Cleveland Clinic

**Cleveland Clinic Standard Design Details: Division 23 - Mechanical**

The following pages contain standard details for the design and construction of new and renovated facilities at all domestic Cleveland Clinic locations. They shall be used by A/E firms in the preparation of drawings and specifications for construction of facilities.

The general purpose of each Detail is to provide the preferred method for installation of construction materials and equipment at Cleveland Clinic facilities regarding Codes and FM Global compliance, execution and uniformity.

These Details are to be used as a part of Mechanical Bid and Construction documents. They are intended to be used to address system design aspects of equipment and materials that Cleveland Clinic desires to standardize among facilities, and identify prohibited materials and construction practices.

The use of these Details is mandatory for all design or maintenance projects. Deviations are discouraged. If project conditions arise which require a deviation, it shall be thoroughly documented by the user and submitted to Cleveland Clinic for review and approval using the Design Standards Revision Request document. Additionally, all Cleveland Clinic staff, architects, engineers, and contractors are encouraged to participate in the ongoing development of these guidelines by communicating any suggestions by use of the Revision Request document.

The Detail Drawings are in AutoCad format and categorized by system.

*****
I. NOTES

a. NOTES – DETAILS FILE NOTES
b. NOMENCLATURE – EQUIPMENT TAG W/ ID. NOMENCLATURE

II. MECHANICAL DETAILS

a. M-001 COOLING COIL CONDENSATE TRAP WITH POSITIVE PRESSURE
b. M-002 COOLING COIL CONDENSATE TRAP WITH NEGATIVE PRESSURE
c. M-003 CHILLED WATER COIL PIPING DETAIL, 2-WAY VALVE
d. M-004 AIR SEPARATOR EXPANSION TANKS AND MAKE-UP WATER PIPING SCHEMATIC
e. M-005 END SUCTION PUMP DETAIL
f. M-006 RADIANT PANEL COIL PIPING DETAIL
g. M-007 MULTIPLE COIL PIPING DETAIL
h. M-008 HORIZONTAL FIRE DAMPER DETAIL
i. M-009 VERTICAL FIRE DAMPER DETAIL
j. M-010 FIRE DAMPER – (3 HR. RATED)
k. M-011 COMBINATION FIRE-SMOKE DAMPER (PACKAGED UNITS)
l. M-012 TYPICAL DIFFUSER DETAIL
m. M-013 LINEAR DIFFUSER DETAIL
n. M-014 DUCTWORK BRANCH CONNECTIONS DETAILS
o. M-015 PIPE GUIDE FOR INSULATED PIPE DETAIL
p. M-016 RIGID INSULATION HANGER DETAIL
q. M-017 INSULATED PIPE ON CLEVIS HANGER
r. M-018 TYPICAL AIR HANDLING UNIT DIAGRAM
s. M-019 COOLING PLANT CONTROL DIAGRAM
t. M-020 TYPICAL VARIABLE FREQUENCY DRIVE CONTROL SAFETIES WIRING DIAGRAM - SERIES

** End of List **
NOTES

1. FILE NAME: CLEVELAND CLINIC MECHANICAL DETAILS.DWG

2. FORMAT: AUTOCAD VERSION: 2010 (R18)

3. SCALE IS BASED ON TEXT HEIGHT. THE STANDARD TEXT HEIGHT IS 3/32". SCALE BY DWG SCALE FACTOR FOR USE IN OTHER THAN FULL SCALE VIEWPORTS. I.E. SCALE BY 96 FOR USE IN 1/8"=1'-0" VIEW (1=96). TYPICAL DETAIL DRAWINGS ARE NOT TO SCALE.

