3.0 DFCM REQUIREMENTS

High Temperature Hot Water System

DETAIL DRAWINGS

DFCM DESIGN MANUAL
UNIVERSITY OF UTAH SUPPLEMENT

January 15, 2016
GENERAL INTRODUCTION TO THE UNIVERSITY OF UTAH SUPPLEMENT:

The DFCM Design Manual “Design Requirements” (State of Utah, Department of Administrative Services, Division of Facilities Construction and Management, referred to herein as “DFCM Manual” or “Manual”) dated June 11, 2009 including highlighted updates is the basis for A/E design services provided for all University of Utah projects.

This document accepts the DFCM Manual as the University of Utah standard, and supplements the Manual with requirements which are needed to satisfy University organization and mission objectives.

REVISIONS SUMMARY
for the University of Utah Supplement:

<table>
<thead>
<tr>
<th>REVISION DATE</th>
<th>LOCATION</th>
<th>SUMMARY OF CHANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>06 January 2012</td>
<td>- - -</td>
<td>University Design Standards. The former University Design Standards Chapters 1 through 12 were reformatted and re-issued as the U of U Supplement to the DFCM Design Manual.</td>
</tr>
<tr>
<td>02 July 2010</td>
<td>HTW-8</td>
<td>Space Heating Converter. Added socket weld fittings</td>
</tr>
<tr>
<td>02 July 2010</td>
<td>HTW-9</td>
<td>Hot Water Generator. Added socket weld fittings</td>
</tr>
</tbody>
</table>
3.0 DESIGN REQUIREMENTS

3.5 DFCM REQUIREMENTS

3.5 Mechanical Part 3 Detail Drawings: High Temperature Hot Water System

<table>
<thead>
<tr>
<th>DRAWING NUMBER</th>
<th>TITLE / DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTW-1</td>
<td>HTHW System, Domestic Hot Water Converter Schematic</td>
</tr>
<tr>
<td>HTW-2</td>
<td>Typical HTW Steam Generator</td>
</tr>
<tr>
<td>HTW-3</td>
<td>Typical Level Control for Steam Generator</td>
</tr>
<tr>
<td>HTW-4</td>
<td>Piping Schematic (Sheet 1)</td>
</tr>
<tr>
<td>HTW-5</td>
<td>Piping Schematic (Sheet 2)</td>
</tr>
<tr>
<td>HTW-6</td>
<td>Pressure Metering Installations</td>
</tr>
<tr>
<td>HTW-7</td>
<td>Cross Section Typical HTW Converter</td>
</tr>
<tr>
<td>HTW-8</td>
<td>Typical HTW Space Heating Converter</td>
</tr>
<tr>
<td>HTW-9</td>
<td>HTW Domestic Hot Water Generator</td>
</tr>
<tr>
<td>HTW-10</td>
<td>Thermometer Well Detail</td>
</tr>
<tr>
<td>HTW-11</td>
<td>Visible Drain Funnels</td>
</tr>
<tr>
<td>HTW-12</td>
<td>Typical HTW Service Entrance</td>
</tr>
<tr>
<td>HTW-13</td>
<td>Wall Entry Detail</td>
</tr>
<tr>
<td>HTW-14</td>
<td>HTW Insulated Envelope Detail</td>
</tr>
<tr>
<td>HTW-15</td>
<td>HTW Pipe Guides &amp; Pipe Support Detail</td>
</tr>
<tr>
<td>HTW-16</td>
<td>Typical HTW Anchor Detail</td>
</tr>
<tr>
<td>HTW-17</td>
<td>Heat Dissipation Plate at Ductbank Crossover</td>
</tr>
<tr>
<td>HTW-18</td>
<td>Air Vent Detail</td>
</tr>
</tbody>
</table>
HOT WATER SUPPLY TO BLDG.

RECIRCULATION PUMP

TEMP. INDICATOR

HIGH AND LOW ALARM SENSORS

BYPASS N.C.

HOT WATER STORAGE TANK

HOT WATER STORAGE TANK

HOT WATER STORAGE TANK

H.T.W. SUPPLY

H.T.W. RETURN

TEMP. CONTROL

TEMP. IND. G1

EMP. SENS. > J

INST. T. EQUUS TYPE
DOMESTIC HOT WATER CONVERTER

COLD WATER FEED

HOT WATER RETURN FROM BLDG.

