BY THE INDEPENDENT TESTING AGENCY. COVERINGS SHALL INCLUDE, BUT NOT LIMITED TO, INSULATION, JACKETING, OUTER CONDUIT CLOSURE KITS, SPECIAL COATINGS, AND BACKFILL. EXAMINATIONS OF WELDS FOR THE METAL CONDUITS FOR PRE-INSULATED CONDUIT PIPING SYSTEMS MAY BE COVERED 2.3 BRONZE BALL VALVES WITHOUT EXAMINATION BY THE INDEPENDENT TESTING AGENCY.
- WELDING AT HANGERS, SUPPORTS AND PLATES TO STRUCTURAL MEMBERS SHALL CONFORM A. TWO-PIECE, FULL-PORT, BRONZE BALL VAL TO AMERICAN WELDING SOCIETY, INC. AWS D1.1 STRUCTURAL WELDING CODE STEEL.
- J. WHEN REQUESTED BY THE INDEPENDENT TESTING AGENCY OR ARCHITECT, SUBMIT IDENTIFYING STENCILED TEST COUPONS MADE BY ANY WELDER IN QUESTION. THE CONTRACTOR SHALL REQUIRE A WELDER TO RETAKE THE TESTS WHEN, IN THE OPINION OF THE ARCHITECT OR INDEPENDENT TESTING AGENCY, THE WORK OF THE WELDER CREATES A REASONABLE DOUBT AS TO HIS PROFICIENCY. TESTS, WHEN REQUIRED, SHALL BE CONDUCTED AT NO ADDITIONAL EXPENSE TO THE OWNER: AND THE WELDER IN QUESTION SHALL NOT BE PERMITTED TO WORK AS A WELDER ON THIS PROJECT UNTIL HE IS RE-QUALIFIED.
- K. THE USE OF BACKING RINGS SHALL BE AT THE DISCRETION OF THE INSTALLING CONTRACTOR PROVIDED THAT THE CONTRACTOR PREPARES AND ALIGNS PIPES PRECISELY TO MELT THOUGH TO THE INSIDE SURFACE - MAKING A FULL PENETRATION WELD. AT THE DIRECTION OF THE INDEPENDENT TESTING AGENCY, THE CONTRACTOR MAY BE DIRECTED TO USE BACKING RINGS (AT NO ADDITIONAL COST TO THE OWNER) WHEN DEEMED NECESSARY BY THE INDEPENDENT TESTING AGENCY AFTER EXAMINATION OF THE PIPE WELDS.
- WHEN WELD TESTING OR EXAMINATION IS PERFORMED AS REQUIRED HEREIN, THE CORRESPONDING WRITTEN CERTIFIED TEST REPORTS SHALL BE SUBMITTED.

3.11 CLEANING

- A. SEE DIVISION 1, THOROUGHLY CLEAN EXPOSED SURFACES OF EQUIPMENT AND MATERIAL AND 2.4 BRONZE GATE VALVES LEAVE IN A NEAT, CLEAN CONDITION READY FOR PAINTING.
- 3.12 ACCESSIBILITY
- A. LOCATE EQUIPMENT THAT MUST BE SERVICED, OPERATED OR MAINTAINED, IN FULLY ACCESSIBLE POSITIONS. EQUIPMENT SHALL INCLUDE, BUT NOT BE LIMITED TO, TERMINAL UNITS, COILS, VALVES, MOTORS, CONTROLLERS, DAMPERS, DRAIN POINTS, CLEANOUTS, ETC. PROVIDE ADEQUATE MEANS TO ACCESS EQUIPMENT FOR REPAIR AND MAINTENANCE INCLUDING CAPABILITIES FOR PLATFORMS, FALL PROTECTION SYSTEMS, AND ANCHORAGE POINTS.
- B. WHERE REQUIRED OR WHERE DIRECTED, PROVIDE ACCESS DOORS. DOORS INSTALLED IN FIRE-RATED WALLS OR SHAFTS SHALL BE LABELED AND SHALL MATCH RATING OF THE CONSTRUCTION. DOORS SHALL BE SUFFICIENT SIZE TO ALLOW ACCESS TO COMPONENTS, EXCEPT MINIMUM SIZE SHALL BE 12" X 16". ACCESS PANELS IN CEILINGS FOR ALL PLUMBING AND HEATING VALVES TO BE 24"X 24" MINIMUM. WHERE EQUIPMENT REQUIRES ACCESS TO VARIOUS PARTS, SUCH AS AIR TERMINAL UNITS REQUIRE ACCESS TO THE CONTROLLER AND VALVE AND PIPING APPURTENANCES FOR THE REHEAT COIL, LOCATE APPURTENANCES REQUIRING ACCESS SUCH THAT ALL DEVICES CAN BE MAINTAINED FROM SINGLE DOOR. FOR ITEMS THAT REQUIRE ACCESS GREATER THAN 3 FEET ABOVE THE CEILING, PROVIDE MINIMUM 4 FEET X 4 FEET REMOVABLE CEILING PANEL TO FACILITATE TOP OF A FOLDING LADDER PLACED ABOVE THE CEILING PLANE. ACCESS DOORS ARE SPECIFIED IN DIVISION 8.
- C. THE CONTRACTOR AT NO EXPENSE TO THE OWNER SHALL REWORK EQUIPMENT DEEMED INACCESSIBLE BY THE ARCHITECT.
- END OF SECTION 220500

SECTION 220523- GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 – GENERAL

- 1.1 RELATED DOCUMENTS
- 1.2 DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND
- SUPPLEMENTARY CONDITIONS, APPLY TO THE WORK UNDER DIVISIONS 21 THROUGH 28 1.3 SUMMARY
- A. SECTION INCLUDES:
- 1. BRONZE BALL VALVES.
- 2. BRONZE GATE VALVES. 3. BRONZE GLOBE VALVES.
- B. RELATED SECTIONS:
- PART 3 EXECUTION 4. DIVISION 22 SECTION "IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT" FOR VALVE TAGS AND SCHEDULES. 3.1 EXAMINATION
- 1.4 DEFINITIONS
- C. CWP: COLD WORKING PRESSURE.
- D. RS: RISING STEM.
- 1.5 QUALITY ASSURANCE
- A. SOURCE LIMITATIONS FOR VALVES: OBTAIN EACH TYPE OF VALVE FROM SINGLE SOURCE FROM D. EXAMINE MATING FLANGE FACES FOR CONDI SINGLE MANUFACTURER. B. ASME COMPLIANCE:
- 1. ASME B16.10 AND ASME B16.34 FOR FERROUS VALVE DIMENSIONS AND DESIGN CRITERIA. 2. ASME B31.1 FOR POWER PIPING VALVES. 3. ASME B31.9 FOR BUILDING SERVICES PIPING VALVES.
- C. NSF COMPLIANCE: NSF 61 FOR VALVE MATERIALS FOR POTABLE-WATER SERVICE.

- 1. PROTECT INTERNAL PARTS AGAINST RUST
- 2. PROTECT THREADS, FLANGE FACES, GROC
- 3. SET GATE, AND GLOBE VALVES CLOSED
- 4. SET BALL VALVES OPEN TO MINIMIZE EXE
- MAINTAIN VALVE END PROTECTION. 2. STORE VALVES INDOORS AND MAINTAIN IF OUTDOOR STORAGE IS NECESSARY,
- ENCLOSURES.

- D. VALVE PRESSURE AND TEMPERATURE RATI FOR SYSTEM PRESSURES AND TEMPERATURE
- F. BUTTERFLY VALVES MAY NOT BE USED ON

2.2 GATE AND BALL VALVES

- A. WHENEVER POSSIBLE PROVIDE BALL VALVES
- C. PROVIDE BLEEDER ON BALL VALVES 3/4" OR

- 1. GATE VALVES: WITH RISING STEM.
- 2. BALL VALVES: WITH EXTENDED OPERATI AND PROTECTIVE SLEEVE THAT ALLOWS
- SEAL OR DISTURBING INSULATION. 3. BUTTERFLY VALVES: WITH EXTENDED NE
- G. VALVE-END CONNECTIONS:
- 1. FLANGED: WITH FLANGES ACCORDING TO
- 2. GROOVED: WITH GROOVES ACCORDING
- 3. SOLDER JOINT: WITH SOCKETS ACCORDI 4. THREADED: WITH THREADS ACCORDING

- 1. MANUFACTURERS: SUBJECT TO COMPLIAN OFFERING PRODUCTS THAT MAY BE INCOR
- LIMITED TO, THE FOLLOWING: a. CRANE CO.; CRANE VALVE GROUP; JE
- b. CRANE CO.; CRANE VALVE GROUP; S
- c. NIBCO INC. d. WATTS REGULATOR CO.; A DIVISION OF
- 2. DESCRIPTION: a. STANDARD: MSS SP-110.
- b. CWP RATING: 600 PSIG.
- c. BODY DESIGN: TWO PIECE. d. BODY MATERIAL: BRONZE.
- e. ENDS: THREADED.
- f. SEATS: PTFE OR TFE.
- q. STEM: BRONZE.
- h. BALL: CHROME-PLATED BRASS. i. PORT: FULL.

A. CLASS 125, RS BRONZE GATE VALVES:

- MANUFACTURERS: SUBJECT TO COMPLIAN OFFERING PRODUCTS THAT MAY BE INCO LIMITED TO, THE FOLLOWING:
- a. CRANE CO.; CRANE VALVE GROUP; JE
- b. CRANE CO.; CRANE VALVE GROUP; ST
- c. NIBCO INC.
- d. WATTS REGULATOR CO.; A DIVISION OF 2. DESCRIPTION:
- a. STANDARD: MSS SP-80, TYPE 2.
- b. CWP RATING: 200 PSIG.
- c. BODY MATERIAL: ASTM B 62, BRONZE
- d. ENDS: SOLDER JOINT.
- e. STEM: BRONZE. f. DISC: SOLID WEDGE; BRONZE.
- g. PACKING: ASBESTOS FREE.
- h. HANDWHEEL: MALLEABLE IRON.

- 1. MANUFACTURERS: SUBJECT TO COMPLIAN OFFERING PRODUCTS THAT MAY BE INCOM LIMITED TO, THE FOLLOWING:
- a. CRANE CO.; CRANE VALVE GROUP; CR b. CRANE CO.; CRANE VALVE GROUP; ST
- c. NIBCO INC.
- 2. DESCRIPTION: a. STANDARD: MSS SP-80, TYPE 2.
- b. CWP RATING: 200 PSIG
- c. BODY MATERIAL: ASTM B 62, BRONZE
- d. ENDS: SOLDER JOINT. e. STEM: BRONZE.
- f. DISC: PTFE.
- g. PACKING: ASBESTOS FREE. h. HANDWHEEL: MALLEABLE IRON.

	DELIVERY, STORAGE, AND HANDLING . PREPARE VALVES FOR SHIPPING AS FOLLOWS:		VALVE INSTALLATION		TRAPEZE F
	 PROTECT INTERNAL PARTS AGAINST RUST AND CORROSION. PROTECT THREADS, FLANGE FACES, GROOVES, AND WELD ENDS. 	В.	INSTALL VALVES WITH UNIONS OR FLANGES AT EACH PIECE OF EQUIPMENT ARRANGED TO ALLOW SERVICE, MAINTENANCE, AND EQUIPMENT REMOVAL WITHOUT SYSTEM SHUTDOWN. LOCATE VALVES FOR EASY ACCESS AND PROVIDE SEPARATE SUPPORT WHERE NECESSARY.		ASSEMBLY CARBON-S
R	 SET GATE, AND GLOBE VALVES CLOSED TO PREVENT RATTLING. SET BALL VALVES OPEN TO MINIMIZE EXPOSURE OF FUNCTIONAL SURFACES. USE THE FOLLOWING PRECAUTIONS DURING STORAGE: 		INSTALL VALVES IN HORIZONTAL PIPING WITH STEM AT OR ABOVE CENTER OF PIPE. INSTALL VALVES IN POSITION TO ALLOW FULL STEM MOVEMENT.		. CLEVIS-TY
U		Α.	ADJUSTING ADJUST OR REPLACE VALVE PACKING AFTER PIPING SYSTEMS HAVE BEEN TESTED AND PUT INTO SERVICE BUT BEFORE FINAL ADJUSTING AND BALANCING. REPLACE VALVES IF PERSISTENT		2. HANGEF
	ENCLOSURES.		LEAKING OCCURS. GENERAL REQUIREMENTS FOR VALVE APPLICATIONS	B	. STRAP-TYF 1. DESCRII
	GENERAL REQUIREMENTS FOR VALVES	A.	IF VALVE APPLICATIONS ARE NOT INDICATED, USE THE FOLLOWING:		EXCEPT 2. HANGER
	. REFER TO VALVE SCHEDULE ARTICLES FOR APPLICATIONS OF VALVES. . VALVE PRESSURE AND TEMPERATURE RATINGS: NOT LESS THAN INDICATED AND AS REQUIRED FOR SYSTEM PRESSURES AND TEMPERATURES.		 SHUTOFF SERVICE: GATE OR BALL VALVES. THROTTLING SERVICE: GLOBE OR BALL VALVES. SELECT VALVES, EXCEPT WAFER TYPES, WITH THE FOLLOWING END CONNECTIONS: 		STAINLE FIBERGLAS
	CHAIN OPERATORS REQUIRED ON ALL VALVES 3" AND OVER ABOVE 96" FROM FINISHED FLOOR. BUTTERFLY VALVES MAY NOT BE USED ON DOMESTIC WATER MAINS.		1. FOR COPPER TUBING, NPS 2 AND SMALLER: THREADED ENDS EXCEPT WHERE SOLDER-JOINT VALVE-END OPTION IS INDICATED IN VALVE SCHEDULES BELOW.	<u>-</u>	OFFERING LIMITED TC 1. ALLIED
	GATE AND BALL VALVES . WHENEVER POSSIBLE PROVIDE BALL VALVES.		DOMESTIC, COLD-WATER VALVE SCHEDULE PIPE NPS 2 AND SMALLER:		2. CHAMPI 3. COOPEF
С	. PROVIDE ZONE SHUT-OFF VALVES AT ALL MAJOR BRANCHES OF THE PIPING SYSTEM. . PROVIDE BLEEDER ON BALL VALVES ¾" OR SMALLER. . ISOLATION VALVES SHALL BE PROVIDED FOR ALL EQUIPMENT		 BRONZE VALVES: SOLDER-JOINT ENDS. BALL VALVES: TWO PIECE, FULL PORT, BRONZE WITH BRONZE TRIM. BRONZE GATE VALVES: CLASS 125. 		4. SEASAF THERMAL-
E.	VALVE SIZES: SAME AS UPSTREAM PIPING UNLESS OTHERWISE INDICATED. VALVES IN INSULATED PIPING: WITH 2-INCH STEM EXTENSIONS AND THE FOLLOWING FEATURES:		4. BRONZE GLOBE VALVES: CLASS 125 NONMETALLIC DISC.	A.	. MANUFACTI OFFERING LIMITED TC 1. CARPEN
	1. GATE VALVES: WITH RISING STEM. 2. BALL VALVES: WITH EXTENDED OPERATING HANDLE OF NON-THERMAL-CONDUCTIVE MATERIAL,	END	OF SECTION 220523		2. CLEMEN
G	AND PROTECTIVE SLEEVE THAT ALLOWS OPERATION OF VALVE WITHOUT BREAKING THE VAPOR SEAL OR DISTURBING INSULATION. 3. BUTTERFLY VALVES: WITH EXTENDED NECK. . VALVE-END CONNECTIONS:	SEC	CTION 220529 – HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT		3. ERICO 4. NATIONA 5. PHS IN
0	1 FLANGEDY WITH FLANGES ACCORDING TO ASME B16.1 FOR IRON VALVES		RT 1 – GENERAL RELATED DOCUMENTS		6. PIPE SI 7. PIPING
	 2. GROOVED: WITH GROOVES ACCORDING TO AWWA C606. 3. SOLDER JOINT: WITH SOCKETS ACCORDING TO ASME B16.18. 4. TUPEADED: WITH TUPEADE ACCORDING TO ASME B1.20.1 	1.2	DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS, APPLY TO THE WORK UNDER DIVISIONS 21 THROUGH 28 SUMMARY	R	8. RILCO I 9. VALUE . INSULATION
	BRONZE BALL VALVES	Α.	. SECTION INCLUDES: 1. METAL PIPE HANGERS AND SUPPORTS.	0.	TYPE I CA BARRIER.
А.	TWO-PIECE, FULL-PORT, BRONZE BALL VALVES WITH BRONZE TRIM: 1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS		2. TRAPEZE PIPE HANGERS. 3. FIBERGLASS PIPE HANGERS.		. FOR TRAF
	OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING: a. CRANE CO.; CRANE VALVE GROUP; JENKINS VALVES.		4. METAL FRAMING SYSTEMS. 5. FIBERGLASS STRUT SYSTEMS.		. FOR CLEVI OF PIPE. . INSERT LE
	 b. CRANE CO.; CRANE VALVE GROUP; STOCKHAM DIVISION c. NIBCO INC. 		6. THERMAL-HANGER SHIELD INSERTS.		BELOW AM
	 d. WATTS REGULATOR CO.; A DIVISION OF WATTS WATER TECHNOLOGIES, INC. 2. DESCRIPTION: a. STANDARD: MSS SP-110. 	B	7. FASTENER SYSTEMS. . RELATED SECTIONS:		FASTENER . POWDER-A CEMENT C
	 b. CWP RATING: 600 PSIG. c. BODY DESIGN: TWO PIECE. d. BODY MATERIAL: BRONZE. e. ENDS: THREADED. 	C	1. DIVISION 22 SECTION "VIBRATION CONTROLS FOR PLUMBING PIPING AND EQUIPMENT". . THE WORK UNDER THIS SECTION OF THE SPECIFICATION SHALL INCLUDE THE FURNISHING OF LABOR, MATERIALS AND EQUIPMENT FOR THE INSTALLATION OF COMPLETE HANGER AND SUPPORTING SYSTEMS.	B	SUPPORTE MECHANICA USE IN H CAPACITIES
	f. SEATS: PTFE OR TFE. g. STEM: BRONZE. h. BALL: CHROME—PLATED BRASS.	1.4	DEFINITIONS		MISCELLAN
24	i. PORT: FULL. BRONZE GATE VALVES		MSS: MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY INC.		. STRUCTUR/ AND GALV/
	CLASS 125, RS BRONZE GATE VALVES:		PERFORMANCE REQUIREMENTS	71	RT 3 – EXE HANGER AI
	 MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING: 		DESIGN TRAPEZE PIPE HANGERS, INCLUDING COMPREHENSIVE ENGINEERING ANALYSIS BY A QUALIFIED PROFESSIONAL ENGINEER, USING PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INDICATED. DESIGN STRUCTURAL PERFORMANCE: HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT	A.	
	 a. CRANE CO.; CRANE VALVE GROUP; JENKINS VALVES. b. CRANE CO.; CRANE VALVE GROUP; STOCKHAM DIVISION. c. NIBCO INC. d. WATTS REGULATOR CO.; A DIVISION OF WATTS WATER TECHNOLOGIES, INC. 		SHALL WITHSTAND THE EFFECTS OF GRAVITY LOADS AND STRESSES WITHIN LIMITS AND UNDER CONDITIONS INDICATED ACCORDING TO ASCE/SEI 7. 1. DESIGN SUPPORTS FOR MULTIPLE PIPES, INCLUDING PIPE STANDS, CAPABLE OF	B	. METAL TRA ARRANGE TOGETHER HANG BEL
	 DESCRIPTION: a. STANDARD: MSS SP-80, TYPE 2. 		SUPPORTING COMBINED WEIGHT OF SUPPORTED SYSTEMS, SYSTEM CONTENTS, AND TEST WATER. 2. DESIGN EQUIPMENT SUPPORTS CAPABLE OF SUPPORTING COMBINED OPERATING WEIGHT OF		1. PIPES PIPE S
	b. CWP RATING: 200 PSIG. c. BODY MATERIAL: ASTM B 62, BRONZE WITH INTEGRAL SEAT AND SCREW—IN BONNET. d. ENDS: SOLDER JOINT.	1.6	SUPPORTED EQUIPMENT AND CONNECTED SYSTEMS AND COMPONENTS.		SPECIFI 2. FIELD F BEING
	e. STEM: BRONZE. f. DISC: SOLID WEDGE; BRONZE. g. PACKING: ASBESTOS FREE.		OPERATION AND MAINTENANCE DATA: PROVIDE HANGERS AND SUPPORTS SUBMITTALS TO INCLUDE IN OPERATION AND MAINTENANCE MANUALS	С	. FIBERGLAS MSS SP-6
0.5	h. HANDWHEEL: MALLEABLE IRON.	1.7	QUALITY ASSURANCE	D	PROPERLY METAL FR/ PIPING, AN
	BRONZE GLOBE VALVES CLASS 125, BRONZE GLOBE VALVES WITH NONMETALLIC DISC:		. STRUCTURAL STEEL WELDING QUALIFICATIONS: QUALIFY PROCEDURES AND PERSONNEL ACCORDING TO AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE – STEEL."	E.	FIBERGLAS
	1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:		. PIPE WELDING QUALIFICATIONS: QUALIFY PROCEDURES AND OPERATORS ACCORDING TO ASME BOILER AND PRESSURE VESSEL CODE. RT 2 – PRODUCTS		THERMAL- INSULATED
	a. CRANE CO.; CRANE VALVE GROUP; CRANE VALVES. b. CRANE CO.; CRANE VALVE GROUP; STOCKHAM DIVISION. c. NIBCO INC.		METAL PIPE HANGERS AND SUPPORTS	G	. FASTENER 1. INSTALL CONCRE
	 2. DESCRIPTION: a. STANDARD: MSS SP-80, TYPE 2. b. CWP RATING: 200 PSIG 	A.	. CARBON-STEEL PIPE HANGERS AND SUPPORTS: 1. DESCRIPTION: MSS SP-58, TYPES 1 THROUGH 58, FACTORY-FABRICATED COMPONENTS.		AND C TOOL MANUFA
	c. BODY MATERIAL: ASTM B 62, BRONZE WITH INTEGRAL SEAT AND SCREW—IN BONNET. d. ENDS: SOLDER JOINT. e. STEM: BRONZE.		 2. GALVANIZED METALLIC COATINGS: PREGALVANIZED OR HOT DIPPED. 3. NONMETALLIC COATINGS: PLASTIC COATING, JACKET, OR LINER. 4. PADDED HANGERS: HANGER WITH FIBERGLASS OR OTHER PIPE INSULATION PAD OR 		2. INSTALL AND CO INSTRUC
	f. DISC: PTFE. g. PACKING: ASBESTOS FREE. h. HANDWHEEL: MALLEABLE IRON.		 PADDED HANGERS: HANGER WITH FIBERGLASS OR OTHER PIPE INSULATION PAD OR CUSHION TO SUPPORT BEARING SURFACE OF PIPING. HANGER RODS: CONTINUOUS-THREAD ROD, NUTS, AND WASHER MADE OF CARBON STEEL OR STAINLESS STEEL. 		. INSTALL H BOLTS, RO INSTALL H
VE	RT 3 - EXECUTION EXAMINATION	B	. STAINLESS—STEEL PIPE HANGERS AND SUPPORTS: 1. DESCRIPTION: MSS SP—58, TYPES 1 THROUGH 58, FACTORY—FABRICATED COMPONENTS.		OF PIPING FACILITATE SIMILAR UI
A	. EXAMINE VALVE INTERIOR FOR CLEANLINESS, FREEDOM FROM FOREIGN MATTER, AND CORROSION. REMOVE SPECIAL PACKING MATERIALS, SUCH AS BLOCKS, USED TO PREVENT DISC MOVEMENT DURING SHIPPING AND HANDLING.		 PADDED HANGERS: HANGER WITH FIBERGLASS OR OTHER PIPE INSULATION PAD OR CUSHION TO SUPPORT BEARING SURFACE OF PIPING. HANGER RODS: CONTINUOUS-THREAD ROD, NUTS, AND WASHER MADE OF STAINLESS 		
	OPERATE VALVES IN POSITIONS FROM FULLY OPEN TO FULLY CLOSED. EXAMINE GUIDES AND SEATS MADE ACCESSIBLE BY SUCH OPERATIONS.	C	STEEL. . COPPER PIPE HANGERS:		
	. EXAMINE THREADS ON VALVE AND MATING PIPE FOR FORM AND CLEANLINESS. . EXAMINE MATING FLANGE FACES FOR CONDITIONS THAT MIGHT CAUSE LEAKAGE. CHECK BOLTING FOR PROPER SIZE, LENGTH, AND MATERIAL. VERIFY THAT GASKET IS OF PROPER SIZE, THAT ITS MATERIAL COMPOSITION IS SUITABLE FOR SERVICE, AND THAT IT IS FREE FROM DEFECTS AND DAMAGE.		 DESCRIPTION: MSS SP-58, TYPES 1 THROUGH 58, COPPER-COATED-STEEL, FACTORY-FABRICATED COMPONENTS. HANGER RODS: CONTINUOUS-THREAD ROD, NUTS, AND WASHER MADE OF COPPER-COATED STEEL OR STAINLESS STEEL. 		
_					

E. DO NOT ATTEMPT TO REPAIR DEFECTIVE VALVES: REPLACE WITH NEW VALVES.

E PIPE HANGERS PTION: MSS SP—69, TYPE 59, SHOP— OR BLY MADE FROM STRUCTURAL CARBON—STE I—STEEL HANGER RODS, NUTS, SADDLES, AND U—E ASS PIPE HANGERS		Bignell Watkins Hasser
-TYPE, FIBERGLASS PIPE HANGERS: CRIPTION: SIMILAR TO MSS SP—58, TYPE 1, STEE E OF FIBERGLASS OR FIBERGLASS—REINFORCED RE GER RODS: CONTINUOUS—THREAD ROD, WASHEF EL.	SIN.	A R C H I T E C T S P. C. ONE PARK PLACE, SUITE 250 ANNAPOLIS, MARYLAND 21401 Maryland: (301) 261–8228 Baltimore: (410) 841–6595 MD Fax: (410) 224–4443 Annapolis: (410) 224–2727
NLESS STEEL.		Website:www.bigwaha.comThese drawings are the property of the Architect. Bignell Watkins Hasser Architects P.C. Unauthorized reproduction for any purpose is an infringement upon copyright laws. Violators will be subject to prosecution by fullest extent of the law. Written dimensions on these drawings shall have precedence over scale dimensions. Contractors shall verify and be responsible for all dimensions and conditions on the
ASS STRUT SYSTEMS CTURERS: SUBJECT TO COMPLIANCE WITH REQUIF NG PRODUCTS THAT MAY BE INCORPORATED INTO TO, THE FOLLOWING: ED TUBE & CONDUIT. MPION FIBERGLASS, INC. PER B-LINE, INC.		job and this office must be notified of any variation from the dimensions and conditions shown by these drawings.
SAFE, INC.; A GIBRALTAR INDUSTRIES COMPANY.		
AL-HANGER SHIELD INSERTS ACTURERS: SUBJECT TO COMPLIANCE WITH REQUIR NG PRODUCTS THAT MAY BE INCORPORATED INTO TO, THE FOLLOWING: PENTER & PATERSON, INC. MENT SUPPORT SERVICES. O INTERNATIONAL CORPORATION. ONAL PIPE HANGER CORPORATION. INDUSTRIES, INC. SHIELDS, INC.; A SUBSIDIARY OF PIPING TECHNOL NG TECHNOLOGY & PRODUCTS, INC O MANUFACTURING CO., INC.	THE WORK INCLUDE, BUT ARE NOT	
JE ENGINEERED PRODUCTS, INC. TON-INSERT MATERIAL FOR COLD PIPING: WATER		
CALCIUM SILICATE WITH 100-PSIG MINIMUM CC R. RAPEZE OR CLAMPED SYSTEMS: INSERT AN	OMPRESSIVE STRENGTH AND VAPOR	
EVIS OR BAND HANGERS: INSERT AND SHIELD STATEMENT AND SHIELD S		Revisions # Date
E. LENGTH: EXTEND 2 INCHES BEYOND SHEET ME AMBIENT AIR TEMPERATURE.		2/24/16 REVIEW SET
ER SYSTEMS R-ACTUATED FASTENERS: THREADED-STEEL STUD, CONCRETE WITH PULL-OUT, TENSION, AND SH RTED LOADS AND BUILDING MATERIALS WHERE USED IICAL-EXPANSION ANCHORS: INSERT-WEDGE-TYPE HARDENED PORTLAND CEMENT CONCRETE; WITH TIES APPROPRIATE FOR SUPPORTED LOADS AND BU	IEAR CAPACITIES APPROPRIATE FOR D. C. STAINLESS– STEEL ANCHORS, FOR I PULL–OUT, TENSION, AND SHEAR	
ANEOUS MATERIALS URAL STEEL: ASTM A 36/A 36M, CARBON-STEEL LVANIZED.	PLATES, SHAPES, AND BARS; BLACK	
EXECUTION		Client:
AND SUPPORT INSTALLATION PIPE—HANGER INSTALLATION: COMPLY WITH MSS S, SUPPORTS, CLAMPS, AND ATTACHMENTS AS FROM THE BUILDING STRUCTURE.		CITY OF TAKOMA PARK
TRAPEZE PIPE—HANGER INSTALLATION: COMPLY N E FOR GROUPING OF PARALLEL RUNS OF H ER ON FIELD—FABRICATED TRAPEZE PIPE HANGER ELOW KINDORF ON TRAPEZE HANGERS. S OF VARIOUS SIZES: SUPPORT TOGETHER ANI SIZE OR INSTALL INTERMEDIATE SUPPORTS F	IORIZONTAL PIPING, AND SUPPORT RS. NO MORE THAN 1" OF ROD TO D SPACE TRAPEZES FOR SMALLEST	Location: 7500 MAPLE AVE TAKOMA PARK MD.
P-69 AND MSS SP-89. INSTALL HANGERS AN	D1.1/D1.1M. WITH APPLICABLE PORTIONS OF	Project: I.T. ROOM UPGRADE
RLY SUPPORT PIPING FROM BUILDING STRUCTURE. FRAMING SYSTEM INSTALLATION: ARRANGE FOR AND SUPPORT TOGETHER ON FIELD—ASSEMBLED M ASS STRUT SYSTEM INSTALLATION: ARRANGE FOR AND SUPPORT TOGETHER ON FIELD—ASSEMBLED F	IETAL FRAMING SYSTEMS. GROUPING OF PARALLEL RUNS OF	
ED PIPING. ER SYSTEM INSTALLATION: ALL POWDER—ACTUATED FASTENERS FOR USE CRETE SLABS LESS THAN 4 INCHES THICK IN CON COMPLETELY CURED. USE OPERATORS THAT AR MANUFACTURER. INSTALL FASTENERS ACCORD	NCRETE AFTER CONCRETE IS PLACED E LICENSED BY POWDER-ACTUATED	MECHANICAL Specifications
JFACTURER'S OPERATING MANUAL. ALL MECHANICAL—EXPANSION ANCHORS IN CONCI COMPLETELY CURED. INSTALL FASTENERS ACCOR RUCTIONS.	DING TO MANUFACTURER'S WRITTEN	Drawn by A2ESG
HANGERS AND SUPPORTS COMPLETE WITH N RODS, NUTS, WASHERS, AND OTHER ACCESSORIES. HANGERS AND SUPPORTS TO ALLOW CONTROLLEI ING SYSTEMS, TO PERMIT FREEDOM OF MOVEMENT ITE ACTION OF EXPANSION JOINTS, EXPANSION	D THERMAL AND SEISMIC MOVEMENT T BETWEEN PIPE ANCHORS, AND TO	Project No. 15032.00 Date 2/24/16
UNITS.	2 TESG uared Rus Engineering	
PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF THE LAWS OF THE STATE OF	pport Group, LLC AD, HAMPSTEAD, MARYLAND 21074 5.977.9741 FAX: 410.374.5471 WWW.A2ESG.COM © COPYRIGHT 2016	

	INSTALL LATERAL BRACING WITH PIPE HANGERS AND SUPPORTS TO PREVENT SWAYING. INSTALL BUILDING ATTACHMENTS WITHIN CONCRETE SLABS OR ATTACH TO STRUCTURAL STEEL. INSTALL CONCRETE INSERTS BEFORE CONCRETE IS PLACED; FASTEN INSERTS TO FORMS AND INSTALL REINFORCING BARS THROUGH OPENINGS AT TOP OF INSERTS.	12.WELDED—STE FROM ABOVE LOADS: a. LIGHT (MS
L.	LOAD DISTRIBUTION: INSTALL HANGERS AND SUPPORTS SO THAT PIPING LIVE AND DEAD LOADS AND STRESSES FROM MOVEMENT WILL NOT BE TRANSMITTED TO CONNECTED EQUIPMENT.	b. MEDIUM (c. HEAVY (M
М.	PIPE SLOPES: INSTALL HANGERS AND SUPPORTS TO PROVIDE INDICATED PIPE SLOPES AND TO NOT EXCEED MAXIMUM PIPE DEFLECTIONS ALLOWED BY ASME B31.9 FOR BUILDING SERVICES PIPING.	13.SIDE-BEAM 14.PLATE LUGS
Ν.	INSULATED PIPING:	IS REQUIRED
	 ATTACH CLAMPS AND SPACERS TO PIPING. a. PIPING OPERATING ABOVE AMBIENT AIR TEMPERATURE: CLAMP MAY PROJECT THROUGH INSULATION. 	15.HORIZONTAL LINEAR HORI K. SADDLES AND S
	b. PIPING OPERATING BELOW AMBIENT AIR TEMPERATURE: USE THERMAL-HANGER SHIELD	SYSTEM SECTION
	 INSERT WITH CLAMP SIZED TO MATCH OD OF INSERT. c. DO NOT EXCEED PIPE STRESS LIMITS ALLOWED BY ASME B31.9 FOR BUILDING SERVICES PIPING. 	 STEEL-PIPE- WITH INSULA PROTECTION
	 INSTALL MSS SP-58, TYPE 39, PROTECTION SADDLES IF INSULATION WITHOUT VAPOR BARRIER IS INDICATED. FILL INTERIOR VOIDS WITH INSULATION THAT MATCHES ADJOINING INSULATION. 	MANUFACTUR 3. THERMAL-HA
	 3. INSTALL MSS SP-58, TYPE 40, PROTECTIVE SHIELDS ON COLD PIPING WITH VAPOR BARRIER. SHIELDS SHALL SPAN AN ARC OF 180 DEGREES. 	L. SPRING HANGER IN PIPING SYSTI 1. RESTRAINT-C
	4. SHIELD DIMENSIONS FOR PIPE: NOT LESS THAN THE FOLLOWING:	MOVEMENT. 2. SPRING CUS
	 a. NPS 1/4 TO NPS 3-1/2: 12 INCHES LONG AND 0.048 INCH THICK. 5. THERMAL-HANGER SHIELDS: INSTALL WITH INSULATION SAME THICKNESS AS PIPING INSULATION. 	EXCEED 1-1 3. SPRING-CUS
	METAL FABRICATIONS CUT, DRILL, AND FIT MISCELLANEOUS METAL FABRICATIONS FOR TRAPEZE PIPE HANGERS	HANGER WITH 4. SPRING SWA THERMAL EX
	SUPPORTS. FIT EXPOSED CONNECTIONS TOGETHER TO FORM HAIRLINE JOINTS. FIELD WELD CONNECTIONS THAT CANNOT BE SHOP WELDED BECAUSE OF SHIPPING SIZE LIMITATIONS.	5. VARIABLE—SF VARIABILITY SYSTEM FRO
C.	FIELD WELDING: COMPLY WITH AWS D1.1/D1.1M PROCEDURES FOR SHIELDED, METAL ARC WELDING; APPEARANCE AND QUALITY OF WELDS; AND METHODS USED IN CORRECTING	6. VARIABLE-SF LIMIT VARIAB PIPING SYST
_	WELDING WORK; AND WITH THE FOLLOWING:1. USE MATERIALS AND METHODS THAT MINIMIZE DISTORTION AND DEVELOP STRENGTH AND CORROSION RESISTANCE OF BASE METALS.	7. VARIABLE–SP LIMIT VARIAB
	 OBTAIN FUSION WITHOUT UNDERCUT OR OVERLAP. REMOVE WELDING FLUX IMMEDIATELY. 	PIPING SYSTI 8. CONSTANT S
	4. FINISH WELDS AT EXPOSED CONNECTIONS SO NO ROUGHNESS SHOWS AFTER FINISHING AND SO CONTOURS OF WELDED SURFACES MATCH ADJACENT CONTOURS.	TRANSFER C OR CONNEC TEST, AND TYPES:
	ADJUSTING HANGER ADJUSTMENTS: ADJUST HANGERS TO DISTRIBUTE LOADS EQUALLY ON ATTACHMENTS AND TO ACHIEVE INDICATED SLOPE OF PIPE.	a. HORIZONT b. VERTICAL
В.	TRIM EXCESS LENGTH OF CONTINUOUS-THREAD HANGER AND SUPPORT RODS TO $1-1/2$ INCHES.	c. TRAPEZE MEMBER.
	PAINTING	M. COMPLY WITH M ARE NOT SPECI
Α.	TOUCHUP: CLEAN FIELD WELDS AND ABRADED AREAS OF SHOP PAINT. PAINT EXPOSED AREAS IMMEDIATELY AFTER ERECTING HANGERS AND SUPPORTS. USE SAME MATERIALS AS USED FOR SHOP PAINTING. COMPLY WITH SSPC-PA 1 REQUIREMENTS FOR TOUCHING UP FIELD-PAINTED SURFACES.	END OF SECTION 22
-	1. APPLY PAINT BY BRUSH OR SPRAY TO PROVIDE A MINIMUM DRY FILM THICKNESS OF 2.0 MILS.	SECTION 220553 -
	TOUCHUP: CLEANING AND TOUCHUP PAINTING OF FIELD WELDS, BOLTED CONNECTIONS, AND ABRADED AREAS OF SHOP PAINT ON MISCELLANEOUS METAL ARE SPECIFIED IN DIVISION 09 PAINTING SECTIONS.	PART 1 – GENERAL
	GALVANIZED SURFACES: CLEAN WELDS, BOLTED CONNECTIONS, AND ABRADED AREAS AND APPLY GALVANIZING-REPAIR PAINT TO COMPLY WITH ASTM A 780.	1.1 RELATED DOCUL 1.2 DRAWINGS AND SUPPLEMENTAR 1.3 SUMMARY
	ADDITIONAL HANGER AND SUPPORT REQUIREMENTS ARE IN SECTIONS SPECIFYING PIPING SYSTEMS AND EQUIPMENT.	A. SECTION INCLUE 1. PIPE LABELS
В.	 WATER PIPING: PROVIDE FEE AND MASON #212 SPLIT RING HANGERS WITH SUPPORTING RODS. COMPLY WITH MSS SP-69 FOR PIPE-HANGER SELECTIONS AND APPLICATIONS THAT ARE NOT 	 VALVE TAGS. 1.4 INFORMATIONAL
	SPECIFIED IN PIPING SYSTEM SECTIONS. USE HANGERS AND SUPPORTS WITH GALVANIZED METALLIC COATINGS FOR PIPING AND EQUIPMENT THAT WILL NOT HAVE FIELD—APPLIED FINISH.	A. PROVIDE INFORI TO ACTION SUB B. VALVE NUMBER
D.	USE NONMETALLIC COATINGS ON ATTACHMENTS FOR ELECTROLYTIC PROTECTION WHERE ATTACHMENTS ARE IN DIRECT CONTACT WITH COPPER TUBING.	MAINTENANCE M
E.	USE CARBON-STEEL PIPE HANGERS AND SUPPORTS, METAL TRAPEZE PIPE HANGERS AND METAL FRAMING SYSTEMS AND ATTACHMENTS FOR GENERAL SERVICE APPLICATIONS.	1.5 COORDINATION A. COORDINATE IN PAINTING OF SU
	USE COPPER-PLATED PIPE HANGERS AND COPPER OR STAINLESS-STEEL ATTACHMENTS FOR COPPER PIPING AND TUBING. USE PADDED HANGERS FOR PIPING THAT IS SUBJECT TO SCRATCHING.	B. COORDINATE INS DOORS.
н.	USE THERMAL-HANGER SHIELD INSERTS FOR INSULATED PIPING AND TUBING. HORIZONTAL-PIPING HANGERS AND SUPPORTS: UNLESS OTHERWISE INDICATED AND EXCEPT	C. INSTALL IDENTI CONCEALMENT.
1.	AS SPECIFIED IN PIPING SYSTEM SECTIONS, INSTALL THE FOLLOWING TYPES: 1. ADJUSTABLE, STEEL CLEVIS HANGERS (MSS TYPE 1): FOR SUSPENSION OF NONINSULATED	PART 2 – PROI 2.1 PIPE LABELS
	OR INSULATED, STATIONARY PIPES NPS 1/2 TO NPS 30. 2. CARBON- OR ALLOY-STEEL, DOUBLE-BOLT PIPE CLAMPS (MSS TYPE 3): FOR SUSPENSION OF PIPES NPS 3/4 TO NPS 36, REQUIRING CLAMP FLEXIBILITY AND UP TO	A. GENERAL REQU WITH LETTERING IDENTIFY THE P
	 4 INCHES OF INSULATION. 3. PIPE HANGERS (MSS TYPE 5): FOR SUSPENSION OF PIPES NPS 1/2 TO NPS 4, TO ALLOW OFF-CENTER CLOSURE FOR HANGER INSTALLATION BEFORE PIPE ERECTION. 	B. SELF—ADHESIVE BACKING. C. PIPE LABEL C
J.	BUILDING ATTACHMENTS: UNLESS OTHERWISE INDICATED AND EXCEPT AS SPECIFIED IN PIPING SYSTEM SECTIONS, INSTALL THE FOLLOWING TYPES:	INCLUDE IDENTI AS USED ON D 1. FLOW-DIREC
	 STEEL OR MALLEABLE CONCRETE INSERTS (MSS TYPE 18): FOR UPPER ATTACHMENT TO SUSPEND PIPE HANGERS FROM CONCRETE CEILING. TOP-BEAM C-CLAMPS (MSS TYPE 19): FOR USE UNDER ROOF INSTALLATIONS WITH 	ADJACENT TO DIRECTION O 2. LETTERING S
	BAR-JOIST CONSTRUCTION, TO ATTACH TO TOP FLANGE OF STRUCTURAL SHAPE.	2.2 VALVE TAGS
	 SIDE-BEAM OR CHANNEL CLAMPS (MSS TYPE 20): FOR ATTACHING TO BOTTOM FLANGE OF BEAMS, CHANNELS, OR ANGLES. CENTER-BEAM CLAMPS (MSS TYPE 21): FOR ATTACHING TO CENTER OF BOTTOM FLANGE 	A. VALVE TAGS: ST NUMBERS.
	OF BEAMS. 5. WELDED BEAM ATTACHMENTS (MSS TYPE 22): FOR ATTACHING TO BOTTOM OF BEAMS IF LOADS ARE CONSIDERABLE AND ROD SIZES ARE LARGE.	1. TAG MATERIA STAMPED HC 2. FASTENERS:
	 6. C-CLAMPS (MSS TYPE 23): FOR STRUCTURAL SHAPES. 7. TOP-BEAM CLAMPS (MSS TYPE 25): FOR TOP OF BEAMS IF HANGER ROD IS REQUIRED 	PART 3 - EXECUTIO
	 7. TOP-BEAM CLAMPS (MSS TYPE 25): FOR TOP OF BEAMS IF HANGER ROD IS REQUIRED TANGENT TO FLANGE EDGE. 8. SIDE-BEAM CLAMPS (MSS TYPE 27): FOR BOTTOM OF STEEL I-BEAMS. 	3.1 GENERAL A. ALL VALVES TO MOUNTED TO TH
	9. STEEL-BEAM CLAMPS WITH EYE NUTS (MSS TYPE 28): FOR ATTACHING TO BOTTOM OF STEEL I-BEAMS FOR HEAVY LOADS.	3.2 PREPARATION
	 10.LINKED-STEEL CLAMPS WITH EYE NUTS (MSS TYPE 29): FOR ATTACHING TO BOTTOM OF STEEL I-BEAMS FOR HEAVY LOADS, WITH LINK EXTENSIONS. 11.MALLEABLE-BEAM CLAMPS WITH EXTENSION PIECES (MSS TYPE 30): FOR ATTACHING TO STRUCTURAL STEEL. 	A. CLEAN PIPING IDENTIFICATION PRIMERS, PAINT

ED-STEEL BRACKETS: FOR SUPPOR ABOVE BY USING CLIP AND ROD.

