

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 ROVANE TURNING VANES.

7. THE FOLLOWING DUCT JOINING METHODS SHALL BE USED:  
 - PITTSBURGH LOCK OR DOUBLE SLIDE LOCK HAMMERED FLAT FOR LONGITUDINAL JOINTS ON STRAIGHT DUCTWORK.  
 - 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 MILD STEEL BAR ON ALL TRANSVERSE AND SIDE JOINTS 73"(1825MM) AND OVER.

8. PROVIDE FIRE DAMPERS WHICH CONFORM TO NFPA REGULATIONS, BEAR ULC LABEL, AND HAVE APPROVAL OF AUTHORITY HAVING JURISDICTION. DAMPERS TO BE TYPE 'B' AND 'C' (UNLESS OTHERWISE NOTED) AND INSTALLED IN DUCTWORK AT FIRE SEPARATIONS WHETHER SHOWN OR NOT. VERIFY LOCATIONS ON ARCHITECTURAL DRAWINGS.

9. ALL NEW DUCTWORK SHALL BE SEALED USING DUCT BOND II HIGH PRESSURE, NON-TOXIC, DUCT SEALER THROUGHOUT ALL SEAMS AND JOINTS.

10. SUPPORT HORIZONTAL DUCTS ON MAXIMUM 8'-0" (2.4 M) CENTERS BY PERFORATED GALV. STEEL RIVETTED STRAP FOR DUCTWORK 36" (915 MM) (EITHER DIMENSION) OR LESS, AND MINIMUM 1" X 1" X 1/8" (25 X 25 X 2 MM) GALV. IRON UNDER DUCTS OVER 36" (915 MM) (EITHER DIMENSION) WITH 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.

14. DUCT MOUNTED MOTORIZED DAMPERS SHALL BE PROVIDED WITH THE FOLLOWING REQUIREMENTS:

- 14.1. ALL MOTORIZED DAMPERS SHALL BE INSULATED LOW LEAKAGE TYPE TO TAMCO 9000 OR EQUAL.
- 14.2. MOTORIZED DAMPERS SHALL BE LOCATED AS NEAR AS POSSIBLE TO THE PLANE OF THE BUILDING ENVELOPE FOR ALL AIR INTAKE AND OUTLET TYPES.
- 14.3. MOTORIZED DAMPERS SHALL CLOSE AUTOMATICALLY WHEN HVAC SYSTEM IS NOT IN OPERATION.
- 14.4. MOTORIZED DAMPERS SHALL BE PROVIDED ON ALL AIR INTAKES AND AIR OUTLET DUCTS EXCEEDING 12"Ø OR 12"x12" IN SIZE.

15. PROVIDE VIBRATION ISOLATORS FOR ALL MECHANICAL EQUIPMENT, INCLUDING PUMPS, UTILITY FANS, AND VENT SETS, AIR HANDLERS, ROOF-TOPS UNITS, CONDENSING UNITS, 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 BLADES C/W STIFFENERS, FULL BLADE-LENGTH SHAFT; BRASS, BALL OR NYLON BUSHING; FELT OR NEOPRENE ANTI-CHATTER BLADE STRIPS; ADJUSTABLE COUNTER-BALANCE.

17. CHIMNEYS AND BREECHING SHALL BE LABORATORY TESTED AND LISTED BY THE UNDERWRITERS LABORATORIES INC. FOR USE WITH BUILDING HEATING EQUIPMENT BURNING NATURAL GAS OR PROPANE GAS, AS DESCRIBED IN NFPA 211, SECTION 60. THE DOUBLE WALL STACK SHALL HAVE AN OUTER JACKET OF GALVANIZED STEEL CONFORMING TO ASTM A525. THERE SHALL BE AN AIR SPACE BETWEEN THE WALLS. THE INNER GAS CONVEYING PIPE SHALL BE AN ALUMINUM ALLOY - JOINTS TO BE SECURED WITH SHEET METAL SCREWS.

18. PROVIDE CHIMNEYS AND/OR BREECHING FOR:  
 - GAS-FIRED DOMESTIC WATER HEATERS.  
 - GAS-FIRED MAKE-UP AIR UNITS.

19. PROVIDE BASE TEE WITH CLEANOUT, ROOF FLASHING AND VENT CAP FOR 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 QUANTITIES AS SHOWN. PROVIDE THREE(3) SETS OF BALANCE REPORTS FOR REVIEW BY THE CONTRACT ADMINISTRATOR. ALL BALANCING REPORTS SHALL INCLUDE FIRE DAMPER TESTING AND CERTIFICATION.