---

**THIS DETAIL ILLUSTRATES INSTALLATION METHODS PREFERRED BY THE CLEVELAND CLINIC AND IS PROVIDED TO THE A/E AS A BASIS FOR THE DEVELOPMENT OF CONTRACT DOCUMENTS. THE A/E MUST DETERMINE SUITABILITY OF THIS DETAIL IN WHOLE OR PART AND SHALL EDIT AS REQUIRED TO COORDINATE WITH SPECIFIC PROJECT REQUIREMENTS. ANY DEVIATIONS FROM THE ILLUSTRATED PREFERRED METHOD MUST BE REQUESTED IN WRITING BY THE PROPOSER FOR REVIEW BY THE CLEVELAND CLINIC**
EQUIPMENT TAGS
WITH LOCATION ID.
NOMENCLATURE

1. MECHANICAL EQUIPMENT TAG NOMENCLATURE

EXAMPLE:

AHU-J 7-01

SEQUENCE NUMBER
FLOOR NUMBER (OR "ROOF")
BUILDING LETTER
TAG:

AHU— AIR HANDLING UNIT
EF— EXHAUST FAN
VAV— VARIABLE AIR VOLUME TERMINAL BOX UNIT
FPVAV— FAN POWERED VARIABLE AIR VOLUME TERMINAL BOX UNIT

**THIS DETAIL ILLUSTRATES INSTALLATION METHODS PREFERRED BY THE CLEVELAND CLINIC AND IS PROVIDED TO THE A/E AS A BASIS FOR THE DEVELOPMENT OF CONTRACT DOCUMENTS. THE A/E MUST DETERMINE SUITABILITY OF THIS DETAIL IN WHOLE OR PART AND SHALL EDIT AS REQUIRED TO COORDINATE WITH SPECIFIC PROJECT REQUIREMENTS. ANY DEVIATIONS FROM THE ILLUSTRATED PREFERRED METHOD MUST BE REQUESTED IN WRITING BY THE PROPOSER FOR REVIEW BY THE CLEVELAND CLINIC**
NOTES:

1. LOCATE TRAP AS CLOSE AS POSSIBLE TO AHU DRAIN OUTLET WITH BOTTOM BELOW SUPPORT STRUCTURE.

2. SIZE OF TRAP PIPING TO BE LARGER OF EQUIPMENT OUTLET SIZE OR DIMENSION ON PLANS.

3. SEE SPECIFICATIONS FOR INSULATION REQUIREMENTS.

4. NOTIFY ENGINEER BEFORE FABRICATING IF PHYSICAL CONDITIONS PROHIBIT INSTALLATION OF DEPTH SHOWN.

**THIS DETAIL ILLUSTRATES INSTALLATION METHODS PREFERRED BY THE CLEVELAND CLINIC AND IS PROVIDED TO THE A/E AS A BASIS FOR THE DEVELOPMENT OF CONTRACT DOCUMENTS. THE A/E MUST DETERMINE SUITABILITY OF THIS DETAIL IN WHOLE OR PART AND SHALL EDIT AS REQUIRED TO COORDINATE WITH SPECIFIC PROJECT REQUIREMENTS. ANY DEVIATIONS FROM THE ILLUSTRATED PREFERRED METHOD MUST BE REQUESTED IN WRITING BY THE PROPOSER FOR REVIEW BY THE CLEVELAND CLINIC**
PLUGGED TEE CLEANOUT (TYP.)

DIELECTRIC UNION

UNIT DRAIN PAN

PITCH DN. TOWARD DRAIN

CASING PRESSURE = 4 IN WC (NEGATIVE)

X = 1/2 X H

H = 1 INCH + CASING PRESSURE

NOTES:

1. LOCATE TRAP AS CLOSE AS POSSIBLE TO AHU DRAIN OUTLET WITH BOTTOM BELOW SUPPORT STRUCTURE.

2. SIZE OF TRAP PIPING TO BE LARGER OF EQUIPMENT OUTLET SIZE OR DIMENSION ON PLANS.

3. SEE SPECIFICATIONS FOR INSULATION REQUIREMENTS.

4. NOTIFY ENGINEER BEFORE FABRICATING IF PHYSICAL CONDITIONS PROHIBIT INSTALLATION OF DEPTH SHOWN.

**THIS DETAIL ILLUSTRATES INSTALLATION METHODS PREFERRED BY THE CLEVELAND CLINIC AND IS PROVIDED TO THE A/E AS A BASIS FOR THE DEVELOPMENT OF CONTRACT DOCUMENTS. THE A/E MUST DETERMINE SUITABILITY OF THIS DETAIL IN WHOLE OR PART AND SHALL EDIT AS REQUIRED TO COORDINATE WITH SPECIFIC PROJECT REQUIREMENTS. ANY DEVIATIONS FROM THE ILLUSTRATED PREFERRED METHOD MUST BE REQUESTED IN WRITING BY THE PROPOSER FOR REVIEW BY THE CLEVELAND CLINIC**
**This detail illustrates installation methods preferred by the Cleveland Clinic and is provided to the A/E as a basis for the development of contract documents. The A/E must determine suitability of this detail in whole or part and shall edit as required to coordinate with specific project requirements. Any deviations from the illustrated preferred method must be requested in writing by the proposer for review by the Cleveland Clinic.**

**NOTE:**
Multiple coil arrangements shall have test plugs and unions on each coil connection, a balancing valve on each return connection and an shut off valve on each supply. Provide butterfly valves with memory stop on pipe sizes 2-1/2" and larger.

---

**Cleveland Clinic**
9500 Euclid Avenue / Cleveland, Ohio 44195
tel:216 / fax:216
www.ccf.org/

**Date:** 04/19/2012
**Scale:** INSERT AT SCALE: 1" = 1"
**Discipline:** M
**Sketch:** 003

---

**Title:** CHILLED WATER COIL PIPING DETAIL 2-WAY VALVE
**This detail illustrates installation methods preferred by the Cleveland Clinic and is provided to the A/E as a basis for the development of contract documents. The A/E must determine suitability of this detail in whole or part and shall edit as required to coordinate with specific project requirements. Any deviations from the illustrated preferred method must be requested in writing by the proposer for review by the Cleveland Clinic.**

Title: AIR SEPARATOR EXPANSION TANK AND MAKE-UP WATER PIPING SCHEMATIC

Date: 04/08/2011

Scale: INSERT AT SCALE: 1" = 1"

Discipline: M

Sketch: 004
BALL VALVE

3/4" DRAIN BALL VALVE WITH CAPPED HOSE THREAD END

PRESSURE GAUGE WITH GAUGE COCK (TYP.)

SUCTION DIFFUSER

FULL SIZED BLOWDOWN LINE WITH UNION AT SUCTION DIFFUSER CONNECTION, BALL VALVE AND CAPPED HOSE THREAD END

1-1/4" PIPE LEG WITH ADJUSTABLE FOOT

MOUNT PUMP ON 4" HIGH CONCRETE PAD

BUTTERFLY VALVE, TYP

SHOT TYPE CHEMICAL FEEDER

CHECK VALVE

THROTTLE VALVE

FLEXIBLE CONNECTION (TYP.)

REDUCER/INCREASER (TYP.)

**THIS DETAIL ILLUSTRATES INSTALLATION METHODS PREFERRED BY THE CLEVELAND CLINIC AND IS PROVIDED TO THE A/E AS A BASIS FOR THE DEVELOPMENT OF CONTRACT DOCUMENTS. THE A/E MUST DETERMINE SUITABILITY OF THIS DETAIL IN WHOLE OR PART AND SHALL EDIT AS REQUIRED TO COORDINATE WITH SPECIFIC PROJECT REQUIREMENTS. ANY DEVIATIONS FROM THE ILLUSTRATED PREFERRED METHOD MUST BE REQUESTED IN WRITING BY THE PROPOSER FOR REVIEW BY THE CLEVELAND CLINIC.**

---

**END SUCTION PUMP DETAIL**

**DISCIPLINE:** M

**DATE:** 04/19/2012

**SCALE:** INSERT AT SCALE: 1" = 1"

**SKETCH:** 005
**THIS DETAIL ILLUSTRATES INSTALLATION METHODS PREFERRED BY THE CLEVELAND CLINIC AND IS PROVIDED TO THE A/E AS A BASIS FOR THE DEVELOPMENT OF CONTRACT DOCUMENTS. THE A/E MUST DETERMINE SUITABILITY OF THIS DETAIL IN WHOLE OR PART AND SHALL EDIT AS REQUIRED TO COORDINATE WITH SPECIFIC PROJECT REQUIREMENTS. ANY DEVIATIONS FROM THE ILLUSTRATED PREFERRED METHOD MUST BE REQUESTED IN WRITING BY THE PROPOSER FOR REVIEW BY THE CLEVELAND CLINIC.**