- GHT (MSS TYPE 31): 750 LB.
- EDIUM (MSS TYPE 32): 1500 LB.
- IEAVY (MSS TYPE 33): 3000 LB.

-BEAM BRACKETS (MSS TYPE 34): LUGS (MSS TYPE 57): FOR ATTA EQUIRED.

- ZONTAL TRAVELERS (MSS TYPE 58): R HORIZONTAL MOVÈMENT WHERE HE
- AND SHIELDS: UNLESS OTHERWISE SECTIONS, INSTALL THE FOLLOWING -PIPE-COVERING PROTECTION SADE
- INSULATION THAT MATCHES ADJOININ ECTION SHIELDS (MSS TYPE 40):
- FACTURER TO PREVENT CRUSHING MAL-HANGER SHIELD INSERTS: FOR
- HANGERS AND SUPPORTS: UNLESS SYSTEM SECTIONS, INSTALL THE RAINT-CONTROL DEVICES (MSS TYPE
- NG CUSHIONS (MSS TYPE 48): FOR ED 1-1/4 INCHES.
- NG-CUSHION ROLL HANGERS (MSS GER WITH SPRINGS.
- NG SWAY BRACES (MSS TYPE 50): MAL EXPANSION IN PIPING SYSTEMS.
- ABLE-SPRING HANGERS (MSS TYPE ABILITY FACTOR TO 25 PÈRCENT TO EM FROM HANGER.
- ABLE-SPRING BASE SUPPORTS (MS VARIABILITY FACTOR TO 25 PERCEI SYSTEM FROM BASE SUPPORT.
- BLE—SPRING TRAPEZE HANGERS (MS VARIABILITY FACTOR TO 25 PERCEI SYSTEM FROM TRAPEZE SUPPORT.
- TANT SUPPORTS: FOR CRITICAL ISFER OF STRESS FROM ONE SUPF CONNECTED EQUIPMENT. INCLUDE AND LOAD-ADJUSTMENT CAPABILIT
- ORIZONTAL (MSS TYPE 54): MOUNTE
- ERTICAL (MSS TYPE 55): MOUNTED
- APEZE (MSS TYPE 56): TWO MBER.

WITH MSS SP-69 FOR TRAPEZE PI SPECIFIED IN PIPING SYSTEM SECT TION 220529

553 – IDENTIFICATION FOR PLUMBIN ENERAL

- DOCUMENTS GS AND GENERAL PROVISIONS OF THE MENTARY CONDITIONS, APPLY TO THE
- INCLUDES:
- LABELS. TAGS.
- ATIONAL SUBMITTALS
- INFORMATIONAL SUBMITTALS IN OPE
- ION SUBMITTALS AND SECTION 017823 IUMBERING SCHEME AND SCHEDULE

- NATE INSTALLATION OF IDENTIFYING D
- IDENTIFYING DEVICES BEFORE IN

- REQUIREMENTS FOR MANUFACTURE TTERING INDICATING SERVICE, AND THE PIPING SYSTEM.
- DHESIVE PIPE LABELS: PRINTED PLAS
- -DIRECTION ARROWS: LABELS INDI
- ERING SIZE: AT LEAST 2 INCHES HIG
- AGS
- AGS: STAMPED 1/4-INCH LETTERS

- LVES TO BE IDENTIFIED BY A PLASTIC) TO THE ACOUSTICAL CEILING GRID
- TION
- PIPING AND EQUIPMENT SURFACES CATION DEVICES, INCLUDING DIRT, OIL S, PAINTS, AND ENCAPSULANTS.

- IANCE MANUALS. IATION
- NATE INSTALLATION OF IDENTIFYING GOF SURFACES WHERE DEVICES ARE
- MENT.

- PRODUCTS BELS
- ABEL CONTENTS: AFTER PIPING IDENTIFICATION OF PIPING SERVICE ON DRAWINGS, PIPE SIZE, AND AN
- CENT TO THE NAME IDENTIFICATION CTION OF FLOW.

- MATERIAL: BRASS, 0.032-INCH MINI

- IPED HOLES FOR ATTACHMENT HARDW
- ENERS: TAGS SHALL BE ATTACHED 1
- XECUTION

SUPPORT OF PIPES FROM BELOW OR FOR SUSPENDING ORD. USE ONE OF THE FOLLOWING FOR INDICATED	3.3 PIPE LABEL INSTALLATION	F. MINERAL-FIBER, PREFORMED PIPE INSULATION:	
	 A. LOCATE PIPE LABELS WHERE PIPING IS EXPOSED OR ABOVE ACCESSIBLE CEILINGS IN FINISHED SPACES; MACHINE ROOMS; ACCESSIBLE MAINTENANCE SPACES SUCH AS PLENUMS; AND EXTERIOR EXPOSED LOCATIONS AS FOLLOWS: 1. NEAR EACH VALVE AND CONTROL DEVICE. 	 PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING: 	
LB. B.	2. NEAR EACH VALVE AND CONTROL DEVICE. 2. NEAR EACH BRANCH CONNECTION, EXCLUDING SHORT TAKEOFFS FOR FIXTURES. WHERE FLOW PATTERN IS NOT OBVIOUS, MARK EACH PIPE AT BRANCH.	a. JOHNS MANVILLE; MICRO—LOK. b. FIBREX INSULATIONS INC.; COREPLUS 1200.	Bignell Watkins Hasser
34): FOR SIDES OF STEEL OR WOODEN BEAMS.	3. NEAR PENETRATIONS THROUGH WALLS, FLOORS, CEILINGS, AND INACCESSIBLE ENCLOSURES.	c. KNAUF INSULATION; 1000 PIPE INSULATION. d. MANSON INSULATION INC.; ALLEY–K.	ARCHITECTS P.C.
R ATTACHING TO STEEL BEAMS IF FLEXIBILITY AT BEAM	 AT ACCESS DOORS, MANHOLES, AND SIMILAR ACCESS POINTS THAT PERMIT VIEW OF CONCEALED PIPING. NEAR MAJOR EQUIPMENT ITEMS AND OTHER POINTS OF ORIGINATION AND TERMINATION. 	e. OWENS CORNING; FIBERGLAS PIPE INSULATION. 2. TYPE I, 850 DEG F MATERIALS: MINERAL OR GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 547, TYPE I, GRADE A, WITH	ONE PARK PLACE, SUITE 250 ANNAPOLIS, MARYLAND 21401 Maryland: (301) 261–8228 Baltimore: (410) 841–6595
E 58): FOR SUPPORTING PIPING SYSTEMS SUBJECT TO ERE HEADROOM IS LIMITED.	6. SPACED AT MAXIMUM INTERVALS OF 15 FOOT. 7. ON PIPING ABOVE REMOVABLE ACOUSTICAL CEILINGS.	FACTORY-APPLIED ASJ OR FACTORY-APPLIED ASJ-SSL.	MD Fax: (410) 224–4443 Annapolis: (410) 224–2727 Website: www.bigwaha.com
IERWISE INDICATED AND EXCEPT AS SPECIFIED IN PIPING DWING TYPES:	3.4 VALVE—TAG INSTALLATION	2.2 INSULATING CEMENTS A. MINERAL-FIBER, HYDRAULIC-SETTING INSULATING AND FINISHING CEMENT: COMPLY WITH	These drawings are the property of the Architect. Bignell Watkins Hasser Architects P.C.
N SADDLES (MSS TYPE 39): TO FILL INTERIOR VOIDS DJOINING INSULATION.	A. INSTALL TAGS ON VALVES AND CONTROL DEVICES IN PIPING SYSTEMS, EXCEPT CHECK VALVES; VALVES WITHIN FACTORY-FABRICATED EQUIPMENT UNITS; SHUTOFF VALVES; FAUCETS;	ASTM C 449/C 449M.	Unauthorized reproduction for any purpose is an infringement upon copyright laws. Violators will be subject to prosecution by fullest extent of the law. Written dimensions on these drawings shall have precedence over scale dimensions.
40): OF LENGTH RECOMMENDED IN WRITING BY HING INSULATION.	CONVENIENCE AND SIMILAR ROUGHING—IN CONNECTIONS OF END—USE FIXTURES AND UNITS. LIST TAGGED VALVES IN A VALVE SCHEDULE.	 PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING: 	Contractors shall verify and be responsible for all dimensions and conditions on the job and this office must be notified of any variation from the dimensions and conditions shown by these drawings.
: FOR SUPPORTING INSULATED PIPE. NLESS OTHERWISE INDICATED AND EXCEPT AS SPECIFIED	END OF SECTION 220553	a. INSULCO, DIVISION OF MFS, INC.; SMOOTHKOTE. b. P. K. INSULATION MFG. CO., INC.; PK NO. 127, AND QUIK-COTE.	
THE FOLLOWING TYPES: S TYPE 47): WHERE INDICATED TO CONTROL PIPING		C. ROCK WOOL MANUFACTURING COMPANY; DELTA ONE SHOT.	
, ,	SECTION 220700 - PLUMBING INSULATION	2.3 ADHESIVES A. MATERIALS SHALL BE COMPATIBLE WITH INSULATION MATERIALS, JACKETS, AND SUBSTRATES	
: FOR LIGHT LOADS IF VERTICAL MOVEMENT DOES NOT	PART 1 - GENERAL	AND FOR BONDING INSULATION TO ITSELF AND TO SURFACES TO BE INSULATED, UNLESS OTHERWISE INDICATED.	
(MSS TYPE 49): FOR EQUIPPING TYPE 41, ROLL		B. FLEXIBLE ELASTOMERIC ADHESIVE: COMPLY WITH MIL-A-24179A, TYPE II, CLASS I.	
PE 50): TO RETARD SWAY, SHOCK, VIBRATION, OR STEMS.	SUPPLEMENTARY CONDITIONS, APPLY TO THE WORK UNDER DIVISIONS 21 THROUGH 28.	 PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING: 	
TYPE 51): PRESET TO INDICATED LOAD AND LIMIT NT TO ALLOW EXPANSION AND CONTRACTION OF PIPING	1.2 SUMMARY A. SECTION INCLUDES:	a. AEROFLEX USA INC.; AEROSEAL. b. ARMACELL LCC; 520 ADHESIVE.	
S (MSS TYPE 52): PRESET TO INDICATED LOAD AND	1. INSULATION MATERIALS:	c. FOSTER PRODUCTS CORPORATION, H. B. FULLER COMPANY; 85–75. d. RBX CORPORATION; RUBATEX CONTACT ADHESIVE.	
PERCENT TO ALLOW EXPANSION AND CONTRACTION OF RT.	a. FLEXIBLE ELASTOMERIC. b. MINERAL FIBER.	2. FOR INDOOR APPLICATIONS, USE ADHESIVE THAT HAS A VOC CONTENT OF 50 G/L OR LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24).	
RS (MSS TYPE 53): PRESET TO INDICATED LOAD AND PERCENT TO ALLOW EXPANSION AND CONTRACTION OF	 ADHESIVES. MASTICS. LAGGING ADHESIVES. 	C. MINERAL-FIBER ADHESIVE: COMPLY WITH MIL-A-3316C, CLASS 2, GRADE A.	
PPORT. ITICAL PIPING STRESS AND IF NECESSARY TO AVOID	4. LAGGING ADHESIVES. 5. SEALANTS. 6. FIELD—APPLIED JACKETS.	1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE	
SUPPORT TO ANOTHER SUPPORT, CRITICAL TERMINAL, CLUDE AUXILIARY STOPS FOR ERECTION, HYDROSTATIC	7. FACTORY—APPLIED JACKETS 8. TAPES.	FOLLOWING: a. CHILDERS PRODUCTS, DIVISION OF ITW; CP-82.	
PABILITY. THESE SUPPORTS INCLUDE THE FOLLOWING	9. SECUREMENTS.	 b. FOSTER PRODUCTS CORPORATION, H. B. FULLER COMPANY; 85–20. c. ITW TACC, DIVISION OF ILLINOIS TOOL WORKS; S-90/80. d. MARATHON, INDUSTRIES, INC + 225 	
MOUNTED HORIZONTALLY. JNTED VERTICALLY.	1.3 ACTION SUBMITTALS A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED. INCLUDE THERMAL CONDUCTIVITY,	 d. MARATHON INDUSTRIES, INC.; 225. e. MON-ECO INDUSTRIES, INC.; 22-25. 2. FOR INDOOR APPLICATIONS, USE ADHESIVE THAT HAS A VOC CONTENT OF 80 G/L OR LESS 	Revisions
TWO VERTICAL-TYPE SUPPORTS AND ONE TRAPEZE	THICKNESS, AND JACKETS.	WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24).	# Date 2/24/16 REVIEW SET
EZE PIPE—HANGER SELECTIONS AND APPLICATIONS THAT	A. PROVIDE INFORMATIONAL SUBMITTALS IN OPERATION AND MAINTENANCE MANUALS IN ADDITION TO ACTION SUBMITTALS AND SECTION 017823 "OPERATION AND MAINTENANCE DATA".	2.4 MASTICS A. MATERIALS SHALL BE COMPATIBLE WITH INSULATION MATERIALS, JACKETS, AND SUBSTRATES;	
	B. QUALIFICATION DATA: FOR QUALIFIED INSTALLER.	COMPLY WITH MIL-C-19565C, TYPE II.	
	C. MATERIAL TEST REPORTS: FROM A QUALIFIED TESTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION INDICATING, INTERPRETING, AND CERTIFYING TEST RESULTS FOR COMPLIANCE OF INSULATION MATERIALS, SEALERS, ATTACHMENTS, CEMENTS, AND JACKETS,	ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24) OR LESS.	
LUMBING PIPING AND EQUIPMENT	WITH REQUIREMENTS INDICATED. INCLUDE DATES OF TESTS AND TEST METHODS EMPLOYED. D. FIELD QUALITY-CONTROL REPORTS.	B. VAPOR-BARRIER MASTIC: WATER BASED; SUITABLE FOR INDOOR AND OUTDOOR USE ON BELOW AMBIENT SERVICES.	
	1.5 QUALITY ASSURANCE	1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE	
OF THE CONTRACT, INCLUDING GENERAL AND	A. INSTALLER QUALIFICATIONS: SKILLED MECHANICS WHO HAVE SUCCESSFULLY COMPLETED AN APPRENTICESHIP PROGRAM OR ANOTHER CRAFT TRAINING PROGRAM CERTIFIED BY THE	FOLLOWING: a. CHILDERS PRODUCTS, DIVISION OF ITW; CP—35.	
TO THE WORK UNDER DIVISIONS 21 THROUGH 28	DEPARTMENT OF LABOR, BUREAU OF APPRENTICESHIP AND TRAINING. B. FIRE-TEST-RESPONSE CHARACTERISTICS: INSULATION AND RELATED MATERIALS SHALL HAVE	 b. FOSTER PRODUCTS CORPORATION, H. B. FULLER COMPANY; 30–90. c. ITW TACC, DIVISION OF ILLINOIS TOOL WORKS; CB–50. d. MARATHON INDUSTRIES, INC.; 590. 	Client:
	FIRE-TEST-RESPONSE CHARACTERISTICS INDICATED, AS DETERMINED BY TESTING IDENTICAL PRODUCTS PER ASTM E 84, BY A TESTING AND INSPECTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION. FACTORY LABEL INSULATION AND JACKET MATERIALS AND	e. MON-ECO INDUSTRIES, INC.; 55-40. f. VIMASCO CORPORATION; 749.	CITY OF TAKOMA PARK
	ADHESIVE, MASTIC, TAPES, AND CEMENT MATERIAL CONTAINERS, WITH APPROPRIATE MARKINGS OF APPLICABLE TESTING AND INSPECTING AGENCY.	2. WATER-VAPOR PERMEANCE: ASTM E 96, PROCEDURE B, 0.013 PERM AT 43-MIL DRY FILM THICKNESS.	
IN OPERATION AND MAINTENANCE MANUALS IN ADDITION 017823 "OPERATION AND MAINTENANCE DATA".	1. INSULATION INSTALLED INDOORS: FLAME—SPREAD INDEX OF 25 OR LESS, AND SMOKE—DEVELOPED INDEX OF 50 OR LESS.	 SERVICE TEMPERATURE RANGE: MINUS 20 TO PLUS 180 DEG F. SOLIDS CONTENT: ASTM D 1644, 59 PERCENT BY VOLUME AND 71 PERCENT BY WEIGHT. COLOR: WHITE. 	Location:
HEDULES: FOR EACH PIPING SYSTEM TO INCLUDE IN	1.6 DELIVERY, STORAGE, AND HANDLING	C. VAPOR-BARRIER MASTIC: SOLVENT BASED; SUITABLE FOR INDOOR USE ON BELOW AMBIENT SERVICES.	7500 MAPLE AVE
	A. PACKAGING: INSULATION MATERIAL CONTAINERS SHALL BE MARKED BY MANUFACTURER WITH APPROPRIATE ASTM STANDARD DESIGNATION, TYPE AND GRADE, AND MAXIMUM USE	SERVICES.	TAKOMA PARK MD.
IFYING DEVICES WITH COMPLETION OF COVERING AND ES ARE TO BE APPLIED.	TEMPERATURE.	MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:	
YING DEVICES WITH LOCATIONS OF ACCESS PANELS AND	A. COORDINATE SIZE AND LOCATION OF SUPPORTS, HANGERS, AND INSULATION SHIELDS	a. CHILDERS PRODUCTS, DIVISION OF ITW; CP-30. b. FOSTER PRODUCTS CORPORATION, H. B. FULLER COMPANY; 30-35. c. ITW TACC, DIVISION OF ILLINOIS TOOL WORKS; CB-25.	Project:
ORE INSTALLING ACOUSTICAL CEILINGS AND SIMILAR	SPECIFIED IN DIVISION 22 SECTION "HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT."	c. ITW TACC, DIVISION OF ILLINOIS TOOL WORKS; CB-25. d. MARATHON INDUSTRIES, INC.; 501. e. MON-ECO INDUSTRIES, INC.; 55-10.	I.T. ROOM UPGRADE
	B. COORDINATE CLEARANCE REQUIREMENTS WITH PIPING INSTALLER FOR PIPING INSULATION APPLICATION AND EQUIPMENT INSTALLER FOR EQUIPMENT INSULATION APPLICATION. BEFORE PREPARING PIPING SHOP DRAWINGS, ESTABLISH AND MAINTAIN CLEARANCE REQUIREMENTS FOR	2. WATER-VAPOR PERMEANCE: ASTM F 1249, 0.05 PERM AT 35-MIL DRY FILM THICKNESS. 3. SERVICE TEMPERATURE RANGE: 0 TO 180 DEG F .	
ACTURED PIPE LABELS: PREPRINTED, COLOR-CODED,	INSTALLATION OF INSULATION AND FIELD-APPLIED JACKETS AND FINISHES AND FOR SPACE REQUIRED FOR MAINTENANCE.	4. SOLIDS CONTENT: ASTM D 1644, 44 PERCENT BY VOLUME AND 62 PERCENT BY WEIGHT. 5. COLOR: WHITE.	
ACTURED PIPE LABELS: PREPRINTED, COLOR-CODED, E, AND SHOWING FLOW DIRECTION. LABELS SHALL	C. COORDINATE INSTALLATION AND TESTING OF HEAT TRACING.	D. BREATHER MASTIC: WATER BASED; SUITABLE FOR INDOOR AND OUTDOOR USE ON ABOVE AMBIENT SERVICES.	MECHANICAL
ED PLASTIC WITH CONTACT-TYPE, PERMANENT-ADHESIVE	1.8 SCHEDULING A. SCHEDULE INSULATION APPLICATION AFTER PRESSURE TESTING SYSTEMS AND, WHERE	1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE	SPECIFICATIONS
PING HAS BEEN INSTALLED, TESTED AND INSULATED, SERVICE USING SAME DESIGNATIONS OR ABBREVIATIONS	REQUIRED, AFTER INSTALLING AND TESTING HEAT TRACING. INSULATION APPLICATION MAY BEGIN ON SEGMENTS THAT HAVE SATISFACTORY TEST RESULTS.	FOLLOWING: a. CHILDERS PRODUCTS, DIVISION OF ITW; CP—10.	
ND AN ARROW INDICATING FLOW DIRECTION. S INDICATING DIRECTION OF FLOW SHALL BE APPLIED ATION AND SHALL POINT AWAY FROM THE NAME IN THE	B. COMPLETE INSTALLATION AND CONCEALMENT OF PLASTIC MATERIALS AS RAPIDLY AS POSSIBLE IN EACH AREA OF CONSTRUCTION.	 b. FOSTER PRODUCTS CORPORATION, H. B. FULLER COMPANY; 35–00. c. ITW TACC, DIVISION OF ILLINOIS TOOL WORKS; CB–05/15. 	
HES HIGH.	PART 2 - PRODUCTS	d. MARATHON INDUSTRIES, INC.; 550. e. MON-ECO INDUSTRIES, INC.; 55-50. f. VIMASCO CORPORATION; WC-1/WC-5.	Drawn by
	2.1 INSULATION MATERIALS A. PRODUCTS SHALL NOT CONTAIN ASBESTOS, LEAD, MERCURY, OR MERCURY COMPOUNDS.	2. WATER-VAPOR PERMEANCE: ASTM F 1249, 3 PERMS AT 0.0625-INCH DRY FILM THICKNESS.	A2ESG
TERS FOR PIPING SYSTEM ABBREVIATION AND 1/2-INCH	B. PRODUCTS THAT COME IN CONTACT WITH STAINLESS STEEL SHALL HAVE A LEACHABLE CHLORIDE CONTENT OF LESS THAN 50 PPM WHEN TESTED ACCORDING TO ASTM C 871.	 3. SERVICE TEMPERATURE RANGE: MINUS 20 TO PLUS 200 DEG F. 4. SOLIDS CONTENT: 63 PERCENT BY VOLUME AND 73 PERCENT BY WEIGHT. 	Project No. 15032.00 Date 2/24/16
CH MINIMUM THICKNESS, AND HAVING PREDRILLED OR HARDWARE.	C. INSULATION MATERIALS FOR USE ON AUSTENITIC STAINLESS STEEL SHALL BE QUALIFIED AS ACCEPTABLE ACCORDING TO ASTM C 795.	5. COLOR: WHITE.	
CHED TO VALVE WHEELS WITH A BRASS WIRE-LINK.	D. FOAM INSULATION MATERIALS SHALL NOT USE CFC OR HCFC BLOWING AGENTS IN THE MANUFACTURING PROCESS.		
	E. FLEXIBLE ELASTOMERIC: CLOSED-CELL, SPONGE- OR EXPANDED-RUBBER MATERIALS. COMPLY WITH ASTM C 534, TYPE I FOR TUBULAR MATERIALS AND TYPE II FOR SHEET	$A^2 + ESG$	
PLASTIC TAG (BLACK LETTERS ON WHITE BACKGROUND)	MATERIALS.		
GRID UNDER THE EQUIPMENT.	MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:		
ACES OF SUBSTANCES THAT COULD IMPAIR BOND OF IRT, OIL, GREASE, RELEASE AGENTS, AND INCOMPATIBLE	a. AEROFLEX USA INC.; AEROCEL. b. ARMACELL LLC; AP ARMAFLEX.	PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR Support Group, LLC	$ \qquad \qquad \qquad \qquad \qquad \qquad \qquad $
	c. RBX CORPORATION; INSUL-SHEET 1800 AND INSUL-TUBE 180.	APPROVED BY ME, AND THAT I AM A DULY LICENSED 3477 SHILOH ROAD, HAMPSTEAD, MARYLAND 21074	
		PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 36773, EXPIRATION DATE: 01-18-17 PHONE: 443.977.9741 FAX: 410.374.5471 WWW.A2ESG.COM © COPYRIGHT 2016	

2.5 LAGGING ADHESIVES JACKET. A. DESCRIPTION: COMPLY WITH MIL-A-3316C, CLASS I, GRADE A, AND SHALL BE COMPATIBLE WITH INSULATION MATERIALS, JACKETS, AND SUBSTRATES. C. INSTALL COMPRESSED FIBERGLASS BLOCKS AT HANGER LOCATIONS. 1. FOR INDOOR APPLICATIONS. USE LAGGING ADHESIVES THAT HAVE A VOC CONTENT WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24) OR LESS. INSULATION SYSTEM SCHEDULES. 2. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS AVAILABLE PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING: INSULATION OR JACKET IN EITHER WET OR DRY STATE. a. FOSTER PRODUCTS CORPORATION, H. B. FULLER COMPANY; 81-42. b. CHILDERS PRODUCTS, DIVISION OF ITW; CP-52. c. MARATHON INDUSTRIES, INC.; 130. d. MON-ECO INDUSTRIES, INC.: 11-30. H. DO NOT WELD BRACKETS, CLIPS, OR OTHER ATTACHMENT DEVICES TO PIPING, FITTINGS, AND e. VIMASCO CORPORATION; 136. SPECIALTIES. 3. FIRE-RESISTANT, WATER-BASED LAGGING ADHESIVE AND COATING FOR USE INDOORS TO ADHERE FIRE-RESISTANT LAGGING CLOTHS OVER EQUIPMENT AND PIPE INSULATION. I. KEEP INSULATION MATERIALS DRY DURING APPLICATION AND FINISHING 4. SERVICE TEMPERATURE RANGE: MINUS 50 TO PLUS 180 DEG F. 5. COLOR: WHITE. K. INSTALL INSULATION WITH LEAST NUMBER OF JOINTS PRACTICAL. 2.6 SEALANTS A. JOINT SEALANTS: B. ASJ FLASHING SEALANTS: 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE PRODUCTS THAT ATTACHMENTS. MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE 2. FOR INSULATION APPLICATION WHERE VAPOR BARRIERS ARE INDICATED, EXTEND INSULATION FOLLOWING: a. CHILDERS PRODUCTS, DIVISION OF ITW; CP-76. 2. MATERIALS SHALL BE COMPATIBLE WITH INSULATION MATERIALS, JACKETS, AND SUBSTRATES. VAPOR-BARRIER MASTIC 3. FIRE- AND WATER-RESISTANT, FLEXIBLE, ELASTOMERIC SEALANT. 4. SERVICE TEMPERATURE RANGE: MINUS 40 TO PLUS 250 DEG F. 5. COLOR: WHITE. BY INSULATION MATERIAL MANUFACTURER. 6. FOR INDOOR APPLICATIONS, USE SEALANTS THAT HAVE A VOC CONTENT OF 250 G/L OR SHIELDS OVER JACKET, ARRANGED TO PROTECT JACKET FROM TEAR OR PUNCTURE BY LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24). HANGER, SUPPORT, AND SHIELD. 2.7 FIELD-APPLIED JACKETS RATE AND WET AND DRY FILM THICKNESSES. A. FIELD-APPLIED JACKETS SHALL COMPLY WITH ASTM C 921, TYPE I, UNLESS OTHERWISE INDICATED. N. INSTALL INSULATION WITH FACTORY-APPLIED JACKETS AS FOLLOWS: B. PVC JACKET: HIGH-IMPACT-RESISTANT, UV-RESISTANT PVC COMPLYING WITH ASTM D 1784, 1. DRAW JACKET TIGHT AND SMOOTH. CLASS 16354-C; THICKNESS AS SCHEDULED; ROLL STOCK READY FOR SHOP OR FIELD CUTTING AND FORMING. THICKNESS IS INDICATED IN FIELD-APPLIED JACKET SCHEDULES. ALONG BOTH EDGES OF STRIP, SPACED 4 INCHES O.C. 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING: a. JOHNS MANVILLE; ZESTON. INCHES O.C. b. P.I.C. PLASTICS, INC.; FG SERIES. c. PROTO PVC CORPORATION; LOSMOKE. d. SPEEDLINE CORPORATION; SMOKESAFE. MANUFACTURER TO MAINTAIN VAPOR SEAL. 2. ADHESIVE: AS RECOMMENDED BY JACKET MATERIAL MANUFACTURER. 3. COLOR: WHITE JOINTS AND AT ENDS ADJACENT TO PIPE FLANGES AND FITTINGS. 4. FACTORY-FABRICATED FITTING COVERS TO MATCH JACKET IF AVAILABLE; OTHERWISE, FIELD FABRICATE. OF ITS NOMINAL THICKNESS. a. SHAPES: 45- AND 90-DEGREE, SHORT- AND LONG-RADIUS ELBOWS, TEES, VALVES, FLANGES, UNIONS, REDUCERS, END CAPS, SOIL-PIPE HUBS, TRAPS, MECHANICAL JOINTS, AND P-TRAP AND SUPPLY COVERS FOR LAVATORIES. AND CRACKING DUE TO THERMAL MOVEMENT. 2.8 TAPES A. ASJ TAPE: WHITE VAPOR-RETARDER TAPE MATCHING FACTORY-APPLIED JACKET WITH ACRYLIC AND SEAL PATCHES SIMILAR TO BUTT JOINTS. ADHESIVE, COMPLYING WITH ASTM C 1136. 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE PRODUCTS THAT 1. VIBRATION-CONTROL DEVICES. MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE 2. TESTING AGENCY LABELS AND STAMPS. FOLLOWING: a. AVERY DENNISON CORPORATION, SPECIALTY TAPES DIVISION; FASSON 0835. 3. NAMEPLATES AND DATA PLATES. b. COMPAC CORP.; 104 AND 105. 3.4 GENERAL PIPE INSULATION INSTALLATION c. IDEAL TAPE CO., INC., AN AMERICAN BILTRITE COMPANY; 428 AWF ASJ. d. VENTURE TAPE; 1540 CW PLUS, 1542 CW PLUS, AND 1542 CW PLUS/SQ. 2. WIDTH: 3 INCHES. INSTALLATION ARTICLES. 3. THICKNESS: 11.5 MILS. 4. ADHESION: 90 OUNCES FORCE/INCH IN WIDTH. 5. ELONGATION: 2 PERCENT. 6. TENSILE STRENGTH: 40 LBF/INCH IN WIDTH. 7. ASJ TAPE DISKS AND SQUARES: PRECUT DISKS OR SQUARES OF ASJ TAPE. OTHERWISE INDICATED. B. PVC TAPE: WHITE VAPOR-RETARDER TAPE MATCHING FIELD-APPLIED PVC JACKET WITH ACRYLIC ADHESIVE. SUITABLE FOR INDOOR AND OUTDOOR APPLICATIONS. 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING: INSULATION. a. AVERY DENNISON CORPORATION, SPECIALTY TAPES DIVISION; FASSON 0555. b. COMPAC CORP.; 130. c. IDEAL TAPE CO., INC., AN AMERICAN BILTRITE COMPANY; 370 WHITE PVC TAPE. d. VENTURE TAPE; 1506 CW NS. HOLD IN PLACE WITH TIE WIRE. BOND PIECES WITH ADHESIVE. 2. WIDTH: 2 INCHES 3. THICKNESS: 6 MILS 4. ADHESION: 64 OUNCES FORCE/INCH IN WIDTH. 5. ELONGATION: 500 PERCENT. 6. TENSILE STRENGTH: 18 LBF/INCH IN WIDTH 5. INSTALL HANDLE EXTENSIONS ON VALVES WHICH ARE INSULATED. 2.9 SECUREMENTS A. BANDS: 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING: a. CHILDERS PRODUCTS; BANDS. b. PABCO METALS CORPORATION; BANDS. c. RPR PRODUCTS, INC.; BANDS. 2. STAINLESS STEEL: ASTM A 167 OR ASTM A 240/A 240M, TYPE 304; 0.015 INCH THICK, 1/2 INCH WIDE WITH WING SEAL. 3. ALUMINUM: ASTM B 209, ALLOY 3003, 3005, 3105, OR 5005; TEMPER H-14, 0.020 INCH THICK, 1/2 INCH WIDE WITH WING SEAL. 4. SPRINGS: TWIN SPRING SET CONSTRUCTED OF STAINLESS STEEL WITH ENDS FLAT AND SLOTTED TO ACCEPT METAL BANDS. SPRING SIZE DETERMINED BY MANUFACTURER FOR CONTOUR. APPLICATION. PART 3 - EXECUTION 3.1 EXAMINATION "UNION." MATCH SIZE AND COLOR OF PIPE LABELS. A. EXAMINE SUBSTRATES AND CONDITIONS FOR COMPLIANCE WITH REQUIREMENTS FOR INSTALLATION AND OTHER CONDITIONS AFFECTING PERFORMANCE OF INSULATION APPLICATION. 1. VERIFY THAT SYSTEMS AND EQUIPMENT TO BE INSULATED HAVE BEEN TESTED AND ARE FREE OF DEFECTS. 2. VERIFY THAT SURFACES TO BE INSULATED ARE CLEAN AND DRY. AND FINISH WITH FINISHING CEMENT, MASTIC, AND FLASHING SEALANT. 3. PROCEED WITH INSTALLATION ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED CONFORM TO THE FOLLOWING: 3.2 PREPARATION A. SURFACE PREPARATION: CLEAN AND DRY SURFACES TO RECEIVE INSULATION. REMOVE ADJOINING PIPE INSULATION. MATERIALS THAT WILL ADVERSELY AFFECT INSULATION APPLICATION. 3.3 GENERAL INSTALLATION REQUIREMENTS A. INSTALL INSULATION MATERIALS, ACCESSORIES, AND FINISHES WITH SMOOTH, STRAIGHT, AND EVEN SURFACES; FREE OF VOIDS THROUGHOUT THE LENGTH OF EQUIPMENT AND PIPING BAND MATERIAL COMPATIBLE WITH INSULATION AND JACKET. INCLUDING FITTINGS, VALVES, AND SPECIALTIES.

