- .1 INCLUDE IN MECHANICAL SECTION, PROVISION OF LABOUR, NEW MATERIALS, TOOLS, TRANSPORTATION, SERVICES AND FACILITIES FOR A COMPLETE MECHANICAL INSTALLATION, THE INSTALLATION SHALL BE LEFT COMPLETE IN ALL RESPECTS AND READY FOR
- .2 THE MECHANICAL SCOPE OF WORK INCLUDES, BUT IS NOT NECESSARILY LIMITED TO THE FOLLOWING PROVISION: .1 PROVISION OF ALL PIPING, VALVES, FLUSH VALVES, PIPE SLEEVES, LABOUR AND MISCELLANEOUS MATERIALS AS REQUIRED TO COMPLETE THE PROJECT.
- .2 FAMILIARIZE CREW WITH SITE IN ORDER TO DETERMINE APPROPRIATE LOCATIONS, SITE CONDITIONS, ETC. THAT MAY
- ,3 WORK MAY NEED TO BE PERFORMED AT NON-STANDARD HOURS. DETERMINE SCHEDULE WITH CONTRACT ADMINISTRATOR.

- 1. PROVIDE ALL LABOUR, MATERIALS, AND EQUIPMENT NECESSARY TO COMPLETE THE WORK SHOWN ON DRAWINGS AND AS SPECIFIED HEREIN,
- ALL NECESSARY PERMITS SHALL BE OBTAINED AND ALL FEES SHALL BE PAID TO CARRY OUT THE SPECIFIED WORK.
- 3. ALL WORK SHALL BE GUARANTEED FOR ONE YEAR FROM DATE OF COMPLETED WORK ACCEPTANCE BY THE CONTRACT ADMINISTRATOR. SUBMIT DOCUMENTATION IDENTIFYING ADDITIONAL EQUIPMENT WARRANTY
- ALL WORK SHALL COMPLY IN EVERY RESPECT WITH ALL NATIONAL, PROWNOAL AND LOCAL CODES AND SYLLAMS, WHICH SHALL BE CONSIDERED PART OF THIS SPECIFICATION. IN THE CASE OF CONFICIENCE REQUIREMENTS, BE GOVERNED BY THE MOST STRINGENT REGULATIONS.
- ALL CUTTING, PATCHING, FLASHING FOR WORK AS REQUIRED HEREIN SHALL BE BY THE CONTRACTOR.
- 7. COORDINATE WORK WITH WORK OF OTHER TRADES TO AVOID CONFLICT
- 8. ALTER THE LOCATION OF DUCTS OR PIPES AT THE DIRECTION OF THE CONTRACT ADMINISTRATOR WITHOUT CHARGE TO THE CONTRACT ADMINISTRATOR, PROVIDED THE CHANGE IS MADE BEFORE INSTALLATION AND DOES NOT NECESSITATE ADDITIONAL WATERIALS
- QUOTATIONS SHALL BE BASED ON THE USE OF SPECIFIED MANUFACTURERS OR APPROVED EQUAL IN ACCORDANCE WITH BE.
 THE USE OF AN EQUAL OR ALTERNATE MANUFACTURERS (APPROVED IN
 ACCORDANCE WITH BE) SHALL IN NO WAY RELIEVE THE
 CONTRACTOR FROM THE RESPONSIBILITY OF PROVIDING CONTRACTOR FROM THE RESPONSIBILITY OF PROVIDING AND ALL WORK THAT WAY BE REQUIRED BY REASON OF DIFFERENT SPACE, WIDGH, ELECTRICAL, OR OTHER REQUIREMENT FROM THAT OF THE SPECIFIED MANACHURER, ALTERNALES SHALL BE APPROVED PRIOR TO THE CLOSE OF TEMBERS IN ACCORDINACE WITH 86. NO SUBMITTALS RECEVED AFTER BIO CLOSING WILL BE ACCEPTED.
- 10. THE CONTRACTOR SHALL PROWDE SIX (6) SETS OF SHOP DRAWNIGS FOR ALL EQUIPMENT FOR REVIEW AND APPROVAL BY CONTRACT ADMINISTRATOR, CONTRACTOR SHALL STAMP SHOP DRAWNIGS REVIEWED BY CONTRACTOR PRIOR TO SUBMISSION. FAILURE TO COMPLY WILL RESULT IN SHOP DRAWINGS BEING RETURNED "UNREVIEWED" BY CONTRACT ADMINISTRATOR.
- 11. FURNISH TO THE CONTRACT ADMINISTRATOR THREE (3) HARD-COVERED LOOSE-LEAF BINDERS CONTAINING THEREIN ONE (1) COMPLETE SET OF LOOSE-LEAF BROCKES CONTAINING HACKER IONE (1) COMPATEL SET OF MANUFACTURES OPERATING AND MAINTENANCE INSTRUCTIONS SHOWING ALL MAGRE EO/PMENT AND APPARATUS REQUIRING MAINTENANCE. INSTRUCTIONS SHALL BE COMMETE FOR INSTRUCTION SHALL BE COMMETE FOR INSTRUCTION SHALL BE COMPATING AND SHALL INCLUDE PRIMARY INFORMATION AND MAINTENANCE AND SHALL INCLUDE PRIMARY INFORMATION SHALL BE REASON SHALL ONLY OF SHALL BOX MATCHES AND ADDRESSES SHALL BOX (MEYELS.) SHALL BOX (SHALL BOX MEYELS.) AND ADDRESSES SHALL BOX (MEYELS.) SHALL BOX (SHALL BOX MEYELS.) AND SHALL BE REQUIRED WITH THE CONTRACT ADMINISTRATORS' REPRESENTATIVE TO ENSURE A THOROUGH UNDERSTANDING OF THE EQUIPMENT AND ITS OPERATION.
- 12. ALL WRING, SUPPLY AND INSTALLATION OF DISCONNECT SWITCHES FOR EQUIPMENT SPECIFIED HEREM SHALL BE PERFORMED BY THE CONTRACTOR, UNLESS OTHERWISE NOTED.
- 13. CONTRACTOR SHALL EXAMINE THE SITE AND CONDITIONS AFFECTING WORK, METHODS OF CONNECTION AND LOCATION OF ALL SERVICES INVOLVED LINDER THIS CONTRACTOR FROM RESPONSIBILITY FOR COMPETING THE MECHANICAL WORK OF THIS CONTRACTOR FROM RESPONSIBILITY FOR COMPETING THE MECHANICAL WORK OF THIS CONTRACT IN A MORKMANLIKE MANNER. NO ALLOWANCE WILL BE MADE AFTER CONTRACT AWARD FOR ANY EXPERSE NICLIBRED THROUGH A FAILURE TO MAKE THIS EXAMINATION AND NVESTIGATION.
- 14, SCHEDULING OF ALL WORK SHALL BE ARRANCED WITH THE CONTRACT ADMINISTRATOR, AND THEY SHALL BE NOTFIED AND APPROVAL OBTAINED PRIOR TO SHUTHING OFF EXISTING SERVICES FOR PURPOSES OF CONNECTING NEW WORK. WORK WITHIN THE BUILDING MAY HAVE TO BE PERFORMED DURING NON-REGULAR WORKING HOURS AND WIST CONFORM TO WORK RULES OF THE BUILDING AS DIRECTED BY THE CONTRACT ADMINISTRATOR
- 15. AS-BUILT DRAWINGS:
 1. OBTAIN SETS OF WHITE PRINTS (ONE FOR EACH SYSTEM IE.
- 1. OBTAIN SETS OF WHITE PRINTS (ONE FOR EACH SYSTEM IE.
 PLUMBING, HACK, FIRE PROFECTION) AND KEEP AT JOB SITE
 AT ALL TIMES.
 2. RECORD ALL ADDITIONS OR DEVIATIONS FROM THE CONTRACT
 DOCUMENTS INCLUDING ALL CHANGES INCURRED BY ADDENDA,
 CHANGE ORDERS, FIELD CHANGES, JOB CONDITIONS, ETC.
 3. CONTRACTORS SHALL BE RESPONSIBILE FOR THE
 PRODUCTION OF AS-DULT RECORD DRAWNOS WHICH SHALL
 PROVIDE A COMPLETE AND ACCURATE RECORD OF THE ACTUAL
 MECHANICAL INSTALLATION, ALL PRINCIPLE BELOW GRADE OR
 NACCESSIBLE PRINT OR DUCT STRENS, ETC. SHALL BE
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- 4. PROJECT RECORD DRAWINGS SHALL BE TRANSFERRED BY CONTRACTOR TO REPRODUCIBLE BOND DRAWINGS AND
- COMINACION I DI REPRODUCIDEE DUND INMINISTA CON LA CALEURE 18-5-BUILT .