---

**Title:** RADIANT PANEL COIL PIPING DETAIL

**Date:** 04/08/2011

**Scale:** INSERT AT SCALE: 1” = 1”
NOTES:
1.) BUTTERFLY VALVES SHALL BE USED IN SUPPLY RUNOUT PIPING WHERE PIPE SIZE IS 2-1/2" OR LARGER.
2.) BALL VALVES SHALL BE USED IN SUPPLY RUNOUT PIPING WHERE PIPE SIZE IS 2" OR SMALLER.
3.) PIPING INSTALLATION SHALL ALLOW FOR EQUIPMENT ACCESS AND COIL PULL.
4.) COIL SUPPLY AND RETURN HEADER PIPING SHALL BE FULL SIZE UNLESS INDICATED OTHERWISE.
5.) SCHEMATIC INDICATES TWO COILS, WHERE AIR HANDLING UNITS HAVE MORE THAN TWO COILS, PROVIDE VALVING, GAUGES AND THERMOMETERS FOR EACH ADDITIONAL COIL.

**THIS DETAIL ILLUSTRATES INSTALLATION METHODS PREFERRED BY THE CLEVELAND CLINIC AND IS PROVIDED TO THE A/E AS A BASIS FOR THE DEVELOPMENT OF CONTRACT DOCUMENTS. THE A/E MUST DETERMINE SUITABILITY OF THIS DETAIL IN WHOLE OR PART AND SHALL EDIT AS REQUIRED TO COORDINATE WITH SPECIFIC PROJECT REQUIREMENTS. ANY DEVIATIONS FROM THE ILLUSTRATED PREFERRED METHOD MUST BE REQUESTED IN WRITING BY THE PROPOSER FOR REVIEW BY THE CLEVELAND CLINIC**

Cleveland Clinic
9500 Euclid Avenue
Cleveland, Ohio 44195

tel:216______ fax:216______
www.ccf.org/______

MULTIPLE COIL PIPING DETAIL

04/08/2011

INSERT AT SCALE: 1" = 1"

007
ACCESS DOOR - LOCATE AT DAMPER TO ALLOW
RESETING OF LINK - SEE ACCESS DOOR DETAIL FOR
SCHEDULE OF SIZES

1/4" 20 N.C. HEX HD.
SELF-TAPPING SHEET METAL SCREW.

PREPARED OPENING CLEARANCE 1/8" PER
FOOT OF DUCT WIDTH OR HEIGHT
WITH A MIN. OF 1/4"
TOP AND SIDES.

FIN. FLR.

SLEEVE - 14GA.
MINIMUM

1/4" 20 N.C. HEX HD.
SELF-TAPPING SHEET METAL SCREW.

PREPARED OPENING CLEARANCE 1/8" PER
FOOT OF DUCT WIDTH OR HEIGHT
WITH A MIN. OF 1/4"
TOP AND SIDES.

FIN. FLR.

SLEEVE - 14GA.
MINIMUM

1-1/2" x 1/8"
MIN. ANGLE FRAME
(TYPICAL). DO NOT
SECURE TO OPENING
(ANGLE TO OVERLAP
OPENING MIN. OF 1")

FIRE DAMPER
FUSIBLE LINK
BREAKAWAY JOINT "S" TYPE TOP AND
BOTTOM DRIVES ON SIDES (USE STANDING "S"
JOINTS ON DUCTS ABOVE 36" WIDE)

SECURE DAMPER TO SLEEVE WITH
POP RIVETS OR BY WELDING IN
MOUNTING HOLES IN DAMPER.