B. INSULATION EXPOSED IN AREAS WITH STUDENT ACCESS SHALL BE WRAPPED WITH A METAL

- D. INSTALL INSULATION MATERIALS, FORMS, VAPOR BARRIERS OR RETARDERS, JACKETS, AND THICKNESSES REQUIRED FOR EACH ITEM OF EQUIPMENT AND PIPE SYSTEM AS SPECIFIED IN
- E. INSTALL ACCESSORIES COMPATIBLE WITH INSULATION MATERIALS AND SUITABLE FOR THE SERVICE. INSTALL ACCESSORIES THAT DO NOT CORRODE, SOFTEN, OR OTHERWISE ATTACK
- F. INSTALL INSULATION WITH LONGITUDINAL SEAMS AT TOP AND BOTTOM OF HORIZONTAL RUNS. G. INSTALL MULTIPLE LAYERS OF INSULATION WITH LONGITUDINAL AND END SEAMS STAGGERED.
- J. INSTALL INSULATION WITH TIGHT LONGITUDINAL SEAMS AND END JOINTS. BOND SEAMS AND JOINTS WITH ADHESIVE RECOMMENDED BY INSULATION MATERIAL MANUFACTURER.
- L. WHERE VAPOR BARRIER IS INDICATED, SEAL JOINTS, SEAMS, AND PENETRATIONS IN INSULATION AT HANGERS, SUPPORTS, ANCHORS, AND OTHER PROJECTIONS WITH VAPOR-BARRIER MASTIC.
- 1. INSTALL INSULATION CONTINUOUSLY THROUGH HANGERS AND AROUND ANCHOR
- ON ANCHOR LEGS FROM POINT OF ATTACHMENT TO SUPPORTED ITEM TO POINT OF ATTACHMENT TO STRUCTURE. TAPER AND SEAL ENDS AT ATTACHMENT TO STRUCTURE WITH
- 3. INSTALL INSERT MATERIALS AND INSTALL INSULATION TO TIGHTLY JOIN THE INSERT. SEAL INSULATION TO INSULATION INSERTS WITH ADHESIVE OR SEALING COMPOUND RECOMMENDED 4. COVER INSERTS WITH JACKET MATERIAL MATCHING ADJACENT PIPE INSULATION. INSTALL
- M. APPLY ADHESIVES, MASTICS, AND SEALANTS AT MANUFACTURER'S RECOMMENDED COVERAGE
- 2. COVER CIRCUMFERENTIAL JOINTS WITH 3-INCH WIDE STRIPS. OF SAME MATERIAL AS INSULATION JACKET. SECURE STRIPS WITH ADHESIVE AND OUTWARD CLINCHING STAPLES 3. OVERLAP JACKET LONGITUDINAL SEAMS AT LEAST 1-1/2 INCHES. INSTALL INSULATION
- WITH LONGITUDINAL SEAMS AT BOTTOM OF PIPE. CLEAN AND DRY SURFACE TO RECEIVE SELF-SEALING LAP. STAPLE LAPS WITH OUTWARD CLINCHING STAPLES ALONG EDGE AT 2 3.6 MINERAL-FIBER INSULATION INSTALLATION a. FOR BELOW AMBIENT SERVICES, APPLY VAPOR-BARRIER MASTIC OVER STAPLES.
- 4. COVER JOINTS AND SEAMS WITH TAPE AS RECOMMENDED BY INSULATION MATERIAL 5. WHERE VAPOR BARRIERS ARE INDICATED, APPLY VAPOR-BARRIER MASTIC ON SEAMS AND
- O. CUT INSULATION IN A MANNER TO AVOID COMPRESSING INSULATION MORE THAN 75 PERCENT
- P. FINISH INSTALLATION WITH SYSTEMS AT OPERATING CONDITIONS. REPAIR JOINT SEPARATIONS
- Q. REPAIR DAMAGED INSULATION FACINGS BY APPLYING SAME FACING MATERIAL OVER DAMAGED AREAS. EXTEND PATCHES AT LEAST 4 INCHES BEYOND DAMAGED AREAS. ADHERE, STAPLE,
- R. FOR ABOVE AMBIENT SERVICES, DO NOT INSTALL INSULATION TO THE FOLLOWING:
- A. REQUIREMENTS IN THIS ARTICLE GENERALLY APPLY TO ALL INSULATION MATERIALS EXCEPT WHERE MORE SPECIFIC REQUIREMENTS ARE SPECIFIED IN VARIOUS PIPE INSULATION MATERIAL
- B. INSULATION INSTALLATION ON FITTINGS, VALVES, STRAINERS, FLANGES, AND UNIONS:
- 1. INSTALL INSULATION OVER FITTINGS, VALVES, STRAINERS, FLANGES, UNIONS, AND OTHER SPECIALTIES WITH CONTINUOUS THERMAL AND VAPOR-RETARDER INTEGRITY, UNLESS
- 2. INSULATE PIPE ELBOWS USING PREFORMED FITTING INSULATION OR MITERED FITTINGS MADE FROM SAME MATERIAL AND DENSITY AS ADJACENT PIPE INSULATION. EACH PIECE SHALL BE BUTTED TIGHTLY AGAINST ADJOINING PIECE AND BONDED WITH ADHESIVE. FILL JOINTS. SEAMS, VOIDS, AND IRREGULAR SURFACES WITH INSULATING CEMENT FINISHED TO A SMOOTH, HARD, AND UNIFORM CONTOUR THAT IS UNIFORM WITH ADJOINING PIPE
- 3. INSULATE TEE FITTINGS WITH PREFORMED FITTING INSULATION OR SECTIONAL PIPE INSULATION OF SAME MATERIAL AND THICKNESS AS USED FOR ADJACENT PIPE. CUT SECTIONAL PIPE INSULATION TO FIT. BUTT EACH SECTION CLOSELY TO THE NEXT AND
- 4. INSULATE VALVES USING PREFORMED FITTING INSULATION OR SECTIONAL PIPE INSULATION OF SAME MATERIAL, DENSITY, AND THICKNESS AS USED FOR ADJACENT PIPE. OVERLAP ADJOINING PIPE INSULATION BY NOT LESS THAN TWO TIMES THE THICKNESS OF PIPE INSULATION, OR ONE PIPE DIAMETER, WHICHEVER IS THICKER. FOR VALVES, INSULATE UP TO AND INCLUDING THE BONNETS. VALVE STUFFING-BOX STUDS, BOLTS, AND NUTS. FILL JOINTS, SEAMS, AND IRREGULAR SURFACES WITH INSULATING CEMENT.
- 6. INSULATE STRAINERS USING PREFORMED FITTING INSULATION OR SECTIONAL PIPE INSULATION OF SAME MATERIAL, DENSITY, AND THICKNESS AS USED FOR ADJACENT PIPE. OVERLAP ADJOINING PIPE INSULATION BY NOT LESS THAN TWO TIMES THE THICKNESS OF PIPE INSULATION, OR ONE PIPE DIAMETER, WHICHEVER IS THICKER. FILL JOINTS, SEAMS, AND IRREGULAR SURFACES WITH INSULATING CEMENT. INSULATE STRAINERS SO STRAINER BASKET FLANGE OR PLUG CAN BE EASILY REMOVED AND REPLACED WITHOUT DAMAGING THE INSULATION AND JACKET. PROVIDE A REMOVABLE REUSABLE INSULATION COVER. FOR BELOW AMBIENT SERVICES, PROVIDE A DESIGN THAT MAINTAINS VAPOR BARRIER.
- 7. INSULATE FLANGES AND UNIONS USING A SECTION OF OVERSIZED PREFORMED PIPE INSULATION. OVERLAP ADJOINING PIPE INSULATION BY NOT LESS THAN TWO TIMES THE THICKNESS OF PIPE INSULATION, OR ONE PIPE DIAMETER, WHICHEVER IS THICKER. 8. COVER SEGMENTED INSULATED SURFACES WITH A LAYER OF FINISHING CEMENT AND COAT
- WITH A MASTIC. INSTALL VAPOR-BARRIER MASTIC FOR BELOW AMBIENT SERVICES AND A BREATHER MASTIC FOR ABOVE AMBIENT SERVICES. REINFORCE THE MASTIC WITH FABRIC-REINFORCING MESH. TROWEL THE MASTIC TO A SMOOTH AND WELL-SHAPED
- 9. FOR SERVICES NOT SPECIFIED TO RECEIVE A FIELD-APPLIED JACKET EXCEPT FOR FLEXIBLE ELASTOMERIC AND POLYOLEFIN, INSTALL FITTED PVC COVER OVER ELBOWS, TEES, STRAINERS, VALVES, FLANGES, AND UNIONS. TERMINATE ENDS WITH PVC END CAPS. TAPE PVC COVERS TO ADJOINING INSULATION FACING USING PVC TAPE. 10.STENCIL OR LABEL THE OUTSIDE INSULATION JACKET OF EACH UNION WITH THE WORD
- C. INSULATE INSTRUMENT CONNECTIONS FOR THERMOMETERS, PRESSURE GAGES, PRESSURE TEMPERATURE TAPS, TEST CONNECTIONS, FLOW METERS, SENSORS, SWITCHES, AND TRANSMITTERS ON INSULATED PIPES AND EQUIPMENT. SHAPE INSULATION AT THESE CONNECTIONS BY TAPERING IT TO AND AROUND THE CONNECTION WITH INSULATING CEMENT
- D. INSTALL REMOVABLE INSULATION COVERS AT LOCATIONS INDICATED. INSTALLATION SHALL 3.9 FIELD QUALITY CONTROL 1. MAKE REMOVABLE FLANGE AND UNION INSULATION FROM SECTIONAL PIPE INSULATION OF
 - SAME THICKNESS AS THAT ON ADJOINING PIPE. INSTALL SAME INSULATION JACKET AS
- 2. WHEN FLANGE AND UNION COVERS ARE MADE FROM SECTIONAL PIPE INSULATION, EXTEND INSULATION FROM FLANGES OR UNION LONG AT LEAST TWO TIMES THE INSULATION THICKNESS OVER ADJACENT PIPE INSULATION ON EACH SIDE OF FLANGE OR UNION. SECURE FLANGE COVER IN PLACE WITH STAINLESS-STEEL OR ALUMINUM BANDS. SELECT

- 3. CONSTRUCT REMOVABLE VALVE INSULATION COVERS IN SAME MANNER AS FOR FLANGES EXCEPT DIVIDE THE TWO-PART SECTION ON THE VERTICAL CENTER LINE OF VALVE BODY. 4. WHEN COVERS ARE MADE FROM BLOCK INSULATION, MAKE TWO HALVES, EACH CONSISTING OF MITERED BLOCKS WIRED TO STAINLESS-STEEL FABRIC. SECURE THIS WIRE FRAME,
- WITH ITS ATTACHED INSULATION, TO FLANGES WITH TIE WIRE. EXTEND INSULATION AT LEAST 2 INCHES OVER ADJACENT PIPE INSULATION ON EACH SIDE OF VALVE. FILL SPACE BETWEEN FLANGE OR UNION COVER AND PIPE INSULATION WITH INSULATING CEMENT. FINISH COVER ASSEMBLY WITH INSULATING CEMENT APPLIED IN TWO COATS. AFTER FIRST COAT IS DRY, APPLY AND TROWEL SECOND COAT TO A SMOOTH FINISH.
- 3.10 PIPIN 5. UNLESS A PVC JACKET IS INDICATED IN FIELD-APPLIED JACKET SCHEDULES, FINISH EXPOSED SURFACES WITH A METAL JACKET. A. ACCEPT
- 3.5 FLEXIBLE ELASTOMERIC INSULATION INSTALLATION
- A. SEAL LONGITUDINAL SEAMS AND END JOINTS WITH MANUFACTURER'S RECOMMENDED ADHESIVE TO ELIMINATE OPENINGS IN INSULATION THAT ALLOW PASSAGE OF AIR TO SURFACE BEING INSULATED.
- B. INSULATION INSTALLATION ON PIPE FLANGES:

SURFACE BEING INSULATED.

- 1. INSTALL PIPE INSULATION TO OUTER DIAMETER OF PIPE FLANGE
- 3.11 INDOOR 2. MAKE WIDTH OF INSULATION SECTION SAME AS OVERALL WIDTH OF FLANGE AND BOLTS, PLUS TWICE THE THICKNESS OF PIPE INSULATION. 3. FILL VOIDS BETWEEN INNER CIRCUMFERENCE OF FLANGE INSULATION AND OUTER
- CIRCUMFERENCE OF ADJACENT STRAIGHT PIPE SEGMENTS WITH CUT SECTIONS OF SHEET INSULATION OF SAME THICKNESS AS PIPE INSULATION. 4. SECURE INSULATION TO FLANGES AND SEAL SEAMS WITH MANUFACTURER'S RECOMMENDED ADHESIVE TO ELIMINATE OPENINGS IN INSULATION THAT ALLOW PASSAGE OF AIR TO
- C. INSULATION INSTALLATION ON PIPE FITTINGS AND ELBOWS:
- 1. INSTALL MITERED SECTIONS OF PIPE INSULATION. 3.12 INDOOR 2. SECURE INSULATION MATERIALS AND SEAL SEAMS WITH MANUFACTURER'S RECOMMENDED A. INSTALI ADHESIVE TO ELIMINATE OPENINGS IN INSULATION THAT ALLOW PASSAGE OF AIR TO SURFACE BEING INSULATED.
- D. INSULATION INSTALLATION ON VALVES AND PIPE SPECIALTIES:
- 1. INSTALL PREFORMED VALVE COVERS MANUFACTURED OF SAME MATERIAL AS PIPE INSULATION WHEN AVAILABLE.
- 2. WHEN PREFORMED VALVE COVERS ARE NOT AVAILABLE, INSTALL CUT SECTIONS OF PIPE END OF SEC AND SHEET INSULATION TO VALVE BODY. ARRANGE INSULATION TO PERMIT ACCESS TO
- PACKING AND TO ALLOW VALVE OPERATION WITHOUT DISTURBING INSULATION. 3. INSTALL INSULATION TO FLANGES AS SPECIFIED FOR FLANGE INSULATION APPLICATION.
- 4. SECURE INSULATION TO VALVES AND SPECIALTIES AND SEAL SEAMS WITH MANUFACTURER'S SECTION 22 RECOMMENDED ADHESIVE TO ELIMINATE OPENINGS IN INSULATION THAT ALLOW PASSAGE OF PART 1 - 0 AIR TO SURFACE BEING INSULATED.

- A. INSULATION INSTALLATION ON STRAIGHT PIPES AND TUBES:
- 1. SECURE EACH LAYER OF PREFORMED PIPE INSULATION TO PIPE WITH WIRE OR BANDS AND TIGHTEN BANDS WITHOUT DEFORMING INSULATION MATERIALS.
- 2. WHERE VAPOR BARRIERS ARE INDICATED, SEAL LONGITUDINAL SEAMS, END JOINTS, AND PROTRUSIONS WITH VAPOR-BARRIER MASTIC AND JOINT SEALANT. 3. FOR INSULATION WITH FACTORY-APPLIED JACKETS ON ABOVE AMBIENT SURFACES, SECURE
- LAPS WITH OUTWARD CLINCHED STAPLES AT 6 INCHES O.C. 4. FOR INSULATION WITH FACTORY-APPLIED JACKETS ON BELOW AMBIENT SURFACES, DO NOT
- STAPLE LONGITUDINAL TABS BUT SECURE TABS WITH ADDITIONAL ADHESIVE AS RECOMMENDED BY INSULATION MATERIAL MANUFACTURER AND SEAL WITH VAPOR-BARRIER MASTIC AND FLASHING SEALANT.
- B. INSULATION INSTALLATION ON PIPE FLANGES:
- INSTALL PREFORMED PIPE INSULATION TO OUTER DIAMETER OF PIPE FLANGE.
- 2. MAKE WIDTH OF INSULATION SECTION SAME AS OVERALL WIDTH OF FLANGE AND BOLTS, PLUS TWICE THE THICKNESS OF PIPE INSULATION. 3. FILL VOIDS BETWEEN INNER CIRCUMFERENCE OF FLANGE INSULATION AND OUTER
- CIRCUMFERENCE OF ADJACENT STRAIGHT PIPE SEGMENTS WITH MINERAL-FIBER BLANKET INSULATION. 4. INSTALL JACKET MATERIAL WITH MANUFACTURER'S RECOMMENDED ADHESIVE, OVERLAP
- SEAMS AT LEAST 1 INCH, AND SEAL JOINTS WITH FLASHING SEALANT. C. INSULATION INSTALLATION ON PIPE FITTINGS AND ELBOWS:
- 1. INSTALL PREFORMED SECTIONS OF SAME MATERIAL AS STRAIGHT SEGMENTS OF PIPE INSULATION WHEN AVAILABLE.
- 2. WHEN PREFORMED INSULATION ELBOWS AND FITTINGS ARE NOT AVAILABLE. INSTALL MITERED SECTIONS OF PIPE INSULATION, TO A THICKNESS EQUAL TO ADJOINING PIPE INSULATION. SECURE INSULATION MATERIALS WITH WIRE OR BANDS.
- D. INSULATION INSTALLATION ON VALVES AND PIPE SPECIALTIES:
- 1. INSTALL PREFORMED SECTIONS OF SAME MATERIAL AS STRAIGHT SEGMENTS OF PIPE INSULATION WHEN AVAILABLE. 2. WHEN PREFORMED SECTIONS ARE NOT AVAILABLE, INSTALL MITERED SECTIONS OF PIPE
- INSULATION TO VALVE BODY. 3. ARRANGE INSULATION TO PERMIT ACCESS TO PACKING AND TO ALLOW VALVE OPERATION WITHOUT DISTURBING INSULATION.
- 4. INSTALL INSULATION TO FLANGES AS SPECIFIED FOR FLANGE INSULATION APPLICATION.
- 3.7 FIELD-APPLIED JACKET INSTALLATION
- A. WHERE GLASS-CLOTH JACKETS ARE INDICATED, INSTALL DIRECTLY OVER BARE INSULATION OR INSULATION WITH FACTORY-APPLIED JACKETS.
- 1. DRAW JACKET SMOOTH AND TIGHT TO SURFACE WITH 2-INCH OVERLAP AT SEAMS AND JOINTS 2. EMBED GLASS CLOTH BETWEEN TWO 0.062-INCH THICK COATS OF LAGGING ADHESIVE.
- 3. COMPLETELY ENCAPSULATE INSULATION WITH COATING, LEAVING NO EXPOSED INSULATION.
- B. WHERE PVC JACKETS ARE INDICATED, INSTALL WITH 1-INCH OVERLAP AT LONGITUDINAL SEAMS AND END JOINTS; FOR HORIZONTAL APPLICATIONS, INSTALL WITH LONGITUDINAL SEAMS ALONG TOP AND BOTTOM OF TANKS AND VESSELS. SEAL WITH MANUFACTURER'S RECOMMENDED ADHESIVE
- 1. APPLY TWO CONTINUOUS BEADS OF ADHESIVE TO SEAMS AND JOINTS, ONE BEAD UNDER LAP AND THE FINISH BEAD ALONG SEAM AND JOINT EDGE.
- 3.8 FINISHES
- A. PIPE INSULATION WITH ASJ, GLASS-CLOTH, OR OTHER PAINTABLE JACKET MATERIAL: PAINT JACKET WITH PAINT SYSTEM IDENTIFIED BELOW.
- 1. FLAT ACRYLIC FINISH: TWO FINISH COATS OVER A PRIMER THAT IS COMPATIBLE WITH JACKET MATERIAL AND FINISH COAT PAINT. ADD FUNGICIDAL AGENT TO RENDER FABRIC MILDEW PROOF. a. FINISH COAT MATERIAL: INTERIOR, FLAT, LATEX-EMULSION SIZE.
- B. FLEXIBLE ELASTOMERIC THERMAL INSULATION: AFTER ADHESIVE HAS FULLY CURED, APPLY TWO COATS OF INSULATION MANUFACTURER'S RECOMMENDED PROTECTIVE COATING. B. FITTING-
- C. COLOR: FINAL COLOR AS SELECTED BY ARCHITECT. VARY FIRST AND SECOND COATS TO ALLOW VISUAL INSPECTION OF THE COMPLETED WORK.
- A. TESTING AGENCY: ENGAGE A QUALIFIED TESTING AGENCY TO PERFORM TESTS AND INSPECTIONS.
- B. PERFORM TESTS AND INSPECTIONS.

D. DO NOT FIELD PAINT ALUMINUM OR STAINLESS-STEEL JACKETS

- C. TESTS AND INSPECTIONS:
- 1. INSPECT FIELD-INSULATED EQUIPMENT, RANDOMLY SELECTED BY ARCHITECT, BY REMOVING FIELD-APPLIED JACKET AND INSULATION IN LAYERS IN REVERSE ORDER OF THEIR INSTALLATION. EXTENT OF INSPECTION SHALL BE LIMITED TO ONE LOCATION FOR EACH TYPE OF EQUIPMENT DEFINED IN THE "EQUIPMENT INSULATION SCHEDULE" ARTICLE. FOR LARGE EQUIPMENT, REMOVE ONLY A PORTION ADEQUATE TO DETERMINE COMPLIANCE.

- A. DRAWING SUPPLEN 1.2 SUMMA
- A. SECTION 1. ABO

- B. THE WO FURNISH COMPLE SATISFAC
- 1.3 QUALITY A. PIPING
- TESTING B. COMPLY

- 1.4 PROJEC A. INTERRU FACILITIE CONDITI
- ACCORD 1. NOTI OF
- 2. DO WRI 1.5. INFORM
- A. PROVIDI ADDITION DATA".
- B. WATER . COORDII BE INS REQUIRE WHERE
- WITHIN SCALE INSTALLE D. FIELD Q
- E. SYSTEM F. FIELD Q
- PART 2 1
- 2.1 PIPING A. COMPLY
- PIPE, SERVICE
- B. POTABLE C. PROVIDE
- BE ACCO
- 2.2 TRANSI A. GENERAL

REMOVING FIELD—APPLIED JACKET THEIR INSTALLATION. EXTENT OF STRAIGHT PIPE, THREE LOCATIONS PIPE SERVICE DEFINED IN THE "F	RS, AND VALVES, RANDOMLY SELECTED BY ARCHITECT, BY AND INSULATION IN LAYERS IN REVERSE ORDER OF INSPECTION SHALL BE LIMITED TO THREE LOCATIONS OF S OF FITTINGS, THREE LOCATIONS OF VALVES FOR EACH PIPING INSULATION SCHEDULE, GENERAL" ARTICLE. BE CONSIDERED DEFECTIVE WORK IF SAMPLE INSPECTION	
REVEALS NONCOMPLIANCE WITH REQ		Bignell Watkins Hasser
3.10 PIPING INSULATION SCHEDULE, GEN		ARCHITECTS P.C.
A. ACCEPTABLE PREFORMED PIPE AND IDENTIFIED FOR EACH PIPING SYSTEM	TUBULAR INSULATION MATERIALS AND THICKNESSES ARE M AND PIPE SIZE RANGE.	ONE PARK PLACE, SUITE 250 ANNAPOLIS, MARYLAND 21401
	HERWISE INDICATED, DO NOT INSTALL INSULATION ON THE	Maryland: (301) 261–8228 Baltimore: (410) 841–6595 MD Fax: (410) 224–4443 Annapolis: (410) 224–2727
FOLLOWING:		Website: www.bigwaha.com
 UNDERGROUND PIPING. CHROME-PLATED PIPES AND FIT INJURY. 	TINGS UNLESS THERE IS A POTENTIAL FOR PERSONNEL	These drawings are the property of the Architect. Bignell Watkins Hasser Architects P.C. Unauthorized reproduction for any purpose is an infringement upon copyright laws. Violators will be subject to prosecution by fullest extent of the law.
3.11 INDOOR PIPING INSULATION SCHEDUL A. GENERAL:	-E	Written dimensions on these drawings shall have precedence over scale dimensions. Contractors shall verify and be responsible for all dimensions and conditions on the job and this office must be notified of any variation from the dimensions and conditions shown by these drawings.
1. NEW PIPING SHALL BE INSULATED B. DOMESTIC COLD WATER:).	
a. FLEXIBLE ELASTOMERIC: 1 IN	ON SHALL BE ONE OF THE FOLLOWING: CH THICK. PIPE INSULATION, TYPE I: 1 INCH THICK.	
3.12 INDOOR, FIELD-APPLIED JACKET SCH		
A. INSTALL JACKET OVER INSULATION JACKET, INSTALL THE FIELD-APPLIED	MATERIAL. FOR INSULATION WITH FACTORY-APPLIED	
B. PIPING, EXPOSED:		
1. PVC 30 MILS THICK.		
END OF SECTION 220700		
SECTION 221116 - DOMESTIC WATER PI	PING	
PART 1 – GENERAL		
	NS OF THE CONTRACT, INCLUDING GENERAL AND TO THE WORK UNDER DIVISIONS 21 THROUGH 28.	
1.2 SUMMARY		
A. SECTION INCLUDES:1. ABOVEGROUND DOMESTIC WATER	PIPES, TUBES, FITTINGS, AND SPECIALTIES INSIDE	Revisions
THE BUILDING.		# Date
	N OF THE SPECIFICATION SHALL INCLUDE THE S AND EQUIPMENT FOR THE INSTALLATION OF PING SYSTEM TO PROVIDE CONTINUOUS AND	2/24/16 REVIEW SET
1.3 QUALITY ASSURANCEA. PIPING MATERIALS SHALL BEAR LAI TESTING AGENCY.	BEL, STAMP, OR OTHER MARKINGS OF SPECIFIED	
B. COMPLY WITH NSF 61 FOR POTABL	E DOMESTIC WATER PIPING AND COMPONENTS. ALL	
VALVES AND FITTINGS ARE TO BE LE	AD FREE.	
1.4 PROJECT CONDITIONS		
	OTHERS UNLESS PERMITTED UNDER THE FOLLOWING	
CONDITIONS AND THEN ONLY AFTER ACCORDING TO REQUIREMENTS INDIC/	ARRANGING TO PROVIDE TEMPORARY WATER SERVICE ATED:	
1. NOTIFY OWNER NO FEWER THAN OF WATER SERVICE.	5 DAYS IN ADVANCE OF PROPOSED INTERRUPTION	Client:
	RRUPTION OF WATER SERVICE WITHOUT OWNER'S	CITY OF TAKOMA PARK
WRITTEN PERMISSION.		
1.5. INFORMATIONAL SUBMITTALS	S IN OPERATION AND MAINTENANCE MANUALS IN	
	ID SECTION 017823 "OPERATION AND MAINTENANCE	Location:
B. WATER SAMPLES: SPECIFIED IN "CLE	FANING" ARTICLE.	7500 MAPLE AVE
C. COORDINATION DRAWINGS: THE DRAW	WINGS ARE GENERALLY INDICATIVE OF THE WORK TO	TAKOMA PARK MD.
REQUIRED, WHICH SHALL BE PROV	SHOW ALL OFFSETS, FITTINGS AND SIMILAR DETAILS IDED TO MEET THE JOB CONDITIONS. IN AREAS	
WITHIN TRADES COVERED BY THIS I	OSE PROXIMITY TO WORK OF OTHER TRADES OR DIVISION OF THE SPECIFICATIONS, PREPARE LARGER	Project:
SCALE DRAWINGS CONSISTING OF PL INSTALLED IN RELATION TO WORK OF	ANS AND SECTIONS TO SHOW HOW WORK IS TO BE	I.T. ROOM UPGRADE
D. FIELD QUALITY-CONTROL REPORTS.		III NOUM OF GRADE
E. SYSTEM PURGING AND DISINFECTINGF. FIELD QUALITY-CONTROL REPORTS.	AUTIVITIES REPORT.	
PART 2 - PRODUCTS		
2.1 PIPING MATERIALS	PIPING SCHEDULE" ARTICLE FOR APPLICATIONS OF	MECHANICAL I
	AND JOINING METHODS FOR SPECIFIC SERVICES,	SPECIFICATIONS
B. POTABLE-WATER PIPING AND COMPO		JI LUII IVAIIVNJ
C. PROVIDE FOR EXPANSION OF PIPING	SUBJECT TO TEMPERATURE CHANGES. THIS SHALL	
BE ACCOMPLISHED BY SWINGS, BEND	US UK LUUFS.	
2.2 TRANSITION FITTINGS A. GENERAL REQUIREMENTS:		Drawn by
1. SAME SIZE AS PIPES TO BE JOIN	NED.	A2ESG
2. PRESSURE RATING AT LEAST EQU	AL TO PIPES TO BE JOINED.	Project No. Date
3. END CONNECTIONS COMPATIBLE V		$\begin{pmatrix} 10 \\ 15032.00 \end{pmatrix} \begin{pmatrix} 2/24/16 \end{pmatrix}$
B. FITTING-TYPE TRANSITION COUPLINGS PIPING SYSTEM FITTING.	: MANUFACTURED PIPING COUPLING OR SPECIFIED	
	+ + ESG	
	$\bigwedge S_{\text{quared}} \stackrel{\text{Rus}}{=} E_{\text{ngineering}}$	
PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I	$\mathrm{S}_{ ext{upport}} \mathbb{G}_{ ext{roup, LLC}}$	
AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER	3477 SHILOH ROAD, HAMPSTEAD, MARYLAND 21074 PHONE: 443.977.9741 FAX: 410.374.5471	
THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 36773, EXPIRATION DATE: 01-18-17	WWW.A2ESG.COM © COPYRIGHT 2016	

2.3 DIELECTRIC FITTINGS 3.8 CLEANING AND DISINFECT A. NO DIELECTRIC UNIONS ARE ALLOWED A. CLEAN AND DISINFECT DOMESTIC WATER PIPING AS FOLLOWS: 1. PURGE ALL NEW PIPING AND PARTS OF EXISTING PIPING THAT HAVE BEEN ALTERED, E. PART 3 - EXECUTION EXTENDED, OR REPAIRED BEFORE USING. 2. CHEMICALS AND MATERIALS USED FOR STERILIZATION OF THE SYSTEMS SHALL MEET 3.1 PIPING INSTALLATION THE REQUIREMENTS OF THE AUTHORITIES HAVING JURISDICTION. A. DRAWING PLANS, SCHEMATICS, AND DIAGRAMS INDICATE GENERAL LOCATION AND 3. USE PURGING AND DISINFECTING PROCEDURES PRESCRIBED BY AUTHORITIES HAVING ARRANGEMENT OF DOMESTIC WATER PIPING. INDICATED LOCATIONS AND ARRANGEMENTS JURISDICTION, LOCAL CODES OR THE HEALTH DEPARTMENT: IF METHODS ARE NOT ARE USED TO SIZE PIPE AND CALCULATE FRICTION LOSS, EXPANSION, AND OTHER DESIGN PRESCRIBED, USE PROCEDURES DESCRIBED IN EITHER AWWA C651 OR AWWA C652 OR CONSIDERATIONS. INSTALL PIPING AS INDICATED UNLESS DEVIATIONS TO LAYOUT ARE APPROVED ON COORDINATION DRAWINGS. FOLLOW PROCEDURES DESCRIBED BELOW: a. FLUSH PIPING SYSTEM WITH CLEAN, POTABLE WATER UNTIL DIRTY WATER DOES NOT 3. INSTALL DOMESTIC WATER PIPING LEVEL AND PLUMB. APPEAR AT OUTLETS. INSTALL PIPING CONCEALED FROM VIEW AND PROTECTED FROM PHYSICAL CONTACT BY b. FILL AND ISOLATE SYSTEM ACCORDING TO EITHER BUILDING OCCUPANTS UNLESS OTHERWISE INDICATED AND EXCEPT IN EQUIPMENT ROOMS AND SERVICE AREAS. 1) FILL SYSTEM OR PART THEREOF WITH WATER/ 50 PPM OF CHLORINE. ISOLATE WITH VALVE). INSTALL PIPING ABOVE ACCESSIBLE CEILINGS TO ALLOW SUFFICIENT SPACE FOR CEILING HOURS. PANEL REMOVAL, AND COORDINATE WITH OTHER SERVICES OCCUPYING THAT SPACE. 2) FILL SYSTEM OR PART THEREOF WITH WATER/ . INSTALL PIPING ADJACENT TO EQUIPMENT AND SPECIALTIES TO ALLOW SERVICE AND MAINTENANCE. 200 PPM OF CHLORINE. ISOLATE AND ALLOW INSTALL PIPING TO PERMIT VALVE SERVICING. c. FLUSH SYSTEM WITH CLEAN, POTABLE WATER COMING FROM SYSTEM AFTER THE STANDING TIME G. INSTALL NIPPLES, UNIONS, SPECIAL FITTINGS, AND VALVES WITH PRESSURE RATINGS THE SAME AS OR HIGHER THAN SYSTEM PRESSURE RATING USED IN APPLICATIONS BELOW d. OBTAIN REPRESENTATIVE SAMPLES OF THE SYST UNLESS OTHERWISE INDICATED. RECOGNIZED BACTERIOLOGICAL LABORATORY. BOTTLES TO AUTHORITIES HAVING JURISDICTION. H. INSTALL PIPING FREE OF SAGS AND BENDS. e. REPEAT PROCEDURES IF BIOLOGICAL EXAMINATION INSTALL FITTINGS FOR CHANGES IN DIRECTION AND BRANCH CONNECTIONS. UNTIL THE SAMPLES ARE ACCEPTABLE. INSTALL UNIONS IN COPPER TUBING AT FINAL CONNECTION TO EACH PIECE OF EQUIPMENT B. AS A CONDITION OF ACCEPTANCE OF THE SYSTEM, FL AND SPECIALTY. TO CERTIFY THAT THE SYSTEM HAS BEEN STERILIZED THE HEALTH DEPARTMENT AND THAT THE SYSTEM 3.2 JOINT CONSTRUCTION CONSUMPTION. A. REAM ENDS OF PIPES AND TUBES AND REMOVE BURRS. BEVEL PLAIN ENDS OF STEEL C. PREPARE AND SUBMIT REPORTS OF PURGING AND COPIES OF WATER SAMPLE APPROVALS FROM AUTHORITIE B. REMOVE SCALE, SLAG, DIRT, AND DEBRIS FROM INSIDE AND OUTSIDE OF PIPES, TUBES, D. CLEAN INTERIOR OF DOMESTIC WATER PIPING SYSTEM AND FITTINGS BEFORE ASSEMBLY. WORK PROGRESSES. DISSIMILAR-MATERIAL PIPING JOINTS: MAKE JOINTS USING ADAPTERS COMPATIBLE WITH 3.9 PIPING SCHEDULE MATERIALS OF BOTH PIPING SYSTEMS. A. TRANSITION AND SPECIAL FITTINGS WITH PRESSURE RA 3.3 VALVE INSTALLATION RATING MAY BE USED IN APPLICATIONS BELOW UNLESS . GENERAL-DUTY VALVES: COMPLY WITH REQUIREMENTS IN DIVISION 22 SECTION B. FLANGES AND UNIONS MAY BE USED FOR ABOVE "GENERAL-DUTY VALVES FOR PLUMBING PIPING" FOR VALVE INSTALLATIONS. OTHERWISE INDICATED. . INSTALL SHUTOFF VALVE CLOSE TO WATER MAIN ON EACH BRANCH AND RISER SERVING C. FITTING OPTION: BRAZED JOINTS MAY BE USED ON ABC PLUMBING FIXTURES OR EQUIPMENT, ON EACH WATER SUPPLY TO EQUIPMENT, AND ON D. ABOVEGROUND DOMESTIC WATER PIPING, NPS 2 AND SM EACH WATER SUPPLY TO PLUMBING FIXTURES THAT DO NOT HAVE SUPPLY STOPS. USE BALL OR GATE VALVES FOR PIPING NPS 2 AND SMALLER. 1. HARD COPPER TUBE, ASTM B 88, TYPE L, COPP BRAZED/SOLDERED JOINTS. INSTALL DRAIN VALVES FOR EQUIPMENT AT LOW POINTS IN HORIZONTAL PIPING, AND WHERE REQUIRED TO DRAIN WATER PIPING. DRAIN VALVES ARE SPECIFIED IN DIVISION 22 3.10 VALVE SCHEDULE SECTION "DOMESTIC WATER PIPING SPECIALTIES." A. DRAWINGS INDICATE VALVE TYPES TO BE USED. WHERE 1. HOSE-END DRAIN VALVES: AT LOW POINTS IN BRANCHES AND LOW POINTS OF INDICATED, THE FOLLOWING REQUIREMENTS APPLY: SYSTEM. 1. SHUTOFF DUTY: USE BALL OR GATE VALVES FOR P 2. CAPS AND CHAINS ON ALL HOSE CONNECTIONS. BUTTERFLY, BALL, OR GATE VALVES WITH FLANGED **I ARGER** 3.4 TRANSITION FITTING INSTALLATION 2. THROTTLING DUTY: USE BALL OR GLOBE VALVES A. INSTALL TRANSITION COUPLINGS AT JOINTS OF DISSIMILAR PIPING. USE BUTTERFLY, BALL VALVES WITH FLANGED EN LARGER. 3.5 CONNECTIONS 3. DRAIN DUTY: HOSE-END DRAIN VALVES. A. DRAWINGS INDICATE GENERAL ARRANGEMENT OF PIPING, FITTINGS, AND SPECIALTIES. B. BUTTERFLY VALVES MAY NOT BE USED ON DOMESTIC WA B. WHEN INSTALLING PIPING ADJACENT TO EQUIPMENT ALLOW SPACE FOR SERVICE AND MAINTENANCE END OF SECTION 221116 C. USE TRANSITION FITTING TO JOIN DISSIMILAR PIPING MATERIALS. 3.6 FIELD QUALITY CONTROL A. PERFORM TESTS AND INSPECTIONS SECTION 230500 - COMMON WORK RESULTS FOR HVAC B. PIPING INSPECTIONS: 1. DO NOT ENCLOSE, COVER, OR PUT PIPING INTO OPERATION UNTIL IT HAS BEEN PART 1 - GENERAL INSPECTED AND APPROVED BY AUTHORITIES HAVING JURISDICTION. 1.1 RELATED DOCUMENTS 2. DURING INSTALLATION, NOTIFY AUTHORITIES HAVING JURISDICTION AT LEAST ONE DAY BEFORE INSPECTION MUST BE MADE. PERFORM TESTS SPECIFIED BELOW IN PRESENCE A. DRAWINGS AND GENERAL PROVISIONS OF THE CON OF AUTHORITIES HAVING JURISDICTION: SUPPLEMENTARY CONDITIONS, APPLY TO THE WORK UNI B. REFERENCES a. ROUGHING-IN INSPECTION: ARRANGE FOR INSPECTION OF PIPING BEFORE CONCEALING OR CLOSING-IN AFTER ROUGHING-IN AND BEFORE SETTING FIXTURES. 1. 2015 INTERNATIONAL BUILDING CODE b. FINAL INSPECTION: ARRANGE FINAL INSPECTION FOR AUTHORITIES HAVING 2. 2015 INTERNATIONAL MECHANICAL CODE JURISDICTION TO OBSERVE TESTS SPECIFIED IN "PIPING TESTS" SUBPARAGRAPH 3. 2012 INTERNATIONAL EXISTING BUILDING CODE BELOW AND TO ENSURE COMPLIANCE WITH REQUIREMENTS. 4. 2011 WSSC PLUMBING CODE 3. REINSPECTION: IF AUTHORITIES HAVING JURISDICTION FIND THAT PIPING WILL NOT PASS 5. 2015 INTERNATIONAL ENERGY CONSERVATION CODE TESTS OR INSPECTIONS, MAKE REQUIRED CORRECTIONS AND ARRANGE FOR 6. NFPA STANDARDS REINSPECTION. 7. ASHRAE HANDBOOKS AND MANUALS 4. REPORTS: PREPARE INSPECTION REPORTS AND HAVE THEM SIGNED BY AUTHORITIES 8. SMACNA MANUALS HAVING JURISDICTION. 9. COUNTY AMENDMENTS . PIPING TESTS: 1.2 DEFINITIONS 1. BEFORE TESTING PIPING SYSTEMS, REMOVE OR OTHERWISE PROTECT FROM DAMAGE, CONTROL DEVICES, AIR VENTS, PLUMBING FIXTURES AND OTHER PARTS WHICH ARE A. PIPING" INCLUDES PIPE, FITTINGS, VALVES, HANGERS NOT DESIGNED TO STAND PRESSURES USED IN TESTING PIPING. COMPRISE A SYSTEM. B. FINISHED SPACES: SPACES OTHER THAN MECHANICAL 2. DOMESTIC WATER PIPING SHALL BE TESTED HYDROSTATICALLY. CHECK COMPONENTS FURRED SPACES, PIPE AND DUCT SHAFTS, UNHEATED TO DETERMINE THAT THEY ARE NOT AIR BOUND AND THAT PIPING IS FULL OF WATER. SPACES ABOVE CEILINGS, UNEXCAVATED SPACES, CRAW 3. TEST FOR LEAKS AND DEFECTS IN NEW PIPING AND PARTS OF EXISTING PIPING THAT C. EXPOSED, INTERIOR INSTALLATIONS: EXPOSED TO VIE HAVE BEEN ALTERED, EXTENDED, OR REPAIRED. IF TESTING IS PERFORMED IN FINISHED OCCUPIED SPACES, MECHANICAL AND ELI SEGMENTS, SUBMIT A SEPARATE REPORT FOR EACH TEST, COMPLETE WITH DIAGRAM HANDLING UNIT SERVICE CORRIDORS, AND ACCESSIBLE OF PORTION OF PIPING TESTED. EXPOSED, EXTERIOR INSTALLATIONS: EXPOSED TO 4. PROVIDE WATER PIPE TEST RESULTS USING PIPING TEST CERTIFICATE FORM FOUND AT OUTDOOR AMBIENT TEMPERATURES AND WEATHER THE END OF THIS SPECIFICATION SECTION. ROOFTOP LOCATIONS AND AT GRADE LOCATIONS. 5. LEAVE NEW, ALTERED, EXTENDED, OR REPLACED DOMESTIC WATER PIPING UNCOVERED CONCEALED, INTERIOR INSTALLATIONS: CONCEALED F AND UNCONCEALED UNTIL IT HAS BEEN TESTED AND APPROVED. EXPOSE WORK THAT PHYSICAL CONTACT BY BUILDING OCCUPANTS. EXAM WAS COVERED OR CONCEALED BEFORE IT WAS TESTED. CHASES, AND DUCT SHAFTS. 6. CAP AND SUBJECT PIPING TO STATIC WATER PRESSURE OF 50 PSIG ABOVE OPERATING CONCEALED, EXTERIOR INSTALLATIONS: CONCEALED FI PRESSURE. WITHOUT EXCEEDING PRESSURE RATING OF PIPING SYSTEM MATERIALS. WEATHER CONDITIONS AND PHYSICAL CONTACT BY BUIL ISOLATE TEST SOURCE AND ALLOW TO STAND FOR FOUR HOURS. LEAKS AND LOSS OUTDOOR AMBIENT TEMPERATURES. EXAMPLES INCLUDI IN TEST PRESSURE CONSTITUTE DEFECTS THAT MUST BE REPAIRED. SHELTERS. 7. REPAIR LEAKS AND DEFECTS WITH NEW MATERIALS AND RETEST PIPING OR PORTION CONDITIONED SPACE: FINISHED SPACES AND EXPOSE THEREOF UNTIL SATISFACTORY RESULTS ARE OBTAINED. CONDITIONED. EXAMPLES INCLUDE OFFICES, CORRIDORS 8. PREPARE REPORTS FOR TESTS AND FOR CORRECTIVE ACTION REQUIRED. CONDITIONING EQUIPMENT. RETURN-AIR PLENUMS ARE D. DOMESTIC WATER PIPING WILL BE CONSIDERED DEFECTIVE IF IT DOES NOT PASS TESTS H. K-FACTOR: NUMBER OF BRITISH THERMAL UNITS OF FOOT PER DEGREE FAHRENHEIT TEMPERATURE DIFFER AND INSPECTIONS. FLAT, PARALLEL SIDES ONE INCH APART. . PREPARE TEST AND INSPECTION REPORTS. I. THE FOLLOWING ARE INDUSTRY ABBREVIATIONS FOR RUBBER MATERIALS: 3.7 ADJUSTING A. PERFORM THE FOLLOWING ADJUSTMENTS BEFORE OPERATION: 1. EPDM: ETHYLENE-PROPYLENE-DIENE TERPOLYMER RUBBER. 2. NBR: ACRYLONITRILE-BUTADIENE RUBBER. 1. CLOSE DRAIN VALVES. 2. OPEN SHUTOFF VALVES TO FULLY OPEN POSITION. 1.3 SUBMITTALS 3. OPEN THROTTLING VALVES TO PROPER SETTING. A. WELDING CERTIFICATES. 4. REMOVE PLUGS USED DURING TESTING OF PIPING AND FOR TEMPORARY SEALING OF B. CERTIFICATES OF COMPLIANCE FOR PRESSURE VESSELS. PIPING DURING INSTALLATION. C. SUBMIT SHOP DRAWINGS OR CUTS SHOWING CONSTRUCTION SIZE, ARRANGEMENT, 5. CHECK PLUMBING SPECIALTIES AND VERIFY PROPER SETTINGS, ADJUSTMENTS, AND OPERATING CLEARANCES, PERFORMANCE CHARACTERISTICS AND CAPACITY OF MATERIALS OPERATION. AND EQUIPMENT. EACH ITEM OF EQUIPMENT PROPOSED SHALL BE A STANDARD CATALOG