 ADMINISTRATOR FOR REVIEW IPON COMPETION IF CORRECTIVE WEASURES ARE REQUIRED AFTER THE SECOND CONTRACT ADMINISTRATOR REVIEW (DUE TO MINISTRATOR REVIEW) (D MISSING INFORMATION AND FOR IMPROPER DRAFTING MISSING INFORMATION AND/OR IMPROPER DIRECTING

 THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE

 CONTRACT ADMINISTRATORS TIME COSTS FOR CORRECTIVE

 MEASURES, COURIER AND PRINTING COSTS.
- MEASURES, COUNTRACTOR SHALL EMPLOY CONTRACT ADMINISTRATOR(OR CAD DRAFTING SERVICE) TO PRODUCE ELECTRONIC COPY AS-BUILT DRAWINGS, CONTRACTOR SHALL BEAR ALL COSTS OF PRODUCTION.
- COPY OF FINAL "AS-BUILT" DRAWING SHALL BE SUBMITTED TO CONTRACT ADMINISTRATOR, ALL COSTS OF "AS-BUILT" DRAWINGS PRODUCTION SHALL BE BORNE BY THE CONTRACTOR.
- 16. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, PROVIDE TEMPORAR HEATING AND HOARDING AS REQUIRED FOR THE PROPER PROGRESS OF THE WORK,
- 17. VERIFY SIZES, INVERTS AND LOCATIONS OF ALL SERVICES PRIOR TO COMMENCEMENT OF WORK. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO SANTARY SEWER, STORM SEWER, DOMESTIC WATER MAINS, FICE.
- 18. HOISTING OF ALL MECHANICAL EQUIPMENT SHALL BE BY THE CONTRACTOR.
- 13. ASSUME FULL RESPONSIBILITY FOR LAYING OUT ALL WORK AND ENSURING THAT NO DAMAGE IS CAUSED TO THE CONTRACT ADMINISTRATORS EQUIPMENT AND PREMISES DUE TO IMPROPER LOCATION AND EXECUTION OF WORK IN THIS CONTRACT. PROTECT AND MAINTAIN ALL WORK UNTIL WORK HAS BEEN COMPLETED AND ACCEPTED BY THE CONTRACT ADMINISTRATOR. STORE ALL MATERIALS AS REQUIRED, AND CLEAN UP REFUSE CAUSED BY ALL WORK. 19. ASSUME FULL RESPONSIBILITY FOR LAYING OUT ALL WORK AND
- 20. IDENTIFY ALL NEW PIPING WITHIN BUILDING INSTALLED IN THIS CONTRACT SHOWING SERVICE, PIPE SIZE, AND FLOW DECEDION, USE CAPITAL ELTERS USING EITHER FIER RESISTANT HIGH CLOSS INTERIOR ENAMEL PAINT OR WATERPROOF, HEAT RESISTANT PLASTIC MARKER TAGS, (SMILAR TO: WHE BRADY IDENTIFICATION TAPES, BANDS, MARKERS), IDENTIFY AT IMAJULUM OF EVERY 50 FT. AND AT LEAST ONCE IN EACH ROOM. LOCATE AND SIZE LETTERING SUCH THAT IT CAN BE SEEN FROM FLOOR.
- 22. IN THE CASE OF DISCREPANCY BETWEEN ARCHITECTURAL AND MECHANICAL DRAWINGS TO NUMBER, TYPE, OR LOCATION OF HVAC EQUIPMENT AND SYSTEMS COMPONENTS, OBTAIN WRITTEN RULING.
- 23. ALL TIME/DATE SENSITIVE ELECTRONIC EQUIPMENT AND SOFTWARE PROVIDED ON THIS PROJECT SHALL BE 4 DIGIT YEAR INPUT COMPATIBLE AND SHALL BE BASED ON THE USE OF FULL UNABBREVIATED, UNANBIGUOUS DISCRETE TIME AND DATE CODES.
- 24. CONTRACTOR SHALL COORDINATE PROVISION OF POWER TO BUILDING CONTROL TRANSFORMERS WITH DIVISION 16 AND CARRY ALL INCREMENTAL COSTS.
- LOWING:

 1 ALL POWER WRING TO EQUIPMENT.
 2 ONE 15 AMP 120V/1PH/60HZ FUSED POWER SUPPLY TO EACH
 MECHANICAL EQUIPMENT AND/OR JANITOR ROOM.
- 26. PROVIDE FIRE STOPPING AT ALL PIPING, CONDUIT (CONTROLS) AND DUCTWORK PENETRATIONS OF ALL REQUIRED FIRE SEPARATIONS WITH APPROVED MATERIAL SYSTEMS, ACCEPTABLE MATERIALS, 3M, DOW,