**THIS DETAIL ILLUSTRATES INSTALLATION METHODS PREFERRED BY THE CLEVELAND CLINIC AND IS PROVIDED TO THE A/E AS A BASIS FOR THE DEVELOPMENT OF CONTRACT DOCUMENTS. THE A/E MUST DETERMINE SUITABILITY OF THIS DETAIL IN WHOLE OR PART AND SHALL EDIT AS REQUIRED TO COORDINATE WITH SPECIFIC PROJECT REQUIREMENTS. ANY DEVIATIONS FROM THE ILLUSTRATED PREFERRED METHOD MUST BE REQUESTED IN WRITING BY THE PROPOSER FOR REVIEW BY THE CLEVELAND CLINIC**
1-1/2" x 1-1/2" x 1/8" MIN.
ANGLE FRAME (TYPICAL)
DO NOT SECURE TO
OPENING FRAMING
(ANGLE TO OVERLAP
OPENING MIN. OF 1")

FIRE DAMPER
CURTAIN TYPE

FIRE PARTITION

PREPARED OPENING CLEARANCE
1/8" PER FOOT OF DUCT WIDTH
OR HEIGHT WITH A MIN. OF
1/4" TOP AND SIDES.

SLEEVE
14 GA. MIN.

FUSIBLE LINK

FIRE DAMPER
(CURTAIN TYPE)

BREAKAWAY JOINT "S"
TYPE TOP AND BOTTOM
DRIVES ON SIDES
(USE STANDING "S"
JOINTS ON DUCTS
ABOVE 36" WIDE)

SECURE DAMPER TO SLEEVE
WITH POP RIVETS OR BY
WELDING IN MOUNTING
HOLES IN DAMPER.

ACCESS DOOR - LOCATE
AT DAMPER TO ALLOW
RESETTING OF LINK
SEE ACCESS DOOR DETAIL
FOR SCHEDULE OF SIZES

1/4"-20 N.C. HEX
HEAD SELF-TAPPING
SHEET METAL SCREW
OR 1/8" POP RIVET

**THIS DETAIL ILLUSTRATES INSTALLATION METHODS PREFERRED BY THE CLEVELAND CLINIC AND IS PROVIDED TO THE A/E AS A BASIS FOR THE DEVELOPMENT OF CONTRACT DOCUMENTS. THE A/E MUST DETERMINE SUITABILITY OF THIS DETAIL IN WHOLE OR PART AND SHALL EDIT AS REQUIRED TO COORDINATE WITH SPECIFIC PROJECT REQUIREMENTS. ANY DEVIATIONS FROM THE ILLUSTRATED PREFERRED METHOD MUST BE REQUESTED IN WRITING BY THE PROPOSER FOR REVIEW BY THE CLEVELAND CLINIC**
**THIS DETAIL ILLUSTRATES INSTALLATION METHODS PREFERRED BY THE CLEVELAND CLINIC AND IS PROVIDED TO THE A/E AS A BASIS FOR THE DEVELOPMENT OF CONTRACT DOCUMENTS. THE A/E MUST DETERMINE SUITABILITY OF THIS DETAIL IN WHOLE OR PART AND SHALL EDIT AS REQUIRED TO COORDINATE WITH SPECIFIC PROJECT REQUIREMENTS. ANY DEVIATIONS FROM THE ILLUSTRATED PREFERRED METHOD MUST BE REQUESTED IN WRITING BY THE PROPOSER FOR REVIEW BY THE CLEVELAND CLINIC**
NOTE:
1. SPECIAL CONDITIONS THAT CANNOT MEET ONE OF THESE STANDARDS SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION ON A CASE BY CASE BASIS.