COF THE FOLLOWING:		AND VALVE-STEM MOVEMENT.
CHLORINE SOLUTION WITH AT LEAST ES AND ALLOW TO STAND FOR 24		 b. CLEARANCES FOR INSTALLATION AND MAINTAINING INSULATION. c. CLEARANCES FOR SERVICING AND MAINTAINING EQUIPMENT, ACCESSORIES, AND SPECIALTIES, INCLUDING SPACE FOR DISASSEMBLY REQUIRED FOR PERIODIC MAINTENANCE.
CHLORINE SOLUTION WITH AT LEAST / TO STAND FOR THREE HOURS. UNTIL NO CHLORINE IS IN WATER		 d. EQUIPMENT AND ACCESSORY SERVICE CONNECTIONS AND SUPPORT DETAILS. e. FIRE—RATED WALL AND FLOOR PENETRATIONS. f. SIZES AND LOCATION OF REQUIRED CONCRETE PADS AND BASES. g. SCHEDULING, SEQUENCING, MOVEMENT, AND POSITIONING OF LARGE
TEMS WATER FOR ANALYSIS BY A UBMIT WATER SAMPLES IN STERILE		EQUIPMENT INTO BUILDING DURING CONSTRUCTION. h. FLOOR PLANS, ELEVATIONS, AND DETAILS TO INDICATE PENETRATIONS IN FLOORS, WALLS, AND CEILINGS AND THEIR RELATIONSHIP TO OTHER
N SHOWS CONTAMINATION. REPEAT		PENETRATIONS AND INSTALLATIONS. i. REFLECTED CEILING PLANS: 1) CEILING SUSPENSION ASSEMBLY MEMBERS.
JRNISH A CERTIFICATE UNDER SEAL TO MEET THE REQUIREMENTS OF I IS SATISFACTORY FOR HUMAN		 2) OTHER SYSTEMS INSTALLED IN SAME SPACE ABOVE CEILING. 3) CEILING AND WALL-MOUNTING ACCESS DOORS AND PANELS REQUIRED TO PROVIDE ACCESS TO DAMPERS AND OTHER OPERATING DEVICES. 4) CEILING-MOUNTING ITEMS, INCLUDING LIGHTING FIXTURES, SPEAKERS, SPRINKLERS,
DISINFECTING ACTIVITIES. INCLUDE ES HAVING JURISDICTION.		ACCESS PANELS, AND SPECIAL MOLDING. 5) REFER TO ARCHITECTURAL CEILING PLANS FOR ADDITIONAL REQUIREMENTS.
I. REMOVE DIRT AND DEBRIS AS	1.4 A.	QUALITY ASSURANCE STEEL SUPPORT WELDING: QUALIFY PROCESSES AND OPERATORS ACCORDING TO AWS D1.1, "STRUCTURAL WELDING CODE——STEEL."
ATINGS AT LEAST EQUAL TO PIPING OTHERWISE INDICATED. EGROUND PIPING JOINTS UNLESS	В.	STEEL PIPE WELDING: QUALIFY PROCESSES AND OPERATORS ACCORDING TO ASME BOILER AND PRESSURE VESSEL CODE: SECTION IX, "WELDING AND BRAZING QUALIFICATIONS." 1. COMPLY WITH PROVISIONS IN ASME B31 SERIES, "CODE FOR PRESSURE PIPING."
OVEGROUND COPPER TUBING. MALLER, SHALL BE THE FOLLOWING:		 COMPLE WITH PROVISIONS IN ASME BUT SERIES, CODE FOR PRESSURE PIPING. CERTIFY THAT EACH WELDER HAS PASSED AWS QUALIFICATION TESTS FOR WELDING PROCESSES INVOLVED AND THAT CERTIFICATION IS CURRENT.
PER SOLDER-JOINT FITTINGS; AND	1.5	DELIVERY, STORAGE, AND HANDLING
E SPECIFIC VALVE TYPES ARE NOT	A.	DELIVER PIPES AND TUBES WITH FACTORY—APPLIED END CAPS. MAINTAIN END CAPS THROUGH SHIPPING, STORAGE, AND HANDLING TO PREVENT PIPE END DAMAGE AND TO PREVENT ENTRANCE OF DIRT, DEBRIS, AND MOISTURE.
IPING NPS 2 AND SMALLER. USE ENDS FOR PIPING NPS 2–1/2 AND	В.	PROPER AND SUITABLE TOOLS, EQUIPMENT AND APPLIANCES FOR THE SAFE AND CONVENIENT HANDLING AND PLACING OF MATERIALS AND EQUIPMENT SHALL BE USED. DURING LOADING, UNLOADING, AND PLACING, CARE SHALL BE TAKEN IN HANDLING THE
FOR PIPING NPS 2 AND SMALLER. IDS FOR PIPING NPS 2-1/2 AND	C.	EQUIPMENT AND MATERIALS SO THAT NO EQUIPMENT OR MATERIALS, INCLUDING OWNER FURNISHED, ARE DAMAGED. MECHANICAL EQUIPMENT DELIVERED TO THE JOB SITE SHALL BE STORED UNDER ROOF OR
ATER MAINS.		OTHER APPROVED COVERING, ON PEDESTALS ABOVE THE GROUND. ENCLOSURES FOR EQUIPMENT SHALL BE WEATHERPROOF. ANY MOTORS INVOLVED IN THE WORK THAT ARE NOT TOTALLY ENCLOSED AND ELECTRICAL/ELECTRONIC COMPONENTS SHALL BE STORED IN A HEATED AREA WITH A MINIMUM TEMPERATURE OF 50 DEG. F. VALVES SHALL BE STORED UNDER ROOF ON WOOD PEDESTALS ABOVE GROUND. PIPE FOR PROJECT USE SHALL BE STORED ABOVE GRADE IN SUCH A MANNER TO PREVENT ENTRANCE OF FOREIGN MATERIALS. PIPE SHALL BE FITTED WITH END CAPS OR SEALS TO PREVENT MOISTURE AND DEBRIS FROM ENTERING PIPE. INSULATION SHALL BE STORE UNDER ROOF OR IN TRAILERS,
NTRACT, INCLUDING GENERAL AND	D.	ADEQUATELY PROTECTED FROM THE WEATHER. FOLLOW WRITTEN INSTRUCTIONS AND RECOMMENDATIONS OF THE MANUFACTURER AND REQUIREMENTS OF THE ARCHITECT IN LUBRICATION, PROTECTION, AND MAINTENANCE OF EQUIPMENT DURING STORAGE. IF MATERIALS OR EQUIPMENT ARE FOUND TO BE IN POOR CONDITION AT THE TIME OF BEING INSTALLED, THE ARCHITECT MAY, AT HIS DISCRETION, ORDER THE CONTRACTOR TO FURNISH AND INSTALL NEW EQUIPMENT OR MATERIALS AT NO COST TO THE OWNER.
IDER DIVISIONS 26 AND 28.	1.6	GENERAL
	Α.	 REGULATORY REQUIREMENTS 1. WORK SHALL CONFORM TO THE REQUIREMENTS OF THE CODES, LAWS AND ORDINANCES OF MONTGOMERY COUNTY, MARYLAND NATIONAL FIRE PROTECTION ASSOCIATION, AMERICAN SOCIETY OF MECHANICAL ENGINEERS AND OTHER AUTHORITIES HAVING JURISDICTION. 2. COMPLY WITH APPLICABLE CODES, LAWS, STANDARD PRACTICES. 3. COMPLY WITH THE STANDARDS OF GOOD PRACTICE AS OUTLINED IN THE ASHRAE GUIDE, THE SHEET METAL AND AIR CONDITIONING CONTRACTOR'S ASSOCIATION'S "DUCT MANUAL", AND THE APPRENTICE TRAINING MANUAL OF THE STEAM FITTERS UNION.
S, AND OTHER ACCESSORIES THAT	В.	ELECTRICAL CHARACTERISTICS FOR MECHANICAL EQUIPMENT: EQUIPMENT OF HIGHER ELECTRICAL CHARACTERISTICS MAY BE FURNISHED PROVIDED SUCH PROPOSED EQUIPMENT IS APPROVED IN WRITING AND CONNECTING ELECTRICAL SERVICES, CIRCUIT BREAKERS, AND CONDUIT SIZES ARE APPROPRIATELY MODIFIED. IF MINIMUM ENERGY RATINGS OR EFFICIENCIES
AND ELECTRICAL EQUIPMENT ROOMS, SPACES IMMEDIATELY BELOW ROOF, /LSPACES, AND TUNNELS. EW INDOORS. EXAMPLES INCLUDE ECTRICAL EQUIPMENT ROOMS, AIR	C.	ARE SPECIFIED, EQUIPMENT SHALL COMPLY WITH REQUIREMENTS. GIVE NECESSARY NOTICES AND OBTAIN REQUIRED PERMITS. PAY FEES AND OTHER COSTS, INCLUDING UTILITY CONNECTIONS OR EXTENSIONS IN CONNECTION WITH THE WORK. FILE NECESSARY PLANS, PREPARE DOCUMENTS AND OBTAIN NECESSARY APPROVALS OF GOVERNMENTAL AGENCIES HAVING JURISDICTION. OBTAIN REQUIRED CERTIFICATES OF
SHAFTS. VIEW OUTDOORS OR SUBJECT TO CONDITIONS. EXAMPLES INCLUDE	1.7	INSPECTION AND DELIVER SAME TO THE ARCHITECT BEFORE REQUEST FOR ACCEPTANCE AND FINAL PAYMENT FOR THE WORK.
ROM VIEW AND PROTECTED FROM MPLES INCLUDE ABOVE CEILINGS,	A.	ARRANGE FOR PIPE SPACES, CHASES, SLOTS, AND OPENINGS IN BUILDING STRUCTURE DURING PROGRESS OF CONSTRUCTION, TO ALLOW FOR HVAC INSTALLATIONS.
ROM VIEW AND PROTECTED FROM LDING OCCUPANTS BUT SUBJECT TO DE INSTALLATIONS WITHIN UNHEATED	В.	COORDINATE INSTALLATION OF REQUIRED SUPPORTING DEVICES IN POURED-IN-PLACE CONCRETE AND OTHER STRUCTURAL COMPONENTS AS THEY ARE CONSTRUCTED.
D INTERIOR SPACES THAT ARE AIR S, ETC., THAT ARE SERVED BY AIR	C.	COORDINATE REQUIREMENTS FOR ACCESS PANELS AND DOORS FOR ITEMS REQUIRING ACCESS THAT ARE CONCEALED BEHIND FINISHED SURFACES. ACCESS PANELS AND DOORS ARE SPECIFIED IN DIVISION 08 SECTION "ACCESS DOORS."
NOT CONDITIONED SPACE. F HEAT TRANSMITTED PER SQUARE RENCE THROUGH A MATERIAL WITH	1.8	VARIANCES
	٨	WHERE CONFLICTS EXIST WITHIN THE CONTRACT DOCUMENTS REQUEST CLARIFICATION PRIOR

PRODUCT OF THE APPROVED MANUFACTURER.

- B. SEE DIVISION 1 AND GENERAL CONDITIONS FOR GENERAL REQUIREMENTS.
- PROVIDE SERVICE OF THE EQUIPMENT MANUFACTURER OR HIS AUTHORIZED REPRESENTATIVE, IF

D. DURING THE WARRANTY PERIOD. SERVICE EQUIPMENT PROVIDED EXCEPT FILTER REPLACEMENT AND BELT REPLACEMENT. PROVIDE LABOR AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS FOR SERVICE AND MAINTENANCE. PRIOR TO THE START OF WARRANTY PERIOD, PROVIDE TO THE ARCHITECT FOR APPROVAL, A SCHEDULE OF REQUIRED MAINTENANCE OPERATIONS TO BE PERFORMED DURING THE WARRANTY PERIOD AND Watkins Hasser Bignell REQUIRED PERIODICALLY THEREAFTER FOR EACH SYSTEM AND ITEM OF EQUIPMENT. THEREAFTER, MONTHLY REPORTS SHALL BE SUBMITTED TO THE OWNER FOR DESCRIBING ACTUAL SERVICE PERFORMED. ARCHILEC Р E. REPAIRS AND REPLACEMENTS: IF THE OWNER FINDS WORK THAT IS DEFECTIVE, INFERIOR OR ONE PARK PLACE, SUITE 250 NOT IN COMPLIANCE WITH THE CONTRACT DURING THE GUARANTEE PERIOD THE OWNER WILL ANNAPOLIS, MARYLAND 21401 INFORM THE CONTRACTOR IN WRITING. THE CONTRACTOR SHALL PROMPTLY PERFORM THE (301) 261-8228 Baltimore: (410) 841-6595 Maryland: FOLLOWING AT NO ADDITIONAL COST TO THE OWNER: (410) 224-4443 Annapolis: (410) 224-2727 MD Fax: Website: www.bigwaha.com 1. REPLACE ALL DEFECTIVE WORK IN A SATISFACTORY MANNER. 2. CORRECT ALL DAMAGE TO THE BUILDING OR CONTENTS WHICH OCCURRED DUE TO THE DEFECTIVE WORK. These drawings are the property of the Architect. Bignell Watkins Hasser Architects P.C. nauthorized reproduction for any purpose is an infringement upon copyright laws. F. THE OWNER MAY CHOOSE TO HAVE DEFECTIVE WORK CORRECTED AT THE EXPENSE OF THE Violators will be subject to prosecution by fullest extent of the law CONTRACTOR IF THE CONTRACTOR FAILS TO PROCEED PROMPTLY TO REPAIR DEFECTIVE WORK Written dimensions on these drawings shall have precedence over scale dimensions. IN AN ACCORDANCE WITH THIS GUARANTEE Contractors shall verify and be responsible for all dimensions and conditions on the job and this office must be notified of any variation from the dimensions and conditions shown by these drawings. 1.10 MATERIALS AND WORKMANSHIP A. ITEMS SHOWN AND NOT SPECIFICALLY CALLED FOR, OR ITEMS SPECIFIED AND NOT SPECIFICALLY INDICATED OR DETAILED ON THE DRAWINGS, OR ITEMS NEITHER SPECIFIED NOR SHOWN, BUT WHICH ARE REASONABLY INCIDENTAL TO AND COMMONLY REQUIRED. B. FURNISH THE SERVICES OF AN EXPERIENCED FULL TIME FIELD SUPERINTENDENT WHO SHALL BE CONSTANTLY IN CHARGE OF THE INSTALLATION OF WORK PROVIDED UNDER THIS DIVISION. SUPERINTENDENT SHALL HAVE DEMONSTRATED EXPERIENCE WITH PROJECTS OF COMPARABLE SIZE AND COMPLEXITY AND SHALL BE APPROVED BY THE ARCHITECT. C. THE QUALITY OF WORKMANSHIP REQUIRED IN THE EXECUTION OF THE WORK SHALL BE THE FINEST AND HIGHEST OBTAINABLE, WORKING WITH THE MATERIALS SPECIFIED. WORKMANSHIP SHALL BE SATISFACTORY TO THE ARCHITECT AND HIS DECISION AS TO ACCEPTABLE QUALITY IS 1.11 EQUIPMENT START-UP AND INITIAL OPERATION A. NO EQUIPMENT SHALL BE OPERATED FOR TESTING OR TRIAL USE UNTIL THERE HAS BEEN FULL COMPLIANCE WITH THE EQUIPMENT MANUFACTURERS' SPECIFICATIONS AND INSTRUCTIONS FOR LUBRICATION, ALIGNMENT, DIRECTION OF ROTATION, BALANCE, AND OTHER APPLICABLE B. PARTICULAR CARE SHALL BE TAKEN TO VERIFY THAT EQUIPMENT IS COMPLETELY ASSEMBLED AND PROPERLY LUBRICATED, AND GREASE AND OIL CASES AND RESERVOIRS HAVE BEEN FILLED TO THE CORRECT LEVEL WITH THE RECOMMENDED LUBRICANT. C. WHERE SPECIFIED, PROVIDE SERVICES OF THE MANUFACTURER OR HIS AUTHORIZED REPRESENTATIVE TO WITNESS, SUPERVISE, OR ASSIST IN THE INSTALLATION AND START-UP EQUIPMENT PROVIDED UNDER THIS DIVISION. A. THE CONTRACT DRAWINGS ARE GENERALLY INDICATIVE OF THE WORK TO BE INSTALLED, BUT THEY DO NOT SHOW ALL OFFSETS, FITTINGS AND SIMILAR DETAILS REQUIRED, WHICH SHALL BE Revisions PROVIDED TO MEET THE JOB CONDITIONS. IN AREAS WHERE WORK IS INSTALLED IN CLOSE PROXIMITY TO WORK OF OTHER TRADES OR WITHIN TRADES COVERED BY THIS DIVISION OF THE # | Date SPECIFICATIONS, PREPARE LARGER SCALE DRAWINGS CONSISTING OF PLANS AND SECTIONS TO 2/24/16 | REVIEW SET SHOW HOW WORK IS TO BE INSTALLED IN RELATION TO WORK OF OTHER TRADES B. BEFORE FABRICATING AND INSTALLING THE WORK, THE CONTRACTOR SHALL CALL THE CONDITION TO THE ATTENTION OF THE ARCHITECT FOR DIRECTION OF ANY MATERIALS AND/OR EQUIPMENT INACCESSIBLE OR IMPRACTICAL. WHEN REQUESTED BY THE ARCHITECT A DETAILED DRAWING OF THE PROPOSED DEPARTURE DUE TO FIELD CONDITIONS, OR THEIR CAUSES, SHALL BE SUBMITTED BY THE CONTRACTOR FOR APPROVAL. THE ARCHITECT SHALL MAKE FINAL WRITTEN DECISIONS AS TO THE CONDITIONS, WHICH REQUIRE THE CHANGING OF WORK. C. CONTRACTOR SHALL COORDINATE WITH THE OTHER TRADES PRIOR TO FABRICATION AND INSTALLATION. COORDINATION WITH TRADES PRIOR TO INSTALLATION, FABRICATION AND A. SEE DIVISION 1. FOR GENERAL REQUIREMENTS. B. CAREFULLY RECORD THE ACTUAL LOCATIONS OF EACH PIECE OF CONCEALED EQUIPMENT, CONTROL DEVICES, PIPE, VALVES ETC. AND WORK WHEN DIFFERENT FROM THE CONTACT Client: 1.14 OPERATING AND MAINTENANCE INSTRUCTIONS CITY OF TAKOMA PARK A. SEE DIVISION 1 FOR GENERAL REQUIREMENTS OF DEMONSTRATION AND TRAINING. B. UPON COMPLETION OF WORK AND OF TESTS, FURNISH THE NECESSARY SKILLED LABOR AND HELPERS FOR OPERATING AND DEMONSTRATING THE SYSTEMS AND EQUIPMENT. C. THE INSTRUCTOR SHALL BE THOROUGHLY FAMILIAR WITH PARTS OF THE INSTALLATION ON Location: WHICH HE IS TO GIVE INSTRUCTION AND SHALL BE TRAINED IN OPERATING THEORY AS WELL AS PRACTICAL OPERATION AND MAINTENANCE WORK. EMPLOY FACTORY TRAINED 7500 MAPLE AVE INSTRUCTORS WHEREVER NECESSARY AND AS SPECIFIED. TAKOMA PARK MD. D. INSTRUCTIONS SHALL INCLUDE A GENERAL DESCRIPTION OF EACH SYSTEM TOGETHER WITH SPECIFIC INSTRUCTIONS DESCRIBING ROUTINE AND EMERGENCY PROCEDURES REQUIRED OF THE BUILDING PERSONNEL FOR OPERATING AND MAINTAINING EACH SYSTEM. THE INSTRUCTIONS SHALL INCLUDE THE NAME OR LABEL, LOCATION, AND FUNCTION OF OPERATING EQUIPMENT AND CONTROLS. OPERATING MODES AND THE PROCEDURES FOR INDEXING EACH MODE SHALL BE Project: CLEARLY DESCRIBED. INCLUDE LUBRICATION CHARTS AND SCHEDULES OF FREQUENCY OF LUBRICATION FOR EQUIPMENT, DESIGNATING EACH POINT OF LUBRICATION AND TYPE OF I.T. ROOM UPGRADE LUBRICATION TO BE USED. LISTINGS OF NAMES, ADDRESSES, AND PHONE NUMBERS OF THE SERVICE ORGANIZATIONS FOR EACH ITEMS OF EQUIPMENT AND A TYPEWRITTEN MAINTENANCE SCHEDULE FOR SAME SHALL BE INCLUDED. E. PROVIDE OPERATION AND MAINTENANCE MANUALS AND RECORD PRODUCT DATA AS SPECIFIED IN A. SUBMITTAL REVIEW BY THE ENGINEER IS INTENDED TO ASSIST CONTRACTOR IN HIS ABILITY TO MECHANICAL COMPLY WITH THE CONTRACT DOCUMENTS. REVIEW OF SUBMITTAL IS ONLY FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPT AS GIVEN IN CONTRACT DOCUMENTS. WHERE CONTRACTOR SUBMITTALS DO NOT CLEARLY INDICATE THE INTENDED MATERIALS FOR USE, THEY MAY BE RETURNED WITHOUT REVIEW OR BE REJECTED. WHERE DIFFERENCES BETWEEN CONTRACT DOCUMENTS AND SUBMITTALS ARE NOT NOTED, CONTRACTOR SHALL COMPLY WITH REQUIREMENTS OF CONTRACT DOCUMENTS. CONTRACTOR ACCEPTS ALL RESPONSIBILITY FOR QUANTITIES, DIMENSIONS, DETAILS, COORDINATION OF TRADES AND JOB SAFETY. 1. ACTION SUBMITTALS: SUBMIT TO ENGINEER FOR REVIEW. Drawn by A2ESG 2. INFORMATIONAL SUBMITTALS: PROVIDE SUBMITTALS IN OPERATIONAL AND MAINTENANCE Project No. Date 2/24/16 15032.00 A Squared Rus Engineering PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 36773, EXPIRATION DATE: 01-18-17 $S_{upport} G_{roup, LLC}$ 3477 SHILOH ROAD, HAMPSTEAD, MARYLAND 21074 PHONE: 443.977.9741 FAX: 410.374.5471 WWW.A2ESG.COM

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- **B. DEFINITION:**
- MANUALS.

- FINAL.
- CONSIDERATIONS.

- 1.12 DRAWINGS

- ORDERING. 1.13 RECORD DRAWING
- DRAWINGS.

- DIVISION 1.
- 1.15 SUBMITTALS

SUBMIT ACCESS DOOR LOCATIONS TO THE ARCHITECT FOR APPROVAL. EQUIPMENT REQUIRING ACCESS DOORS SHALL NOT BE INSTALLED PRIOR TO APPROVAL OF ACCESS DOOR LOCATIONS. COORDINATION DRAWINGS:

SAMPLES, DRAWINGS, SPECIFICATIONS, CATALOGS, ETC., SUBMITTED FOR APPROVAL SHALL BE

BE USED.

PROPERLY LABELED INDICATING SPECIFIC SERVICE FOR WHICH MATERIAL OR EQUIPMENT IS TO

- 1. PROVIDE COORDINATION DRAWINGS IN ACCORDANCE WITH DIVISION 1 SECTION "PROJECT MANAGEMENT AND COORDINATION". DETAIL MAJOR ELEMENTS, COMPONENTS, AND SYSTEMS OF MECHANICAL EQUIPMENT AND MATERIALS IN RELATIONSHIP WITH OTHER SYSTEMS, INSTALLATIONS, AND BUILDING COMPONENTS (I.E. ELECTRICAL, PLUMBING, SPRINKLER, STRUCTURAL AND ARCHITECTURAL WORK). SHOW SPACE REQUIREMENTS FOR INSTALLATION AND ACCESS. INDICATE IF SEQUENCE AND COORDINATION OF INSTALLATIONS ARE IMPORTANT
- TO EFFICIENT FLOW OF THE WORK. INCLUDE THE FOLLOWING BUT NOT LIMITED TO:
 - a. PLANNED PIPING LAYOUT, INCLUDING VALVE AND SPECIALTY LOCATIONS D VALVE STEN MOVENENT

ERE CUMPLICIS EXIST WITHIN THE CUMTRACT DUCUMENTS, REQUEST CLARIF TO THE SUBMISSION OF A BID. IF CLARIFICATION IS NOT REQUESTED, PROVIDE THE WORK REPRESENTING THE HIGHER COST AND QUALITY.

A. CERTAIN ITEMS OF EQUIPMENT SHALL BE WARRANTED FOR A LONGER TIME THAN THE GENERAL

- 1.9 WARRANTY
- WARRANTY PERIOD. PROVIDE FOR SERVICE OR REPLACEMENT REQUIRED IN CONNECTION WITH THE WARRANTY OF THESE ITEMS

REQUIRED TO ACHIEVE SPECIFIED PERFORMANCE OF EQUIPMENT PROVIDED.

C.	PROCESSING TIME: ALLOW TIME FOR SUBMITTAL REVIEW, INCLUDING TIME FOR RESUBMITTALS, AS FOLLOWS. TIME FOR REVIEW SHALL COMMENCE ON ENGINEER'S RECEIPT OF SUBMITTAL.		INSTALL FITTINGS FOR CHANGES IN DIRECTION INSTALL PIPING TO ALLOW APPLICATION OF II
	1. INITIAL REVIEW: ALLOW 20 WORKING (BUSINESS) DAYS FOR INITIAL REVIEW OF EACH SUBMITTAL. ALLOW ADDITIONAL TIME IF COORDINATION WITH SUBSEQUENT SUBMITTALS IS REQUIRED. ENGINEER WILL ADVISE ARCHITECT WHEN A SUBMITTAL BEING PROCESSED MUST		SELECT SYSTEM COMPONENTS WITH PRESSU OPERATING PRESSURE. INSTALL ESCUTCHEONS FOR PENETRATIONS C
	BE DELAYED FOR COORDINATION. 2. RESUBMITTAL REVIEW: ALLOW 15 WORKING (BUSINESS) DAYS FOR EACH RESUBMITTAL.	L.	SLEEVES ARE NOT REQUIRED FOR CORE-DRI
	3. ENGINEER WILL REVIEW AN INITIAL SUBMITTAL AND ONE (1) RESUBMITTAL. ANY ADDITIONAL REVIEWS SHALL BE BILLED TO THE GENERAL CONTRACTOR ON AN HOURLY		PERMANENT SLEEVES ARE NOT REQUIRED FO
	BASIS AT THE ENGINEERS CURRENT BILLING RATES AND WILL NOT BE RETURNED TO		INSTALL SLEEVES FOR PIPES PASSING THROU INSTALL SLEEVES FOR PIPES PASSING
	THE GENERAL CONTRACTOR UNTIL PAYMENT HAS BEEN RECEIVED. THIS SHALL NOT BE CAUSE FOR ANY DELAY CLAIMS OR ADDITIONAL COMPENSATION CLAIMS BY THE	0.	GYPSUM-BOARD PARTITION.
	GENERAL CONTRACTOR TO THE OWNER.		1. CUT SLEEVES TO LENGTH FOR MOUNTING a. EXCEPTION: EXTEND SLEEVES INST
PAR	T 2 – PRODUCTS		AREAS OR OTHER WET AREAS 2 IN CAST-IRON SLEEVE FITTINGS BELOW
	PRODUCTS TO BE USED		RING IF RING IS SPECIFIED.
Α.	ITEMS ARE SPECIFIED BY DESIGNATIONS SUCH AS TRADE NAME, MANUFACTURER'S NAME, CATALOG NUMBER AND INDICATE THE CAPACITY AND QUALITY OF THE PRODUCTS OR MATERIALS		2. INSTALL SLEEVES THAT ARE LARGE EN SPACE BETWEEN SLEEVE AND PIPE OR F
В.	TO BE USED ON THIS PROJECT. ONLY PRODUCTS INDICATED ON CONTRACT DOCUMENTS BY NAME AND MODEL NUMBER HAVE		SLEEVE MATERIALS: a. PVC OR STEEL PIPE SLEEVES: FOR
	BEEN COORDINATED WITH OTHER TRADES. COORDINATE ITEMS OF OTHER MANUFACTURER WITH OTHER TRADES.		b. STEEL SHEET SLEEVES: FOR GYPSUM-BOARD PARTITIONS.
C.	THE WORK UNDER THIS SECTION OF THE SPECIFICATION SHALL INCLUDE THE FURNISHING OF LABOR, MATERIALS AND EQUIPMENT FOR THE INSTALLATION OF COMPLETE PLUMBING SYSTEM		c. STACK SLEEVE FITTINGS: FOR WATERPROOFING. SECURE FLASHING
	TO PROVIDE CONTINUOUS AND SATISFACTORY SERVICE.		OF CAST-IRON SOIL PIPE TO EXTEN LEVEL. REFER TO DIVISION 07 SI FLASHING.
	FOUNDATIONS AND EQUIPMENT SUPPORTS		1) SEAL SPACE OUTSIDE OF SLEEVE
 Α.	PROVIDE FOUNDATIONS, SUPPORTS, CURBS AND BASES FOR EQUIPMENT, AS NECESSARY FOR SATISFACTORY INSTALLATION AND OPERATION OF EQUIPMENT. FURNISH AND SET ANCHOR	Ρ.	FIRE-BARRIER PENETRATIONS: MAINTAIN I CEILINGS, AND FLOORS AT PIPE PENETRATION
	BOLTS.		MATERIALS. REFER TO DIVISION 07 SECTION
	FIRESTOPPING SYSTEM DESCRIPTION	Q.	VERIFY FINAL EQUIPMENT LOCATIONS FOR RC
			PIPING CONNECTIONS
	COMBINATION OF MATERIALS TO FORM AN EFFECTIVE BARRIER AGAINST THE SPREAD OF FLAME, SMOKE, AND GASES, AND MAINTAIN THE INTEGRITY OF FIRE RESISTANCE RATE	Α.	MAKE CONNECTIONS ACCORDING TO THE FOL 1. INSTALL UNIONS, IN PIPING NPS 2 ANI
	WALLS, BARRIERS, PARTITIONS, FLOORS, FLOOR/CEILING/ROOF ASSEMBLIES, INCLUDING THROUGH PENETRATIONS AND CONSTRUCTION JOINTS. THROUGH-PENETRATIONS INCLUDE		FINAL CONNECTION TO EACH PIECE OF E
-	THE ANNULAR SPACES AROUND PIPES, TUBES, CONDUITS, WIRES, CABLES, AND VENTS. CONSTRUCTION JOINTS INCLUDE THOSE USED TO ACCOMMODATE EXPANSION, CONTRACTION,		2. INSTALL FLANGES, IN PIPING NPS 2-1/ AND AT FINAL CONNECTION TO EACH PIE
	WIND, OR SEISMIC MOVEMENT; FIRESTOPPING MATERIALS SHALL NOT INTERFERE WITH REQUIRED MOVEMENT OF JOINTS.		3. DRY PIPING SYSTEMS: INSTALL DIELEC MATERIALS OF DISSIMILAR METALS.
В.	STORAGE AND DELIVERY		4. WET PIPING SYSTEMS: INSTALL DIELECTI PIPING MATERIALS OF DISSIMILAR METALS
	1. MATERIALS SHALL BE DELIVERED IN THE ORIGINAL UN-OPENED PACKAGES OR CONTAINERS SHOWING NAMES OF THE MANUFACTURER AND THE BRAND NAME OF THE PRODUCT.	37	EQUIPMENT INSTALLATION - COMMON REQUI
	MATERIALS SHALL BE STORED OFF THE GROUND AND SHALL BE PROTECTED FROM DAMAGE AND EXPOSURE TO ELEMENTS. DAMAGED OR DETERIORATED MATERIALS SHALL BE REMOVED		INSTALL EQUIPMENT TO ALLOW MAXIMUM PO
0	FROM THE SITE.	в.	HEIGHTS ARE NOT INDICATED. INSTALL EQUIPMENT LEVEL AND PLUMB, PAR
	FIRESTOPPING MATERIALS	C.	SYSTEMS AND COMPONENTS IN EXPOSED INT INSTALL HVAC EQUIPMENT TO FACILITAT
	 FIRESTOPPING MATERIALS SHALL CONSIST OF COMMERCIALLY MANUFACTURED PRODUCTS COMPLYING WITH THE FOLLOWING MINIMUM REQUIREMENTS: FIRE HAZARD CLASSIFICATION: MATERIAL SHALL HAVE A FLAME SPREAD OF 25 OR LESS, 		REPLACEMENT OF COMPONENTS. CONNECT MINIMUM INTERFERENCE TO OTHER INSTALLA
	AND A SMOKE DEVELOPED RATING OR 50 OR LESS, WHEN TESTED IN ACCORDANCE WITH ASTM E 84 OR UL 723. MATERIALS SHALL BE NON-TOXIC TO HUMANS AT ALL STAGES OF		LOCATIONS. IN NO CASE SHALL EQUIPMENT THAN MANUFACTURER'S RECOMMENDATIONS.
	THE APPLICATION AND PERFORMANCE OF THE MATERIALS. 3. FIRE RESISTANCE RATING: FIRESTOPPING WILL NOT BE REQUIRED TO HAVE A GREATER	D.	INSTALL EQUIPMENT TO ALLOW RIGHT OF WAY
			PAINTING
	CONSTRUCTION IN WHICH THEY OCCUR.	А.	DAMAGE AND TOUCHUP: REPAIR MARRED / MATERIALS AND PROCEDURES TO MATCH OR FINISH IF, IN THE OPINION OF THE ARCH
	WATER LEAK DETECTION AND ALARM SYSTEM PROVIDE BATTERY OPERATED WATER LEAK DETECTION AND ALARM SYSTEM FOR EACH PAN. 9		SEVERELY DAMAGED.
,	VOLT BATTERY SHALL HAVE A SERVICE LIFE OF 3 YEARS MINIMUM. SENSOR SHALL BE LOCATED IN PAN TO DETECT WATER. ALARM SHALL BE WALL MOUNTED. MANUFACTURERS		1. TOUCH UP THREADS OF ZINC COATED S COAT OF ENAMEL CONFORMING TO PAINT
	SHALL BE HONEYWELL, DWYER AND FLOODMASTER.		2 PREPARE PIPING AND ASSOCIATED HANGE FIELD PAINT.
	PAN FOR WATER LEAK DETECTION PROVIDE A GALVANIZED STEEL PAN HAVING A MATERIAL THICKNESS OF NOT THAN 24 GAUGE	3.9	CUTTING AND PATCHING
,	AND 2" IN DEPTH. SECURE AND SLOPE PAN (AVOID SLOPING PAN TOWARDS ELECTRICAL ROOM AND EXTERIOR WALL). SUFFICIENT SIZE AND SHAPE SHALL RECEIVE ANY PIPE LEAK ABOVE IT		SEE DIVISION 1 FOR GENERAL REQUIREMENTS CUTTING AND PATCHING OF BUILDING MATER
	ROOM. PROVIDE ADEQUATE QUANTITY TO COVER THE AREA.		WORKMANLIKE MANNER. SURFACES, WHICH AN REPAIRED OR PROVIDED WITH NEW MATERIALS
PAR	T 3 – EXECUTION		WITH MATERIALS AND METHODS SIMILAR TO A ARCHITECT. STRUCTURAL MEMBERS SHALL NO ON THE DRAWINGS.
	EXISTING CONDITIONS VISIT THE SITE AND BECOME FAMILIAR WITH EXISTING CONDITIONS. MODIFICATIONS TO WORK	.3.1	
~ •	REQUIRED TO ALLOW FOR EXISTING CONDITIONS SHALL BE PROVIDED. SUBMIT PROPOSED MODIFICATIONS TO THE ARCHITECT FOR APPROVAL PRIOR TO INSTALLATION.		VERIFY THAT RIGGING PATH FOR EQUIPMENT
В.	RELOCATE EXISTING HANGERS AND SUPPORTS WHERE NECESSARY TO INSTALL NEW WORK. MAXIMUM SPACING REQUIREMENTS SHALL APPLY FOR RELOCATED SUPPORTS.		MATERIALS. VERIFY ACCESSWAYS AND WEIGH INCLUDING ELEVATORS, FLOORS, WALLS, CE EQUIPMENT OR SECTIONS OF EQUIPMENT
C.	COORDINATE INTERRUPTIONS IN SERVICE OF EXISTING SYSTEMS WITH THE OWNER. PROVIDE TEMPORARY CONNECTIONS TO MAINTAIN OPERATION OF EXISTING SYSTEMS.		EQUIPMENT SHALL BE ORDERED IN A KNOCH THE SITE. SUBMIT IN WRITING TO ARCHITECT
3.2	MANNER OF INSTALLATION	D	PROHIBIT RIGGING OF EQUIPMENT INTO SPAC USE PLANKING OR CRIBBING AS REQUIRED
Α.	PIPING SHALL BE INSTALLED TO PRESERVE ACCESS TO VALVES, DAMPERS AND EQUIPMENT. VALVES AND EQUIPMENT WHICH REQUIRE FREQUENT SERVICE, ADJUSTMENT OR CONTROL AND		DAMAGE. PROTECT EQUIPMENT FROM DAMAGE
	WHICH CANNOT BE LOCATED IN A READILY ACCESSIBLE AND SAFE PLACE, SHALL BE PROVIDED WITH EXTENSION DEVICES AND REMOTE OPERATORS, AS NECESSARY AND AS ACCEPTED FOR		
	USE BY THE ARCHITECT. PIPING SHALL BE RUN TO FOLLOW THE LINES OF THE BUILDING AND TO ALLOW THE MAXIMUM	Α.	WELDING PIPING SHALL COMPLY WITH THE ASME CODE FOR PRESSURE PIPING, ANSI/
	HEADROOM CONSISTENT WITH PROPER PITCH. PIPING SUBJECT TO THERMAL EXPANSION SHALL BE ARRANGED TO PERMIT MOVEMENT WITHOUT DAMAGE TO THE PIPING, DUCTWORK AND		B31.9 – BUILDING SERVICES PIPING, CONT FEDERAL, STATE OR LOCAL AGENCIES HAVING
	EQUIPMENT.	В.	THAN THE ABOVE ANSI/ASME CODES. STATE, COUNTRY, AND CITY FIRE PREVEN
	WORKMANSHIP FURNISH THE SERVICES OF AN EXPERIENCED FULL TIME FIELD SUPERINTENDENT WHO SHALL		REGULATIONS, AND NFPA 241 SHALL BE APPROPRIATE PORTABLE FIRE EXTINGUISHER
	BE CONSTANTLY IN CHARGE OF THE INSTALLATION OF WORK PROVIDED UNDER THIS DIVISION. SUPERINTENDENT SHALL HAVE DEMONSTRATED EXPERIENCE WITH PROJECTS OF COMPARABLE		BUILDING, NOTIFY THE CONSTRUCTION MANAGOCCUR, AND SUBMIT FOR APPROVAL A FOCCUPANTS. PROCEED ONLY UPON RECEIP
В.	SIZE AND COMPLEXITY AND SHALL BE APPROVED BY THE ARCHITECT. THE QUALITY OF WORKMANSHIP REQUIRED IN THE EXECUTION OF THE WORK SHALL BE THE		PROVIDE REASONABLE BARRIERS, COVERING CONSTRUCTION MANAGER FOR PROTECTIO
	FINEST AND HIGHEST OBTAINABLE, WORKING WITH THE MATERIALS SPECIFIED. WORKMANSHIP SHALL BE SATISFACTORY TO THE ARCHITECT AND HIS DECISION AS TO ACCEPTABLE QUALITY IS FINAL.		OCCUPANTS. IN REGARDS TO WELDING CONEGATIVE PRESSURE WITHIN THE WORK ARE
3.4	EQUIPMENT CONNECTIONS		FUMES TO OCCUPIED AREAS OF THE BUIL SMOKE REMOVAL SYSTEMS AS REQUIRED -
	EQUIPMENT SHALL BE INSTALLED AND CONNECTED IN ACCORDANCE WITH THE BEST		THE BUILDING EXTERIOR IN A MANNER TO THROUGH AREAWAYS, WINDOWS, ETC. AND AV
	ENGINEERING PRACTICE AND IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS. AUXILIARY PIPING, VALVES, AND ELECTRIC CONNECTIONS RECOMMENDED BY THE MANUFACTURER OR REQUIRED FOR PROPER OPERATION SHALL BE PROVIDED.	C.	PROVIDE SINGLE-VEE TYPE BUTT WEI CONFIGURATION SHALL CONFORM TO ANSI B
マト	PIPING SYSTEMS - COMMON REQUIREMENTS	D.	BEFORE WELDING IS PERFORMED, SUBMIT A PROCEDURE SPECIFICATION TOGETHER WITH
	INSTALL PIPING ACCORDING TO THE FOLLOWING REQUIREMENTS AND DIVISION 23 SECTIONS	-	REQUIRED BY SECTION IX OF THE ASME BOIL
В.	SPECIFYING PIPING SYSTEMS. INSTALL PIPING IN CONCEALED LOCATIONS, UNLESS OTHERWISE INDICATED AND EXCEPT IN	Ŀ.	BEFORE A WELDER SHALL PERFORM WELD RECORD OF WELDER OR WELDING OPERATOR IX OF THE ASME BOILER AND PRESSURE VES
C.	EQUIPMENT ROOMS AND SERVICE AREAS. INSTALL PIPING AT RIGHT ANGLES OR PARALLEL TO BUILDING WALLS. DIAGONAL RUNS ARE	F.	WELDS SHALL HAVE PENETRATION COMPLETE
	PROHIBITED UNLESS SPECIFICALLY INDICATED OTHERWISE. INSTALL PIPING ABOVE ACCESSIBLE CEILINGS TO ALLOW SUFFICIENT SPACE FOR CEILING PANEL		USED TO ASSURE FULL PENETRATION FOR
	REMOVAL.		(E.G. ALL MEDIUM PRESSURE STEAM PIP CONDITIONS LESS THAN 350°F SHALL BE IN CODE
	INSTALL PIPING TO PERMIT VALVE SERVICING. INSTALL PIPING AT INDICATED SLOPES.		CODE.
	INSTALL PIPING FREE OF SAGS AND BENDS.		