SECTION 15180 INSULATION

- ALL INSULATING MATERIALS, METHODS, SIZES AND TYPES OF N. ALL INSULATING MAIERIALS, METHOUS, SIZES AND THES OF INSULATION FOR ALL PIPING AND DUCT WORK SHALL BE INSTALLED TO THE REQUIREMENTS OF THE ASHRAE STANDARDS 90.1-2004 "ENERGY STANDARD FOR BUILDING EXCEPT LOW-RISE RESIDENTIAL BUILDING", STANDARD 90.2-2001 "ENERGY EFFICIENT DESIGN OF LOW-RISE RESIDENTIAL BUILDINGS" AND THERMAL INSULATION ASSOCIATION OF CANADA (TIAC) STANDARDS.
- 1. PROVIDE 1/2" (12 MM) ON PIPING LESS THAN 1 1/2"(38MM) OR 1" (25MM) ON PIPING 2"(50MM) OR GREATER THICK RIGID PIPE INSULATION ON ALL DOWESTIC WATER PIPES. INSULATION C/W
- 2. PROVIDE 1" (25 MM) THICK PIPE INSULATION ON ALL PLUMBING VENTS PASSING THROUGH ROOF FOR A DISTANCE OF 10'-0" (3 M) INSIDE FROM POINT OF COLD TO WARM SURFACE PENETRATION. INSULATION C/W VAPOUR BARRIER.
- 3. PROVIDE 1 1/2" (38 MM) THICK FLEXIBLE DUCT INSULATION C/W RFFRK FACING ON EXHAUST DUCTWORK & ALL SUPPLY DUCTWORK FROM ALL AIR HANDLING FOUNPLENT. EXHAUST DUCTWORK STALL BE INSULATED FOR A MINIMUM DISTANCE OF 10-0" (3 M) FROM PENETRATION OF BUILDING THERMAL ENVELOPE. REFER TO DRAWINGS FOR ADDITIONAL INSULATION FROURFEINTS. ALL SUPPLY AIR DUCTWORK CONVEYING AIR—CONDITIONED AIR SHALL BE INSULATED.
- 3. PROVIDE 2" (50 MM)THICK RIGID THERMAL FACED INSULATION ON ALL DUCTWORK CONVEYING OUTSIDE AIR COMPLETE WITH RFFRK FACING, DÜCTWORK SHALL BE INSULATED OVER ENTIRE RUN FROM PENETRATION OF BUILDING THERMAL ENVELOPE TO UNIT CONNECTION,
- 7. ACOUSTICALLY INSULATE DUCTWORK WITH 1° (25 MW) FLEXBLE DUCT INSULATION WITH FLAME ATTENUATED FIBRES BONDED WITH THERMOSETING RESIN, BLACK PLASTIC—CADTED MAT FINISH. PROVIDE WHERE NOTED ON DRAWNGS OR AS SHOWN AS HATCHED DUCTWORK OR ALLOW FOR UP TO 10 FT. (3 M) FROM SUPPLY AND RETURN AIR OPENINGS OF ROOF MOUNTED COURMENT.
- 8. DO NOT EXTERNALLY INSULATE ANY DUCTWORK WHICH IS SPECIFIED OR SHOWN TO BE INTERNALLY INSULATED UNLESS NOTED OTHERWISE.
- 9. INSULATION COVERINGS:
 DUCTWORK RUNNING OUTSIDE BUILDING THERMAL ENVELOPE AND EXPOSED TO THE WEATHER:
- 3. CROSS HATCHED DUCT WORK REFERENCES INTERNALLY INSULATED, SINGLE HATCH DUCT WORK REFERENCES EXTERNALLY INSULATED. DUCT WORK FROM RT-1, EXPOSED TO THE OUTDOORS, SHALL BE EQUIPPED WITH 2" INTERNAL INSULATION AND WATERTICHT CONSTRUCTION.

- .1 MASTIC FINISH OVER INSULATION SHALL BE W-CRYL CP-10 WHITE MEATHER BARRIER COATING AS MANUFACTURED BY CHILDERS PRODUCTS COMPANY. IT SHALL BE APPLED IN TWO COATS, THE FIRST COAT BEING A TACK COAT APPLED AT A RATE OF TWO GALLONS PER 100 SQ. FT. (81 L/SQM), AND WHILE STILL WET A LAYER OF CHIL-CLAS #5 OPEN WEAVE GLASS (LOT MEMBRANE SHALL BE EMBEDDED WITH ALL FABRIC COAT AT A COVERAGE OF FOUR CALLONS PER 100 SQ. FT. (1.6 1/SQM)) SHALL BE APPLED, FULLY COVERING THE CLOTH MEMBRANE, SO THAT THE MINIMUM DRY FILM THICKNESS IS 1/16" (0.65"), (1.6 MW). THERE SHALL BE NO VOIDS OR HOLES AND THE MASTIC SHALL BE TOWELLED, SPRAYED OR WET-BRUSHED TO A SMOOTH EVEN FINISH PROVIDE ALMMINUM WET-BRUSHED TO A SMOOTH EVEN FINISH. PROVIDE ALUMINUM
- WATER-PROOFED AND FLASHED EITHER BY EXTENDING THE VECTOR OF THE VIBOR OF THE VECTOR OF THE VIBOR OF THE ADJOINING SURFACE, OR, IF THAT SURFACE WILL ATTAIN TEMPERATURES IN EXCESS OF 180 DEGREES F (82 DEGREES, O. USE CHIL-
- .3 ALL INSULATION IN EXPOSED LOCATIONS, AND ALL DUCTWORK IN FAN ROOMS, SERVICE ROOMS, GARAGES, ETC., SHALL BE COVERED WITH CANVAS WRAP. INSULATION EXPOSED TO THE MOISTURE SHALL BE COMPLETE WITH COVER PER 9.1/9.2
- PIPE INSULATION:

 ALL PIPING IN EXPOSED LOCATIONS SHALL BE COVERED WITH CANYAS WAPA. THIS SHALL INCLUDE PIPING IN FAN ROOMS, SERVICE ROOMS, GARAGES, ETC.
- .2 INSULATION EXPOSED TO MOISTURE SHALL BE PROVIDED WITH PVC JACKET (PROTO, OR EQUAL IN ACCORDANCE WITH B6).
- .3 ALL PIPING EXPOSED TO OUTDOOR CONDITIONS SHALL BE PROVIDED WITH ALUMINUM JACKETING.

SECTION 15400 PLUMBING

PROVIDE COMPLETE FUNCTIONAL PLUMBING SYSTEM COMPRISED OF DOMESTIC WATER PIPING, VENTS, SANITARY AND DRAINAGE PIPING, RAIN WATER LEADERS, ETC.