**CONTROLS**

THE POINTS BELOW DESCRIBE THE CONTROL SEQUENCE OF THE H.V.A.C. EQUIPMENT SPECIFIED IN THE SCHEDULES. ALL CONTROLS TO BE SUPPLIED BY DIV. 15 AND WIRED BY DIV.15. CONTROLS SUBCONTRACTOR SHALL BE A SUBCONTRACTOR OF THE MECHANICAL SUBCONTRACTOR. PROVIDE LOCKABLE COVERS FOR ALL THERMOSTATS, NEW OR EXISTING. ALL CONTROL WIRING SHALL BE PLENUM RATED IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE TO MEET THE DEVELOPED SMOKE/FLAME SPREAD RATINGS OF 25/50.

1. EXHAUST VENTILATION CONTROL:

- 1.1. INDOOR MAKE UP AIR UNIT AND EXHAUST FAN TO BE TIMECLOCK CONTROLLED PER THE FOLLOWING:
  - 1.1.1. UNOCCUPIED HOURS OPERATION:
    - 1.1.1.1. MOTORIZED DAMPER ON MIXING BOX FOR OUTSIDE AIR TO MAKE UP AIR UNIT SHALL CLOSE AND RETURN DAMPER ON MIXING BOX SHALL OPEN.
    - 1.1.1.2. FAN OF MAKE UP AIR UNIT SHALL CYCLE ON CALL FOR HEAT/COOL.
    - 1.1.1.3. UNIT TO UTILIZE DISCHARGE TEMPERATURE CONTROL C/W REMOTE ROOM RESET.

- 1.1.2. OCCUPIED HOURS OPERATION:
  - 1.1.2.1. MOTORIZED DAMPER ON MIXING BOX FOR OUTSIDE AIR TO MAKE UP AIR UNIT SHALL OPEN AND RETURN DAMPER ON MIXING BOX SHALL CLOSE.
  - 1.1.2.1. EXHAUST FAN SHALL ENERGIZE
  - 1.1.2.2. FAN OF MAKE UP AIR UNIT SHALL REMAIN ON.

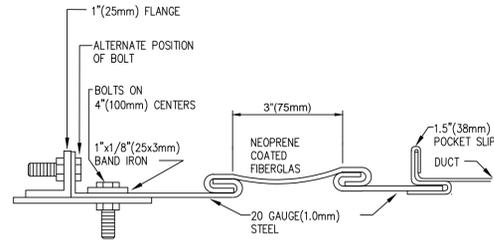
1.1.2.3. UNIT TO UTILIZE DISCHARGE TEMPERATURE CONTROL C/W REMOTE ROOM RESET.

1.1.2.4. WHEN TIMECLOCK INITIATES UNOCCUPIED SCHEDULE, EXHAUST FAN SHALL DE-ENERGIZE.

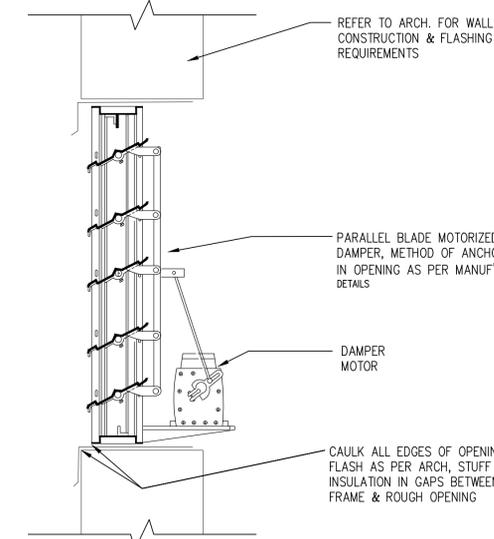
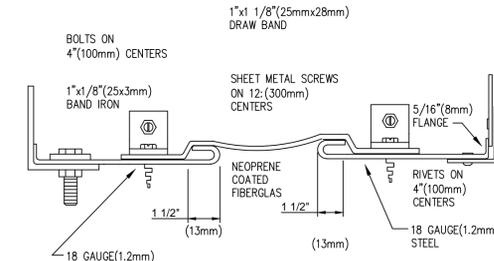
**MECHANICAL EQUIPMENT SCHEDULES:**

EQUIPMENT THAT IS SUPPLIED WITH A FACTORY-INSTALLED DISCONNECTING MEANS FOR THE CONNECTION OF THE SUPPLY SIDE FEEDER CONDUCTORS MUST BE CERTIFIED SO THAT THESE CONDUCTORS CAN BE OF EITHER ALUMINUM OR COPPER.