- TION AND BRANCH CONNECTIONS. OF INSULATION.
- SSURE RATING EQUAL TO OR GREATER THAN SYSTEM
- NS OF WALLS, CEILINGS, AND FLOORS.
- -DRILLED HOLES. FOR HOLES FORMED BY REMOVABLE PE SLEEVES.
- ROUGH CONCRETE AND MASONRY WALLS.
- NG THROUGH CONCRETE AND MASONRY WALLS,
- TING FLUSH WITH BOTH SURFACES. NSTALLED IN FLOORS OF MECHANICAL EQUIPMENT INCHES ABOVE FINISHED FLOOR LEVEL. EXTEND OW FLOOR SLAB AS REQUIRED TO SECURE CLAMPING
- ENOUGH TO PROVIDE 1/4-INCH ANNULAR CLEAR R PIPE INSULATION. USE THE FOLLOWING
- OR PIPES SMALLER THAN NPS 6. PIPES NPS 6 AND LARGER, PENETRATING
- OR PIPES PENETRATING FLOORS WITH MEMBRANE IING BETWEEN CLAMPING FLANGES. INSTALL SECTION TEND SLEEVE TO 2 INCHES ABOVE FINISHED FLOOR SECTION "SHEET METAL FLASHING AND TRIM" FOR
- EEVE FITTINGS WITH GROUT.
- IN INDICATED FIRE RATING OF WALLS, PARTITIONS, RATIONS. SEAL PIPE PENETRATIONS WITH FIRESTOP TION "PENETRATION FIRESTOPPING" FOR MATERIALS. ROUGHING-IN.
- FOLLOWING, UNLESS OTHERWISE INDICATED: AND SMALLER, ADJACENT TO EACH VALVE AND AT F EQUIPMENT.
- -1/2 AND LARGER, ADJACENT TO FLANGED VALVES PIECE OF EQUIPMENT.
- LECTRIC UNIONS AND FLANGES TO CONNECT PIPING
- ECTRIC COUPLING AND NIPPLE FITTINGS TO CONNECT
- QUIREMENTS POSSIBLE HEADROOM UNLESS SPECIFIC MOUNTING
- PARALLEL AND PERPENDICULAR TO OTHER BUILDING INTERIOR SPACES, UNLESS OTHERWISE INDICATED.
- ECT EQUIPMENT FOR EASE OF DISCONNECTING, WITH LLATIONS. EXTEND GREASE FITTINGS TO ACCESSIBLE IENT BE INSTALLED WITH SERVICE CLEARANCE LESS
- WAY FOR PIPING INSTALLED AT REQUIRED SLOPE.
- D AND DAMAGED FACTORY-PAINTED FINISHES WITH RCHITECT OR OWNER, THE FACTORY FINISHES ARE
-) SCREWED PIPE WITH RUSTOLEUM PRIMER AND ONE AINTING SPECIFICATION. NGERS SPECIFIED TO BE PAINTED TO ACCEPT
- ENTS. ATERIALS SHALL BE PERFORMED IN A NEAT AND H ARE DAMAGED BY THE CONTRACTOR, SHALL BE RIALS. PATCHING AND MATERIALS SHALL BE DONE O ADJACENT WORK, SUBJECT TO APPROVAL OF THE NOT BE CUT OR PENETRATED UNLESS INDICATED
- MENT PRIOR TO START OF WORK OR ORDERING OF EIGHT CARRYING CAPACITY OF BUILDING FEATURES. IENT ARE LARGER THAN AVAILABLE ACCESSWAYS, OCKED-DOWN CONFIGURATION FOR RE-ASSEMBLY AT ECT WHERE PROBLEMS ARE ENCOUNTERED THAT MAY PACE WITH THE PROPOSED SOLUTIONS.
- IRED TO PROTECT ADJOINING CONSTRUCTION FROM AGE UNTIL CONSTRUCTION IS COMPLETED.
- ISI/ASME B31.1 POWER PIPING, AND ANSI/ASME ONTRACTOR SHALL COMPLY WITH REQUIREMENTS OF VING LEGAL JURISDICTION THAT ARE MORE STRINGENT 3.14 FLASHING
- VENTION CODE REQUIREMENTS, FIRE AND SAFETY BE COMPLIED WITH. INCLUDING THE PROVISION OF HERS. PRIOR TO PERFORMING WELDING WITHIN THE ANAGER IN ADVANCE OF AREAS WHERE WELDING WILL END OF SECTION 230500 A PLAN FOR PROTECTION OF THE BUILDING AND EIPT OF CONSTRUCTION MANAGER'S APPROVAL AND INGS, ETC., AS REQUIRED OR REQUESTED BY THE CTION OF THE INSTALLED WORK AND BUILDING AREA TO PREVENT THE MIGRATION OF SMOKE AND BUILDING. PROVIDE TEMPORARY EXHAUST FANS AND PART 1 - GENERAL - DISCHARGE OF SMOKE AND FUMES SHALL BE TO TO NOT BE RECIRCULATED BACK INTO BUILDING
- AWAY FROM PUBLIC ACCESSWAY. WELDS, UNLESS SPECIFIED OTHERWISE. JOINT I B16.25.
- A COPY OF THE CONTRACTOR'S STANDARD WELDING 1.2 SUMMARY WITH THE PROCEDURE QUALIFICATION RECORD AS BOILER AND PRESSURE VESSEL CODE.
- ELDING, SUBMIT A COPY OF THE MANUFACTURER'S ATOR QUALIFICATION TESTS AS REQUIRED BY SECTION 1.3 DEFINITIONS VESSEL CODE.
- ETE TO THE INSIDE DIAMETER OF THE PIPE AND THE TWEEN ENDS OF PIPE PRIOR TO WELDING SHALL BE B. ICC-ES: ICC-EVALUATION SERVICE. OR PIPE SERVICE CONDITIONS OF 350°F AND ABOVE PIPING). WELD PENETRATIONS FOR PIPE SERVICE 1.4 SUBMITTALS IN ACCORDANCE WITH THE APPLICABLE ANSI/ASME

- G. VISUAL AND NONDESTRUCTIVE EXAMINATIONS SHALL BE PERFORMED TO DETECT THE SURFACE AND INTERNAL DISCONTINUITIES IN COMPLETED WELDS BY AN INDEPENDENT TESTING AGENCY HIRED BY THE CONSTRUCTION MANAGER. THE CONTRACTOR SHALL FULLY COOPERATE WITH AN INDEPENDENT TESTING AGENCY SO THAT WELDS CAN BE EXAMINED BY THE INDEPENDENT TESTING AGENCY. THE TYPES AND EXTENT OF NON-DESTRUCTIVE EXAMINATIONS REQUIRED FOR PIPE WELDS ARE AS SHOWN IN TABLE 136.4 OF ASME CODE FOR PRESSURE PIPING, ANSI/ASME B31.1 - POWER PIPING AND AS CONTAINED HEREIN. IF REQUIREMENTS FOR VISUAL AND NONDESTRUCTIVE EXAMINATIONS ARE TO BE OTHER THAN CONTAINED HEREIN, THE DEGREE OF EXAMINATION AND BASIS OF REJECTION SHALL BE A MATTER OF PRIOR WRITTEN AGREEMENT BETWEEN THE CONSTRUCTION MANAGER AND THE INDEPENDENT TESTING AGENCY. THE EXTENT OF VISUAL AND NON-DESTRUCTIVE EXAMINATIONS SHALL BE AS FOLLOWS:
- 1. THE INDEPENDENT TESTING AGENCY SHALL TEST A MINIMUM OF 10% OF THE TOTAL LENGTH OR NUMBER OF PIPING WELDS BY UTILIZING RADIOGRAPH, ULTRASONIC TESTING, SECTIONING OR A COMBINATION OF THESE METHODS AS DETERMINED BY THE INDEPENDENT TESTING AGENCY. IF A RANDOM WELD TEST REVEALS THAT A WELD FAILS TO MEET THE MINIMUM QUALITY REQUIREMENTS, AN ADDITIONAL 10 PERCENT OF THE WELDS IN THAT SAME GROUP SHALL BE TESTED AT THE CONTRACTOR'S EXPENSE AND AT NO ADDITIONAL COST TO THE OWNER. IF THE ADDITIONAL WELDS EXAMINED MEET THE QUALITY REQUIREMENTS, THE ENTIRE GROUP OF WELDS REPRESENTED SHALL BE ACCEPTED AND THE DEFECTIVE WELDS SHALL BE REPAIRED. IF ANY OF THE ADDITIONAL WELDS EXAMINED ALSO FAIL TO MEET THE QUALITY REQUIREMENTS AS DETERMINED BY THE INDEPENDENT TESTING AGENCY, THAT ENTIRE GROUP OF WELDS SHALL BE REJECTED. REMOVE AND RE-WELD REJECTED WELDS OR EXAMINE REJECTED WELDS (AT THE CONTRACTOR'S EXPENSE AND AT NO ADDITIONAL COST TO THE OWNER) AND REMOVE AND RE-WELD DEFECTS.
- WELDS SHALL BE VISUALLY EXAMINED AS FOLLOWS:
- d. BEFORE WELDING FOR COMPLIANCE TO THE QUALIFIED WELDING PROCEDURE. b. DURING WELDING - FOR CONFORMANCE TO THE QUALIFIED WELDING PROCEDURE. c. AFTER WELDING - FOR CRACKS, CONTOUR AND FINISH, BEAD REINFORCEMENT, UNDERCUTTING, OVERLAP, AND SIZE OF FILLET WELDS.
- WELDS DETERMINED TO BE UNACCEPTABLE SHALL BE REMOVED AND REPLACED BY THE CONTRACTOR. AT NO ADDITIONAL COST TO THE OWNER. IN ACCORDANCE WITH THE APPLICABLE STANDARDS. REPAIR DEFECTS DISCOVERED BETWEEN WELD PASSES BEFORE ADDITIONAL WELD MATERIAL IS DEPOSITED. WHEREVER A DEFECT IS REMOVED, AND REPAIR BY WELDING IS NOT REQUIRED, THE AFFECTED AREA SHALL BE BLENDED INTO THE SURROUNDING SURFACE ELIMINATING SHARP NOTCHES, CREVICES, OR THE SAME TEST METHODS THAT FIRST REVEALED THE DEFECT TO ENSURE THAT THE DEFECT HAS BEEN ELIMINATED. AFTER RE-WELDING, RE-EXAMINE THE REPAIRED AREA BY THE SAME TEST METHODS ORIGINALLY USED FOR THAT AREA. FOR REPAIRS TO BASE MATERIAL, THE MINIMUM EXAMINATION SHALL BE THE SAME AS REQUIRED FOR BUTT WELDS. INDICATION OF A DEFECT SHALL BE REGARDED AS A DEFECT UNLESS RE-EVALUATION BY NON-DESTRUCTIVE EXAMINATION TESTING OR BY SURFACE CONDITIONING SHOWS THAT NO UNACCEPTABLE INDICATIONS ARE PRESENT. THE USE OF FOREIGN MATERIAL TO MASK, FILL IN, SEAL, OR DISGUISE WELDING DEFECTS WILL NOT BE PERMITTED.
- H. PIPE WELDS SHALL NOT BE COVERED PRIOR TO EXAMINATION BY THE INDEPENDENT TESTING AGENCY. SHOULD THE INDEPENDENT TESTING AGENCY ENCOUNTER PIPE JOINTS THAT ARE COVERED, CONTRACTOR SHALL REMOVE COVERING AND REPLACE WITH NEW COVERING, AT NO ADDITIONAL COST TO THE OWNER, FOLLOWING EXAMINATION BY THE INDEPENDENT TESTING AGENCY. COVERINGS SHALL INCLUDE, BUT NOT LIMITED TO, INSULATION, JACKETING, OUTER CONDUIT CLOSURE KITS, SPECIAL COATINGS, AND BACKFILL. EXAMINATIONS OF WELDS FOR THE METAL CONDUITS FOR PRE-INSULATED CONDUIT PIPING SYSTEMS MAY BE COVERED WITHOUT EXAMINATION BY THE INDEPENDENT TESTING AGENCY.
- I. WELDING AT HANGERS, SUPPORTS AND PLATES TO STRUCTURAL MEMBERS SHALL CONFORM TO AMERICAN WELDING SOCIETY, INC. AWS D1.1 STRUCTURAL WELDING CODE STEEL.
- ITATE SERVICE, MAINTENANCE, AND REPAIR OR J. WHEN REQUESTED BY THE INDEPENDENT TESTING AGENCY OR ARCHITECT, SUBMIT IDENTIFYING STENCILED TEST COUPONS MADE BY ANY WELDER IN QUESTION. THE CONTRACTOR SHALL REQUIRE A WELDER TO RETAKE THE TESTS WHEN, IN THE OPINION OF THE ARCHITECT OR INDEPENDENT TESTING AGENCY, THE WORK OF THE WELDER CREATES A REASONABLE DOUBT AS TO HIS PROFICIENCY. TESTS, WHEN REQUIRED, SHALL BE CONDUCTED AT NO ADDITIONAL EXPENSE TO THE OWNER: AND THE WELDER IN QUESTION SHALL NOT BE PERMITTED TO WORK AS A WELDER ON THIS PROJECT UNTIL HE IS RE-QUALIFIED.
- ORIGINAL FACTORY FINISH. PROVIDE COMPLETE NEW K. THE USE OF BACKING RINGS SHALL BE AT THE DISCRETION OF THE INSTALLING CONTRACTOR PROVIDED THAT THE CONTRACTOR PREPARES AND ALIGNS PIPES PRECISELY TO MELT THOUGH TO THE INSIDE SURFACE - MAKING A FULL PENETRATION WELD. AT THE DIRECTION OF THE INDEPENDENT TESTING AGENCY, THE CONTRACTOR MAY BE DIRECTED TO USE BACKING RINGS (AT NO ADDITIONAL COST TO THE OWNER) WHEN DEEMED NECESSARY BY THE INDEPENDENT TESTING AGENCY AFTER EXAMINATION OF THE PIPE WELDS.
 - L. WHEN WELD TESTING OR EXAMINATION IS PERFORMED AS REQUIRED HEREIN, THE CORRESPONDING WRITTEN CERTIFIED TEST REPORTS SHALL BE SUBMITTED.
 - 3.12 CLEANING
 - A. SEE DIVISION 1, THOROUGHLY CLEAN EXPOSED SURFACES OF EQUIPMENT AND MATERIAL AND LEAVE IN A NEAT, CLEAN CONDITION READY FOR PAINTING.
 - 3.13 ACCESSIBILITY
 - A. LOCATE EQUIPMENT THAT MUST BE SERVICED, OPERATED OR MAINTAINED, IN FULLY ACCESSIBLE POSITIONS. EQUIPMENT SHALL INCLUDE. BUT NOT BE LIMITED TO. COILS. VALVES, MOTORS, CONTROLLERS, DRAIN POINTS, CLEANOUTS, ETC. PROVIDE ADEQUATE MEANS TO ACCESS EQUIPMENT FOR REPAIR AND MAINTENANCE INCLUDING CAPABILITIES FOR PLATFORMS, FALL PROTECTION SYSTEMS, AND ANCHORAGE POINTS.
- CEILINGS, ROOFS, AND RELATED FEATURES. WHEN B. WHERE REQUIRED OR WHERE DIRECTED, PROVIDE ACCESS DOORS. DOORS INSTALLED IN FIRE-RATED WALLS OR SHAFTS SHALL BE LABELED AND SHALL MATCH RATING OF THE CONSTRUCTION. DOORS SHALL BE SUFFICIENT SIZE TO ALLOW ACCESS TO COMPONENTS. EXCEPT MINIMUM SIZE SHALL BE 12" X 16". WHERE EQUIPMENT REQUIRES ACCESS TO VARIOUS PARTS, SUCH AS AIR TERMINAL UNITS REQUIRE ACCESS TO THE CONTROLLER AND VALVE AND PIPING APPURTENANCES FOR THE REHEAT COIL, LOCATE APPURTENANCES REQUIRING ACCESS SUCH THAT ALL DEVICES CAN BE MAINTAINED FROM SINGLE DOOR. FOR ITEMS THAT REQUIRE ACCESS GREATER THAN 3 FEET ABOVE THE CEILING, PROVIDE MINIMUM 4 FEET X 4 FEET REMOVABLE CEILING PANEL TO FACILITATE TOP OF A FOLDING LADDER PLACED ABOVE THE CEILING PLANE. ACCESS DOORS ARE SPECIFIED IN DIVISION 8.
- THE PROVISIONS OF THE LATEST REVISION OF THE C. THE CONTRACTOR AT NO EXPENSE TO THE OWNER SHALL REWORK EQUIPMENT DEEMED INACCESSIBLE BY THE ARCHITECT.

 - A. SEE DIVISION 7 SECTIONS, BASE FLASHING OF ROOF PENETRATIONS, DUCTS, FANS AND OTHER EQUIPMENT, IF REQUIRED. CAP FLASHINGS SHALL BE PROVIDED TO MAKE A WATER TIGHT SEAL.

OPERATIONS WITHIN THE BUILDING, MAINTAIN A SECTION 230548-VIBRATION CONTROLS FOR HVAC PIPING AND EQUIPMENT

- 1.1 RELATED DOCUMENTS
- A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS, APPLY TO THE WORK UNDER DIVISIONS 26 AND 28.
- A. THIS SECTION INCLUDES THE FOLLOWING: 1. VIBRATION ISOLATORS.

- A. IBC: INTERNATIONAL BUILDING CODE.

- A. PRODUCT DATA: FOR THE FOLLOWING: 1. INCLUDE RATED LOAD, RATED DEFLECTION, AND OVERLOAD CAPACITY FOR EACH TYPE OF VIBRATION ISOLATION DEVICE.

- 2.1 GENERAL

- 1. MASON INDUSTRIES 2. AMBER/BOOTH COMPANY, INC.
- EQUIPMENT.
- OPERATION.
- LIMIT-STOP RESTRAINT.
- INSTALLATION.
- LOAD.
- BRACKETS.

- CAP SCREW.
- CAPACITY RANGE.

- LOAD.

PROVIDE VIBRATION ISOLATORS MANUFACTURED BY A FIRM SPECIALIZING IN THIS TYPE OF WORK FOR EQUIPMENT AND PIPING THAT IS CAPABLE OF TRANSMITTING NOISE AND VIBRATION TO THE BUILDING STRUCTURES.

B. ISOLATORS SHALL BE DESIGNED TO SUIT VIBRATION FREQUENCY TO BE ABSORBED. PROVIDE ISOLATOR UNITS OF AREA DISTRIBUTION TO OBTAIN PROPER RESILIENCY UNDER MACHINERY LOAD AND IMPACT. WHERE UNEQUAL DISTRIBUTION OF WEIGHT OCCURS, DESIGN ISOLATORS FOR UNIFORM DEFLECTION UNDER IMPOSED LOAD.

C. EXAMINE THE CONTRACT DRAWINGS FOR SIZES, HORSEPOWERS, ROTATIONAL SPEEDS, EQUIPMENT LOCATION, LENGTH OF SPAN BETWEEN COLUMNS AND BEAMS AND CONSTRUCTION TYPE TO DETERMINE THE ISOLATOR SELECTION TYPE AND DEFLECTION REQUIRED FOR EACH PIECE OF MECHANICAL EQUIPMENT. CONFORM TO THE REQUIREMENTS OF THE AMERICAN SOCIETY OF HEATING, REFRIGERATING, AND AIR-CONDITIONING ENGINEERS (ASHRAE) HANDBOOK, "HVAC SYSTEMS AND APPLICATIONS", "SOUND AND VIBRATION CONTROL"

D. ISOLATORS OF THE SAME TYPE SHALL BE THE PRODUCT OF THE SAME MANUFACTURER.

2.2 VIBRATION ISOLATORS

A. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS. MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

3. KINETICS NOISE CONTROL.

4. VIBRATION MOUNTINGS & CONTROLS, INC.

B. PADS: ARRANGED IN SINGLE OR MULTIPLE LAYERS OF SUFFICIENT STIFFNESS FOR UNIFORM LOADING OVER PAD AREA, MOLDED WITH A NONSLIP PATTERN AND GALVANIZED-STEEL BASEPLATES, AND FACTORY CUT TO SIZES THAT MATCH REQUIREMENTS OF SUPPORTED

1. RESILIENT MATERIAL: OIL – AND WATER-RESISTANT NEOPRENE.

MOUNTS: DOUBLE-DEFLECTION TYPE, WITH MOLDED, OIL-RESISTANT NEOPRENE ISOLATOR ELEMENTS WITH FACTORY-DRILLED, ENCAPSULATED TOP PLATE FOR BOLTING TO EQUIPMENT AND WITH BASEPLATE FOR BOLTING TO STRUCTURE. COLOR-CODE OR OTHERWISE IDENTIFY TO INDICATE CAPACITY RANGE.

1. MATERIALS: CAST-DUCTILE-IRON OR WELDED STEEL HOUSING CONTAINING TWO SEPARATE AND OPPOSING, OIL-RESISTANT NEOPRENE ELEMENTS THAT PREVENT CENTRAL THREADED ELEMENT AND ATTACHMENT HARDWARE FROM CONTACTING THE HOUSING DURING NORMAL

2. NEOPRENE: SHOCK-ABSORBING MATERIALS COMPOUNDED ACCORDING TO THE STANDARD FOR BRIDGE-BEARING NEOPRENE AS DEFINED BY AASHTO. a. MAXIMUM DUROMETER: 70.

D. RESTRAINED SPRING ISOLATORS: FREESTANDING, STEEL, OPEN-SPRING ISOLATORS WITH

1. HOUSING: STEEL WITH RESILIENT VERTICAL-LIMIT STOPS TO PREVENT SPRING EXTENSION DUE TO WEIGHT BEING REMOVED; FACTORY-DRILLED BASEPLATE BONDED TO 1/4-INCH THICK, NEOPRENE OR RUBBER ISOLATOR PAD ATTACHED TO BASEPLATE UNDERSIDE; AND ADJUSTABLE EQUIPMENT MOUNTING AND LEVELING BOLT THAT ACTS AS BLOCKING DURING

2. RESTRAINT: LIMIT STOP AS REQUIRED FOR EQUIPMENT.

3. OUTSIDE SPRING DIAMETER: NOT LESS THAN 80 PERCENT OF THE COMPRESSED HEIGHT OF THE SPRING AT RATED LOAD.

4. MINIMUM ADDITIONAL TRAVEL: 50 PERCENT OF THE REQUIRED DEFLECTION AT RATED

5. LATERAL STIFFNESS: MORE THAN 80 PERCENT OF RATED VERTICAL STIFFNESS. 6. OVERLOAD CAPACITY: SUPPORT 200 PERCENT OF RATED LOAD, FULLY COMPRESSED, WITHOUT DEFORMATION OR FAILURE.

E. HORIZONTAL THRUST RESTRAINTS: MODIFIED SPRING ISOLATOR. WITH ROD AND ANGLE

1. OUTSIDE SPRING DIAMETER: NOT LESS THAN 80 PERCENT OF THE COMPRESSED HEIGHT OF THE SPRING AT RATED LOAD. 2. MAXIMUM MOVEMENT: 1/4-INCH FROM STOP TO MAXIMUM THRUST.

3. OVERLOAD CAPACITY: SUPPORT 200 PERCENT OF RATED LOAD, FULLY COMPRESSED, WITHOUT DEFORMATION OR FAILURE

4. BASEPLATES: FACTORY DRILLED FOR BOLTING TO STRUCTURE AND BONDED TO 14-INCH-THICK, RUBBER ISOLATOR PAD ATTACHED TO BASEPLATE UNDERSIDE, WITH INTEGRAL NEOPRENE BUSHING AND PRECOMPRESSION STOP NUT.

5. END PLATE AND ADJUSTMENT BOLT: THREADED END PLATE WITH ADJUSTMENT BOLT AND

6. DEFLECTION: MATCH SPRING ISOLATORS.

F. ELASTOMERIC HANGERS: DOUBLE-DEFLECTION TYPE, FITTED WITH MOLDED, OIL-RESISTANT ELASTOMERIC ISOLATOR ELEMENTS BONDED TO STEEL HOUSINGS WITH THREADED CONNECTIONS FOR HANGER RODS. COLOR-CODE OR OTHERWISE IDENTIFY TO INDICATE

1. FRAME: STEEL, FABRICATED FOR CONNECTION TO THREADED HANGER RODS AND TO ALLOW FOR A MAXIMUM OF 30 DEGREES OF ANGULAR HANGER-ROD MISALIGNMENT WITHOUT BINDING OR REDUCING ISOLATION EFFICIENCY.

2. ELASTOMERIC ELEMENT: MOLDED, OIL-RESISTANT RUBBER OR NEOPRENE. STEEL-WASHER-REINFORCED CUP TO SUPPORT SPRING AND BUSHING PROJECTING THROUGH BOTTOM OF FRAME.

3. MAXIMUM DUROMETER: 70. G. SPRING HANGERS: COMBINATION COIL-SPRING AND ELASTOMERIC-INSERT HANGER WITH SPRING AND INSERT IN COMPRESSION.

1. FRAME: STEEL, FABRICATED FOR CONNECTION TO THREADED HANGER RODS AND TO ALLOW FOR A MAXIMUM OF 30 DEGREES OF ANGULAR HANGER-ROD MISALIGNMENT WITHOUT

BINDING OR REDUCING ISOLATION EFFICIENCY. 2. OUTSIDE SPRING DIAMETER: NOT LESS THAN 80 PERCENT OF THE COMPRESSED HEIGHT

OF THE SPRING AT RATED LOAD. 3. MINIMUM ADDITIONAL TRAVEL: 50 PERCENT OF THE REQUIRED DEFLECTION AT RATED

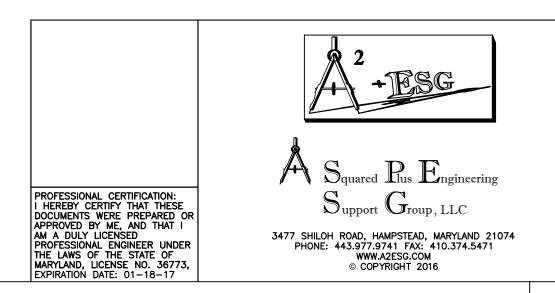
4. LATERAL STIFFNESS: MORE THAN 80 PERCENT OF RATED VERTICAL STIFFNESS. 5. OVERLOAD CAPACITY: SUPPORT 200 PERCENT OF RATED LOAD, FULLY COMPRESSED, WITHOUT DEFORMATION OR FAILURE

6. ELASTOMERIC ELEMENT: MOLDED, OIL-RESISTANT RUBBER OR NEOPRENE.

STEEL-WASHER-REINFORCED CUP TO SUPPORT SPRING AND BUSHING PROJECTING THROUGH BOTTOM OF FRAME

7. SELF-CENTERING HANGER ROD CAP TO ENSURE CONCENTRICITY BETWEEN HANGER AND SUPPORT SPRING COIL.

H. PIPE RISER RESILIENT SUPPORT: ALL-DIRECTIONAL, ACOUSTICAL PIPE ANCHOR CONSISTING OF 2 STEEL TUBES SEPARATED BY A MINIMUM OF 1/2-INCH THICK NEOPRENE. INCLUDE STEEL AND NEOPRENE VERTICAL-LIMIT STOPS ARRANGED TO PREVENT VERTICAL TRAVEL IN BOTH DIRECTIONS. DESIGN SUPPORT FOR A MAXIMUM LOAD ON THE ISOLATION MATERIAL OF 500 PSIG AND FOR EQUAL RESISTANCE IN ALL DIRECTIONS.



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SLE	I ILIENT PIPE GUIDES: TELESCOPIC ARRANGEMENT OF 2 STEEL TUBES OR POST AND EVE ARRANGEMENT SEPARATED BY A MINIMUM OF 1/2-INCH THICK NEOPRENE. WHERE	3.5 HVAC VIBRATION-CONTROL	
TO SHE	ARANCES ARE NOT READILY VISIBLE, A FACTORY—SET GUIDE HEIGHT WITH A SHEAR PIN ALLOW VERTICAL MOTION DUE TO PIPE EXPANSION AND CONTRACTION SHALL BE FITTED. AR PIN SHALL BE REMOVABLE AND REINSERTABLE TO ALLOW FOR SELECTION OF PIPE /EMENT. GUIDES SHALL BE CAPABLE OF MOTION TO MEET LOCATION REQUIREMENTS.	PIPING	ISOLATOR AND BA
PART 3	LIENT WASHER-BUSHINGS: MOLDED, OIL RESISTANT BRIDGE BEARING NEOPRENE. - EXECUTION	FIRST THREE SUPPORTS NEAR EQUIPMENT ISOLATED WITH SPRINGS	l RESTRAINED S ISOLATORS (FL
DEV CON B. EXA ACT C. PRC	MINATION MINE AREAS AND EQUIPMENT TO RECEIVE VIBRATION ISOLATION AND WIND-CONTROL ICES FOR COMPLIANCE WITH REQUIREMENTS FOR INSTALLATION TOLERANCES AND OTHER IDITIONS AFFECTING PERFORMANCE. MINE ROUGHING-IN OF REINFORCEMENT AND CAST-IN-PLACE ANCHORS TO VERIFY 'UAL LOCATIONS BEFORE INSTALLATION. DCEED WITH INSTALLATION ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN RECTED.	FIRST THREE SUPPORTS NEAR EQUIPMENT ISOLATED WITH PADS AND MOUNTS, AND NON–ISOLAT EQUIPMENT.	
A. DRII 1. II I S A	ATION-CONTROL DEVICE INSTALLATION LED-IN ANCHORS: DENTIFY POSITION OF REINFORCING STEEL AND OTHER EMBEDDED ITEMS PRIOR TO PRILLING HOLES FOR ANCHORS. DO NOT DAMAGE EXISTING REINFORCING OR EMBEDDED TEMS DURING CORING OR DRILLING. NOTIFY THE STRUCTURAL ENGINEER IF REINFORCING STEEL OR OTHER EMBEDDED ITEMS ARE ENCOUNTERED DURING DRILLING. LOCATE AND WOID PRESTRESSED TENDONS, ELECTRICAL AND TELECOMMUNICATIONS CONDUIT, AND GAS INES.	GENERALLY, AFTER FIRST THREE SUPPORTS, WITHIN 50 FEET OF ISOLATED EQUIPMENT, OR WITHIN MECHANICAL ROOM (WHICHEVER IS GREATER)	
 H 3. V H S 4. A F T A	NO NOT DRILL HOLES IN CONCRETE OR MASONRY UNTIL CONCRETE, MORTAR, OR GROUT HAS ACHIEVED FULL DESIGN STRENGTH. WEDGE ANCHORS: PROTECT THREADS FROM DAMAGE DURING ANCHOR INSTALLATION. HEAVY-DUTY SLEEVE ANCHORS SHALL BE INSTALLED WITH SLEEVE FULLY ENGAGED IN THE STRUCTURAL ELEMENT TO WHICH ANCHOR IS TO BE FASTENED. ADHESIVE ANCHORS: CLEAN HOLES TO REMOVE LOOSE MATERIAL AND DRILLING DUST PRIOR TO INSTALLATION OF ADHESIVE. PLACE ADHESIVE IN HOLES PROCEEDING FROM THE BOTTOM OF THE HOLE AND PROGRESSING TOWARD THE SURFACE IN SUCH A MANNER AS TO AVOID INTRODUCTION OF AIR POCKETS IN THE ADHESIVE.	PIPE RISERS AND GUIDES WITHIN 50 FEET OF ISOLATED EQUIPMEN OR WITHIN MECHANICAL ROOM (WHICHEVER IS GREATER) FANS WITHIN FACTORY FABRICATED	
6. II F	SET ANCHORS TO MANUFACTURER'S RECOMMENDED TORQUE, USING A TORQUE WRENCH. NSTALL ZINC-COATED STEEL ANCHORS FOR INTERIOR AND STAINLESS-STEEL ANCHORS OR EXTERIOR APPLICATIONS.	AIR-HANDLING UNITS	SPRING ISOI HORIZONTAL RESTRAINTS, BASE
	GN VIBRATION ISOLATORS SQUARELY ABOVE OR BELOW MOUNTING POINTS OF THE PORTED EQUIPMENT.	FAN RPM SCHEDULE	
PAR D. POS	EQUIPMENT WITH BASES, LOCATE ISOLATORS ON THE SIDES OF THE BASE THAT ARE ALLEL TO THE EQUIPMENT SHAFT. SITION VIBRATION ISOLATION HANGERS AS HIGH AS POSSIBLE IN THE HANGER ROD SEMBLY BUT NOT IN CONTACT WITH THE BUILDING STRUCTURE. PROVIDE 1-INCH MINIMUM	UP TO 300 RPM 301–500 RPM 501 RPM AND ABOVE	
CLE FOR	ARANCE BETWEEN HANGER HOUSING AND STRUCTURE ABOVE. PROVIDE SIDE CLEARANCE HANGER HOUSINGS TO ALLOW A FULL 360-DEGREE ROTATION ABOUT THE ROD AXIS HOUT CONTACTING ANY OBJECT.	CONDENSING UNITS MOUNTED ON PAD	RESTRAINED ISOLATORS
STR PIPI	ALLEL PIPES MAY BE HUNG TOGETHER ON A TRAPEZE THAT IS ISOLATED FROM THE UCTURE. ISOLATOR DEFLECTIONS MUST EQUAL THE GREATEST DEFLECTION FOR THOSE ES IF ISOLATED INDIVIDUALLY. DO NOT MIX ISOLATED AND NON—ISOLATED PIPES ON THE IE TRAPEZE.	NOTES: 1. REFER TO FAN RPM S BASED ON MINIMUM SI CONTROLLERS OR MULTI 2. THE SPRING HANGERS SI	PEED (RPM) ANT —SPEED MOTORS.
OTH 2—I EQU TO	NOT HANG OR SUPPORT PIPING, DUCTWORK, CONDUIT OR MECHANICAL EQUIPMENT ON IER EQUIPMENT, PIPES OR DUCTWORK INSTALLED ON VIBRATION ISOLATORS. MAINTAIN NCH CLEARANCE BETWEEN ISOLATED EQUIPMENT AND WALLS, CEILINGS AND OTHER IIPMENT. DO NOT ALLOW DRAIN PIPING CONNECTED TO VIBRATION—ISOLATED EQUIPMENT CONTACT THE BUILDING STRUCTURE OR OTHER NON—ISOLATED SYSTEMS UNLESS IT IS IILIENTLY MOUNTED.	PROVIDE LATERAL SUPPO 3. STATIC DEFLECTION EQUA END OF SECTION 230548	ORT ONLY.
 IS (THE	KIBLE PIPING CONNECTORS: PROVIDE FLEXIBLE PIPING CONNECTORS IN PIPING WHERE IT CONNECTED TO VIBRATION—ISOLATED EQUIPMENT. INSTALL THESE CONNECTORS BETWEEN E EQUIPMENT AND THE FIRST ASSOCIATED PIPE SUPPORT OR HANGER, EXCEPT WHERE PPORTS CONNECT TO AN INERTIA BASE COMMON TO THE EQUIPMENT.	SECTION 230553 – IDENTIFICAT	ON FOR HVAC PI
POS MIS EQU LOA	INSTALLATION OR USE OF VIBRATION ISOLATORS SHALL NOT CAUSE ANY CHANGE OF SITION OF PIPING WHICH WILL RESULT IN STRESSES IN PIPING CONNECTIONS OR ALIGNMENT OF SHAFTS OR BEARINGS. IN ORDER TO MEET THIS OBJECTIVE, MAINTAIN JIPMENT AND PIPING IN A RIGID POSITION DURING INSTALLATION. DO NOT TRANSFER THE AD TO THE ISOLATORS UNTIL THE INSTALLATION IS COMPLETE AND UNDER FULL ERATIONAL LOAD.	PART 1 – GENERAL 1.1 RELATED DOCUMENTS A. DRAWINGS AND GENERAL SUPPLEMENTARY CONDITION	
A. TES REP	D QUALITY CONTROL TING AGENCY: ENGAGE THE ISOLATOR MANUFACTURER OR THEIR AUTHORIZED RESENTATIVE TO PERFORM TESTS AND INSPECTIONS. TS AND INSPECTIONS:	 SUMMARY A. THIS SECTION INCLUDES T INSTALLATION: EQUIPMENT LABELS. PIPE LABELS 	HE FOLLOWING N
1. F 2. S 0 3 F 4. I 5. V	PROVIDE EVIDENCE OF RECENT CALIBRATION OF TEST EQUIPMENT BY A TESTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION. SCHEDULE TEST WITH OWNER, THROUGH ARCHITECT/ENGINEER, WITH AT LEAST SEVEN DAYS' ADVANCE NOTICE. TEST EQUIPMENT ISOLATORS AND FIRST FOUR ASSOCIATED VIBRATION ISOLATION HANGERS ROM EACH EQUIPMENT CONNECTION. INSPECT VIBRATION CONTROL DEVICES AND REMOVE PAINT SPLATTERS, SPOTS, DIRT, AND DEBRIS. VIBRATION TESTING IS SPECIFIED IN DIVISION 23 SECTION "TESTING, ADJUSTING, AND BALANCING FOR HVAC."	 3. WARNING TAGS 1.3 COORDINATION A. COORDINATE INSTALLATION PAINTING OF SURFACES WH B. COORDINATE INSTALLATION DOORS. C. INSTALL IDENTIFYING DEV CONCEALMENT. 	ERE DEVICES ARE OF IDENTIFYING D
	IOVE AND REPLACE MALFUNCTIONING UNITS AND RETEST AS SPECIFIED ABOVE.	 PART 2 – PRODUCTS 2.1 MANUFACTURERS A. MANUFACTURERS: SUBJECT OF THE FOLLOWING: 	TO COMPLIANCE
B. ADJ OPE	UST ISOLATORS AFTER PIPING SYSTEM IS AT OPERATING WEIGHT. UST LIMIT STOPS ON RESTRAINED SPRING ISOLATORS TO MOUNT EQUIPMENT AT NORMAL RATING HEIGHT. AFTER EQUIPMENT INSTALLATION IS COMPLETE, ADJUST LIMIT STOPS SO	 BRADY CORPORATION. MARKING SERVICES, INC. SETON IDENTIFICATION P 2.2 EQUIPMENT LABELS 	
C. ADJ	Y ARE OUT OF CONTACT DURING NORMAL OPERATION. UST ACTIVE HEIGHT OF SPRING ISOLATORS SO THAT ISOLATED EQUIPMENT IS LEVEL AND PROPER ALIGNMENT WITH CONNECTING DUCTS AND PIPES.	A. METAL LABELS FOR EQUIPM1. DATA:a. MANUFACTURER, PRO	DUCT NAME, MOD
¼– E. ADJU	ACH THRUST RESTRAINTS AT CENTERLINE OF THRUST AND ADJUST TO A MAXIMUM OF INCH MOVEMENT DURING START AND STOP. JST RESTRAINTS TO PERMIT FREE MOVEMENT OF EQUIPMENT WITHIN NORMAL MODE OF CRATION.	 b. CAPACITY, OPERATING c. LABELS OF TESTED C 2. LOCATION: ACCESSIBLE A 3. FASTENERS: AS REQUIRE 4. MATERIAL AND THICKNES HAVING PREDRILLED OR 5. MINIMUM LABEL SIZE: 1 LESS THAN 2-1/2 BY 3 	COMPLIANCES. AND VISIBLE. D TO MOUNT ON SS: ANODIZED A STAMPED HOLES LENGTH AND WIDT 3/4 INCH.
		 MINIMUM LETTER SIZE: 1 24 INCHES, 1/2 INCH I LARGER LETTERING FOF TWO-THIRDS TO THREE- FASTENERS: STAINLESS- ADHESIVE: CONTACT-TY SUBSTRATE. 	FOR VIEWING DIST GREATER VIEW FOURTHS THE SI STEEL MOLY-RIVE