- 2. ALL WATER PIPING ABOVE GROUND INSIDE BUILDING SHALL BE TYPE "L" HARD COPPER; 3RD PARTY CERTIFIED. ALL PIPING BELOW GROUND SHALL BE TYPE "K" SOFT COPPER; 3RD PARTY CERTIFIED.
- DRAINS AND VENT PIPING UNDERGROUND INSIDE BUILDING SHALL BE CAST IRON CLASS 4000, OR PVC PLASTIC, FITTINGS SHALL BE MECHANICAL JOINT FOR CAST IRON OR SOLVENT CEMENT FOR PVC.
- 4. SANITARY WASTE STACKS, HORIZONTAL WASTE, VENT AND RAIN WATER LEADERS, ABOVE GROUND INSIDE BUILDING, SHALL BE CAST IRON CLASS 4000. VENT PPING AND RYTUINE RUN-OUTS MAY ALSO BE DWY COPPER OR PVC PLASTIC, FITTINGS SHALL BE MECHANICAL JOINT FOR CAST IRON, SOLDER FOR DWY COPPER AND SOLVENT CEMENT FOR
- 5. ALL PVC PLASTIC PIPING USED FOR HIGH-RISE BUILDINGS SH HAVE A FLAME SPREAD RATING OF 0, AND A SMOKE DEVELOPED RATING OF 35, PIPING AND FITTINGS SHALL BE OF ONE
- 6. CONTRACTOR SHALL VERIFY ON SITE ALL CONNECTION POINTS TO EXISTING BUILDING SERVICES. COORDINATE ALL NEW PIPING RUNS WITH CONTRACT ADMINISTRATOR.
- 7. USE 95/5 TIN-ANTINIONY BRAZING SOLDER ON ALL HOT AND COLD WATER PIPING. USE NON-CORROSIVE NON-LEADED FLUX,
- 8. ALL VALVES TO BE BY ONE MANUFACTURER, STANDARD OF ACCEPTANCE: JENKINS BROS. LTD.
- 9. MANUFACTURED SHOCK ABSORBERS, AUTOMATIC AIR VENTS, AND PARTITION STOPS SHALL BE INSTALLED AT THE TOP OF ALL RISERS, AND ON ALL FIXTURES OR BATTERY OF FIXTURES.
- 10. CONTRACTOR SHALL ALLOW FOR IN TENDER QUOTATION
 ANY ADDITIONAL LABOUR, MATERIALS, ETC. DEEMED NECESSARY DUE
 TO ERACT SITE CONDITIONS WHICH HAVE NOT BEEN REFLECTED IN
 MECHANICAL DRAWNIC OR IN MECHANICAL SPECIFICATION. NOTEY
 CONTRACT AMMINISTRATOR OF ALL DISCREPANICES PHOR TO TENDER CLOSE.
- 11. ON COMPLETION, ALL PIPING SYSTEMS SHALL BE CLEANED & FLUSHED OUT TO REMOVE ANY FOREIGN MATERIAL IN THE PIPING.
- 12. GAS PIPING SHALL BE BLACK STEEL PIPE, EQUAL TO ASTM A-53 SCH. 40 WITH 150 LBS. STANDARD BLACK MALLEABLE RCN SCREWED FITTINGS ALL WORK SHALL COMPLY WITH C.G.A. B149.1-00 "NATURAL GAS AND PROPANE INSTALLATION CODE", COMPLETE WITH DEPARTMENT OF LABOUR GAS NOTICES, AND SHALL BE PERFORMED BY FULLY QUALIFIED GAS FITTERS AND/OR WELDERS LICENSED TO PRACTICE IN THE PROVINCE OF MANITOBA.
- 14. RUN CAS PIPNG TO SERVE CONTRACT ADMINISTRATOR'S EQUIPMENT.
 TAKE DUT PERMITS AND CONNECTE COUPMENT READY FOR USE, PROVIDE CAS
 REGULATIONS TO SERVE NEW CAS FRED EQUIPMENT. CAS REGULATIONS SHALL BE
 C.G.A APPROVED AS MANUFACTURED BY FISHER, OR EQUAL IN ACCORDANCE WITH B6. PROVIDE
 GAS CLOKE DRIT LEG AND FLEXIBLE CONNECTIONS AT EACH PIECE OF
- WORK, PAY ALL COSTS AND/OR FEES.
- AND REQUIREMENTS TO MEET THE CAN/CSA-B149.1-05 AND TSSA/MB. DEPT, OF LABOUR REQUIREMENTS.
- 17. PROVIDE DIELECTRIC COUPLINGS WHEREVER PIPES OF DISSIMILAR METALS ARE JOINED.

PIPE SIZE	ROD DIA,	STEEL		COPPER
UP TO 3/4"	3/8"	6'		6'
1" TO 1 1/4" 1 1/2" & 2"	3/8* 3/8"	8' 10'	6'	8'
2 1/2" & 3"	1/2"	12'		8'
4" & 5"	5/8"	12'		8'

19 PIPE HANCERS WHERE RECILIRED SHALL BE CRINNEL FIG 65 FOR 19. PIPE HANGER'S WHERE RECURITED SHALL BE GRINNEL RIGES FOR STEEL PIPE AND FOILT EXPANSION CASE SET IN HOLES DRILLED IN CONCRETE OR ATTACHED TO FIG.225 OR 227 CLAIM ATTACHED TO FLOOR JOSTS AND ROOF JOSTS. FOR INSULATED PHINNE, PROVIDE PROTECTION TIGE 167 SADULES SIZE HANGER TO ACCOMMODATE INSULATION, WHERE APPLIED.