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NOTES:

1. BONNET FLANGES 600 LB. ANSI.
2. RADIAL FLANGE HTW SUPPLY & RETURN 600 LBS. ANSI.
3. DRAIN CONNECTION AS REQUIRED.
4. VENT CONNECTIONS AS REQUIRED.
5. TUBE SUPPORTS AS REQUIRED.
6. TRACK & TRACK SUPPORTS.
7. TUBE PASS PARTITIONS AS REQUIRED (GASKETED).
8. TUBE SHEET.
9. TUBE BUNDLE.
10. SHELL.
11. WATER INLET & DISTRIBUTION PIPE (BUTT WELD).
12. SPLASH BAFFLE IF REQUIRED.
13. SEPARATOR.
14. CRADLE MAKE PROVISIONS FOR EXPANSION OF UNIT.
15. CONCRETE OR STRUCTURAL SUPPORT PIER.
16. MINIMUM 11"x15" MANHOLE.
17. ROLLED 3"x3"x1/4" L INSULATION RING. WELD BOTTOM HALF CONTINUOUS.
   TOP HALF 2" IN 4" TO SHELL.
18. STEAM OUTLET CONNECTION. MINIMUM 150 LB. ANSI.
19. SLOWDOWN CONNECTION (BUTT WELD).
20. SAFETY VALVE CONNECTION.
21. COUPLING FOR PRESSURE CONTROL.
22. COUPLING FOR PRESSURE GAGE.
23. COUPLING FOR CHEMICAL FEED.
24. COUPLING FOR CONTINUOUS SLOWDOWN.
25. COUPLING FOR WATER COLUMN.
26. COUPLING FOR WATER LEVEL CONTROL.
27. COUPLING FOR HIGH LEVEL CONTROL.
28. COUPLING FOR LOW LEVEL CONTROL.
29. COUPLING FOR VENT CONNECTION.
30. FOR MATERIAL TO BE USED SEE SPECIFICATION.
31. FOR INSULATION OF UNIT SEE SPECIFICATION.
32. FOR PAINT SEE SPECIFICATION.
33. FOR REQUIRED DESIGN & TEST Pressures and Design Temperatures, See Specifications.
34. SHOW DIMENSION FOR SPACE REQUIRED TO REMOVE BUNDLE.
35. STEAM SPACE TO OCCUPY 551 VOLUME OF SHELL.
FLOAT CAGE FOR LEVEL CONTROL, HIGH & LOW WATER LEVEL CONTROLS, ALARM SWITCHES, ETC.

PLUG <TYPICAL) GLOBE DRAIN VALVE. 

EXTEND TO EQUIPMENT DRAIN. <DWG. NO. HTW-8)

SINGLE POST

NOTE:
PIPE SIZES SHALL SUIT FLOAT CAGES & SWITCHES.

FLOAT CAGE FOR LEVEL CONTROL, HIGH & LOW WATER LEVEL CONTROLS, ALARM SWITCHES, ETC.

PLUG <TYPICAL) 

UNIONS.

GLOBE DRAIN VALVE. 

EXTEND TO EQUIPMENT DRAIN. <DWG. NO. HTW-8)

MULTIPLE FLOATS FOR SAME TANK CONNECTIONS
NOTES:

1. HTW STEAM GENERATOR.
2. CONDENSATE TANK.
3. CHEMICAL FEED TANK & PUMP, SEE SPECIFICATIONS
4. WATER SOFTENER.
5. BRINE & SALT STORAGE TANK.
6. 31g00W ON.
7. HIGH LEVEL CUT OFF & ALARM.
8. WATER LEVEL CONTROL CYCLES PUMPS.
9. LOW LEVEL CUT OFF & ALARM.
10. MAX VP CONTROL & VALVE.
11. LOW LEVEL PUMP CONTROL.
12. WATER METER.

1. DOUBLE VALVE VENTS & DRAINTS INSTALLED ON ALL STEAM GENERATOR HEAOS & PFWG AS REQUIRED FOR PROPER VENTING & DRAINING. 0.10" LONG NIPPLE WITH PHAIN (N) INTO VALVE. DISCHARGE END OF NIPPLE TO HAVE MALE PIPE THREAD.