DULE				PIPE LABELS GENERAL REQUIREMENTS FOR MANUFACTURED PIPE LABELS: PREPRINTED, COLOR-CODED,	H. SYSTEM EF PERFORMAN
BASE TYPE	MIN. STATIC D (INCHES) SLAB ON GRADE			WITH LETTERING INDICATING SERVICE, AND SHOWING FLOW DIRECTION. PRETENSIONED PIPE LABELS: PRECOILED, SEMIRIGID PLASTIC FORMED TO COVER FULL CIRCUMFERENCE OF PIPE AND TO ATTACH TO PIPE WITHOUT ADHESIVE.	THOSE PRES
) SPRING (FLOOR MOUNTED)	(NOTE 3)	(NOTE 3)		SELF-ADHESIVEPIPELABELS:PRINTEDPLASTICWITHPRESSURE-SENSITIVE,PERMANENT-ADHESIVEBACKING.PLASTICTAPE:CONTINUOUSLYPRINTED,VINYLTAPEATLEAST3MILSTHICKWITHPRESSURE-SENSITIVE,PERMANENT-TYPE,SELF-ADHESIVEBACK.1.WIDTHFORMARKERSONPIPESWITHOD,INCLUDINGINSULATION,LESSTHAN6INCHES:	J. AABC: ASSO K. NEBB: NATIO L. TAB: TESTIN M. TAB SPECIA
RIC HANGERS				 ¾ INCH MINIMUM. 2. WIDTH FOR MARKERS ON PIPES WITH OD, INCLUDING INSULATION, 6 INCHES OR LARGER: 1-1/2 INCHES MINIMUM. 	1.4 ACTION SUI A. CERTIFIED T THIS SECTIO
D); ISOLATION LOOR MOUNTED)	0.35	0.35		WARNING TAGS WARNING TAGS: PREPRINTED OR PARTIALLY PREPRINTED, ACCIDENT-PREVENTION TAGS, OF PLASTICIZED CARD STOCK WITH MATTE FINISH SUITABLE FOR WRITING.	1.5 INFORMATIO A. PROVIDE IN ADDITION TO DATA".
RIC HANGERS ED); ISOLATION				 SIZE: 3 BY 5-1/4 INCHES MINIMUM. FASTENERS: BRASS GROMMET AND WIRE. NOMENCLATURE: LARGE-SIZE PRIMARY CAPTION SUCH AS "DANGER," "CAUTION," OR "DO NOT OPERATE." 	B. CERTIFIED T SECTION, C C. WARRANTIES
(FLOOR MOUNTED)	0.35	0.35	PAR	4. COLOR: YELLOW BACKGROUND WITH BLACK LETTERING. T 3 – EXECUTION	1.6 QUALITY AS A. TAB CONTR/ B. CERTIFICATIO
R RESILIENT AND RESILIENT DES		0.35	Α.	EQUIPMENT IDENTIFICATION INSTALL AND PERMANENTLY FASTEN EQUIPMENT NAMEPLATES ON EACH MAJOR ITEM OF MECHANICAL EQUIPMENT. LOCATE NAMEPLATES WHERE ACCESSIBLE AND VISIBLE. INSTALL EQUIPMENT MARKERS WITH PERMANENT ADHESIVE ON EACH MAJOR ITEM OF	INCLUDES TI 1. REVIEW CERTIFIE 2. CERTIFY
ISOLATORS, TAL THRUST				 MECHANICAL EQUIPMENT. 1. LETTER SIZE: MINIMUM ¼ INCH FOR NAME OF UNITS IF VIEWING DISTANCE IS LESS THAN 24 INCHES, ½ INCH FOR VIEWING DISTANCES UP TO 72 INCHES, AND PROPORTIONATELY LARGER LETTERING FOR GREATER VIEWING DISTANCES. INCLUDE SECONDARY LETTERING TWO-THIRDS TO THREE-FOURTHS THE SIZE OF PRINCIPAL LETTERING. 	PROCED C. TAB REPOR TESTING AN "PROCEDUR/
NTS, AND INERTIA		(NOTE 1)		2. LOCATE MARKERS WHERE ACCESSIBLE AND VISIBLE.	SYSTEMS", (D. INSTRUMEN
	2.5 1.5	3.5 2.5		 PIPING IDENTIFICATION INSTALL MANUFACTURED PIPE MARKERS INDICATING SERVICE ON EACH PIPING SYSTEM. INSTALL WITH FLOW INDICATION ARROWS SHOWING DIRECTION OF FLOW. 1. PIPES WITH OD, INCLUDING INSULATION, LESS THAN 6 INCHES: PRETENSIONED PIPE MARKERS. USE SIZE TO ENSURE A TIGHT FIT. 	STANDARDS SYSTEMS OF OF ENVIRON CERTIFICATIC
	1.0	1.5		2. PIPES WITH OD, INCLUDING INSULATION, LESS THAN 6 INCHES (CONTRACTOR'S OPTION): SELF-ADHESIVE PIPE MARKERS. USE COLOR-CODED, SELF-ADHESIVE PLASTIC TAPE, AT LEAST ¾ INCH WIDE, LAPPED AT LEAST 1-1/2 INCHES AT BOTH ENDS OF PIPE MARKER,	E. INSTRUMEN MORE FREQ 1. KEEP A
IED SPRING RS		1.5		AND COVERING FULL CIRCUMFERENCE OF PIPE. 3. PIPES WITH OD, INCLUDING INSULATION, 6 INCHES AND LARGER: SHAPED PIPE MARKERS. USE SIZE TO MATCH PIPE AND SECURE WITH FASTENERS.	CALIBRA 1.7 PROJECT C
MINIMUM STATIC				4. PIPES WITH OD, INCLUDING INSULATION, 6 INCHES AND LARGER (CONTRACTOR'S OPTION): SELF-WIDE, LAPPED AT LEAST 3 INCHES AT BOTH ENDS OF PIPE MARKER, AND COVERING FULL CIRCUMFERENCE OF PIPE.	A. PARTIAL OV BEFORE SUI MINIMIZE CO
RS. ERTICAL LOAD; THE LATORS SUPPORTING			В.	LOCATE PIPE MARKERS AND COLOR BANDS WHERE PIPING IS EXPOSED IN FINISHED SPACES; ACCESSIBLE MAINTENANCE SPACES SUCH AS SHAFTS AND PLENUMS AS FOLLOWS:	1.8 COORDINATI A. NOTICE: PR
				 NEAR EACH VALVE AND CONTROL DEVICES. NEAR EACH BRANCH CONNECTION, EXCLUDING SHORT TAKEOFFS FOR FIXTURES AND TERMINAL UNITS. WHERE FLOW PATTERN IS NOT OBVIOUS, MARK EACH PIPE AT BRANCH. NEAR PENETRATIONS THROUGH WALLS, WALLS, FLOORS, CEILINGS, AND NONACCESSIBLE ENCLOSURES. 	TEST DATES B. COORDINATE SYSTEMS A OPERATE HV
				4. AT ACCESS DOORS, MANHOLES, AND SIMILAR ACCESS POINTS THAT PERMIT VIEW OF CONCEALED PIPING.	1.9 WARRANTY A. PROVIDE ON
PIPING AND EQUIP	MENT			5. NEAR MAJOR EQUIPMENT ITEMS AND OTHER POINTS OF ORIGINATION AND TERMINATION. 6. SPACED AT MAXIMUM INTERVALS OF 15 FEET ALONG EACH RUN. 7. ON PIPING ABOVE REMOVABLE ACOUSTICAL CEILINGS.	1. NATIONA "NATION, CONDITIO REQUIRE
OF THE CONTR THE WORK UNDER [WARNING-TAG INSTALLATION WRITE REQUIRED MESSAGE ON, AND ATTACH WARNING TAGS TO, EQUIPMENT AND OTHER	THE CO a. THE CONT
G MECHANICAL IDEN	ITIFICATION MATER	IALS AND THEIR	3.5	ITEMS WHERE REQUIRED. PREPARATION	b. SYSTE AND
				CLEAN PIPING AND EQUIPMENT SURFACES OF SUBSTANCES THAT COULD IMPAIR BOND OF IDENTIFICATION DEVICES, INCLUDING DIRT, OIL, GREASE, RELEASE AGENTS, AND INCOMPATIBLE PRIMERS, PAINTS, AND ENCAPSULANTS. ADJUSTING	2. SPECIAL WILL AS FIRM FA THE FOI a. THE
NG DEVICES WITH	COMPLETION OF	COVERING AND		RELOCATE MECHANICAL IDENTIFICATION MATERIALS AND DEVICES THAT HAVE BECOME VISUALLY BLOCKED BY OTHER WORK.	CONT b. SYSTE AND
ARE TO BE APPLIED G DEVICES WITH LO		SS PANELS AND		CLEANING CLEAN FACES OF MECHANICAL IDENTIFICATION DEVICES.	PART 2 – PART 3 –
INSTALLING ACOU	JSTICAL CEILINGS	S AND SIMILAR	END	OF SECTION 230553	3.1 EXAMINATIO A. EXAMINE TH AND TO DIS OF SYSTEMS
CE WITH REQUIREME	NTS, PROVIDE PR	ODUCTS BY ONE		TION 230593-TESTING, ADJUSTING, AND BALANCING FOR HVAC	1. CONTRAC CONDITIO
			A.	T 1 – GENERAL DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS, APPLY TO THE WORK UNDER DIVISIONS 26 AND 28.	B. EXAMINE AP C. EXAMINE PI RECORD DO D. EXAMINE EQ
				SUMMARY THIS SECTION INCLUDES TAB TO PRODUCE DESIGN OBJECTIVES FOR THE FOLLOWING: 1. HVAC EQUIPMENT QUANTITATIVE-PERFORMANCE SETTINGS. 2. VIBRATION MEASURING. 3. REPORTING RESULTS OF ACTIVITIES AND PROCEDURES SPECIFIED IN THIS SECTION.	DATA TO PF CREATE UN ALL OR F PERFORMAN DIFFERENT
IODEL NUMBER, AND CHARACTERISTICS, A				DEFINITIONS ADJUST: TO REGULATE FLOW RATE AND AIR PATTERNS AT THE EQUIPMENT, SUCH AS TO	AT THE FAC CHARTS FO SMACNA'S " THE DESIGN
ON EQUIPMENT. D ALUMINUM, 0.032 ES FOR ATTACHMEN		THICKNESS, AND		REDUCE FAN SPEED OR ADJUST A DAMPER. BALANCE: TO PROPORTION FLOWS WITHIN THE DISTRIBUTION SYSTEM, INCLUDING SUBMAINS, BRANCHES, AND TERMINALS, ACCORDING TO INDICATED QUANTITIES. BARRIER OR BOUNDARY: CONSTRUCTION, EITHER VERTICAL OR HORIZONTAL, SUCH AS WALLS, FLOORS, AND CEILINGS THAT ARE DESIGNED AND CONSTRUCTED TO RESTRICT THE	E. EXAMINE DE ASSUMPTION OF PHILOSO
NAME OF UNITS IF	QUIRED LABEL CO		D.	WALLS, FLOORS, AND CEILINGS THAT ARE DESIGNED AND CONSTRUCTED TO RESTRICT THE MOVEMENT OF AIRFLOW, SMOKE, ODORS, AND OTHER POLLUTANTS. DRAFT: A CURRENT OF AIR, WHEN REFERRING TO LOCALIZED EFFECT CAUSED BY ONE OR MORE FACTORS OF HIGH AIR VELOCITY, LOW AMBIENT TEMPERATURE, OR DIRECTION OF	
NAME OF UNITS IF DISTANCES UP TO 7 IEWING DISTANCES. SIZE OF PRINCIPAL RIVETS.	2 INCHES, AND P INCLUDE SECON	ROPORTIONATELY		AIRFLOW, WHEREBY MORE HEAT IS WITHDRAWN FROM A PERSON'S SKIN THAN IS NORMALLY DISSIPATED. PROCEDURE: AN APPROACH TO AND EXECUTION OF A SEQUENCE OF WORK OPERATIONS TO YIELD REPEATABLE RESULTS.	
IT ADHESIVE, COM	PATIBLE WITH L4	ABEL AND WITH		REPORT FORMS: TEST DATA SHEETS FOR RECORDING TEST DATA IN LOGICAL ORDER. SYSTEM EFFECT: A PHENOMENON THAT CAN CREATE UNDESIRED OR UNPREDICTED CONDITIONS THAT CAUSE REDUCED CAPACITIES IN ALL OR PART OF A SYSTEM	

G. SYSTEM EFFECT: A PHENOMENON THAT CAN CREATE UNDESIRED OR UNPREDICTED CONDITIONS THAT CAUSE REDUCED CAPACITIES IN ALL OR PART OF A SYSTEM.

MANCE RATINGS OF A FAN WH PRESENTED WHEN THE FAN WAS	ES USED TO CALCULATE A REDUCTION OF TH EN INSTALLED UNDER CONDITIONS DIFFERENT FRC 5 PERFORMANCE TESTED. E QUANTITATIVE PERFORMANCE OF SYSTEMS C	R
SSOCIATED AIR BALANCE COUNC IATIONAL ENVIRONMENTAL BALAN STING, ADJUSTING, AND BALANC	ICING BUREAU. ING.	BignellWatkinsHasserARCHITECTSP.C.
ECIALIST: AN ENTITY ENGAGED T SUBMITTALS D TAB REPORTS: SUBMIT TWO CTION, ON APPROVED FORMS C	COPIES OF REPORTS PREPARED, AS SPECIFIED	ONE PARK PLACE, SUITE 250 ANNAPOLIS, MARYLAND 21401 Maryland: (301) 261-8228 Baltimore: (410) 841-6595 MD Fax: (410) 224-4443 Annapolis: (410) 224-2727 N Website: www.bigwaha.com
	IN OPERATION AND MAINTENANCE MANUALS D SECTION 017823 "OPERATION AND MAINTENANC	
N, ON APPROVED FORMS CERTINES SPECIFIED IN THIS SECTION		job and this office must be notified of any variation from the dimensions and conditions shown by these drawings.
	GAGE A TAB FIRM CERTIFIED BY AABC OR NEBB. TIFY TAB FIELD DATA REPORTS. THIS CERTIFICATIO	N
EW FIELD DATA REPORTS TO TIFIED TAB REPORTS.	VALIDATE ACCURACY OF DATA AND TO PREPAR	E
CEDURES SPECIFIED AND REFER PORT FORMS: USE STANDARD AND BALANCING HEATING, VEN DURAL STANDARDS FOR TESTING	MPLIED WITH THE APPROVED TAB PLAN AND TH RENCED IN THIS SPECIFICATION. FORMS FROM AABC'S "NATIONAL STANDARDS FO ITILATING, AND AIR CONDITIONING SYSTEMS", NEBB G, ADJUSTING, AND BALANCING OF ENVIRONMENTA IS – TESTING, ADJUSTING, AND BALANCING."	R S
RDS FOR TESTING AND BALANCI S OR NEBB'S "PROCEDURAL STA	CURACY: AS DESCRIBED IN AABC'S "NATIONAL NG HEATING, VENTILATING, AND AIR CONDITIONING ANDARDS FOR TESTING, ADJUSTING, AND BALANCING II, "REQUIRED INSTRUMENTATION FOR NEBB	
MENTATION CALIBRATION: CALIBR REQUENTLY IF REQUIRED BY IN:	ATE INSTRUMENTS AT LEAST EVERY SIX MONTHS O STRUMENT MANUFACTURER.	R
BRATION AND THE NAME OF PA	NSTRUMENT CALIBRATION THAT INDICATED DATE C RTY PERFORMING INSTRUMENT CALIBRATION.	F Revisions
SUBSTANTIAL COMPLETION. CO CONFLICTS WITH OWNER'S OPI	MAY OCCUPY COMPLETED AREAS OF BUILDIN OPERATE WITH OWNER DURING TAB OPERATIONS T ERATIONS.	
NATION PROVIDE SEVEN DAYS' ADVANG TES AND TIMES.	CE NOTICE FOR EACH TEST. INCLUDE SCHEDULE	D
S AND EQUIPMENT, HVAC CO	ORY-AUTHORIZED SERVICE REPRESENTATIVES FO INTROLS INSTALLERS, AND OTHER MECHANICS T INT TO SUPPORT AND ASSIST TAB ACTIVITIES.	
NTY ONE OF THE FOLLOWING:		
IONAL STANDARDS FOR TESTIN DITIONING SYSTEMS" FORMS S UIREMENTS OF THE CONTRACT CONTRACT DOCUMENTS. GUARA HE CERTIFIED TAB FIRM HAS TE ONTRACT DOCUMENTS.	GUARANTEE: PROVIDE A GUARANTEE ON AABC G AND BALANCING HEATING, VENTILATING, AND A STATING THAT AABC WILL ASSIST IN COMPLETIN DOCUMENTS IF TAB FIRM FAILS TO COMPLY WIT NTEE INCLUDES THE FOLLOWING PROVISIONS: STED AND BALANCED SYSTEMS ACCORDING TO THE	Client:
ASSIST IN COMPLETING REQU FAILS TO COMPLY WITH THE FOLLOWING PROVISIONS:	GUARANTEE ON NEBB FORMS STATING THAT NEE JIREMENTS OF THE CONTRACT DOCUMENTS IF TA CONTRACT DOCUMENTS. GUARANTEE SHALL INCLUE STED AND BALANCED SYSTEMS ACCORDING TO THE	E 7500 MAPLE AVE
YSTEMS ARE BALANCED TO OPT ND INSTALLATION LIMITS. PRODUCTS (NOT APPLICABLE EXECUTION	IMUM PERFORMANCE CAPABILITIES WITHIN DESIGN	Project: I.T. ROOM UPGRADE
ATION THE CONTRACT DOCUMENTS ⁻	TO BECOME FAMILIAR WITH PROJECT REQUIREMENT STEMS' DESIGNS THAT MAY PRECLUDE PROPER TA	s
TRACT DOCUMENTS ARE DE DITIONS OF CONTRACT. APPROVED SUBMITTAL DATA FO	FINED IN THE GENERAL AND SUPPLEMENTAR OR HVAC SYSTEMS AND EQUIPMENT. TS DESCRIBED IN DIVISION 1 SECTION "PROJEC	MECHANICAL
EQUIPMENT PERFORMANCE DA PROJECT CONDITIONS AND RE UNDESIRED OR UNPREDICTED PART OF A SYSTEM. CA MANCE RATINGS OF HVAC E NT FROM THOSE PRESENTED FACTORY. TO CALCULATE SYS FOUND IN AMCA 201, "FANS SIGN DATA AND INSTALLED CON SIGN DATA AND INSTALLED CON DESIGN DATA, INCLUDING HVA TIONS FOR ENVIRONMENTAL CO	ATA INCLUDING FAN CURVES. RELATE PERFORMANC QUIREMENTS, INCLUDING SYSTEM EFFECTS THAT CA CONDITIONS THAT CAUSE REDUCED CAPACITIES LCULATE SYSTEM EFFECT FACTORS TO REDUC EQUIPMENT WHEN INSTALLED UNDER CONDITION WHEN THE EQUIPMENT WAS PERFORMANCE TESTE TEM EFFECTS FOR AIR SYSTEMS, USE TABLES AN AND SYSTEMS," SECTIONS 7 THROUGH 10; OR IGN," SECTIONS 5 AND 6. COMPARE THIS DATA WIT DITIONS. AC SYSTEM DESCRIPTIONS, STATEMENTS OF DESIG DNDITIONS AND SYSTEMS' OUTPUT, AND STATEMENT BOUT HVAC SYSTEM AND EQUIPMENT CONTROLS.	N N E S D D Drawn by A2ESG H N Project No. 15032.00 Date 2/24/16
	2 +ESG	
PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR	Squared Rus Engineering Support Group, LLC	M2.9

	EXAMINE SYSTEM AND EQUIPMENT INSTALLATIONS AND VERIFY THAT THEY ARE COMPLETE AND THAT TESTING, CLEANING, AND ADJUSTING SPECIFIED IN INDIVIDUAL SECTIONS HAVE BEEN PERFORMED.	 3.8 FINAL REPORT A. GENERAL: TYPEWRITTEN, OR COMPUTER PRINTOL STANDARD BOND PAPER, IN THREE-RING BINDE SEPARATE SECTIONS BY TESTED SYSTEMS AND
	EXAMINE TEST REPORTS FOR EACH SYSTEM AND EQUIPMENT. EXAMINE SYSTEMS FOR FUNCTIONAL DEFICIENCIES THAT CANNOT BE CORRECTED BY ADJUSTING AND BALANCING.	B. INCLUDE A CERTIFICATION SHEET IN FRONT OF CERTIFIED TESTING AND BALANCING ENGINEER.
	EXAMINE HVAC EQUIPMENT TO ENSURE THAT BELTS ARE ALIGNED AND TIGHT, AND EQUIPMENT WITH FUNCTIONING CONTROLS IS READY FOR OPERATION. EXAMINE EQUIPMENT FOR INSTALLATION AND FOR PROPERLY OPERATING SAFETY	1. INCLUDE A LIST OF INSTRUMENTS USED CALIBRATION.
к.	INTERLOCKS AND CONTROLS. REPORT DEFICIENCIES DISCOVERED BEFORE AND DURING PERFORMANCE OF TAB PROCEDURES. OBSERVE AND RECORD SYSTEM REACTIONS TO CHANGES IN CONDITIONS. RECORD DEFAULT SET POINTS IF DIFFERENT FROM INDICATED VALUES.	 C. FINAL REPORT CONTENTS: IN ADDITION TO CE FOLLOWING: 1. FAN CURVES. 2. MANUFACTURERS' TEST DATA.
Α.	PREPARATION PREPARE A TAB PLAN THAT INCLUDES STRATEGIES AND STEP-BY-STEP PROCEDURES.	 FIELD TEST REPORTS PREPARED BY SYSTEM OTHER INFORMATION RELATIVE TO EQUIPM SHOP DRAWINGS AND PRODUCT DATA.
	COMPLETE SYSTEM READINESS CHECKS AND PREPARE SYSTEM READINESS REPORTS. GENERAL PROCEDURES FOR TESTING AND BALANCING	D. GENERAL REPORT DATA: IN ADDITION TO F FOLLOWING DATA IN THE FINAL REPORT, AS API
	PERFORM TESTING AND BALANCING PROCEDURES ON EACH SYSTEM ACCORDING TO THE PROCEDURES CONTAINED IN AABC'S "NATIONAL STANDARDS FOR TESTING AND BALANCING HEATING, VENTILATING, AND AIR CONDITIONING SYSTEMS", NEBB'S "PROCEDURAL STANDARDS FOR TESTING, ADJUSTING, AND BALANCING OF ENVIRONMENTAL SYSTEMS", OR SMACNA'S "HVAC SYSTEMS – TESTING, ADJUSTING, AND BALANCING"; AND THIS SECTION. CUT INSULATION, DUCTS, PIPES, AND EQUIPMENT CABINETS FOR INSTALLATION OF TEST	 TITLE PAGE. NAME AND ADDRESS OF THE TAB FIRM. PROJECT NAME. PROJECT LOCATION. ENGINEER'S NAME AND ADDRESS. CONTRACTOR'S NAME AND ADDRESS.
 C.	PROBES TO THE MINIMUM EXTENT NECESSARY TO ALLOW ADEQUATE PERFORMANCE OF PROCEDURES. AFTER TESTING AND BALANCING, CLOSE PROBE HOLES AND PATCH INSULATION WITH NEW MATERIALS IDENTICAL TO THOSE REMOVED. RESTORE VAPOR BARRIER AND FINISH ACCORDING TO INSULATION SPECIFICATIONS FOR THIS PROJECT. MARK EQUIPMENT AND BALANCING DEVICES SETTINGS WITH PAINT OR OTHER SUITABLE,	 7. REPORT DATE. 8. SIGNATURE OF TAB SUPERVISOR WHO CERT 9. TABLE OF CONTENTS WITH THE TOTAL NUM SECTION OF THE REPORT. NUMBER EACH 10. SUMMARY OF CONTENTS INCLUDING THE FORM
	PERMANENT IDENTIFICATION MATERIAL, INCLUDING DAMPER-CONTROL POSITIONS, VALVE POSITION INDICATORS, FAN-SPEED-CONTROL LEVERS, AND SIMILAR CONTROLS AND DEVICES, TO SHOW FINAL SETTINGS.	a. INDICATED VERSUS FINAL PERFORMANCE. b. NOTABLE CHARACTERISTICS OF SYSTEMS. c. DESCRIPTION OF SYSTEM OPERATION SEV
	TAKE AND REPORT TESTING AND BALANCING MEASUREMENTS IN INCH-POUND (IP) UNITS.	DOCUMENTS. 11. NOMENCLATURE SHEETS FOR EACH ITEM OF
	VERIFY PROPER ROTATION OF FANS.	12. DATA FOR TERMINAL UNITS, INCLUDING FITTINGS.
	MEASURE ENTERING— AND LEAVING—AIR TEMPERATURES. RECORD COMPRESSOR DATA.	13. NOTES TO EXPLAIN WHY CERTAIN FINAL D INDICATED VALUES.
	PROCEDURES FOR MOTORS MOTORS, 1/2 HP AND LARGER: TEST AT FINAL BALANCED CONDITIONS AND RECORD	E. FAN TEST REPORTS: FOR SUPPLY FANS, INCL
	THE FOLLOWING DATA: 1. MANUFACTURER'S NAME, MODEL NUMBER, AND SERIAL NUMBER.	a. SYSTEM IDENTIFICATION. b. LOCATION.
	2. MOTOR HORSEPOWER RATING. 3. MOTOR RPM.	c. MAKE AND TYPE. d. MODEL NUMBER AND SIZE.
	4. EFFICIENCY RATING. 5. NAMEPLATE AND MEASURED VOLTAGE, EACH PHASE. 6. NAMEPLATE AND MEASURED AMPERAGE, EACH PHASE.	 e. MANUFACTURER'S SERIAL NUMBER. f. ARRANGEMENT AND CLASS.
	7. STARTER THERMAL-PROTECTION-ELEMENT RATING. PROCEDURES FOR VIBRATION MEASUREMENTS USE A VIBRATION METER MEETING THE FOLLOWING CRITERIA:	 g. SHEAVE MAKE, SIZE IN INCHES, AND BOR h. CENTER—TO—CENTER DIMENSIONS OF S INCHES.
	1. SOLID-STATE CIRCUITRY WITH A PIEZOELECTRIC ACCELEROMETER.	2. MOTOR DATA:
	 VELOCITY RANGE OF 0.1 TO 10 INCHES PER SECOND. DISPLACEMENT RANGE OF 1 TO 100 MILS. FREQUENCY RANGE OF AT LEAST 0 TO 1000 HZ. CAPABLE OF FILTERING UNWANTED FREQUENCIES. 	 a. MOTOR MAKE, AND FRAME TYPE AND SIZE b. HORSEPOWER AND RPM. c. VOLTS, PHASE, AND HERTZ. d. FULL-LOAD AMPERAGE AND SERVICE FAC⁻
D.	CALIBRATE THE VIBRATION METER BEFORE EACH DAY OF TESTING. 1. USE A CALIBRATOR PROVIDED WITH THE VIBRATION METER. 2. FOLLOW VIBRATION METER AND CALIBRATOR MANUFACTURER'S CALIBRATION	e. SHEAVE MAKE, SIZE IN INCHES, AND BOR f. CENTER-TO-CENTER DIMENSIONS OF S INCHES.
с.	PROCEDURES. PERFORM VIBRATION MEASUREMENTS WHEN OTHER BUILDING AND OUTDOOR VIBRATION SOURCES ARE AT A MINIMUM LEVEL AND WILL NOT INFLUENCE MEASUREMENTS OF EQUIPMENT BEING TESTED.	g. NUMBER, MAKE, AND SIZE OF BELTS. 3. TEST DATA (INDICATED AND ACTUAL VALUES
	1. TURN OFF EQUIPMENT IN THE BUILDING THAT MIGHT INTERFERE WITH TESTING. 2. CLEAR THE SPACE OF PEOPLE.	a. TOTAL AIRFLOW RATE IN CFM.b. TOTAL SYSTEM STATIC PRESSURE IN INCH
D.	PERFORM VIBRATION MEASUREMENTS AFTER EQUIPMENT TESTING IS COMPLETE.	c. FAN RPM. d. DISCHARGE STATIC PRESSURE IN INCHES
	CLEAN EQUIPMENT SURFACES IN CONTACT WITH THE VIBRATION TRANSDUCER. POSITION THE VIBRATION TRANSDUCER ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS AND TO AVOID INTERFERENCE WITH THE OPERATION OF THE EQUIPMENT	e. SUCTION STATIC PRESSURE IN INCHES WO
G	BEING TESTED. MEASURE AND RECORD VIBRATION ON ROTATION EQUIPMENT OVER 3 HP.	F. COMPRESSOR AND CONDENSER REPORTS: FOR AND AIR-COOLED CONDENSING UNITS INCLUDE
	MEASURE AND RECORD EQUIPMENT VIBRATION, BEARING, EQUIPMENT BASE VIBRATION, AND BUILDING STRUCTURE VIBRATION. RECORD VELOCITY AND DISPLACEMENT READINGS IN THE HORIZONTAL, VERTICAL, AND AXIAL PLANES.	 UNIT DATA: a. UNIT IDENTIFICATION.
	1. FANS AND HVAC EQUIPMENT WITH FANS:	b. LOCATION. c. UNIT MAKE AND MODEL NUMBER.
	a. FAN BEARING: DRIVE END AND OPPOSITE END. b. MOTOR BEARING: DRIVE END AND OPPOSITE END.	d. COMPRESSOR MAKE. e. COMPRESSOR MODEL AND SERIAL NUMBE
	c. EQUIPMENT CASING: TOP AND SIDE. d. EQUIPMENT BASE: TOP AND SIDE. e. BUILDING: FLOOR.	f. REFRIGERANT WEIGHT IN LB.
	f. DUCTWORK: TO AND FROM EQUIPMENT AFTER FLEXIBLE CONNECTIONS. g. PIPING: TO AND FROM EQUIPMENT AFTER FLEXIBLE CONNECTIONS.	g. LOW AMBIENT TEMPERATURE CUTOFF IN E 2. TEST DATA (INDICATED AND ACTUAL):
	FOR EQUIPMENT WITH VIBRATION ISOLATION, TAKE FLOOR MEASUREMENTS WITH THE VIBRATION ISOLATION BLOCKED SOLID TO THE FLOOR AND WITH THE VIBRATION ISOLATION FLOATING. CALCULATE AND REPORT THE DIFFERENCES. INSPECT, MEASURE, AND RECORD VIBRATION ISOLATION.	 a. INLET-DUCT STATIC PRESSURE IN INCHES b. OUTLET-DUCT STATIC PRESSURE IN INCHI c. ENTERING-AIR, DRY-BULB TEMPERATURE d. LEAVING-AIR, DRY-BULB TEMPERATURE IN
	1. VERIFY THAT VIBRATION ISOLATION IS INSTALLED IN THE REQUIRED LOCATIONS. 2. VERIFY THAT INSTALLATION IS LEVEL AND PLUMB. 3. VERIFY THAT ISOLATORS ARE PROPERLY ANCHORED.	e. CONTROL SETTINGS. f. UNLOADER SET POINTS.
	4. FOR SPRING ISOLATORS, MEASURE THE COMPRESSED SPRING HEIGHT, THE SPRING OD, AND THE TRAVEL-TO-SOLID DISTANCE.	g. LOW-PRESSURE-CUTOUT SET POINT IN P h. HIGH-PRESSURE-CUTOUT SET POINT IN F
	5. MEASURE THE OPERATING CLEARANCE BETWEEN EACH INERTIA BASE AND THE FLOOR OR CONCRETE BASE BELOW. VERIFY THAT THERE IS UNOBSTRUCTED CLEARANCE BETWEEN THE BOTTOM OF THE INERTIA BASE AND THE FLOOR.	i. SUCTION PRESSURE IN PSIG. j. SUCTION TEMPERATURE IN DEG F.
	REPORTING	k. CONDENSER REFRIGERANT PRESSURE IN I I. CONDENSER REFRIGERANT TEMPERATURE
A.	INITIAL CONSTRUCTION-PHASE REPORT: BASED ON EXAMINATION OF THE CONTRACT DOCUMENTS AS SPECIFIED IN "EXAMINATION" ARTICLE, PREPARE A REPORT ON THE ADEQUACY OF DESIGN FOR SYSTEMS' BALANCING DEVICES. RECOMMEND CHANGES AND	m. OIL PRESSURE IN PSIG.
	ADDITIONS TO SYSTEMS' BALANCING DEVICES TO FACILITATE PROPER PERFORMANCE MEASURING AND BALANCING. RECOMMEND CHANGES AND ADDITIONS TO HVAC SYSTEMS AND GENERAL CONSTRUCTION TO ALLOW ACCESS FOR PERFORMANCE MEASURING AND	n. OIL TEMPERATURE IN DEG F. o. VOLTAGE AT EACH CONNECTION.
В.	BALANCING DEVICES. STATUS REPORTS: AS WORK PROGRESSES, PREPARE REPORTS TO DESCRIBE COMPLETED PROCEDURES, PROCEDURES IN PROGRESS, AND SCHEDULED PROCEDURES. INCLUDE A LIST OF DEFICIENCIES AND PROBLEMS FOUND IN SYSTEMS BEING TESTED AND BALANCED.	p. AMPERAGE FOR EACH PHASE.q. KILOWATT INPUT.r. CRANKCASE HEATER KILOWATT.
ĺ	PREPARE A SEPARATE REPORT FOR EACH SYSTEM AND EACH BUILDING FLOOR FOR	s. NUMBER OF FANS.

SYSTEMS SERVING MULTIPLE FLOORS.

u. CONDENSER FAN AIRFLOW RATE IN CFM.

OUT IN LETTER—QUALITY FONT, ON DER, TABULATED AND DIVIDED INTO D BALANCED SYSTEMS. OF BINDER SIGNED AND SEALED BY THE	 v. CONDENSER FAN MOTOR MAKE, FRAME SIZE, RPM, AND HORSEPOWER. w. CONDENSER FAN MOTOR VOLTAGE AT EACH CONNECTION. x. CONDENSER FAN MOTOR AMPERAGE FOR EACH PHASE. G. VIBRATION MEASUREMENT REPORTS: 	 1.7 DELIVERY, S A. PACKAGING: APPROPRIATE TEMPERATUR B. PROTECT AL
D FOR PROCEDURES, ALONG WITH PROOF OF	1. DATE AND TIME OF TEST. 2. VIBRATION METER MANUFACTURER, MODEL NUMBER, AND SERIAL NUMBER.	INSTALLATION ARCHITECT'S
CERTIFIED FIELD REPORT DATA, INCLUDE THE	 EQUIPMENT DESIGNATION, LOCATION, EQUIPMENT, SPEED, MOTOR SPEED, AND MOTOR HORSEPOWER. DIAGRAM OF EQUIPMENT SHOWING THE VIBRATION MEASUREMENT LOCATIONS. MEASUREMENT READINGS FOR EACH MEASUREMENT LOCATION. CALCULATE ISOLATOR EFFICIENCY USING MEASUREMENTS TAKEN. DESCRIPTION OF PREDOMINANT VIBRATION SOURCE. 	1.8 COORDINATIO A. COORDINATE APPLICATION INSTALLER DUCTWORK INSTALLATION
TEM AND EQUIPMENT INSTALLERS. PMENT PERFORMANCE, BUT DO NOT INCLUDE	H. INSTRUMENT CALIBRATION REPORTS	PART 2 – PROD
FORM TITLES AND ENTRIES, INCLUDE THE APPLICABLE:	 REPORT DATA: INSTRUMENT TYPE AND MAKE. SERIAL NUMBER. APPLICATION. DATES OF USE. DATES OF CALIBRATION. 	 2.1 INSULATION A. COMPLY WIT WHERE INSU B. PRODUCTS S C. PRODUCTS CHLORIDE CO D. INSULATION
	3.9 INSPECTIONS A. INITIAL INSPECTION:	ACCEPTABLE E. FOAM INSUL MANUFACTUR
RTIFIES THE REPORT. JMBER OF PAGES DEFINED FOR EACH CH PAGE IN THE REPORT. FOLLOWING:	1. AFTER TESTING AND BALANCING ARE COMPLETE, OPERATE EACH SYSTEM AND RANDOMLY CHECK MEASUREMENTS TO VERIFY THAT THE SYSTEM IS OPERATING ACCORDING TO THE FINAL TEST AND BALANCE READINGS DOCUMENTED IN THE FINAL REPORT.	F. MINERAL-FIB THERMOSETT WITH FACTOR
E. S. SEQUENCE IF IT VARIES FROM THE CONTRACT OF EQUIPMENT. G MANUFACTURER'S NAME, TYPE, SIZE, AND DATA IN THE BODY OF REPORTS VARY FROM	 2. RANDOMLY CHECK THE FOLLOWING FOR EACH SYSTEM: a. MEASURE AIRFLOW OF AT LEAST 10 PERCENT OF AIR OUTLETS. b. MEASURE ROOM TEMPERATURE AT EACH THERMOSTAT/TEMPERATURE SENSOR. COMPARE THE READING TO THE SET POINT. c. MEASURE SOUND LEVELS AT TWO LOCATIONS. d. VERIFY THAT BALANCING DEVICES ARE MARKED WITH FINAL BALANCE POSITION. e. NOTE DEVIATIONS FROM THE CONTRACT DOCUMENTS IN THE FINAL REPORT. 	 PRODUCTS MAY BE I FOLLOWIN a. CERTA b. JOHNS c. KNAUF d. OWENS 2. K-FACTOR
ICLUDE THE FOLLOWING:	B. FINAL INSPECTION: 1. AFTER INITIAL INSPECTION IS COMPLETE AND EVIDENCE BY RANDOM CHECKS VERIFIES	G. FLEXIBLE E COMPLY WIT
ORE.	 THAT TESTING AND BALANCING ARE COMPLETE AND EVIDENCE BY TRANDOM CHECKS VERITIES THAT TESTING AND BALANCING ARE COMPLETE AND ACCURATELY DOCUMENTED IN THE FINAL REPORT, REQUEST THAT A FINAL INSPECTION BE MADE BY ARCHITECT. TAB FIRM TEST AND BALANCE ENGINEER SHALL CONDUCT THE INSPECTION IN THE PRESENCE OF ARCHITECT/ENGINEER. ARCHITECT/ENGINEER SHALL RANDOMLY SELECT MEASUREMENTS, DOCUMENTED IN THE FINAL REPORT, TO BE RECHECKED. RECHECKING SHALL BE LIMITED TO EITHER 10 PERCENT OF THE TOTAL MEASUREMENTS RECORDED OR THE EXTENT OF MEASUREMENTS THAT CAN BE ACCOMPLISHED IN A NORMAL 8-HOUR BUSINESS DAY. IF RECHECKS YIELD MEASUREMENTS THAT DIFFER FROM THE MEASUREMENTS DOCUMENTED IN THE FINAL REPORT BY MORE THAN THE TOLERANCES ALLOWED, THE MEASUREMENTS SHALL BE NOTED AS "FAILED." 	MATERIALS. SUBSTITUTIO 1. PRODUCT a. AEROF b. ARMAC c. NOMAC 2. MAXIMUM
SHEAVE, AND AMOUNT OF ADJUSTMENTS IN	 5. IF THE NUMBER OF "FAILED" MEASUREMENTS IS GREATER THAN 10 PERCENT OF THE TOTAL MEASUREMENTS CHECKED DURING THE FINAL INSPECTION, THE TESTING AND BALANCING SHALL BE CONSIDERED INCOMPLETE AND SHALL BE REJECTED. 6. TAB FIRM SHALL RECHECK ALL MEASUREMENTS AND MAKE ADJUSTMENTS. REVISE THE FINAL REPORT AND BALANCING DEVICE SETTINGS TO INCLUDE ALL CHANGES AND DESURAT THE FINAL REPORT. 	2.2 ADHESIVES A. MATERIALS S AND FOR B OTHERWISE I B. MINERAL-FIB
ACTOR.	RESUBMIT THE FINAL REPORT. 7. REQUEST A SECOND FINAL INSPECTION. IF THE SECOND FINAL INSPECTION ALSO FAILS, OWNER SHALL CONTRACT THE SERVICES OF ANOTHER TAB FIRM TO COMPLETE THE TESTING AND BALANCING IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND DEDUCT THE COST OF THE SERVICES FROM THE FINAL PAYMENT.	1. PRODUCT FOLLOWIN INCLUDE,
ORE. SHEAVE, AND AMOUNT OF ADJUSTMENTS IN	3.10 ADDITIONAL TESTS A. SEASONAL PERIODS: IF INITIAL TAB PROCEDURES WERE NOT PERFORMED DURING	a. CHILDE b. FOSTE
	NEAR-PEAK SUMMER AND WINTER CONDITIONS, PERFORM ADDITIONAL TAB DURING NEAR-PEAK SUMMER AND WINTER CONDITIONS.	c. ITW TA d. MARAT
IES):	END OF SECTION 230593	e. MON-1 2. FOR INDO
CHES WG.	SECTION 230700 – HVAC INSULATION	C. FLEXIBLE EL
TS WG.	PART 1 – GENERAL	1. PRODUCT
WG. DR REFRIGERANT SIDE OF UNITARY SYSTEMS, DE THE FOLLOWING:	 1.1 RELATED DOCUMENTS A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS, APPLY TO THE WORK UNDER DIVISIONS 26 AND 28. 	a. AEROF b. ARMAC c. FOSTE d. CHILDE
	 1.2 SUMMARY A. THIS SECTION INCLUDES MECHANICAL INSULATION FOR DUCT, INCLUDING THE FOLLOWING: 1. INSULATION MATERIALS 2. ADHESIVES. 	e. RBX C PART 3 – EXECU
BERS.	1.3 DEFINITIONS	3.1 EXAMINATION A. EXAMINE SI
I DEG F.	A. FSK: FOIL, SCRIM, KRAFT PAPER. 1.4 ACTION SUBMITTAL A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED, IDENTIFY THERMAL CONDUCTIVITY,	INSTALLATION 1. VERIFY T FREE OF 2. VERIFY TI
ES WG.	THICKNESS, AND JACKETS (BOTH FACTORY AND FIELD APPLIED, IF ANY).	3. PROCEED CORRECTI
CHES WG. RE IN DEG F. IN DEG F. PSIG.	 A. PROVIDE INFORMATIONAL SUBMITTALS IN OPERATION AND MAINTENANCE MANUALS IN ADDITION TO ACTION SUBMITTALS AND SECTION 017823 "OPERATION AND MAINTENANCE DATA". B. MATERIAL TEST REPORTS: FROM A QUALIFIED TESTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION INDICATING, INTERPRETING, AND CERTIFYING TEST RESULTS FOR COMPLIANCE OF INSULATION MATERIALS, SEALERS, ATTACHMENTS, CEMENTS, AND JACKETS, WITH REQUIREMENTS INDICATED. INCLUDE DATES OF TESTS AND TEST METHODS EMPLOYED. C. INSTALLER CERTIFICATES: SIGNED BY CONTRACTOR CERTIFYING THAT INSTALLERS COMPLY WITH 	 3.2 PREPARATION A. SURFACE PEMATERIALS T B. COORDINATEWITH REQUIR 3.3 COMMON INSTRUCT
N PSIG.	REQUIREMENTS. 1.6 QUALITY ASSURANCE	A. INSTALL INSI EVEN SURFA FITTINGS, AN
N PSIG. E IN DEG F.	 A. INSTALLER QUALIFICATIONS: SKILLED MECHANICS WHO HAVE SUCCESSFULLY COMPLETED AN APPRENTICESHIP PROGRAM OR ANOTHER CRAFT TRAINING PROGRAM CERTIFIED BY THE DEPARTMENT OF LABOR, BUREAU OF APPRENTICESHIP AND TRAINING. B. FIRE-TEST-RESPONSE CHARACTERISTICS: INSULATION AND RELATED MATERIALS SHALL HAVE FIRE-TEST-RESPONSE CHARACTERISTICS INDICATED, AS DETERMINED BY TESTING IDENTICAL PRODUCTS PER ASTM E 84, BY A TESTING AND INSPECTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION. FACTORY LABEL INSULATION AND JACKET MATERIALS AND ADHESIVE, WITH APPROPRIATE MARKINGS OF APPLICABLE TESTING AND INSPECTING AGENCY. 1. INSULATION INSTALLED INDOORS: FLAME-SPREAD INDEX OF 25 OR LESS, AND SMOKE-DEVELOPED INDEX OF 50 OR LESS. 2. INSULATION MATERIALS SHALL BE TESTED AND RATED ACCORDING TO ASTM TEST METHOD 	riffings, An
	C-177 TO DETERMINE K-FACTORS.	



t. CONDENSER FAN RPM.