PLUMBING FIXTURES AND EQUIPMENTS

- WC-1 TOILET FLOOR MOUNTED FLUSH VALVE (BARRIER FREE DESIGN)
- AMERICAN STANDARD MADERA ELONGATED 16-1/8" (410MM) HIGH #2305.100 'LOW CONSUMPTION' TOILET, FLOOR MOUNTED FOR FLUSH VALVE, VITREOUS CHINA, ELONGATED SYPHON JET FLUSH ACTION BOWL, FULLY GLAZED 2" (50MM) BALL PASS INTERNAL TRAPWAY, 10" X 12" (254MM X 304MM) LARGE WATER SURFACE, 1.3 GAL. (6L) X 12" (25-MAN X 30-MM) LARGE WATER SURFACE, 1.3 GAL. (6L)
 FLUSH, 1-1/2" (38MM) FOR SPUID AND BOLI CAPS. PROVIDE FLOOR
 FLANGE, FLANGE BOLTS AND GASKET. SLOAN TEGAL. #111-YG-XL
 FLUSH VALVE, C.P. LUW CONSUMPTION, FACTORY SET FLOW, QUIET
 ACTION DIAPHRAGM TYPE, WITH NON-HOLD OPEN FEATURE, VACUUM
 BREAKER AND EXTRINCED SETT BUMPER ON BACK-CHECK ANGLE STOP.
 CENTOCO #820STS SEAT, ELONGATED HEAVY DUTY SOLID PLASTIC
 OPEN FRONT WITH COVER, REINFORCED STANLESS STEEL CHECK
 HINGE, POSTS, WASHERS AND NUTS.
- L-1 BASIN WALL HUNG (BARRIER FREE DESIGN AND GENERAL USE) FOR TIGHT SPACE AREAS
 - 1. AMERICAN STANDARD "MURRO" #0954.000 BASIN, 4" (102MM)
 CENTRES, 27 X 21"X 5 7-1/2" (569MM X 533MM X 127-191MM)
 DEEP, WALL HUNG, VITREOUS CHINA, REAR OVERFLOW, FOR
 CONCEALED AND SUPPORT. CHICAGO FAUCETS #8027—VX FAUCET,
 C.P. 4" (102MM) C.C., SOLID CAST BRASS LEAD-FREE BODY, 1/4
 TURN CERAMO DISC VALVE CARTIRIOGES, WITH VANDAL-RESSTANT
 1.84 CPM (8L) FLOW AREATOR OUTLET AND CAST BRASS LEVER
 HANDLES MCQUIRE #1550 BARN, C.P. OPEN GRD. MCQUIRE
 #H170BVRB SUPPLIES, C.P., POLISHED, SHORT HORIZONTAL
 NITGRAL SWEAT TUBES WITH VP. COMBINATION #HEEL
 HANDLE ACT TUBES WITH VP. COMBINATION #HEEL
 HANDLE ACT TUBES WITH VP. COMBINATION #HEEL
 HANDLE ACT TUBES WITH VP. COMBINATION #HEEL
 HANDLES MCGUIRE #8872C "PT TRAP, C.P.
 POLISHED, CAST BRASS 1—1/4" (32MM) WITH CLEANOUT AND
 BRADED FLEWBLE HISTERS, MCGUIRE #8872C "PT TRAP, C.P.
 POLISHED, CAST BRASS 1—1/4" (32MM) WITH CLEANOUT AND
 SCULTCHEON, SMITH SERIES 80700—M CARRIER, WITH STEEL PIPE
 LEGS, BLOCK BASE FEET SUPPORT, CONCEALED ARMS AND PEDESTAL
 PLAIE, FOR MARROW WALL INSTALLATION PROVIDE "Z" TYPE FLEEVE
 FOR ARMS.) AMERICAN STANDARD #9059.020 SEMI-CHINA PEDESTAL
 TO COVER EXPOSED PIPMG AS PER LOCAL CODES.
- FD-1 FLOOR DRAINS FIN. AREAS
- .1 SMITH SERIES 2005A FLOOR DRAIN, ALL DUCO COATED CAST IRON BODY, REVERSIBLE FLASHING CLAMP WITH SEEPAGE OPENINGS AND ADJUSTABLE 5" (127MM) DIAMETER NICKEL BROINZE 1/4" (6.35MM) THICK STRAINER, SECURED WITH S.S. SCREW, 4" (OLOMA) THEORY ON STRAINER, WHERE REQUIRED BY LOCAL CODE PROVIDE TRAP PRIMER CONNECTION "P!".)
- CO-1 FLOOR CLEANOUT (UNFINISHED AND OUTSIDE AREAS)
- .1 SMITH 'TWIS-TO-FLOOR' SERIES 4220 FLOOR CLEANOUT, DUCO COATED CAST IRON BODY AND REMOVABLE POSITIVE GASKET SEAL CLOSURE PLUG AND HEAVY DUTY 6" (150MM) ROUND ADJUSTABLE SCORIATED CAST IRON COVER SECURED WITH STAINLESS STEEL SCREWS, C.O. CAST IN COVER. (FOR WATER-PROOFED AREAS PROVIDE 'FC' FLANCE WITH FLASHING CLAMP'
- CD-2 STACK CLEANOUT
- .1 SMITH SERIES 4510 STACK CLEANOUT, IN BASE OF CAST IRON STACKS WITH NEOPRENE CASKETED PLUC, WHERE CLEANOUTS ARE CONCEALED BENIND FINISHED WALLS ACCESS SHALL BE WADE BY SMITH 4530 ROUND STAINLESS STEEL PLATE AND SLOTTED FLAT HEAD STAINLESS STEEL PLATE HEAD STAINLESS STEEL PLATE HEAD STAINLESS STEEL PLATE S STAINLESS STEEL SCREW.
- TP-1 TRAP SEAL PRIMER SERVING 1 TO 2 DRAINS
- .1 P.P.P. INC. MODEL PR-500 AUTOMATIC TRAP SEAL PRIMER VALVE, CAST BRASS BODY, SERWING TO R2 AUTOMADICAL OR REMOTE AREA BORINS (PRIMER AUTOMATICALLY ACTIVITATIO WHICH THERE IS A PRESSURE DROP IN THE SYSTEM) WITH 1/2" (12,7MM) NPT (MTOF) CONNECTIONS WITH STRANIER AND INTERGRAL BACK FLOW PREVENTER &
- WHA WATER HAMMER ARRESTORS
- .1 SMITH 'HYDROTROL' WATER HAMMER ARRESTORS SERIES #5000, STANLESS STEEL, PRESSURZED CHAMBERS, BELLOWS, SUZ ACCORDING TO AMAUNEACTURES' RECOMMENDATIONS CHART BELOW TO ELIMINATE WATER HAMMER AND SHOCK FROM PIPING SYSTEM. PROVIDE WATER HAMMER ARRESTORS ON HOT AND COLD WATER SUPPLES TO ALL QUICK VALVES, SOLENODS, AND PLUMBING FIXTURES, AND LOCATE IN AN UPRICH POSITION BETWEEN THE LAST THO FIXTURES ON A LINE, OR HORIZONTALLY AT THE END OF LINE CLOSEST TO SUPPLY SOURCE.

SECTION 15800 HEATING, VENTILATION & AIR CONDITIONING

2. ALL DUCTWORK INSTALLATION SHALL BE PERFORMED IN ACCORDANCE WITH ASHRAE, SMACNA LATEST EDITION DUCT STANDARDS.

DUCT CONSTRUCTION:

1. RECTANGULAR DUCTNORK SHALL BE CONSTRUCTED FROM
GALVANZED SHEET METAL OF THE FOLLOWING U.S. STANDARD
GALVES:

DUCTS UP 10 12" ON LONGEST DIMENSION 26 GA.

DUCTS 13" TO 28" ON LONGEST DIMENSION 24 GA.

DUCTS 29" TO 54" ON LONGEST DIMENSION 25 GA.

DUCTS 29" TO 54" ON LONGEST DIMENSION 25 GA.

DUCTS 29" TO 54" ON LONGEST DIMENSION 26 GA.

WELDED STAINLESS STEEL (WATERTIGHT CONSTRUCTION) SHALL BE USED ON THE SUPPLY AND RETURN DUCF MAINS SERVING RT-1, ONLY IN AREAS MICHOEL EXTEND INFOLOIGH THE NDOOR CHBIRIT AREA ON GALVANZED WETAL DUCF WORK FOR ALL OTHER SUPPLY AND RETURN DUCF WORK SHALL BE ACCEPTABLE.

GAUGES:

CONDUIT SIZE 8" AND SMALLER

ROUND AND OVAL DUCTWORK SHALL BE SPIRAL CONDUIT CONSTRUCTION OF ZINC COATED STEEL OF THE FOLLOWING U.S.

GAUGE OF METAL 26

THIS CONTRACTOR SHALL SUPPLY AND INSTALL ALL DUCTWORK INCLUDING APPURTENANCES, HANGERS, DAMPERS, ETC.