14. DOUBLE VALVED W/ 3" LONG NIPPLE WITH PHAIN END INTO VALVE DISCHARGE END OF NIPPLE TO HAVE MALE PIPE THREAD.

15. SPECIES 100 SPECIAL VALVES.
16. SHUT-OFF VALVE OR NON-RETURN VALVE & MORE THAN ONE HTW STEAM GENERATOR CONNECTED IN PARALLEL.
17. VALVED DRAINS AT LOW POINTS (EXTEND TO DRAIN).
18. DRAIN ELBOWS WITH OR NIPPLE.
19. FEED PUMPS, PROVIDE 101 MD BY AS P(1 E.O.,
20. AUTOMATIC CONTINUOUS SLOWDOWN, SEE SPECIFICATIONS.
21. TEMPERATURE REGULATOR.

22. SAMPLE CONNECTION.
23. REEK OR ORIFICE TO SUIT TYPE PUUP FURNISHED.
24. RETURN TO CHEMICAL HEAOS TANK.
25. PRESSURE RANGE, STRAIGHT RUN OF PIPE FOR PROPER PRESSURE MEASUREMENT AT ORIFICE PLATE.
27. ORIFICE LOW VALVE DRAIN EXTEND TO DRAIN FILL.
28. PRESSURE CONTROLLER.
29. ROAST CAGE SIGHT GLASS ASSEMBLY.
30. PROVIDE TEMPERATURE WEBS & OTHER SENSING POINTS FOR CENTRAL CONTROL SYSTEM.
31. REDUCE PRESSURIZED WATER PREVENTER.
32. PRESSURE REGULATING VALVE.
33. SLOWDOWN HEAT RECOVERY FOR HYDROFICATION SYSTEM. SEE SECTION 8.11M DESIGN SIBOADORS.
1/2" PIPE OR 1/2" O.D. SEAMLESS TUBING.

DIRECT CONNECTION

NOTE:
1. PIPING & GLOBE VALVES TO BE OF SAME PRESSURE CLASS AS MAIN PIPING.
2. ALL GAGES OR DEVICES MEASURING RAPIDLY FLUCTUATING OR PULSATING PRESSURES TO BE PROTECTED BY PRESSURE SNUBBERS.
3. REMOTE CONNECTED GAGES TO BE CALIBRATED TO COMPENSATE FOR STATIC FLUID HEAD IN GAGE WHEN DIRECTED BY ENGINEER.
RECESSED GASKET SURFACE TO HELP RETAIN GASKET AND REDUCE THE POSSIBILITY OF BLOW OUT

HTW HEAD GASKET

TUBE SHEET

HEAD

TUBE BUNDLE

SHELL

SECONDARY GASKET

SHOULDER BOLT NUT

2H NUT

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NOTES:

1. BONNET FLANGES 600 LB. ANSI.
2. RADIAL FLANGE HTH SUPPLY & RETURN 600 LB. ANSI.
3. INLET FLANGE
4. OUTLET FLANGE
5. TUBE SHEET
6. TUBE BUNDLE
7. SHELL
8. BAFﬂES
9. STAY RODS
10. SPACER
11. TUBE PASS PARTITIONS AS REQUIRED.
12. CRADLE <MAKE PROVISIONS FOR EXPANSION OF UNIT>
13. CONCRETE OR STRUCTURAL SUPPORT PIER.
14. THERMOMETER WELL FOR CONTROL ELEMENT, ARRANGE PIPING TO PROVIDE WELL IMMEDIATELY ADJACENT TO CONVERTER OUTLET.
15. SOCKET WELDED ELBOWLETS LOCATE AS NEAR TO SHELL OUTLET AS POSSIBLE.
16. THERMOMETER WITH SEPARABLE SOCKET.
17. DRAIN CONNECTION
18. VENT CONNECTIONS AS REQUIRED.
19. RELIEF VALVE CONNECTIONS
20. VENT

21. DIMENSION "L" NOT TO BE GREATER THAN 5 TIMES DIMENSION "D".
22. SHOW DIMENSION FOR SPACE REQUIRED TO REMOVE BUNDLE.
23. FOR MATERIAL TO BE USED, SEE SPECIFICATIONS.
24. FOR INSULATION OF UNIT, SEE SPECIFICATIONS.
25. FOR PAINT, SEE SPECIFICATIONS.
26. FOR REQUIRED DESIGN & TEST PressURES & DESIGN TEMPERATURES, SEE SPECIFICATIONS.
27. COUPLING FOR PRESSURE GAGE.