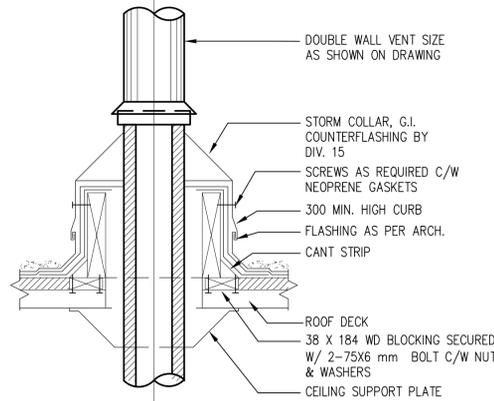
MECHANICAL AND ELECTRICAL SUBCONTRACTORS ARE RESPONSIBLE FOR THE MUTUAL COORDINATION OF ALL ELECTRICAL REQUIREMENTS OF MECHANICAL EQUIPMENT. COORDINATION IS TO INCLUDE THE COMMUNICATION OF ALL FINAL ELECTRICAL NAMEPLATE INFORMATION FROM THE MECHANICAL SUBCONTRACTOR TO THE ELECTRICAL SUBCONTRACTOR, THE COMMUNICATION OF THE DETAILED CONTROL INFORMATION AS WELL AS ANY ANCILLARY INFORMATION REQUIRED FOR THE FINAL SYSTEMS TO OPERATE AS INTENDED BY THE RESPONSIBLE PROFESSIONAL ENGINEER. THE COORDINATION IS TO OCCUR PRIOR TO THE ORDERING OF EQUIPMENT BY EITHER TRADE. NO EXTRA COMPENSATION WILL BE ALLOWED DUE TO FAILURE TO CARRY OUT THIS COORDINATION. REPORT AT ONCE TO THE CONTRACT ADMINISTRATOR ANY DEFECT, DISCREPANCY, OMISSION OR INTERFERENCE AFFECTING THE SATISFACTORY COMPLETION OF WORK.



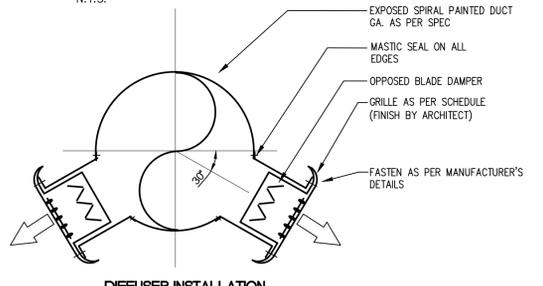
**DUCT CONNECTION DETAILS**  
N.T.S.



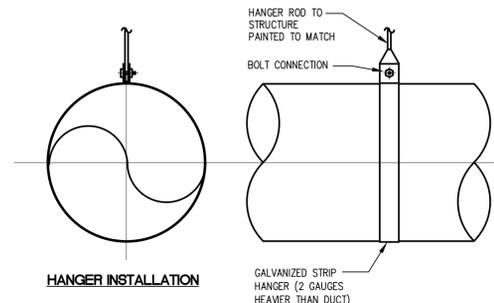
**MOTORIZED DAMPER DETAIL**  
N.T.S.



**CHIMNEY THROUGH ROOF DETAIL**  
N.T.S.

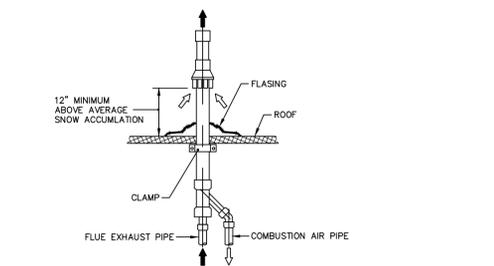


**DIFFUSER INSTALLATION**



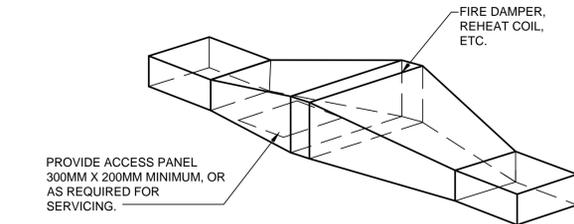
**HANGER INSTALLATION**

**TYPICAL EXPOSED ROUND DUCT INSTALLATION**  
N.T.S.

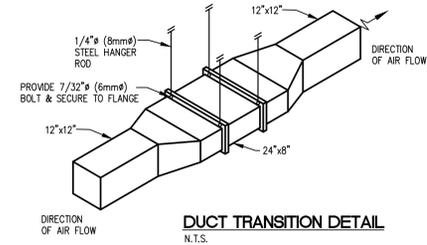


**CONCENTRIC FLAT ROOF TERMINATION INSTALLATION DETAIL**  
N.T.S.

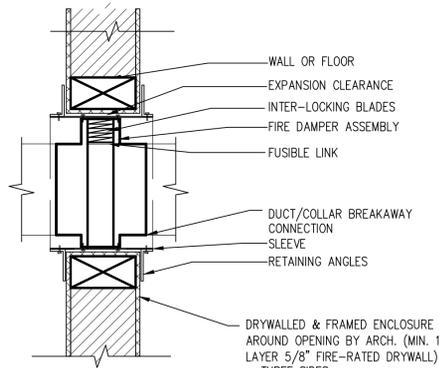
(TYPICAL FOR HIGH EFFICIENCY GAS FURNACES)