- FIXTURE UNITS MODEL NO. CONN. SIZE
- 13. VALVES IN GAS PIPING SHALL BE GRINNELL FIG. C.G.A. OR EQUAL IN ACCORDANCE WITH B6.
- 1. PROVIDE SUPPLY, RETURN AND EXHAUST AIR DUCT SYSTEMS FROM AIR HANDLING EQUIPMENT AND FANS AS SHOWN.
- 15, CONTRACTOR SHALL COORDINATE SERVICE INSTALLATIONS AND/OR MODIFICATIONS WITH LOCAL UTILITY PRIOR TO COMMENCEMENT OF
- 16. CONTRACTOR SHALL PROVIDE PRE-ASSEMBLED AND PRE-TESTED OVER-PRESSURE RELIEF REGULATORS AND VENT ASSEMBLES ON ALL PROPANE AND NATURAL GAS PIPING SYSTEMS GREATER THAN 7° N.C., INSTALLED AT EACH APPLIANCE AND/OR EQUIPMENT, INSTALLATION
- 18. USE THE FOLLOWING ROD DIAMETER AND SPACING SCHEDULE TO ESTABLISH MINIMUM HANGING STANDARDS FOR HORIZONTAL PIPING:

- 5. DUCT SIZES INDICATED ON DRAWINGS REFERENCE INTERNAL DIMENSIONS. ALL SEAMS AND JOINTS IN ROUND OR OVAL DUCT FITTINGS SHALL BE CONTIGUOUSLY WELDED. RE-COAT ZINC COATING DAMAGED BY WELDING PROCEDURE.
- 5. BALANCING DAMPERS SHALL BE CONSTRUCTED FROM GALVANIZED STEEL 2 GAUGES HEAVIER THAN THE DUCTWORK IN WHICH THEY ARE INSTALLED C/W LOCKING QUADRANT AND INDICATING DEVICE.
- 6. TURNING VANES SHALL BE CONSTRUCTED TO THE FOLLOWING REQUIREMENTS:
- USE DUCT ELBOWS WHICH HAVE A THROAT RADIUS OF 1-1/2 TIMES
 THE DUCT DIAMETER.

 WHERE SPACE IS LIMITED, USE DUCT ELBOWS FABRICATED WITH
 SPACE THROATS AND BACKS AND FITTED WITH ROYANE TURNING
- 7. THE FOLLOWING DUCT JONING METHODS SHALL BE USED:
 PITTSBURGH LOCK OR DOUBLE SLIDE LOCK HAMMERED FLAT FOR
 LONGTUDINAL JONITS ON STRAGHT DUCTYON
 PITTSBURGH LOCK FOR CORNER LOCK OF FITTING. - FLAT DRIVE CLEAT JOINT ON ALL SIDE JOINTS 18" (450MM) AND
- UNDER IN LENGTH.

 FLAT SLIP CLEAT JOINT ON ALL TRANSVERSE JOINTS 18" (450MM)
 AND UNDER IN LENGTH.

 ANGLE "S" OR STANDING DRIVE CLEATS ON ALL SIDE JOINTS 19"(475MM) TO 30"(750MM) ON HEIGHT.
 - STANDING "S" OR STANDING DRIVE CLEATS ON ALL TRANSVERSE
- JOINTS 19"(475MM) TO 30"(750MM) IN LENGTH.

 ANGLE "S" OR STANDING DRIVE CLEATS ON ALL TRANSVERSE AND SIDE JOINTS 31 (725MM) TO 72 (1800MM).

 - STANDING 'S' OR STANDING DRIVE CLEATS REINFORCED WITH 1 1/2"(38MM) X 4.5MM WILD STEEL BAR ON ALL TRANSVERSE AND SIDE JOINTS 73"(1825MM) AND OVER.
- 8. PROVIDE FIRE DAMPERS (WHICH CONFORM TO NEPA REQUILATIONS, BEAR ULC LABEL, AND HAVE APPROVAL OF AUTHORITY HAYING JURISDICHON, DAMPERS TO BE "TYPE "IS AND "C' (UNLESS OTHERWISE NOTED)AND INSTALLED IN DUCTIFIOR AT FIRE SEPARATIONS WHICHER SHOWN OR NOT. VERIFY LOCATIONS ON ARCHITECTURAL DRAWNOS.
- 9. ALL NEW DUCTWORK SHALL BE SEALED USING DUCT BOND II HIGH PRESSURE, NON-TOXIC, DUCT SEALER THROUGHOUT ALL SEAMS AND
- 10. SUPPORT HORIZONTAL DUCTS ON MAXIMUM 8"-0" (2.4 M)CENTERS BY PERFORATED GALV. STEEL RIVETTED STRAP FOR DUCTNORK 36" (915 MW) (ETHER DIMENSING) OR LESS, AND MINMUM! "1" 1" 1", 1", 1" (915 MW) (25 x 25 x 2 MM) GALV. IRON UNDER DUCTS OVER 36" (915 MW) (ETHER DIMENSION) MITH 3/8" (6 MM) DIAM. THREADED RODS SUSPENDING ANGLES FROM STRUCTURE.
- 11. PROVIDE ACCESS DOORS WHERE REQUIRED FOR SERVING OF EQUIPMENT AND FIRE DAMPERS,
- 12. PROVIDE 4" (100 MM) FLEXIBLE DUCT CONNECTIONS ON BOTH INLET AND OUTLET DISCHARGE SIDES OF EACH FAN.
- 13. PROVIDE ONE SPARE SET OF FILTERS FOR EACH AIR HANDLING UNIT
- 15. PROVIDE VIBRATION ISOLATORS FOR ALL WECHANICAL EQUIPMENT, INCLUDING PUMPS, UTILITY FANS, AND VENT SETS, AR HANDLERS, ROOF-TOPS UNITS, COMPENSION, GUNTS, COMPRESSED, ETC. AS APPLICABLE. SUBMIT SHOP DRAWINGS PRIOR TO INSTALLATION.
- 16. BACK-DRAFT DAMPERS SHALL BE PROVIDED WITH THE FOLLOWING MINIMUM REQUIREMENTS: - 16 GA. GALVANIZED STEEL OR ALUMINUM CHANNEL FRAME; 16 GA.
- GALVANIZED SIEEL OF ALDMINUM CHANNEL FARME, TO GA GALVANIZED BLADES C/W STIFFENERS, FULL BLADE-LENGTH SHAFT; BRASS, BALL OR NYLON BUSHING; FELT OR NEOPRENE ANTI-CHATTER BLADE STRIPS; ADJUSTABLE COUNTER-BALANCE.
- 17. CHINNEYS AND BREECHING SHALL BE LABORATORY TESTED AND LISTED BY THE UNDERWRITERS LABORATORES INC. FOR USE WITH BUILDING HEATING COUPMENT BURNING NATURAL GAS OR PROPANE GAS, AS DESCRIBED IN NFDA 211, SECTION 60. THE DOUBLE WALL STACK SHALL HAVE AN OUTER JACKET FOR GALVANIZED STELL CONFORMING TO ASTM AS25. THERE SHALL BE AN AIR SPACE BETWEEN THE WALLS, THE INNER GAS COLYENING PIES SHALL BE AN LAULANIUM JALLOY JOINTS TO BE SECURED WITH SHEET METAL SCREWS.
- PROVIDE CHIMNEYS AND/OR BREECHING FOR: GAS-FIRED (INDIRECT) MAKE-UP AIR UNITS.
- 19. PROVIDE BASE TEE WITH CLEANOUT, ROOF FLASHING AND VENT CAPFOR ALL EQUIPMENT AS REQUIRED.
- 20. ALL AIR SYSTEMS SHALL BE BALANCED AND TESTED BY A CERTIFIED A.A.B.C. INDEPENDENT BALANCING AGENCY TO PROVIDE OUANTITIES AS SHOWN. PROVIDE INTRECELS, SETS OF BALANCE REPORTS FOR REVIEW BY THE CONTRACT ADMINISTRATOR. ALL BALANCING REPORTS SHALL INCLUDE FIRE DAMPER TESTING AND CERTIFICATION.