Notes 17 and 18:
Add "Socket weld fitting" to each note.
NOTES:

1. BONNET FLANGES 600 LB. ANSI.
2. RADIAL FLANGE HTW SUPPLY S. RETURN 600 LBS. ANSI.
3. TUBE SUPPORTS AS REQUIRED.
4. TUBE PASS PARTITIONS AS REQUIRED.
5. VENT CONNECTIONS AS REQUIRED.
6. TUBE SHEET.
7. TUBE BUNDLE.
8. SHELL.
9. DRAIN CONNECTION AS REQUIRED.
10. WATER INLET.
11. WATER OUTLET.
12. CRADLE. MAKE PROVISIONS FOR EXPANSION OF UNIT.
13. CONCRETE OR STRUCTURAL SUPPORT PER.
14. MINIMUM 11"x15" MANHOLE.
15. DRAIN CONNECTION.
16. RELIEF VALVE CONNECTION.
17. THERMOMETER WITH SEPARABLE SOCKET.
18. THERMOMETER WELL FOR CONTROL ELEMENT.
19. SHOW DIMENSION FOR SPACE REQUIRED TO REMOVE BUNDLE.
20. FOR PAINT, SEE SPECIFICATIONS.
21. FOR INSULATIONS OF UNIT, SEE SPECIFICATIONS.
22. FOR REQUIRED DESIGN S. TEST PRESSURE S. DESIGN TEMPERATURE, SEE SPECS.
23. ROLLED 3"x3½"x1/4" L INSULATION RING. WELD BOTTOM HALF CONTINUOUS.
   TOP HALF 2" IN 4" TO SHELL.
24. PROVIDE VENT FOR SHELL.
25. PROVIDE PRESSURE GAUGE CONNECTION.
26. PROVIDE SUITABLE COATING S. CORROSION PROTECTION FOR INSIDE OF TANK.
27. PROVIDE 1-11/4" THREADED FITTING ON VESSEL WITH A 24" TO 30" LONG MAGNESIUM SACRIFICIAL ANODE. INSTALL WITH A CENTER CORE WEEP DETECTION HOLE. INSTALL ANODE IN FRONT OR BACK FOR EASY ACCESSIBILITY.

NOTE: THIS DETAIL APPLIES TO BOTH STORAGE TYPE AND INSTANTANEOUS TYPE GENERATORS, EXCEPT MANWAY MAY BE DELETED ON INSTANTANEOUS SHELLS.

Notes 5 and 9:
Add "Socket weld fitting" to each note.
INSULATION.

THERMOMETER WELL.

THERMOMETER WELL INSTALLATION IN VERTICAL PIPE

45 DEG. MIN. 90 DEG. PREFERRED WHERE ACCESSIBLE.

SOCKET WELDED TO PIPE.

THERMOMETER WELL INSTALLATION IN HORIZONTAL PIPE

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DIA. OF PIPE MUST BE LESS THAN DIM. X.

PIPE GUIDE, CAS REQUIRED

CLAMP.

2" MIN.

PLATE THICKNESS NOT LESS THAN 1/4".

FUNCTION TYPE "A"
<FOR SINGLE VISIBLE DRAIN)

FUNCTION TYPE "B"
<FOR MORE THAN ONE VISIBLE DRAIN)
NOTES:

1. AIR VENTS AT HIGH POINTS.
2. THERMOMETER WITH SEPARABLE SOCKET.
3. PRESSURE GAUGE ASSEMBLY. MOUNT GAUGES ON BRACKETS.
4. BY-PASS GLOBE VALVE. PROVIDE OFFSETS OR LOOPS IN BY-PASS PIPING TO PERMIT FREE & UNRESTRICTED PIPE MOVEMENT DUE TO TEMPERATURE CHANGES. 1" FOR LINES TO 3". 1-114" FOR LINES 4" TO 6".
5. DRAINS EXTEND TO EQUIPMENT DRAINS.
6. HIGH TEMPERATURE WATER SUPPLY & RETURN IN CONDUIT WITH END SEAL.
7. ORIFICE & FLANGES FOR FLOW MEASUREMENT. PROVIDE REQUIRED STRAIGHT RUN OF PIPE PROPER MEASUREMENT FOR NEW OR FUTURE INSTALLATIONS.
EXISTING WALL
FLASHING CEMENT.