**ACCESS DOOR DETAIL**  
N.T.S.



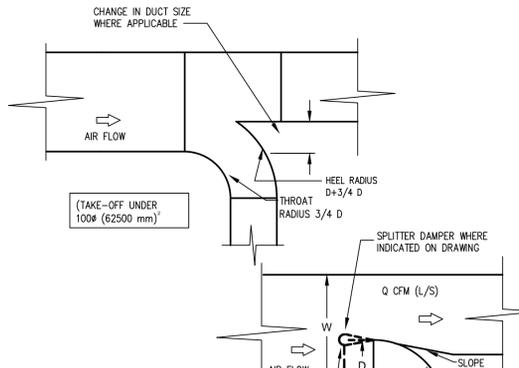
**DUCT TRANSITION DETAIL**  
N.T.S.



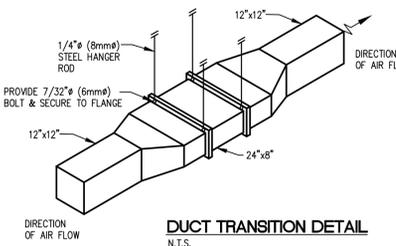
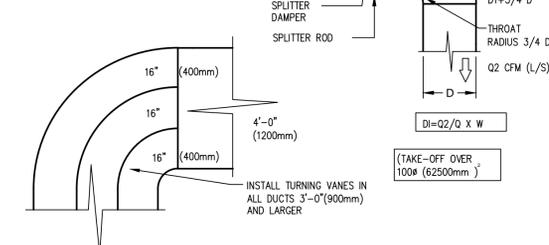
**TYPE 'B' FIRE DAMPER DETAIL**  
N.T.S.

NOTES:  
FIRE DAMPER TO BE INSTALLED AS PER MANUFACTURER'S RECOMMENDATION.

DUCT/COLLAR BREAKAWAY CONNECTION TO BE APPROVED.



**DUCT CONSTRUCTION DETAILS**  
N.T.S.



**DUCT TRANSITION DETAIL**  
N.T.S.

0	CONSTRUCTION	JHG	2016.08.17
No.	REVISION	BY	DATE

THIS DRAWING MUST NOT BE SCALED

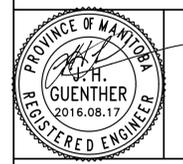
CONSULTANT

**NOVA 3 ENGINEERING LTD.**  
CONSULTING ENGINEERS  
201-120 FORT STREET TEL: (204) 943-6142  
WINNIPEG, MANITOBA R3C 1C7 FAX: (204) 942-1276  
WWW.NOVA3.CA JN: 36-083

THIS DRAWING IS THE EXCLUSIVE PROPERTY OF NOVA 3 ENGINEERING LTD. AND MAY ONLY BE REPRODUCED WITH THE WRITTEN PERMISSION OF NOVA 3 ENGINEERING LTD.

THE CONCEPT AND DESIGN INCORPORATED INTO THIS DRAWING ARE BASED ON INFORMATION PROVIDED BY THE CLIENT AND OTHER RELATED SOURCES. PROFESSIONAL ENGINEER ACCEPTS NO RESPONSIBILITY FOR DRAWING AND DESIGN UNLESS DRAWING IS ACCOMPANIED BY ORIGINAL SEALED LETTER OF INTENT OR EQUIVALENT ACCEPTABLE FACSIMILE. PROFESSIONAL ENGINEER ACCEPTS NO RESPONSIBILITY FOR FINAL INSTALLATION CONFORMANCE WITHOUT ORIGINAL SEALED CERTIFICATE OF INSPECTION OR EQUIVALENT ACCEPTABLE FACSIMILE.

CONSULTANT



LOCATION

**ST. VITAL ARENA**  
580 ST. ANNE'S RD  
WINNIPEG, MANITOBA

DRAWING  
**MECHANICAL SPECIFICATIONS CONTINUED**

DESIGNED BY	APPROVED BY
SJ	JHG
DRAWN BY	
SJ	
DATE	SCALE
2016/08/17	AS NOTED
PROJECT	DWG No.
36-083M	<b>M3.1</b>