MECHANICAL EQUIPMENT SCHEDULES:

- .1 DIFFUSERS AND GRILLES; (BASED ON PRICE)
- LBP/15A/1000 LINEAR BAR SUPPLY GRILLE, DUCT MOUNTED, PROVIDE ACOUSTIC LINED DUCT BOOT, (BOOT SIZE (I.D.); FACE AREA OF GRILLE X 12HIGH"). ALUMINUM FINISH.
- 530/F/L/A/B12 SIDEWALL RETURN/TRANSFER GRILLE
- 620DAL/B12 DUCT MOUNT ALUMINUM GRILLE C/W ALUMINUM BALANCING DAMPER.
- 520/F/L/A/B12 SIDEWALL SUPPLY GRILLE, DUCT MOUNTED.
- 1. THE POINTS BELOW DESCRIBE THE CONTROL SEQUENCE OF THE N-V.A.C. EQUIPMENT SPECIFIED IN THE SCHEDULES. ALL CONTROLS TO BE SUPPLED BY DN. 15. AND WREDE BY DVI15, AND SHALL BE THE COMPLETE RESPONSIBILITY OF THIS DIVISION. NEW OR EXISTING, ALL CONTROL WIRING SHALL BE RUN IN WEATHERPROOF PVC CONDUIT.
- MAKE-UP AIR UNIT (MUA-1)

 I PROVIDE NODOR CONTROL PANEL WITHIN BASEMENT
 SERWICE AREA FOR AIR TEMPERATURE SELECTOR, AND
 DISCHARGE AIR TEMPERATURE SENSOR. HEATING SECTION
 STALL CYCLE AS REQUIRED TO MAINTAIN DISCHARGE AIR
 TEMPERATURE SENSOR. ALL HEAT RECOVERY/DEFROST
 COM/FORDS SHALLS (MAMAN) JAILEGRAL-10 FIRE ECONPUENT.

 ITEM 3

 2 PROVIDE MAINTAIL HEATING CONCRETE TO THE ECONPUENT. .1 MAKE-UP AIR UNIT (MUA-1)
 - .2 PROVIDE MANUAL HI-LOW SELECTOR SWITCH FOR MANUAL CONTROL OF MOTORIZED DAMPER POSITION.

- .3 MUA-1 TO OPERATE VIA WALL MOUNT HUMDITY SENSOR WITHIN NDOOR EXHIBIT AND HUMDISTAT IN BASEMENT SERVICE AREA, UPON DETECTION OF ELEVATED HUMDITY LEVELS, MUA-1 SHALL ENERGZE AT FAN SPEED AS DETERMINED BY FAN SELECTOR SWITCH MUA-1 SHALL DE-ENGREZE ONCE HUMDITY LEVELS FALL BELOW
- PROVUE MANUAL 0-6 HOUR OVERRIDE TIMER TO ENERGIZE
 WIA-1 AT FAN SPEED AS DETERMINED BY FAN SELECTOR SMITCH,
 WIA-1 SHALL DE-ENERGIZE ONCE MANUAL TIMER DURATION HAS
 EXPIRED.
- .5 ALL DAMPERS SHALL FULLY CLOSE IN UNOCCUPIED MODE
- .2 ROOF TOP UNIT (RT-1):
- PROUDE PROGRAMMABLE THERMOSTAT C/W NIGHT SETBACK,
 OCCUPIED/UNOCCUPIED SCHEDULE. DURING UNOCCUPIED
 MODE. ALL OUTDOOR AIR DAMPERS SHALL REMAIN CLOSED.

 IAD (CO2) SENSOR AT RETURN PLENUM INLET SHALL OPERATE TO
 ECONOMIZER DAMPERS BASED ON OCCUPANT DEMAND.
- .3 ROOFTOP UNIT (RT-2) ITEMIZED PRICE:
 1. PROVIDE PROGRAMMABLE THERMOSTAT C/W REMOTE SPACE SENSOR; THERMOSTAT MOUNTED IN BASEMENT SERVICE AREA.

MUA-1: GAS FIRED MAKE-UP AIR UNIT/HEAT RECOVERY VENTILATOR

- 1. MAKE-UP AIR UNIT SHALL BE AN OUTDOOR PACKAGED ENGINEERED AIR DESIGN WITH FORWARD CURVE SUPPLY AND RETURN BLOWERS WITH PILLOW BLOCK BEARINGS, HORIZONTAL DISCHARGE, TOP RETURN AIR, HINGED ACCESS DOORS, SUMMER/WINTER FILTER SECTION WITH 2"
 MERY 7 PLEATED FILTERS, EXHAUST AIR FILTER SYSTEM, INLET DAMPERS C/W 3 POSITION OPERATOR ON INTAKE AND EXHAUST, 1" 1-1/2 LB./CU.FT. INSULATION THROUGHOUT, 18 GA. CONSTRUCTION 1/2 LB, /CLUFT, INSULATION THROUGHOUT, 18 CA. CONSTRUCTION WITH GREY DAMEL FINISH COAT, UNIT TO BE BASE MOUNTED.

 2. HEATING UNITS SHALL BE INDIRECT NATURAL CAS FIRED APPROVED FOR BOTH SEA LEVEL AND HIGH ALTITUDE AREAS. THE ENTIRE PACKAGE, INCLUDING DAMPER CONTROLS, FAN CONTROLS, AND ALL OTHER MISCELLANEOUS CONTROLS. AND ACCESSORIES SHALL BE APPROVED BY AN INDEPENDENT TESTING AUTHORITY AND CARRY THE APPROVAL LABEL OF THAT AUTHORITY AS A COMPLETE OPERATING PACKAGE.
- PACKAGE.

 3. ALL UNITS MUST EXCEED THE ASHRAE 90.1 REQUIREMENT OF STEADY STATE EFFORMOY AT LOW FIRE. HEAT EXCHANGER SHALL BE A PRIMARY PRIMA AND MULTI-THESE SCRONDARY ASSEMELY CONSTRUCTED OF TITANUM STANLESS STEEL WITH MULTI-PLANE METAL THROUGH ATON AND SHALL BE OF A FLOATING STRESS RELEVED DESIGN. HEAT EXCHANGER SHALL BE PROVIDED WITH CONDENSATE DRAIN CONNECTION. USING BUTT THE FURHANCES AND CLOSED COUPLED BLOWERS ARE NOT ACCEPTABLE. THE HEAT COUPLED BLOWERS ARE, NOT ALLIEF AND EACH THE AT EXCHANGER PRINCIPLE ASSESSMENT SPALL BE A ROW THROUGH POSITIVE PRESSURE TYPE AND SHALL HAVE AN INTERRUPTED PILOT IGNITION SYSTEM TO PROVIDE MOREASED SAFETY, UNITS USING CONTINUOUS OR INTERMITTENT PILOTS ARE NOT ACCEPTABLE.

 4. FLAME SUPPLICATION SHALL BE FROM THE MAIN FLAME AFTER IGNITION NOT THE PILOT FLAME. ATMOSSPHERE BURNERS OR BURNERS WITH POWER ASSISTED MENTING ARE NOT ACCEPTABLE.
- WITH POWER ASSISTED VENTING ARE NOT AUCEPTABLE.