B. INSTALL INSULATION MATERIALS, FORMS, VAPOR BARRIERS OR RETARDERS, JACKETS, AND THICKNESSES REQUIRED FOR EACH ITEM OF EQUIPMENT, DUCT SYSTEM, AND PIPE SYSTEM AS SPECIFIED IN INSULATION SYSTEM SCHEDULES. C. INSTALL ACCESSORIES COMPATIBLE WITH INSULATION MATERIALS AND SUITABLE FOR THE SERVICE. INSTALL ACCESSORIES THAT DO NOT CORRODE, SOFTEN, OR OTHERWISE ATTACK INSULATION OR JACKET IN EITHER WET OR DRY STATE. D. INSTALL INSULATION WITH LONGITUDINAL SEAMS AT TOP AND BOTTOM OF HORIZONTAL RUNS. E. INSTALL MULTIPLE LAYERS OF INSULATION WITH LONGITUDINAL AND END SEAMS STAGGERED. F. DO NOT WELD BRACKETS, CLIPS, OR OTHER ATTACHMENT DEVICES TO PIPING, FITTINGS, AND SPECIALTIES. G. KEEP INSULATION MATERIALS DRY DURING APPLICATION AND FINISHING H. INSTALL INSULATION WITH TIGHT LONGITUDINAL SEAMS AND END JOINTS. BOND SEAMS AND JOINTS WITH ADHESIVE RECOMMENDED BY INSULATION MATERIAL MANUFACTURER. I. INSTALL INSULATION WITH LEAST NUMBER OF JOINTS PRACTICAL J. INSTALL INSULATION CONTINUOUSLY THROUGH HANGERS AND AROUND ANCHOR ATTACHMENTS. K. WHERE VAPOR BARRIER IS INDICATED, SEAL JOINTS, SEAMS, AND PENETRATIONS IN INSULATION AT ANCHORS AND OTHER PROJECTIONS WITH VAPOR-BARRIER MASTIC. 1. INSTALL INSULATION CONTINUOUSLY THROUGH HANGERS AND AROUND ANCHOR ATTACHMENTS. 2. FOR INSULATION APPLICATION WHERE VAPOR BARRIERS ARE INDICATED, EXTEND INSULATION ON ANCHOR LEGS FROM POINT OF ATTACHMENT TO SUPPORTED ITEM TO POINT OF ATTACHMENT TO STRUCTURE. TAPER AND SEAL ENDS AT ATTACHMENT TO STRUCTURE WITH VAPOR-BARRIER MASTIC. 3. INSTALL INSERT MATERIALS AND INSTALL INSULATION TO TIGHTLY JOIN THE INSERT. SEAL INSULATION TO INSULATION INSERTS WITH ADHESIVE OR SEALING COMPOUND RECOMMENDED BY INSULATION MATERIAL MANUFACTURER. 4. COVER INSERTS WITH JACKET MATERIAL MATCHING ADJACENT PIPE INSULATION. INSTALL SHIELDS OVER JACKET, ARRANGED TO PROTECT JACKET FROM TEAR OR PUNCTURE BY HANGER, SUPPORT, AND SHIELD. L. APPLY ADHESIVES, MASTICS, AND SEALANTS AT MANUFACTURER'S RECOMMENDED COVERAGE RATE AND WET AND DRY FILM THICKNESSES. M. CUT INSULATION IN A MANNER TO AVOID COMPRESSING INSULATION MORE THAN 75 PERCENT OF ITS NOMINAL THICKNESS. N. FINISH INSTALLATION WITH SYSTEMS AT OPERATING CONDITIONS. REPAIR JOINT SEPARATIONS AND CRACKING DUE TO THERMAL MOVEMENT. O. REPAIR DAMAGED INSULATION FACINGS BY APPLYING SAME FACING MATERIAL OVER DAMAGED AREAS. EXTEND PATCHES AT LEAST 4 INCHES BEYOND DAMAGED AREAS. ADHERE, STAPLE, AND SEAL PATCHES SIMILAR TO BUTT JOINTS P. REPLACE INSULATION ON DUCTWORK AND EQUIPMENT WHERE INSULATION IS DAMAGED DURING CONSTRUCTION OR REMOVED FOR TESTING AND BALANCING WORK. Q. FOR ABOVE AMBIENT SERVICES, DO NOT INSTALL INSULATION TO THE FOLLOWING: VIBRATION—CONTROL DEVICES. 2. TESTING AGENCY LABELS AND STAMPS. 3. NAMEPLATES AND DATA PLATES 3.4 PENETRATIONS A. INSULATION INSTALLATION AT ABOVEGROUND EXTERIOR WALL PENETRATIONS: INSTALL INSULATION CONTINUOUSLY THROUGH WALL PENETRATIONS. 1. SEAL PENETRATIONS WITH FLASHING SEALANT 2. FOR APPLICATIONS REQUIRING ONLY INDOOR INSULATION, TERMINATE INSULATION INSIDE WALL SURFACE AND SEAL WITH JOINT SEALANT. FOR APPLICATIONS REQUIRING INDOOR AND OUTDOOR INSULATION, INSTALL INSULATION FOR OUTDOOR APPLICATIONS TIGHTLY JOINED TO INDOOR INSULATION ENDS. SEAL JOINT WITH JOINT SEALANT. 3. EXTEND JACKET OF OUTDOOR INSULATION OUTSIDE WALL FLASHING AND OVERLAP WALL FLASHING AT LEAST 2 INCHES. 4. SEAL JACKET TO WALL FLASHING WITH FLASHING SEALANT. B. INSULATION INSTALLATION AT INTERIOR WALL AND PARTITION PENETRATIONS (THAT ARE NOT FIRE RATED): INSTALL INSULATION CONTINUOUSLY THROUGH WALLS AND PARTITIONS. C. INSULATION INSTALLATION AT FIRE-RATED WALL AND PARTITION PENETRATIONS: INSTALL INSULATION CONTINUOUSLY THROUGH PENETRATIONS OF FIRE-RATED WALLS AND PARTITIONS. TERMINATE INSULATION AT FIRE DAMPER SLEEVES FOR FIRE-RATED WALL AND PARTITION PENETRATIONS. EXTERNALLY INSULATE DAMPER SLEEVES TO MATCH ADJACENT INSULATION AND OVERLAP DUCT INSULATION AT LEAST 2 INCHES. 1. COMPLY WITH REQUIREMENTS IN DIVISION 07 SECTION "PENETRATION FIRESTOPPING"IRESTOPPING AND FIRE-RESISTIVE JOINT SEALERS. 3.5 PIPING INSULATION SCHEDULE, GENERAL A. ACCEPTABLE INSULATION MATERIALS. THICKNESSES AND VAPOR RETARDER REQUIREMENTS ARE IDENTIFIED FOR EACH PIPING SYSTEM AND PIPE SIZE RANGE. IF MORE THAN ONE MATERIAL IS LISTED FOR AN APPLICATION AND SIZE RANGE. SELECTION FROM MATERIALS LISTED IS CONTRACTOR'S OPTION. 3.6 ITEMS NOT INSULATED: UNLESS OTHERWISE INDICATED, DO NOT INSTALL INSULATION ON THE FOLLOWING: A. FIRE-SUPPRESSION PIPING. B. VIBRATION-CONTROL DEVICES. C. FACTORY-INSULATED ACCESS PANELS AND DOORS. D. PROVIDE REMOVABLE, REPLACEABLE INSULATION PLUGS AT MANUFACTURER'S EQUIPMENT IDENTIFICATION PLATES AND AT ASME PRESSURE VESSEL PLATES ON INSULATED EQUIPMENT. INSULATION MATERIAL INSULATION THICKNESS VAPOR RETARDER REQUIRED SERVICE AIR CONDITIONING CONDENSATE DRAIN, EQUIPMENT DRAIN PIPING INTERIOR, ALL SIZES FLEXIBLE ELASTOMERIC 1/2" YES EXTERIOR, ALL SIZES FLEXIBLE ELASTOMERIC YES

NOTES:

INDOOR, EXPOSED INSULATED PIPING TEMPERATURES 200 DEGREES F AND

ABOVE 200 DEGREES F

OUTDOOR EXPOSED PIPING

INDOOR, ALL LOCATIONS, FITTINGS AND IN PIPING SYSTEMS AT SERVICE TEMPE 200 DEGREES F AND BELOW

OUTDOOR, ALL LOCATIONS, FITTINGS AND VALVES IN PIPING SYSTEMS

END OF SECTION 230700

SECTION 232113-HYDRONIC PIPING

PART 1 – GENERAL

- 1.1 RELATED DOCUMENTS
- SECTION 232300 REFRIGERANT PIPING 1. UNCONDITIONED SPACES INCLUDE LOCATIONS WHERE SUMMER TEMPERATURE AND PART 1 – GENERAL HUMIDITY CONDITIONS ARE SIMILAR TO OUTDOOR CONDITIONS (SUCH AS MECHANICAL ROOMS VENTILATED WITH UNCONDITIONED OUTDOOR AIR, ETC). 1.1 RELATED DOCUMENTS A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND OTHER DIVISION SPECIFICATION SECTIONS, APPLY TO 3.26 FIELD APPLIED JACKET APPLICATION SCHEDULE THIS SECTION SERVICE YΡE 1.2 SUMMARY A. THIS SECTION INCLUDES REFRIGERANT PIPING USED FOR AIR-CONDITIONING APPLICATIONS. WITHIN 8 FEET OR FLOOR, FOR SERVIC B. THE WORK UNDER THIS SECTION OF THE SPECIFICATION SHALL INCLUDE THE FURNISHING OF LABOR, MATERIALS AND EQUIPMENT FOR THE INSTALLATION OF COMPLETE SYSTEM TO INDOOR, EXPOSED INSULATED PIPING W PROVIDE CONTINUOUS AND SATISFACTORY SERVICE. 8 FEET OF FLOOR, FOR SERVICE TEMP 1.3 PERFORMANCE REQUIREMENTS A. LINE TEST PRESSURE FOR REFRIGERANT R-410A: 1. SUCTION LINES FOR AIR-CONDITIONING APPLICATIONS: 300 PSIG. 2. SUCTION LINES FOR HEAT-PUMP APPLICATIONS: 535 PSIG. 3. HOT-GAS AND LIQUID LINES: 535 PSIG. FACTORY FABRICATED PVC COVERS 1.4 SUBMITTALS A. PRODUCT DATA: FOR EACH TYPE OF VALVE AND REFRIGERANT PIPING SPECIALTY INDICATED. INCLUDE PRESSURE DROP, BASED ON MANUFACTURER'S TEST DATA, FOR THE ALUMINUM FOLLOWING: 1. THERMOSTATIC EXPANSION VALVES. 2. SOLENOID VALVES. 3. HOT-GAS BYPASS VALVES. 4. FILTER DRYERS. 5. STRAINERS. 6. PRESSURE-REGULATING VALVES. B. SHOP DRAWINGS: SHOW LAYOUT OF REFRIGERANT PIPING AND SPECIALTIES, INCLUDING C. CHECK VALVES: PIPE, TUBE, AND FITTING SIZES, FLOW CAPACITIES, VALVE ARRANGEMENTS AND LOCATIONS, SLOPES OF HORIZONTAL RUNS, OIL TRAPS, DOUBLE RISERS, WALL AND FLOOR A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND PENETRATIONS, AND EQUIPMENT CONNECTION DETAILS. SHOW INTERFACE AND SPATIAL SUPPLEMENTARY CONDITIONS, APPLY TO THE WORK UNDER DIVISIONS 26 AND 28. RELATIONSHIPS BETWEEN PIPING AND EQUIPMENT. 1. REFRIGERANT PIPING INDICATED ON DRAWINGS IS SCHEMATIC ONLY. SIZE PIPING AND DESIGN ACTUAL PIPING LAYOUT, INCLUDING OIL TRAPS, DOUBLE RISERS, SPECIALTIES, A. THIS SECTION INCLUDES BUT NOT LIMITED TO PIPING, SPECIAL-DUTY VALVES, AND AND PIPE AND TUBE SIZES TO ACCOMMODATE, AS A MINIMUM, EQUIPMENT PROVIDED, HYDRONIC SPECIALTIES FOR HEATING WATER: ELEVATION DIFFERENCE BETWEEN COMPRESSOR AND EVAPORATOR, AND LENGTH OF PIPING TO ENSURE PROPER OPERATION AND COMPLIANCE WITH WARRANTIES OF 1. CONDENSATE PIPING. CONNECTED EQUIPMENT. 2. THE WORK UNDER THIS SECTION OF THE SPECIFICATION SHALL INCLUDE THE C. WELDING CERTIFICATES: COPIES OF CERTIFICATES FOR WELDING PROCEDURES AND FURNISHING OF LABOR, MATERIALS AND EQUIPMENT FOR THE INSTALLATION OF PERSONNEL. COMPLETE SYSTEM TO PROVIDE CONTINUOUS AND SATISFACTORY SERVICE. D. FIELD QUALITY-CONTROL TEST REPORTS: INDICATE AND INTERPRET TEST RESULTS FOR 1.3 COORDINATION COMPLIANCE WITH PERFORMANCE REQUIREMENTS. A. COORDINATE LAYOUT AND INSTALLATION OF HYDRONIC PIPING AND SUSPENSION SYSTEM E. OPERATION AND MAINTENANCE DATA: FOR REFRIGERANT VALVES AND PIPING SPECIALTIES COMPONENTS WITH OTHER CONSTRUCTION, INCLUDING BUILDING STRUCTURE, ELECTRICAL TO INCLUDE IN MAINTENANCE MANUALS SPECIFIED IN DIVISION 01. CONDUIT AND RACEWAY SYSTEMS, LIGHT FIXTURES, HVAC EQUIPMENT FIRE-SUPPRESSION-SYSTEM COMPONENTS, SUPPORTS AND PARTITION ASSEMBLIES. 1.5 QUALITY ASSURANCE B. COORDINATE PIPE FITTING PRESSURE CLASSES WITH PRODUCTS SPECIFIED IN RELATED SECTIONS. A. WELDING: QUALIFY PROCEDURES AND PERSONNEL ACCORDING TO ASME BOILER AND PRESSURE VESSEL CODE: SECTION IX, "WELDING AND BRAZING QUALIFICATIONS." C. COORDINATE INSTALLATION OF PIPE SLEEVES FOR PENETRATIONS THROUGH WALLS AND FLOOR ASSEMBLIES. COORDINATE WITH REQUIREMENTS FOR FIRESTOPPING SPECIFIED IN B. ASHRAE STANDARD: COMPLY WITH ASHRAE 15, "SAFETY CODE FOR MECHANICAL DIVISION 7 SECTION "THROUGH-PENETRATION FIRESTOP SYSTEMS" FOR FIRE AND SMOKE **REFRIGERATION SYSTEMS.**" WALL AND FLOOR ASSEMBLIES. C. ASME STANDARD: COMPLY WITH ASME B31.5, "REFRIGERATION PIPING AND HEAT TRANSFER COMPONENTS.' PART 2 – PRODUCTS 1.6 PRODUCT STORAGE AND HANDLING A. STORE PIPING IN A CLEAN AND PROTECTED AREA WITH END CAPS IN PLACE TO ENSURE A. GENERAL: REFER TO PART 3 "PIPING APPLICATIONS" ARTICLE FOR APPLICATIONS OF PIPE AND FITTING MATERIALS. THAT PIPING INTERIOR AND EXTERIOR ARE CLEAN WHEN INSTALLED. 1.7 COORDINATION A. COORDINATE LAYOUT AND INSTALLATION OF REFRIGERANT PIPING AND SUSPENSION SYSTEM A. DRAWN-TEMPER COPPER TUBING: ASTM B 88, TYPE L COMPONENTS WITH OTHER CONSTRUCTION, INCLUDING LIGHT FIXTURES. HVAC EQUIPMENT. B. WROUGHT-COPPER FITTINGS: ASME B16.22. FIRE-SUPPRESSION-SYSTEM COMPONENTS, AND PARTITION ASSEMBLIES. C. WROUGHT-COPPER UNIONS: ASME B16.22 WITH RED BRONZE RING NUT. B. COORDINATE PIPE SLEEVE INSTALLATIONS FOR WALL PENETRATIONS. D. SOLDER FILLER METALS: ASTM B 32, 95-5 TIN ANTIMONY. C. COORDINATE PIPE SLEEVE INSTALLATIONS FOR PENETRATIONS IN EXTERIOR WALLS. COORDINATE WITH REQUIREMENTS FOR FIRESTOPPING SPECIFIED IN DIVISION 7 E. BRAZING FILLER METALS: AWS A5.8, CLASSIFICATION BAG-1 (SILVER). SECTION "THROUGH-PENETRATION FIRESTOP SYSTEMS" FOR MATERIALS AND METHODS FOR SEALING PIPE PENETRATIONS THROUGH FIRE AND SMOKE BARRIERS. 2.3 HYDRONIC PIPING SPECIALTIES D. COORDINATE PIPE FITTING PRESSURE CLASSES WITH PRODUCTS SPECIFIED IN RELATED SECTIONS. A. PROVIDE INSULATION ON ALL PIPING. 1.8 EXTRA MATERIALS PART 3 - EXECUTION A. FURNISH EXTRA MATERIALS DESCRIBED BELOW THAT MATCH PRODUCTS INSTALLED AND THAT ARE PACKAGED WITH PROTECTIVE COVERING FOR STORAGE AND IDENTIFIED WITH LABELS DESCRIBING CONTENTS. A. CONDENSATE DRAIN AND EQUIPMENT DRAINAGE LINES: TYPE L DRAWN-TEMPER COPPER TUBING WITH SOLDERED JOINTS. 1. REFRIGERATION OIL TEST KITS: TWO EACH, CONTAINING EVERYTHING REQUIRED TO G. THERMOSTATIC EXPANSION VALVES: COMPLY WITH ARI 750. CONDUCT ONE TEST. 2. REFRIGERANT: TWO CONTAINERS EACH, WITH 20 LB OF REFRIGERANT. A. DRAWING PLANS, SCHEMATICS, AND DIAGRAMS INDICATE GENERAL LOCATION AND 3. FILTER-DRYERS: THREE OF EACH TYPE. ARRANGEMENT OF PIPING SYSTEMS. INDICATE PIPING LOCATIONS AND ARRANGEMENTS IF SUCH WERE USED TO SIZE PIPE AND CALCULATE FRICTION LOSS, EXPANSION, PUMP PART 2 – PRODUCTS SIZING, AND OTHER DESIGN CONSIDERATIONS. B. INSTALL PIPING IN CONCEALED LOCATIONS. UNLESS OTHERWISE INDICATED AND EXCEPT IN 2.1 MANUFACTURERS EQUIPMENT ROOMS AND SERVICE AREAS. A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY C. INSTALL PIPING AT RIGHT ANGLES OR PARALLEL TO BUILDING WALLS. DIAGONAL RUNS ONE OF THE FOLLOWING: ARE PROHIBITED UNLESS SPECIFICALLY INDICATED OTHERWISE. 1. REFRIGERANTS: D. INSTALL PIPING ABOVE ACCESSIBLE CEILINGS TO ALLOW SUFFICIENT SPACE FOR CEILING a. ALLIED SIGNAL, INC./FLUORINE PRODUCTS; GENETRON REFRIGERANTS. PANEL REMOVAL. b. DUPONT COMPANY; FLUOROCHEMICALS DIV. E. INSTALL PIPING TO PERMIT VALVE SERVICING. c. ELF ATOCHEM NORTH AMERICA, INC,; FLUOROCARBON DIV. F. INSTALL PIPING FREE OF SAGS AND BENDS. d. ICI AMERICAS INC./ICI KLEA; FLUOROCHEMICALS BUS. G. INSTALL FITTINGS FOR CHANGES IN DIRECTION AND BRANCH CONNECTIONS. 2. REFRIGERANT SPECIALTIES: a. CLIMATE & INDUSTRIAL CONTROLS GROUP; PARKER-HANNIFIN CORP.; REFRIGERATION & AIR CONDITIONING DIVISION.
- 1.2 SUMMARY

- 2.1 PIPING MATERIALS
- 2.2 COPPER TUBE AND FITTINGS

- 3.1 PIPING APPLICATIONS
- 3.2 PIPING INSTALLATIONS

- H. INSTALL PIPING TO ALLOW APPLICATION OF INSULATION.
- I. INSTALL GROUPS OF PIPES PARALLEL TO EACH OTHER, SPACED TO PERMIT APPLYING INSULATION AND SERVICING OF VALVES.
- J. INSTALL PIPING AT A UNIFORM GRADE OF 0.2 PERCENT UPWARD IN DIRECTION OF FLOW. K. REDUCE PIPE SIZES USING ECCENTRIC REDUCER FITTING INSTALLED WITH LEVEL SIDE UP.
- 3.3 CLEANING

YES

YES

YES

NO

NO

END OF SECTION 232113

GENERALLY, ALL SIZES FLEXIBLE ELASTOMERIC 1/2" UNCONDITIONED SPACE (NOTE 1), FLEXIBLE ELASTOMERIC ALL SIZES 1 - 1/2OUTDOOR ABOVEGROUND REFRIGERANT SUCTION AND HOT GAS PIPING ALL SIZES FLEXIBLE ELASTOMERIC CONDENSATE PIPING INDOOR DUTY $1 \ 1/4$ " DIAMETER AND SMALLER MINERAL FIBER 1 - 1/2"

INDOOR REFRIGERANT SUCTION AND HOT GAS PIPING

MINERAL FIBER

1 1/2" DIAMETER

AND LARGER

	FIELD APPLIED JACKET T
CE BELOW	PVC
VITHIN PERATURES	
	ALUMINUM
	ALUMINUM
VALVES RATURES	

A. FLUSH HYDRONIC PIPING SYSTEMS WITH CLEAN WATER. FLUSHING SHALL BE WITNESSED BY THE CONSTRUCTION MANAGER. PREPARE REPORT AND SUBMIT FOR RECORD.

- b. DANFOSS ELECTRONICS. INC.
- c. EMERSON ELECTRIC COMPANY; ALCO CONTROLS DIV.
- d. HENRY VALVE COMPANY. e. SPORLAN VALVE COMPANY
- 2.2 COPPER TUBE AND FITTINGS
- A. DRAWN-TEMPER COPPER TUBE ASTM B 88, TYPE L.
- B. WROUGHT-COPPER FITTINGS: ASME B16.22.
- C. WROUGHT-COPPER UNIONS: ASME B16.22.
- D. SOLDER FILLER METALS: ASTM B 32. USE 95-5 TIN ANTIMONY OR ALLOY HB SOLDER TO JOIN COPPER SOCKET FITTINGS ON COPPER PIPE.
- E. BRAZING FILLER METALS: AWS A5.8. CLASSIFICATION BAG (CADMIUM FREE SILVER ALLOY) FOR BRONZE FITTINGS AND TYPE BCUP (COPPER-PHOSPHOROUS ALLOY) FOR COPPÉR FITTINGS.
- F. FLEXIBLE CONNECTORS: 500-PSIG MINIMUM OPERATING PRESSURE: SEAMLESS TIN-BRONZE CORE, HIGH-TENSILE BRONZE-BRAID COVERING, AND SOLDER-JOINT END CONNECTIONS; DEHYDRATED, PRESSURE TESTED, MINIMUM 7 INCHES LONG.



3.2 VALVE AND SPECIALTY APPLICATIONS

- A. INSTALL VALVES IN SUCTION AND DISCHARGE LINES OF COMPRESSOR
- SOLDERING OR BRAZING OR WELDING, TO PREVENT SCALE FORMATION. A. PRODUCT SPLIT-SYS E. SOLDERED JOINTS: CONSTRUCT JOINTS ACCORDING TO ASTM B 828 OR CDA'S "COPPER AND STRAINERS IF THEY ARE NOT AN INTEGRAL PART OF VALVES AND STRAINERS. DIVISION 0 TUBE HANDBOOK." B. ELECTRICA F. BRAZED JOINTS: CONSTRUCT JOINTS ACCORDING TO AWS'S "BRAZING HANDBOOK," CHAPTER COMPRESSOR SUCTION CONNECTION. NFPA 70, "PIPE AND TUBE." JURISDICT USE TYPE BCUP, COPPER-PHOSPHORUS ALLOY FOR JOINING COPPER SOCKET FITTINGS WITH C. ENERGY-E DRYERS. COPPER PIPE. "ENERGY 2. USE TYPE BAG, CADMIUM-FREE SILVER ALLOY FOR JOINING COPPER WITH BRONZE OR ASHRAE STEEL "SYSTEMS VALVE. INSTALL SOLENOID VALVES IN HORIZONTAL LINES WITH COIL AT TOP. A. THREADED JOINTS: THREAD STEEL PIPE WITH TAPERED PIPE THREADS ACCORDING TO E. ASHRAE/IE ASME B1.20.1. CUT THREADS FULL AND CLEAN USING SHARP DIES. REAM THREADED PIPE ASHRAE/IE EVAPORATORS. ENDS TO REMOVE BURRS AND RESTORE FULL ID. JOIN PIPE FITTINGS AND VALVES AS FOLLOWS: 1. APPLY APPROPRIATE TAPE OR THREAD COMPOUND TO EXTERNAL PIPE THREADS UNLESS 1. INSTALL VALVE SO DIAPHRAGM CASE IS WARMER THAN BULB. 1.6 COORDINAT DRY-SEAL THREADING IS SPECIFIED 2. SECURE BULB TO CLEAN, STRAIGHT, HORIZONTAL SECTION OF SUCTION LINE USING A. COORDINAT DAMAGED THREADS: DO NOT USE PIPE OR PIPE FITTINGS WITH THREADS THAT ARE BULB STRAPS. DO NOT MOUNT BULB IN A TRAP OR AT BOTTOM OF THE LINE. CORRODED OR DAMAGED. DO NOT USE PIPE SECTIONS THAT HAVE CRACKED OR OPEN B. PROVIDE S 3. IF EXTERNAL EQUALIZER LINES ARE REQUIRED, MAKE CONNECTION WHERE IT WILL REFLECT WELDS. SUCTION-LINE PRESSURE AT BULB LOCATION. 1.7 WARRANTY H. STEEL PIPE CAN BE THREADED, BUT THREADED JOINTS MUST BE SEAL BRAZED OR SEAL WELDED. SPECIAL W CODE. PIPE SAFETY-RELIEF-VALVE DISCHARGE LINE TO OUTSIDE ACCORDING TO ASHRAE 15. MANUFACTL WELDED JOINTS: CONSTRUCT JOINTS ACCORDING TO AWS D10.12/D10.12M. AIR-CONDI CONDENSING UNITS AT THE INLET OF THE THERMOSTATIC EXPANSION VALVE OR AT THE INLET J. FLANGED JOINTS: SELECT APPROPRIATE GASKET MATERIAL, SIZE, TYPE, AND THICKNESS FOR WARRANTY SERVICE APPLICATION. INSTALL GASKET CONCENTRICALLY POSITIONED. USE SUITABLE OF THE EVAPORATOR COIL CAPILLARY TUBE LUBRICANTS ON BOLT THREADS. 1. WARRAN FIVE YE FURNISHED AS AN INTEGRAL ASSEMBLY FOR DEVICE BEING PROTECTED: 3.5 FIELD QUALITY CONTROL 1. SOLENOID VALVES.
- B. INSTALL SERVICE VALVES FOR GAGE TAPS AT INLET AND OUTLET OF HOT-GAS BYPASS VALVES C. INSTALL A CHECK VALVE AT THE COMPRESSOR DISCHARGE AND A LIQUID ACCUMULATOR AT THE D. EXCEPT AS OTHERWISE INDICATED, INSTALL VALVES ON INLET AND OUTLET SIDE OF FILTER E. INSTALL A FULL-SIZED, THREE-VALVE BYPASS AROUND FILTER DRYERS. F. INSTALL SOLENOID VALVES UPSTREAM FROM EACH EXPANSION VALVE AND HOT-GAS BYPASS G. INSTALL THERMOSTATIC EXPANSION VALVES AS CLOSE AS POSSIBLE TO DISTRIBUTORS ON H. INSTALL SAFETY RELIEF VALVES WHERE REQUIRED BY ASME BOILER AND PRESSURE VESSEL I. INSTALL MOISTURE/LIQUID INDICATORS IN LIQUID LINES ADJACENT TO FILTER-DRYERS AT J. INSTALL STRAINERS UPSTREAM FROM AND ADJACENT TO THE FOLLOWING UNLESS THEY

- 2. THERMOSTATIC EXPANSION VALVES
- 3. HOT-GAS BYPASS VALVES.
- COMPRESSOR.
- K. INSTALL PERMANENT FILTER DRYERS IN LIQUID LINES AT CONDENSING UNITS BETWEEN COMPRESSOR AND THERMOSTATIC EXPANSION VALVE, AND IN THE SUCTION LINE AT THE COMPRESSOR.
- L. INSTALL RECEIVERS SIZED TO ACCOMMODATE PUMP-DOWN CHARGE M. INSTALL FLEXIBLE CONNECTORS AT OR NEAR COMPRESSORS
- 3.3 PIPING INSTALLATION
- A. DRAWING PLANS, SCHEMATICS, AND DIAGRAMS INDICATE GENERAL LOCATION AND ARRANGEMENT OF PIPING SYSTEMS; INDICATED LOCATIONS AND ARRANGEMENTS WERE USED TO SIZE PIPE AND CALCULATE FRICTION LOSS, EXPANSION, PUMP SIZING, AND OTHER DESIGN CONSIDERATIONS. INSTALL PIPING AS INDICATED UNLESS DEVIATIONS TO LAYOUT ARE APPROVED ON SHOP DRAWINGS.
- B. INSTALL REFRIGERANT PIPING ACCORDING TO ASHRAE 15.
- C. BASIC PIPING INSTALLATION REQUIREMENTS ARE SPECIFIED IN DIVISION 23 SECTION "COMMON WORK RESULTS FOR HVAC."
- D. INSTALL PIPING IN CONCEALED LOCATIONS UNLESS OTHERWISE INDICATED AND EXCEPT IN EQUIPMENT ROOMS AND SERVICE AREAS.
- E. INSTALL PIPING INDICATED TO BE EXPOSED AND PIPING IN EQUIPMENT ROOMS AND SERVICE AREAS AT RIGHT ANGLES OR PARALLEL TO BUILDING WALLS. DIAGONAL ARE RUNS PROHIBITED UNLESS SPECIFICALLY INDICATED OTHERWISE. F. INSTALL PIPING ABOVE ACCESSIBLE CEILINGS TO ALLOW SUFFICIENT SPACE FOR CEILING
- PANEL REMOVAL G. INSTALL PIPING ADJACENT TO MACHINES TO ALLOW SERVICE AND MAINTENANCE.
- H. INSTALL PIPING FREE OF SAGS AND BENDS.
- J. SELECT SYSTEM COMPONENTS WITH PRESSURE RATING EQUAL TO OR GREATER THAN SYSTEM OPERATING PRESSURE.
- K. INSTALL PIPING AS SHORT AND DIRECT AS POSSIBLE, WITH A MINIMUM NUMBER OF JOINTS, ELBOWS, AND FITTINGS.
- L. ARRANGE PIPING TO ALLOW INSPECTION AND SERVICE OF COMPRESSOR AND OTHER EQUIPMENT REFRIGERATION EQUIPMENT. INSTALL VALVES AND SPECIALTIES IN ACCESSIBLI LOCATIONS TO ALLOW FOR SERVICE AND INSPECTION. INSTALL ACCESS DOORS OR PANELS AS SPECIFIED IN DIVISION 08 SECTION "ACCESS DOORS AND FRAMES" IF VALVES OR EQUIPMENT
- REQUIRING MAINTENANCE IS CONCEALED BEHIND FINISHED SURFACES. M. INSTALL REFRIGERANT PIPING IN RIGID OR FLEXIBLE CONDUIT IN LOCATIONS WHERE EXPOSED TO MECHANICAL INJURY.
- HANGERS OR BETWEEN PIPES FOR INSULATION INSTALLATION. USE SLEEVES THROUGH FLOORS, WALLS, OR CEILINGS, SIZED TO PERMIT INSTALLATION OF FULL-THICKNESS INSULATION.
- N. INSTALL PIPING WITH ADEQUATE CLEARANCE BETWEEN PIPE AND ADJACENT WALLS AND O. INSTALL COPPER TUBING IN RIGID OR FLEXIBLE CONDUIT IN LOCATIONS WHERE COPPER TUBING WILL BE EXPOSED TO MECHANICAL INJURY.
- BEARINGS. P. SLOPE REFRIGERANT PIPING AS FOLLOWS: E. REPLACE CORE OF REPLACEABLE FILTER DRYER AFTER SYSTEM HAS BEEN ADJUSTED AND AFTER 1. INSTALL HORIZONTAL HOT-GAS DISCHARGE PIPING WITH A UNIFORM SLOPE DOWNWARD AWAY DESIGN FLOW RATES AND PRESSURES ARE ESTABLISHED.
- FROM COMPRESSOR.
- 2. INSTALL HORIZONTAL SUCTION LINES WITH A UNIFORM SLOPE DOWNWARD TO COMPRESSOR. 3. INSTALL TRAPS AND DOUBLE RISERS TO ENTRAIN OIL IN VERTICAL RUNS.
- 4. LIQUID LINES MAY BE INSTALLED LEVEL.
- Q. INSTALL UNIONS TO ALLOW REMOVAL OF SOLENOID VALVES. PRESSURE-REGULATING VALVES. AND EXPANSION VALVES AND AT CONNECTIONS TO COMPRESSORS AND EVAPORATORS.
- R. WHEN BRAZING OR SOLDERING, REMOVE SOLENOID-VALVE COILS AND SIGHT GLASSES; ALSO REMOVE VALVE STEMS, SEATS, AND PACKING, AND ACCESSIBLE INTERNAL PARTS OF REFRIGERANT SPECIALTIES. DO NOT APPLY HEAT NEAR EXPANSION-VALVE BULB.
- S. INSTALL THE FOLLOWING PIPE ATTACHMENTS: ADJUSTABLE STEEL CLEVIS HANGERS FOR INDIVIDUAL HORIZONTAL RUNS LESS THAN 20 FEET LONG.
- 1. ROLLER HANGERS AND SPRING HANGERS FOR INDIVIDUAL HORIZONTAL RUNS 20 FEET OR LONGER.
- 2. PIPE ROLLERS FOR MULTIPLE HORIZONTAL RUNS 20 FEET OR LONGER, SUPPORTED BY A TRAPEZE.
- 3. SPRING HANGERS TO SUPPORT VERTICAL RUNS.
- T. INSTALL HANGERS FOR COPPER TUBING WITH THE FOLLOWING MAXIMUM SPACING AND MINIMUM ROD SIZES:
- 1. NPS 1/2: MAXIMUM SPAN, 60 INCHES; MINIMUM ROD SIZE, 1/4 INCH.
- 2. NPS 5/8: MAXIMUM SPAN, 60 INCHES; MINIMUM ROD SIZE, 1/4 INCH.
- 3. NPS 1: MAXIMUM SPAN, 72 INCHES; MINIMUM ROD SIZE, 1/4 INCH.
- 4. NPS 1-1/4: MAXIMUM SPAN, 96 INCHES; MINIMUM ROD SIZE, 3/8 INCH.
- 5. NPS 1-1/2: MAXIMUM SPAN, 96 INCHES; MINIMUM ROD SIZE, 3/8 INCH.
- 6. NPS 2: MAXIMUM SPAN, 96 INCHES; MINIMUM ROD SIZE, 3/8 INCH.
- U. PROVIDE PREFABRICATED PIPE SUPPORTS FOR PIPING ROUTED ON GRADE EVERY SIX (6) FEET AND CHANGE OF DIRECTION.
- V. IDENTIFY REFRIGERANT PIPING AND VALVES ACCORDING TO DIVISION 23 SECTION "IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT."
- A. REAM ENDS OF PIPES AND TUBES AND REMOVE BURRS. BEVEL PLAIN ENDS OF STEEL PIPE. B. REMOVE SCALE, SLAG, DIRT, AND DEBRIS FROM INSIDE AND OUTSIDE OF PIPE AND FITTINGS
- BEFORE ASSEMBLY. C. BRAZE AND SOLDER JOINTS ACCORDING TO DIVISION 23 SECTION "COMMON WORK RESULTS

- 5. END CONNECTIONS: SOCKET OR THREADED. 6. WORKING PRESSURE RATING: 500 PSIG.
- 7. MAXIMUM OPERATING TEMPERATURE: 275 DEG F.
- P. LIQUID ACCUMULATORS: COMPLY WITH ARI 495.
- 1. BODY: WELDED STEEL WITH CORROSION-RESISTANT COATING.
- END CONNECTIONS: SOCKET OR THREADED.
- 3. WORKING PRESSURE RATING: 500 PSIG.
- 4. MAXIMUM OPERATING TEMPERATURE: 275 DEG F
- 2.4 REFRIGERANT PIPING SPECIALTIES

1. END CONNECTIONS: SOCKET

I. STRAIGHT-TYPE STRAINERS:

J. ANGLE-TYPE STRAINERS:

2. THROTTLING RANGE: MAXIMUM 5 PSIG.

3. WORKING PRESSURE RATING: 500 PSIG

2. SCREEN: 100-MESH STAINLESS STEEL

3. END CONNECTIONS: SOCKET OR FLARE

4. WORKING PRESSURE RATING: 500 PSIG

1. BODY: FORGED BRASS OR CAST BRONZE

4. END CONNECTIONS: SOCKET OR FLARE

5. WORKING PRESSURE RATING: 500 PSIG

PROTECTED BY FILTER SCREEN.