**THIS DETAIL ILLUSTRATES INSTALLATION METHODS PREFERRED BY THE CLEVELAND CLINIC AND IS PROVIDED TO THE A/E AS A BASIS FOR THE DEVELOPMENT OF CONTRACT DOCUMENTS. THE A/E MUST DETERMINE SUITABILITY OF THIS DETAIL IN WHOLE OR PART AND SHALL EDIT AS REQUIRED TO COORDINATE WITH SPECIFIC PROJECT REQUIREMENTS. ANY DEVIATIONS FROM THE ILLUSTRATED PREFERRED METHOD MUST BE REQUESTED IN WRITING BY THE PROPOSER FOR REVIEW BY THE CLEVELAND CLINIC**

Cleveland Clinic
9500 Euclid Avenue
Cleveland, Ohio 44195
www.cdf.org

TITLE: TYPICAL DIFFUSER DETAILS
DISCIPLINE: M
DATE: 04/19/2012
SCALE: INSERT AT SCALE: 1" = 1"
**THIS DETAIL ILLUSTRATES INSTALLATION METHODS PREFERRED BY THE CLEVELAND CLINIC AND IS PROVIDED TO THE A/E AS A BASIS FOR THE DEVELOPMENT OF CONTRACT DOCUMENTS. THE A/E MUST DETERMINE SUITABILITY OF THIS DETAIL IN WHOLE OR PART AND SHALL EDIT AS REQUIRED TO COORDINATE WITH SPECIFIC PROJECT REQUIREMENTS. ANY DEVIATIONS FROM THE ILLUSTRATED PREFERRED METHOD MUST BE REQUESTED IN WRITING BY THE PROPOSER FOR REVIEW BY THE CLEVELAND CLINIC.**

**TITLE:** LINEAR DIFFUSER DETAIL

**DATE:** 04/19/2012

**SCALE:** INSERT AT SCALE: 1" = 1"

**SKETCH:** 012
**THIS DETAIL ILLUSTRATES INSTALLATION METHODS PREFERRED BY THE CLEVELAND CLINIC AND IS PROVIDED TO THE A/E AS A BASIS FOR THE DEVELOPMENT OF CONTRACT DOCUMENTS. THE A/E MUST DETERMINE SUITABILITY OF THIS DETAIL IN WHOLE OR PART AND SHALL EDIT AS REQUIRED TO COORDINATE WITH SPECIFIC PROJECT REQUIREMENTS. ANY DEVIATIONS FROM THE ILLUSTRATED PREFERRED METHOD MUST BE REQUESTED IN WRITING BY THE PROPOSER FOR REVIEW BY THE CLEVELAND CLINIC.**

**DUCTWORK BRANCH CONNECTION DETAILS**

<table>
<thead>
<tr>
<th>TITLE:</th>
<th>DISCIPLINE:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DUCTWORK BRANCH CONNECTION DETAILS</strong></td>
<td><strong>M</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DATE:</th>
<th>SCALE:</th>
<th>SKETCH:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>04/19/2012</strong></td>
<td><strong>INSERT AT SCALE: 1&quot; = 1&quot;</strong></td>
<td><strong>013</strong></td>
</tr>
</tbody>
</table>
NOTE: SEE PIPE GUIDE SUPPORT
NOTE: WHERE THIS DETAIL IS USED FOR COLD PIPING, RIGID INSULATION AND COVERING SHALL BE SEALED TO PROVIDE CONTINUOUS VAPOR BARRIER.

**THIS DETAIL ILLUSTRATES INSTALLATION METHODS PREFERRED BY THE CLEVELAND CLINIC AND IS PROVIDED TO THE A/E AS A BASIS FOR THE DEVELOPMENT OF CONTRACT DOCUMENTS. THE A/E MUST DETERMINE SUITABILITY OF THIS DETAIL IN WHOLE OR PART AND SHALL EDIT AS REQUIRED TO COORDINATE WITH SPECIFIC PROJECT REQUIREMENTS. ANY DEVIATIONS FROM THE ILLUSTRATED PREFERRED METHOD MUST BE REQUESTED IN WRITING BY THE PROPOSER FOR REVIEW BY THE CLEVELAND CLINIC**
TYP CLEVIS HANGER
(SPACE AS PER SPEC)

HEAVY DUTY PIPE INSULATION

180° INSULATION PROTECTION SADDLE

NOTE: PROVIDE REQUIRED TAPERED BLOCK REINFORCEMENT OR PIPE PROTECTION SADDLE AS REQUIRED BY MANUFACTURER AND AS SPECIFIED.