 5. THE HEAT EXCHANGER/BURNER ASSEMBLY SHALL INCLUDE 15:1
 TURNDOWN. THE HIGH TURN DOWN HEAT EXCHANGER/BURNER ASSEMBLY
 MINIMUM INPUT SHALL BE CAPABLE OF CONTROLLING 6:7% OF ITS MINIMUM INPUT SHALL BE CAPABLE OF CONTROLLING 8.7% OF HIS RATED INPUT, EXCLUDING THE PILOT ASSEMBLY, WITHOUT ON/OFF CYCLING AND INCLUDE BUILT IN ELECTRONIC LINEARIZATION OF FUEL AND COMBUSTION AIR, EFFICIENCY SHALL INCREASE FROM HIGH
- TOLE AND COMBOSTION ARE, EFFICIENCY SHALL INCREASE FROM HIGH TO LOW FIRE.

 6. VENTING FOR OUTDOOR UNITS SHALL BE PROVIDED BY THE EQUIPMENT MANUFACTURER AND SHALL INCLUDE A DOUBLE WALL VENT SUITABLE FOR "-40 F("-40" C) APPLICATIONS.

 7. PROVIDE A MAKE UP AIR REVERSE AIRFLOW HIGH LIMIT SWITCH IN SERIES WITH THE STANAROR HIGH LIMIT SWITCH MONTH SERIES WITH SERSEN SHARP SERIES WITH THE STANAROR HIGH LIMIT SWITCH MONTH SERIES WITH SERSEN SHARP SERVEN SHARP SHARP SERVEN SHARP SH
- SERIES WITH THE STAMDARD HIGH LINIT SWITCH MOUNTED IN THE BLOWER DISCHARGE.

 8. PROVIDE AN AIR-TO-AIR HEAT IPPE EXCHANGER WITH PERFORMANCE AS SHOWN IN THE SCHEDULE, TO BE COIL TAS MANUFACTURED AND SUPPLIED BY ENGINEERED AIR. ALTERNATIVE HEAT PIPE MANUFACTURES SHALL PROVIDE AT THE CONTRACT ADMINISTRATOR'S REQUEST, SAMPLES OF TUBES WITH THE INTERNAL WICK BEFORE AND AFTER EXPANSION OF THE TUBES.

 9. THE TRU SHALL BE MOUNTED ON A CRADLE WITH ACCOMPANYING LINKAGE, TUCKOM, CONTROL ACTUATOR AND Q-TRAC SOLD STATE DEDICATED OPERATING CONTROLLER.

 10. PROVIDE ENHANCES RECOVERY: MANUAU HEAT RECOVERY IS OBTAINED BY FIRST ALLOWING FROST TO FORM ON THE EXHAUST SIDE OF THE COIL AND LOUNG A PRESSURE DIFFERENTIAL SWITCH TO STRES WHEN THE PROST FORMS, JUST PRIOR TO FROST FORMING MANUAU HEAT RECOVERY OCCUPS, WHEN PROST IS DETECTED THE FROST CONTROL SETPOINT IS RESET LIPHARDS, AND THE HEAT PIPE IS SENT TO SEFROST WORKER TO STAML DETECTION OF THE PROST FORMING MANUAU HEAT PRECOVERY CALED THE PROST FORMING MANUAU HEAT RECOVERY OCALED FLOWERS IS STILL ACHIEVED BUT AT A LOWER LEVEL UNTIL THE HEAT PIPE IS CLEAR OF FROST.

 11. WING, COATED TEXTIBLE CONNECTORS, ONE OF PRECIDENT CONTROL SETPOINT IN THE RECEASERY TILTING MOUNEMENT OF THE RECLAM COLPROVIDE EXCHANGING EXCEPT THE ENHAUST LEAVING FACE.

 2. TILL MEECH CAPANISH TO INCORPORATE A LOW FRICTION PHYOTING BASE WITH SELF ALLOWING BALL OR ROLLER BEARINGS.

 3. PROVIDE A TEGION DISCOURTED HEAT FOR FROOL CONTROL PROVIDE A TEGION DISCOURTED HEAT THON OF CONTROL.
- 13. PROVIDE A TESIOD MODULATING THERMOSTAT FOR ROOM CONTRO PROVIDE A REVIOUT PANEL CYLLINIT ON/OFF SWITCH & LIGHT, HEAT ON/OFF SWITCH REVIOUT. 14. MUA-1: ENG AIR MODE DUSAG/HEP/O, SUPPLY-2,000 CFM AT 0.5TSP, RETURN: 2,200CFM AT 0.5TSP, 330 MBH NPUT, 246 MBH OUTPUT, 113.4 BOCKE, EHAING TEMPERATURE RISE, SNOW HEAT PIFE WITH NITERNAL WOCKING, 2 HP, SUPPLY & 2 HP, RETURN FIRE WITH MICHINGE WINDING, 2 IN. SUPPLY & 2 FOR RELIGING 2404/1/60 OPP MOTOR, 12/12 FORWARD CURVE BLOWERS.

 3-POSITION DAMPERS (FULLY CLOSED/PARTIAL OPEN/FULL OPEN) SHALL BE ADJUSTED FOR OPERATION OF UNIT AT HALF AND FULL AIRFLOW CAPACITIES.

- ON TOP O'N TO WIN AT THAT AND YOLE AIMED CAPACITIES.

 1. ALL EOUPMENT BASED ON CARRIER 48TC SERIES ROOF TOP UNITS OR APPROVED EQUAL IN ACCORDANCE WITH BG. ALL UNITS SHALL BE PACKAGED GAS FIRED/ELECTRIC COOL, C/W BELT DRIVE, R-400 AR FERRIERANT, HIGH EFF. COOLING, WEATHER HOODS, HORIZONTAL DISCHARGE, BASE CURB, FLITER SECTION (PROVIDE CLEAN SET OF FILTERS IN UNITS, AND ONE SPARE SET TO CONTRACT ADMINISTRATOR UPON COMPLETION), STANLESS STEEL HEAT EXCHANGERS, COORDINATE ALL VOLTAGE REQUIREMENTS W/DIVISION 16 PRIOR TO SHOP DRAWING SUBMISSION.
- .1 RT-1 (PAYULON AREA)
 CARRER 48TCCOOS, NOMNAL 5.0 TONS COOLING, 115MBH/93MBH
 OJTPUT HEATING, 2200 CFM AT 0.75° E.S.P., POWER EXHAUST, 100 %
 MODULATING ECONOMIZER DAMPERS W/MAQ (CO2) SENSOR KIT FOR
 CONTROL OF MININUM UD

FAN SCHEDULE

SP-B110, 80CFM AT 0.4"ESP, OR APPROVED EQUAL IN ACCORDANCE WITH B-6. DISCHARGE TO STEEL HOODED WALL CAP C/W BIRD SCREEN AND BACK DRAFT DAMPER.

ADDENDUM NO.3

NOVA 3 ENCINEERING LTD. 201-120 FORT STREET TEL.: (204) 943-6142 WINNIPEG, MANITOBA FAX.: (204) 942-1276 R3C 107

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Drawing Title: MECHANICAL **SPECIFICATIONS**

Project Number: 0714

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