5. END CONNECTIONS: SOCKET OR FLARE.

6. WORKING PRESSURE RATING: 500 PSIG

PRESSURE DIFFERENTIAL MEASUREMENT

8. MAXIMUM OPERATING TEMPERATURE: 240 DEG F

M. PERMANENT FILTER DRYERS: COMPLY WITH ARI 730.

6. MAXIMUM PRESSURE LOSS: 2 PSIG.

7. WORKING PRESSURE RATING: 500 PSIG

1. BODY AND COVER: PAINTED-STEEL SHELL.

PRESSURE DIFFERENTIAL MEASUREMENT

6. WORKING PRESSURE RATING: 500 PSIG.

5. END CONNECTIONS: SOCKET OR FLARE.

6. WORKING PRESSURE RATING: 500 PSIG

O. RECEIVERS: COMPLY WITH ARI 495.

7. MAXIMUM OPERATING TEMPERATURE: 240 DEG F

7. MAXIMUM OPERATING TEMPERATURE: 275 DEG F.

4. BODY: WELDED STEEL WITH CORROSION-RESISTANT COATING.

2. COMPLY WITH UL 207; LISTED AND LABELED BY AN NRTL.

3. BODY: WELDED STEEL WITH CORROSION-RESISTANT COATING.

5. MAXIMUM PRESSURE LOSS: 2 PSIG.

7. MAXIMUM OPERATING TEMPERATURE: 240 DEG F.

L. REPLACEABLE—CORE FILTER DRYERS: COMPLY WITH ARI 730.

STAINLESS-STEEL SCREWS, AND NEOPRENE GASKETS.

3. DESIGNED FOR REVERSE FLOW (FOR HEAT-PUMP APPLICATIONS).

2. DRAIN PLUG: BRASS HEX PLUG.

3. SCREEN: 100-MESH MONEL

K. MOISTURE/LIQUID INDICATORS

1. BODY: FORGED BRASS.

SUPPORT.

SUPPORT.

N. MUFFLERS:

AN NRTL.

4. END CONNECTIONS: SOCKET

END CONNECTIONS: SOCKET.

4. MAXIMUM OPERATING TEMPERATURE: 240 DEG F

5. MAXIMUM OPERATING TEMPERATURE: 275 DEG F.

6. MAXIMUM OPERATING TEMPERATURE: 275 DEG F

2. WINDOW: REPLACEABLE, CLEAR, FUSED GLASS WINDOW WITH INDICATING ELEMENT

1. BODY AND COVER: PAINTED-STEEL SHELL WITH DUCTILE-IRON COVER

2. FILTER MEDIA: 10 MICRON, PLEATED WITH INTEGRAL END RINGS; STAINLESS-STEEL

5. ACCESS PORTS: NPS 1/4 CONNECTIONS AT ENTERING AND LEAVING SIDES FOR

2. FILTER MEDIA: 10 MICRON, PLEATED WITH INTEGRAL END RINGS; STAINLESS-STEEL

4. ACCESS PORTS: NPS 1/4 CONNECTIONS AT ENTERING AND LEAVING SIDES FOR

1. COMPLY WITH ASME BOILER AND PRESSURE VESSEL CODE; LISTED AND LABELED BY

4. TAPPINGS: INLET, OUTLET, LIQUID LEVEL INDICATOR, AND SAFETY RELIEF VALVE.

4. MINIMUM MOISTURE INDICATOR SENSITIVITY: INDICATE MOISTURE ABOVE 60 PPM

3. INDICATOR: COLOR CODED TO SHOW MOISTURE CONTENT IN PPM.

1. BODY: WELDED STEEL WITH CORROSION-RESISTANT COATING.

- A. MOISTURE/LIQUID INDICATORS: 500-PSIG MAXIMUM WORKING PRESSURE AND 200 DEG F OPERATING TEMPERATURE; ALL-BRASS BODY WITH REPLACEABLE, POLISHED, OPTICAL VIEWING WINDOW WITH COLOR-CODED MOISTURE INDICATOR; WITH SOLDER-END CONNECTIONS.
- B. PERMANENT FILTER-DRYER: 350-PSIG MAXIMUM OPERATING PRESSURE AND 225 DEG MAXIMUM OPERATING TEMPERATURE; STEEL SHELL AND WROUGHT-COPPER FITTINGS FOR SOLDER-END CONNECTIONS; MOLDED-FELT CORE SURROUNDED BY DESICCANT.
- 2.5 REFRIGERANTS
- A. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
- B. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
- 1. ATOFINA CHEMICALS, INC. 2. DUPONT COMPANY; FLUOROCHEMICALS DIV.
- 3. HONEYWELL, INC.; GENETRON REFRIGERANTS
- 4. INEOS FLUOR AMERICAS LLC.
- C. ASHRAE 34, R-410A: PENTAFLUOROETHANE/DIFLUOROMETHANE.
- D. ASHRAE 34, MATCH REFRIGERANT TYPES SPECIFIED FOR EQUIPMENT IN OTHER DIVISION 23 SECTIONS.
- PART 3 EXECUTION
- 3.1 PIPING APPLICATIONS FOR REFRIGERANT R-410A
- A. HOT-GAS AND LIQUID LINES, AND SUCTION LINES FOR HEAT-PUMP APPLICATIONS: 3.4 PIPE JOINT CONSTRUCTION COPPER, TYPE ACR DRAWN-TEMPER TUBING AND WROUGHT-COPPER FITTINGS WITH SOLDERED JOINTS.
- B. SAFETY-RELIEF-VALVE DISCHARGE PIPING: COPPER, TYPE ACR DRAWN-TEMPER TUBING AND WROUGHT-COPPER FITTINGS WITH SOLDERED JOINTS.
- FOR MECHANICAL."

- I. INSTALL FITTINGS FOR CHANGES IN DIRECTION AND BRANCH CONNECTIONS.

- A. PERFORM TESTS AND INSPECTIONS AND PREPARE TEST REPORTS
- B. TESTS AND INSPECTIONS INSPECT REFRIGERANT PIPING ACCORDING TO ASME B31.5, CHAPTER 1. COMPLY WITH ASME B31.5, CHAPTER VI.
- TEST REFRIGERANT PIPING, SPECIALTIES, AND RECEIVERS. ISOLATE COMPRESSOR, CONDENSER, EVAPORATOR, AND SAFETY DEVICES FROM TEST PRESSURE IF THEY ARE NOT

D. FILL PIPE AND FITTINGS WITH AN INERT GAS (NITROGEN OR CARBON DIOXIDE), DURING

- RATED ABOVE THE TEST PRESSURE. TEST HIGH- AND LOW-PRESSURE SIDE PIPING OF EACH SYSTEM SEPARATELY AT NOT LESS THAN THE LOWER OF THE DESIGN PRESSURE OR THE SETTING OF PRESSURE RELIEF DEVICE PROTECTING HIGH AND LOW SIDE OF SYSTEM INDICATED IN PART 1 "PERFORMANCE
- REQUIREMENTS" ARTICLE. a. FILL SYSTEM WITH NITROGEN TO THE REQUIRED TEST PRESSURE.
- b. SYSTEM SHALL MAINTAIN TEST PRESSURE AT THE MANIFOLD GAGE THROUGHOUT DURATION OF TEST.
- c. TEST JOINTS AND FITTINGS WITH ELECTRONIC LEAK DETECTOR OR BY BRUSHING A SMALL AMOUNT OF SOAP AND GLYCERIN SOLUTION OVER JOINTS
- d. FILL SYSTEM WITH NITROGEN TO RAISE A TEST PRESSURE OF 150 PSIG OR HIGHER AS REQUIRED BY AUTHORITIES HAVING JURISDICTION.
- e. REMAKE LEAKING JOINTS USING NEW MATERIALS, AND RETEST UNTIL SATISFACTORY RESULTS ARE ACHIEVED.
- 3.6 SYSTEM CHARGING

A. CHARGE SYSTEM USING THE FOLLOWING PROCEDURES:

- 1. INSTALL CORE IN FILTER DRYERS AFTER LEAK TEST BUT BEFORE EVACUATION.
- 2. EVACUATE ENTIRE REFRIGERANT SYSTEM WITH A VACUUM PUMP TO 500 MICROMETERS. IF VACUUM HOLDS FOR 12 HOURS, SYSTEM IS READY FOR CHARGING.
- 3. BREAK VACUUM WITH REFRIGERANT GAS, ALLOWING PRESSURE TO BUILD UP TO 2 PSIG.
- 4. CHARGE SYSTEM WITH A NEW FILTER-DRYER CORE IN CHARGING LINE
- 3.7 ADJUSTING A. ADJUST THERMOSTATIC EXPANSION VALVE TO OBTAIN PROPER EVAPORATOR SUPERHEAT REQUIREMENTS.
- B. ADJUST HIGH- AND LOW-PRESSURE SWITCH SETTINGS TO AVOID SHORT CYCLING IN RESPONSE TO FLUCTUATING SUCTION PRESSURE.
- C. ADJUST SET-POINT TEMPERATURE OF AIR-CONDITIONING CONTROLLERS TO THE SYSTEM DESIGN TEMPERATURE.
- D. PERFORM THE FOLLOWING ADJUSTMENTS BEFORE OPERATING THE REFRIGERATION SYSTEM, ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS:
- 1. OPEN SHUTOFF VALVES IN CONDENSER WATER CIRCUIT.
- 2. VERIFY THAT COMPRESSOR OIL LEVEL IS CORRECT.
- 3. CHECK COMPRESSOR OIL LEVEL ABOVE CENTER OF SIGHT GLASS
- 4. OPEN COMPRESSOR SUCTION AND DISCHARGE VALVES.
- 5. OPEN REFRIGERANT VALVES EXCEPT BYPASS VALVES THAT ARE USED FOR OTHER PURPOSES. 6. CHECK OPEN COMPRESSOR-MOTOR ALIGNMENT AND VERIFY LUBRICATION FOR MOTORS AND

END OF SECTION 232300

SECTION 238126 - SPLIT-SYSTEM AIR-CONDITIONING UNITS PART 1 – GENERAL

- 1.1 RELATED DOCUMENTS
- A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS, APPLY TO THE WORK UNDER DIVISIONS 26 AND 28.
- 1.2 SUMMARY
- A. THIS SECTION INCLUDES SPLIT-SYSTEM UNITS CONSISTING OF SEPARATE EVAPORATOR-FAN AND COMPRESSOR-CONDENSER COMPONENTS.
- 1. SPLIT SYSTEM AIR CONDITIONING UNITS 2. THE SYSTEM SHALL BE CAPABLE OF REFRIGERANT PIPING LENGTHS INDICATED ON THE DRAWINGS, WITHOUT ANY OIL TRAPS OR ADDITIONAL EQUIPMENT.
- B. THE WORK UNDER THIS SECTION OF THE SPECIFICATION SHALL INCLUDE THE FURNISHING OF LABOR, MATERIALS AND EQUIPMENT FOR THE INSTALLATION OF COMPLETE SYSTEM TO PROVIDE CONTINUOUS AND SATISFACTORY SERVICE.
- 1.3 ACTION SUBMTTALS
- A. PRODUCT DATA: INCLUDE RATED CAPACITIES, FURNISHED SPECIALTIES, AND ACCESSORIES FOR EACH TYPE OF PRODUCT INDICATED. INCLUDE PERFORMANCE DATA IN TERMS OF CAPACITIES, OUTLET VELOCITIES, STATIC PRESSURES, SOUND POWER CHARACTERISTICS, MOTOR REQUIREMENTS, AND ELECTRICAL CHARACTERISTICS.
- 1.4 INFORMATIONAL SUBMITTALS
- A. SHOP DRAWINGS: DIAGRAM POWER, SIGNAL, AND CONTROL WIRING.
- B. SAMPLES FOR INITIAL SELECTION: FOR UNITS WITH FACTORY-APPLIED COLOR FINISHES.
- C. FIELD QUALITY-CONTROL TEST REPORTS.
- D. OPERATION AND MAINTENANCE DATA: FOR SPLIT-SYSTEM AIR-CONDITIONING UNITS TO INCLUDE
- IN EMERGENCY, OPERATION, AND MAINTENANCE MANUALS. E. WARRANTY: SPECIAL WARRANTY SPECIFIED IN THIS SECTION.

PART 2 - PRO 2.1 SPLIT SYS

1.5 QUALITY A

- A. GENERAL 1. PROVID
- HUMIDI FURNIS OF THE
- 2. SYSTEM CANADI COOLIN
- CSA C-3. PROVIDE
- B. DESIGN RE 1. THE E RFFRIG UNIT.
- INSTALL SHALL BLOW-C. SUBMITTAL
- 1. SUBMIT DIAGRA
- CONNEC D. QUALITY AS
- 1. THE SY SHALL VOLTAGE CALIBRA WORLD
- E. EVAPORATO 1. THE CAE STEEL
- FROM AIR DISTRI
- 1. THE AIF ASSEMB BEARING CAPACI MODULA 2. AIR FIL

G

QUALITY ASSURANCE PRODUCT OPTIONS: DRAWINGS INDICATE SIZE, PROFILES, AND DIMENSIONAL REQUIREMENTS OF SPLIT-SYSTEM UNITS AND ARE BASED ON THE SPECIFIC SYSTEM INDICATED. REFER TO DIVISION 01 SECTION "PRODUCT REQUIREMENTS." ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, ARTICLE 100, BY A TESTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, AND MARKED FOR INTENDED USE. ENERGY-EFFICIENCY RATIC: EQUAL TO OR GREATER THAN PRESCRIBED BY ASHRAE 90.1, "ENERGY EFFICIENT DESIGN OF NEW BUILDINGS EXCEPT LOW-RISE RESIDENTIAL BUILDINGS." ASHRAE COMPLIANCE: APPLICABLE REQUIREMENTS IN ASHRAE 62.1-2004, SECTION 5 - "SYSTEMS AND EQUIPMENT" AND SECTION 7 - "CONSTRUCTION AND STARTUP." ASHRAE/IESNA 90.1-2004. COMPLIANCE: APPLICABLE REQUIREMENTS IN ASHRAE/IESNA 90.1-2004, SECTION 6 - "HEATING, VENTILATING, AND AIR-CONDITIONING." COORDINATE SIZE, LOCATION, AND CONNECTION DETAILS WITH EQUIPMENT SUPPORTS. PROVIDE SUPPORTS. COORDINATION LOCATION OF EXTERIOR UNIT PRIOR TO INSTALLATION. WARRANTY SPECIAL WARRANTY: MANUFACTURER'S STANDARD WARRANTY FOR PARTS AND FORM IN WHICH MANUFACTURER AGREES TO REPAIR OR REPLACE COMPONENTS OF SPLIT-SYSTEM AR-CONDITIONING UNITS THAT FAIL IN MATERIALS OR WORKMANSHIP WITHIN SPECIFIED WARRANTY PERIOD. 1. WARRANTY PERIOD FOR COMPRESSORS: MANUFACTURER'S STANDARD, NUT NOT LESS THAN FIVE YEARS FROM DATE OF SUBSTANTIAL COMPLETION. 1. WARRANTY PERIOD FOR COMPRESSORS: MANUFACTURER'S STANDARD, NUT NOT LESS THAN FIVE YEARS FROM DATE OF SUBSTANTIAL COMPLETION.	Bignell Watkins Hasser ARCHITECTS P.C. ONE PARK PLACE, SUITE 250 ANNAPOLIS, MARYLAND 21401 Maryland: (301) 261–8228 Baltimore: (410) 841–6595 MD Fax: (410) 224–4443 Annapolis: (410) 224–2727 Website: www.bigwaha.com These drawings are the property of the Architect. Bignell Watkins Hasser Architects P.C. Unauthorized reproduction for any purpose is an infringement upon copyright laws. Violators will be subject to prosecution by fullest extent of the law. Written dimensions on these drawings shall have precedence over scale dimensions. Contactors shall verify and be repossible for all dimensions and conditions on the job and this office must be notified of any variation from the dimensions and conditions shown by these drawings.
 SPLIT SYSTEM AIR CONDITIONER GENERAL 1. PROVIDE SPLIT SYSTEM AIR CONDITIONER TO MAINTAIN TEMPERATURE AND RELATIVE HUMIDITY CONDITIONS WITHIN THE ROOM. THE MANUFACTURER SHALL DESIGN AND FURNISH ALL EQUIPMENT TO BE FULLY COMPATIBLE WITH HEAT DISSIPATION REQUIREMENTS OF THE SITE. 2. SYSTEM SHALL BE SUPPLIED WITH CSA CERTIFICATION TO THE HARMONIZED U.S. AND CANADIAN PRODUCT SAFETY STANDARD CSA C22.2 NO 236/UL 1995 FOR "HEATING AND COOLING EQUIPMENT" AND MARKED WITH THE CSA C-US LOGO (60 HZ ONLY). 3. PROVIDE ALL APPURTANENCES FOR AN OPERABLE SYSTEM. DESIGN REQUIREMENTS 	
 THE ENVIRONMENTAL CONTROL SYSTEM SHALL BE A FACTORY ASSEMBLED UNIT. THE REFRIGERATION SYSTEM SHALL BE SPLIT, WITH THE COMPRESSOR LOCATED IN CONDENSING UNIT. THE EVAPORATOR SECTION SHALL BE SPECIFICALLY DESIGNED FOR FLOOR-MOUNTED INSTALLATION AND SERVICEABLE FROM THE FRONT OF THE SYSTEM. CONDENSING UNITS SHALL BE DESIGNED FOR OUTDOOR MOUNTING. THE SYSTEM SHALL BE DESIGNED FOR BLOW-THROUGH AIR ARRANGEMENT. SUBMITTALS SUBMITTALS SHALL BE PROVIDED WITH THE PROPOSAL AND SHALL INCLUDE: SINGLE-LINE DIAGRAMS; DIMENSIONAL, ELECTRICAL AND CAPACITY DATA; AND PIPING AND ELECTRICAL CONNECTION DRAWINGS. QUALITY ASSURANCE THE SYSTEM SHALL BE FACTORY-TESTED BEFORE SHIPMENT. TESTING SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO: QUALITY CONTROL CHECKS, "HIPOT" TEST (TWO TIMES RATED VOLTAGE PLUS 1000 VOLTS, PER NRTL AGENCY REQUIREMENTS) AND METERING 	Revisions # Date 2/24/16 REVIEW SET
 CALIBRATION TESTS. THE SYSTEM SHALL BE DESIGNED AND MANUFACTURED ACCORDING TO WORLD CLASS QUALITY STANDARDS. THE MANUFACTURER SHALL BE ISO 9001 CERTIFIED. EVAPORATOR CABINET AND FRAME CONSTRUCTION 1. THE CABINET AND CHASSIS SHALL BE CONSTRUCTED OF HEAVY GAUGE, PAINTED FURNITURE STEEL. THE CABINET SHALL BE DESIGNED FOR EASY INSTALLATION AND SERVICE ACCESS FROM THE FRONT ONLY. AIR DISTRIBUTION 1. THE AIR DISTRIBUTION SYSTEM SHALL BE CONSTRUCTED WITH A QUIET, DIRECT-DRIVE FAN ASSEMBLY EQUIPPED WITH MULTIPLE DOUBLE-INLET BLOWERS, SELF-ALIGNING SLEEVE BEARINGS AND LIFETIME LUBRICATION. FAN MOTOR(S) SHALL BE PERMANENT-SPLIT CAPACITOR, HIGH EFFICIENCY TYPE, EQUIPPED WITH TWO SPEEDS FOR AIR FLOW MODULATION. DEHUMIDIFICATION SHALL UTILIZE THE LOWER FAN SPEED. 2. AIR FILTER SHALL BE A CLEANABLE POLYPROPYLENE MONOFILAMENT TYPE OVER EXPANDED ALUMINUM WITH ALUMINUM FRAME. IT SHALL BE EASILY REMOVABLE FROM THE FRONT OF THE SYSTEM BY MEANS OF QUARTER-TURN FASTENERS AND SHALL NOT REQUIRE SYSTEM SHALL BE PAINTED. 	Client: CITY OF TAKOMA PARK Location: 7500 MAPLE AVE
 MICROPROCESSOR CONTROL 1. THE CONTROL SYSTEM SHALL BE MICROPROCESSOR-BASED, FACTORY-WIRED INTO THE SYSTEM AND TESTED PRIOR TO SHIPMENT. THE WALL-MOUNTED CONTROL ENCLOSURE SHALL INCLUDE A 2-LINE BY 16-CHARACTER LCD PROVIDING CONTINUOUS DISPLAY OF OPERATING STATUS AND ALARM CONDITION. AN 8-KEY MEMBRANE KEYPAD FOR SETPOINT/PROGRAM CONTROL, FAN SPEED SELECTION AND UNIT ON/OFF SHALL BE LOCATED BELOW THE DISPLAY. THE CONTROL DISPLAY SHALL BE FIELD-WIRED TO THE CONTROL BOARD USING 4-CONDUCTOR FIELD-SUPPLIED THERMOSTAT WIRE. 2. TEMPERATURE AND HUMIDITY SENSORS SHALL BE LOCATED IN THE WALL BOX, WHICH SHALL BE CAPABLE OF BEING LOCATED UP TO 300 FT FROM THE EVAPORATOR UNIT. 3. MONITORING a. THE LCD SHALL PROVIDE ON/OFF INDICATION, OPERATING MODE INDICATION (COOLING, HEATING, HUMIDIFYING, DEHUMIDIFYING), FAN SPEED INDICATION AND CURRENT DAY, TIME, TEMPERATURE AND HUMIDITY INDICATION. THE MONITORING SYSTEM SHALL BE CAPABLE OF RELAYING UNIT OPERATING PARAMETERS AND ALARMS. 	TAKOMA PARK MD. Project: I.T. ROOM UPGRADE MECHANICAL
 b. CONTROL SETPOINT PARAMETERS TEMPERATURE SETPOINT: 65–85'F TEMPERATURE SENSITIVITY: 1 TO 9.9'F HUMIDITY SETPOINT: 20–80% RH HUMIDITY SENSITIVITY: 1 TO 30% RH c. UNIT CONTROLS a) COMPRESSOR SHORT-CYCLE CONTROL b) THE CONTROL SYSTEM SHALL PREVENT COMPRESSOR SHORT-CYCLING BY A 3-MINUTE TIMER FROM COMPRESSOR STOP TO THE NEXT START. 2) COMMON ALARM AND REMOTE ON/OFF a) A COMMON ALARM RELAY SHALL PROVIDE A CONTACT CLOSURE TO A REMOTE ALARM DEVICE. TWO (2) TERMINALS SHALL ALSO BE PROVIDED FOR REMOTE ON/OFF CONTROL. INDIVIDUAL ALARMS SHALL BE "ENABLED" OR "DISABLED" FROM REPORTING TO THE COMMON ALARM. 	Drawn by A2ESG Project No. 15032.00 Date 2/24/16
PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 36773, EXPIRATION DATE 91-18-17	M2.12

 3) SETBACK CONTROL a) THE CONTROL SHALL BE USER—CONFIGURABLE TO USE A MANUAL SETPOINT CONTROL OR A PROGRAMMABLE, TIME—BASED SETBACK CONTROL. THE SETBACK CONTROL SHALL BE BASED ON A 5 DAY/2 DAY PROGRAMMED WEEKLY SCHEDULE WITH CAPABILITY OF ACCEPTING TWO EVENTS PER PROGRAM DAY. 4) TEMPERATURE CALIBRATION 	 3. PIPING CONNECTIONS a. INSTALL AND CONNECT DEVICES FUL BE FACTORY MOUNTED. FURNISH DIAGRAM SUBMITTAL TO PIPING CONT 4. SUPPLY AND DRAIN WATER PIPING a. CONNECT WATER SUPPLY AND DRAI
a) THE CONTROL SHALL INCLUDE THE CAPABILITIES TO CALIBRATE THE TEMPERATURE AND HUMIDITY SENSORS AND ADJUST THE SENSOR RESPONSE DELAY TIME FROM 10 TO 90 SECONDS. THE CONTROL SHALL BE CAPABLE OF DISPLAYING TEMPERATURE VALUES IN 'F OR 'C. 5) SYSTEM AUTO RESTART	TRAP AS MANUFACTURER'S INSTRUC 5. FIELD QUALITY CONTROL a. STARTUP AIR CONDITIONING UNIT INSTRUCTIONS. TEST CONTROLS AND
a) FOR STARTUP AFTER POWER FAILURE, THE SYSTEM SHALL PROVIDE AUTOMATIC RESTART WITH A PROGRAMMABLE (UP TO 9.9 MINUTES IN 6-SECOND INCREMENTS) TIME DELAY. PROGRAMMING CAN BE PERFORMED EITHER AT THE WALL-MOUNTED CONTROLLER OR FROM THE CENTRAL, SITE-MONITORING SYSTEM. 4. ALARMS	PART 3 – EXECUTION 3.1 INSTALLATION A. MAINTAIN MANUFACTURERS' RECOMMENDED
 a. UNIT ALARM 1) THE CONTROL SYSTEM SHALL MONITOR UNIT OPERATION AND ACTIVATE AN AUDIBLE AND VISUAL ALARM IN THE EVENT OF THE FOLLOWING FACTORY PRESET ALARM CONDITIONS: a) HIGH TEMPERATURE (MAX 90°F) b) LOW TEMPERATURE (MIN 35°F) c) HIGH HUMIDITY (MAX 85% RH) d) LOW HUMIDITY (MIN 15% RH) e) HIGH WATER ALARM - LOCKOUT UNIT OPERATION f) HIGH HEAD PRESSURE g) LOSS OF POWER h) COMPRESSOR SHORT CYCLE b. CUSTOM ALARMS HUMIDIFIER PROBLEM WATER DETECTED CUSTOM ALARM (1) CUSTOM ALARM (2) USER-CUSTOMIZED TEXT CAN BE ENTERED FOR THE TWO (2) CUSTOM ALARMS. c. ALARM CONTROLS EACH ALARM (UNIT AND CUSTOM) SHALL BE INDIVIDUALLY ENABLED OR DISABLED (EXCEPT FOR HIGH HEAD PRESSURE AND HIGH WATER IN CONDENSATE PAN) AND CAN BE PROGRAMMED FOR A TIME DELAY OF 0 TO 255 SECONDS OF CONTINUOUS ALARM CONDITION TO BE RECOGNIZED AS AN ALARM. EACH ALARM SHALL ALSO BE ENABLED OR DISABLED TO ACTIVATE THE COMMON ALARM SHALL ALSO BE ENABLED OR DISABLED TO ACTIVATE THE COMMON ALARM SHALL ALSO BE ENABLED OR DISABLED TO ACTIVATE THE COMMON ALARM (EXCEPT HIGH HEAD PRESSURE AND HIGH WATER IN CONDENSATE PAN). 	 B. INSTALL PER MANUFACTURER'S REQUIREME C. PROVIDE A CLEAN OUT TEE ON CONDENS SEE CONDENSATION DRAINING. D. PROVIDE SUPPORT ON SPLIT SYSTEM OUTH E. SEAL ARM FLEX AT POINTS PER MANUFACTIRER G. INSTALL ONITS LEVEL AND PLUMB. H. INSTALL EVAPORATOR-FAN COMPONENTS DEVICES SECURELY FASTENED TO BUILDING 1. REFER TO DIVISION 23 SECTION "MECH/ REQUIREMENTS. I. PROVIDE INTERCONNECTING WIRING. J. INSTALL GROUND-MOUNTING, COMPRESS ANCHOR UNITS TO SUPPORTS. K. INSTALL COMPRESSOR-CONDENSER COMPO TO DIVISION 23 SECTION "VIBRATION CONT L. INSTALL AND CONNECT PRECHARGED REFF FITTINGS. INSTALL TUBING TO ALLOW AG "REFRIGERANT PIPING."
 d. AUDIBLE ALARM 1) THE AUDIBLE ALARM SHALL ANNUNCIATE AT THE LCD WALL BOX ANY ALARM THAT IS ENABLED BY THE OPERATOR. e. COMMON ALARM 	 B. GROUND EQUIPMENT ACCORDING TO DIVISION C. ELECTRICAL CONNECTIONS: COMPLY WIND POWER WIRING, SWITCHES, AND MOTOR COMPLY
 A PROGRAMMABLE COMMON ALARM SHALL BE PROVIDED TO INTERFACE USER SELECTED ALARMS WITH A REMOTE ALARM DEVICE. F. REMOTE MONITORING ALL ALARMS SHALL BE COMMUNICATED TO THE SITE MONITORING SYSTEM WITH THE FOLLOWING INFORMATION: DATE AND TIME OF OCCURRENCE, UNIT NUMBER AND PRESENT TEMPERATURE AND HUMIDITY. 	3.3 FIELD QUALITY CONTROL A. MANUFACTURER'S FIELD SERVICE: ENGAG TO INSPECT, TEST, AND ADJUST FI INSTALLATION, INCLUDING CONNECTIONS, A IN WRITING.
H. DIRECT EXPANSION SYSTEM EVAPORATOR COMPONENTS	 B. THE MANUFACTURER SHALL DESIGN AND WITH HEAT DISSIPATION REQUIREMENTS. C. PERFORM THE FOLLOWING FIELD TESTS AN
 DIRECT EXPANSION COIL a. THE EVAPORATOR SECTION SHALL INCLUDE AN EVAPORATOR COIL, THERMOSTATIC EXPANSION VALVE AND FILTER DRIER. b. IT SHALL BE CONSTRUCTED OF COPPER TUBES AND ALUMINUM FINS. AN EXTERNALLY EQUALIZED THERMOSTATIC EXPANSION VALVE SHALL CONTROL REFRIGERANT FLOW. THE EVAPORATOR COIL SHALL BE FACTORY-CHARGED WITH R-407C REFRIGERANT AND SEALED. THE COIL SHALL BE PROVIDED WITH A GALVANIZED STEEL DRAIN PAN. THE EVAPORATOR UNIT CAN BE COUPLED DIRECTLY WITH A OUTDOOR CONDENSING UNIT. 	 LEAK TEST: AFTER INSTALLATION, CHAR AND RETEST UNTIL NO LEAKS EXIST. OPERATIONAL TEST: AFTER ELECTRICAL CONFIRM PROPER MOTOR ROTATION AN TEST AND ADJUST CONTROLS AND S CONTROLS AND EQUIPMENT.
 I. OUTDOOR AIR-COOLED PROP FAN CONDENSING UNIT 1. CONDENSING UNIT COMPONENTS SHALL INCLUDE A CONDENSER COIL, A DIRECT-DRIVE	D. REMOVE AND REPLACE MALFUNCTIONING UI 3.4 STARTUP SERVICE
 PROPELLER-TYPE FAN, A SCROLL COMPRESSOR, HIGH-PRESSURE SWITCH, LIEBERT® LEE-TEMP™ RECEIVER AND HEAD PRESSURE CONTROL VALVE, HOT GAS BYPASS SYSTEM AND LIQUID LINE SOLENOID VALVE. A HOT GAS BYPASS SYSTEM SHALL BE PROVIDED TO REDUCE COMPRESSOR CYCLING AND IMPROVE OPERATION UNDER LOW-LOAD CONDITIONS. ALL COMPONENTS SHALL BE FACTORY-ASSEMBLED, CHARGED WITH R-407C REFRIGERANT AND SEALED. NO INTERNAL PIPING, BRAZING, DEHYDRATION OR CHARGING SHALL BE REQUIRED. CONDENSING UNIT SHALL BE DESIGNED FOR 95°F AMBIENT AND BE CAPABLE OF OPERATION. 	C. ENGAGE A FACTORY-AUTHORIZED SERVICE 1. COMPLETE INSTALLATION AND STARTUP INSTRUCTIONS. END OF SECTION 238126
OPERATION TO -30°F. 3. THE CONDENSER COIL SHALL BE CONSTRUCTED OF COPPER TUBES AND ALUMINUM FINS.	
J. FACTORY-INSTALLED OPTIONS 1. ELECTRIC REHEAT	
 a. THE ELECTRIC REHEAT SHALL BE LOW-WATT DENSITY, TUBULAR ELEMENT AND SHALL INCLUDE AGENCY APPROVED SAFETY SWITCH TO PROTECT THE SYSTEM FROM OVERHEATING. 2. STEAM GENERATING HUMIDIFIER 	
 a. THE ENVIRONMENTAL CONTROL SYSTEM SHALL BE EQUIPPED WITH A STEAM GENERATING HUMIDIFIER THAT IS CONTROLLED BY THE MICROPROCESSOR CONTROL SYSTEM. IT SHALL BE COMPLETE WITH DISPOSABLE CANISTER, ALL SUPPLY AND DRAIN VALVES, 1" AIR GAP ON FILL LINE, INLET STRAINER, STEAM DISTRIBUTOR AND ELECTRONIC CONTROLS. THE NEED TO CHANGE THE CANISTER SHALL BE ANNUNCIATED ON THE MICROPROCESSOR WALL BOX CONTROL PANEL. THE HUMIDIFIER SHALL HAVE A CAPACITY OF 3 LB./HR AN LED LIGHT ON THE HUMIDIFIER ASSEMBLY SHALL INDICATE CYLINDER FULL, OVERCURRENT DETECTION, FILL SYSTEM FAULT AND END OF CYLINDER LIFE CONDITIONS. K. SHIP-LOOSE ACCESSORIES 	
1. REMOTE SENSORS a. THE UNIT SHALL BE SUPPLIED WITH REMOTE TEMPERATURE AND HUMIDITY SENSORS. THE SENSORS SHALL BE CONNECTED TO THE UNIT BY A 30 FT. SHIELDED CABLE.	
 CONDENSATE PUMP a. THE CONDENSATE PUMP SHALL HAVE THE CAPACITY OF 60 GPH AT10 FT. HEAD. IT SHALL BE COMPLETE WITH INTEGRAL FLOAT SWITCH, DISCHARGE CHECK VALVE, PUMP, MOTOR ASSEMBLY AND RESERVOIR. A SECONDARY FLOAT SWITCH SHALL BE PROVIDED TO PERMIT FIELD WIRING TO THE UNIT CONTROL TO SHUT DOWN THE EVAPORATOR UPON A HIGH WATER LEVEL CONDITION. REFRIGERANT LINE a. PROVIDE LONG LINE KIT. 4. REFRIGERANT LINE SWEAT ADAPTER KIT a. PROVIDE A SWEAT ADAPTER KIT TO PERMIT FIELD BRAZING OF REFRIGERANT LINE CONNECTIONS FOR APPLICATION TO SPLIT SYSTEMS. SITE MONITORING SYSTEM 	
 a. A SITE MONITORING STSTEM a. A SITE MONITORING SYSTEM SHALL BE PROVIDED FOR REMOTE MONITORING OF THE UNIT AND MONITORING OF OTHER SUPPORT EQUIPMENT. MONITORING SYSTEM SHALL HAVE THE CAPABILITY TO MONITOR AND CHANGE (AT THE USER DIRECTION) THE TEMPERATURE AND HUMIDITY SETPOINTS AND SENSITIVITIES OF EACH UNIT. THE PRINTER SHALL PROVIDE THE USER WITH CHRONOLOGICAL ALARM INFORMATION. IT SHALL ALSO BE CAPABLE OF BEING PROGRAMMED TO PRINT OUT ENVIRONMENTAL CONDITIONS OR OPERATING MODES AT EACH UNIT. LOCATION TO BE DETERMINED BY OWNER. CONTRACTOR TO COORDINATE LOCATION WITH OWNER OR OWNER REPRESENTATIVE. L. INSTALLATION OF AIR CONDITIONING UNIT 	
1. GENERAL α. INSTALL AIR CONDITIONING UNIT IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION	
INSTRUCTIONS. INSTALL UNIT PLUMB AND LEVEL, FIRMLY ANCHORED IN LOCATION INDICATED AND MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES. 2. ELECTRICAL WIRING a. INSTALL AND CONNECT ELECTRICAL DEVICES FURNISHED BY MANUFACTURER BUT NOT	

SPECIFIED TO BE FACTORY MOUNTED. FURNISH COPY OF MANUFACTURER'S ELECTRICAL

CONNECTION DIAGRAM SUBMITTAL TO ELECTRICAL CONTRACTOR.

1

FURNISHED BY MANUFACTURER BUT NOT SPECIFIED TO SH COPY OF MANUFACTURER'S PIPING CONNECTION ONTRACTOR.

RAINS TO AIR CONDITIONING UNIT. PROVIDE PITCH AND JCTIONS AND LOCAL CODES REQUIRE.

IT IN ACCORDANCE WITH MANUFACTURER'S STARTUP ND DEMONSTRATE COMPLIANCE WITH REQUIREMENTS.

ED CLEARANCES.

MENTS. ENSATE DRAIN AND INSTALL A CLEAR RIGID TUBING TO

UTDOOR UNIT AND SPRING VIBRATION ELIMINATORS. ACTURER REQUIREMENTS. ER'S REQUIREMENTS.

NTS USING MANUFACTURER'S STANDARD MOUNTING ING STRUCTURE. CHANICAL VIBRATION CONTROL" FOR VIBRATION ISOLATOR

SSOR-CONDENSER COMPONENTS ON SUPPORT PAD.

IPONENTS ON RESTRAINED, SPRING ISOLATORS. REFER INTROLS FOR HVAC PIPING AND EQUIPMENT." EFRIGERANT TUBING TO COMPONENT'S QUICK-CONNECT ACCESS TO UNIT. REFER TO DIVISION 23 SECTION

ALLOW SERVICE AND MAINTENANCE.

ISION 26.

WITH REQUIREMENTS IN DIVISION 26 SECTIONS FOR CONTROLS.

AGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE FIELD-ASSEMBLED COMPONENTS AND EQUIPMENT AND TO ASSIST IN FIELD TESTING. REPORT RESULTS

D FURNISH ALL EQUIPMENT TO BE FULLY COMPATIBLE

AND INSPECTIONS AND PREPARE TEST REPORTS:

ARGE SYSTEM AND TEST FOR LEAKS. REPAIR LEAKS AL CIRCUITRY HAS BEEN ENERGIZED, START UNITS TO AND UNIT OPERATION. SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING

UNITS AND RETEST AS SPECIFIED ABOVE.

E REPRESENTATIVE TO PERFORM STARTUP SERVICE.

UP CHECKS ACCORDING TO MANUFACTURER'S WRITTEN

		Bignell Watkins Hasser
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		Revisions # Date 2/24/16 REVIEW SET
		Client: CITY OF TAKOMA PARK
		Location: 7500 MAPLE AVE
		TAKOMA PARK MD. Project: I.T. ROOM UPGRADE
		MECHANICAL
		SPECIFICATIONS
		Drawn by A2ESG Project No. 15032.00 Date 2/24/16
	2 + ESG	
PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 36773, EXPIRATION DATE: 01–18–17	A Squared Plus Engineering Support Group, LLC 3477 SHILOH ROAD, HAMPSTEAD, MARYLAND 21074 PHONE: 443.977.9741 FAX: 410.374.5471 WWW.A2ESG.COM © COPYRIGHT 2016	$\left(M2.13 \right)$