1/4" PL. A'S SECURE "O" WALL WITH (4) 5/8"
D.A. EXPANSION BOLTS.
1/2" LAVICRETE.

CALCULUM SILICATE
INSULATION.

PROVIDE OPENING IN
PLATE 1/2" LARGER
THAN DIA. OF PIPE.

PIPE SLEEVE
14" FOR 10" PIPE,
12" FOR 8" PIPE.

NOTE
SEE DRAWING NO. HTW-14
FOR LETTER DIMENSIONS.

TYPICAL TRANSITION DETAIL
GILSGULATE TO Z-CRETE.

1. 24" PIECE OF CONTINUOUS ROOFING FIBERGLASS
OVER TOP & DRAPE DOWN SDO'S. W/1
FLASHING CEMENT ON BOTH SIDES.

2. EXTEND TWO Z-CRETE BENT & DRAIN OPENINGS
INTO INSIDE OF WALL WITH 1-1/2"
GALV. BENT PIPE. CAP END OF PIPE.
bury pipe inside of gilsulate
insulation.
ENVELOPE DIMENSIONS: (APPLIES TO ALL DETAILS AT COMPACTED DENSITY OF INSULATION).

<table>
<thead>
<tr>
<th>PIPE SIZES</th>
<th>DIM. INCHES</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot;-3&quot;</td>
<td>5 5 6</td>
</tr>
<tr>
<td>4ft-611</td>
<td>6 5 7</td>
</tr>
<tr>
<td>8&quot;</td>
<td>7 5 8</td>
</tr>
<tr>
<td>10&quot;</td>
<td>8 5 10</td>
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</tbody>
</table>

NOTE:

FIBROUS WRAP SHALL BE 500 DEGREE F. MINERAL FIBER OR COMPARABLE FIBERGLASS INSULATION.
METAL SURFACES BURIED IN CONCRETE SHALL BE PAINTED WITH (2) COATS OF EPOXY PAINT.

PIPE GUIDE DETAIL

CONCRETE FILLED PVC PIPE END NOT TO EXTEND BEYOND INSULATION.

DETAIL OF SUPPORT

CONCRETE SHALL BE PAINTED WITH KOPPERS SUPER SERV BITUMASTIC.
3/8" CONTINUOUS WELD WEB.
S. FLANGES OF WIDE FLANGES TO PIPE.
TRIM AS REQUIRED.

GILSULATE INSULATION.

COAT ALL SURFACES OF STEEL
S. TOP OF CONCRETE WITH KOPPERS
SUPER-SERV BITUMASTIC.

4 BARS AT 9" O.C. EACH WAY
IN ALL FACES.

METAL SURFACES BURIED IN
CONCRETE SHALL BE PAINTED
WITH (2) COATS OF EPOXY PAINT.

POUR ENTIRE CONCRETE ANCHOR
BLOCK IN AGAINST UBDISTURBED
EARTH. (HAND EXCAVATE)
**PLAN VIEW**

- Electrical or communication duct bank
- Mastic

**CROSS SECTION**

- Standard gilsulate installation
- 4"x8"x1/4" copper plates centered on crossover point
- 1" styrofoam, 8' long x width of duct bank (not to scale)
- Additional gilsulate packed under plates
- HTW pipes
- Sheet rock
- B th sides minimum overlap

*This detail to be used when distance between duct bank and HTW installation is less than 12".*

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**Drawing Title:**
HEAT DISSIPATION PLATE AT DUCTBANK CROSSOVER

**Revision Date:**
MAR.2001

**Drawing No.:**
HTW-17

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3" LONG NIPPLE WELDED TO VALVE DISCHARGE. END OF NIPPLE TO HAVE MALE PIPE THREAD.

FOR VENTS LOCATED > 8' FROM FLOOR, EXTEND SECOND VALVE AS SHOWN.

NOTE: HIGH POINTS OF ALL PIPING TO BE VENTED.

WELDOLET... REDUCER AS REQ'D.

PIPE SIZE (NOM.) | DIAMETER
--- | --- | ---
A | B | C
1-1/4" | 1-1/2" | 2"
2" | 2" | 3"
2-1/2" | 2-1/2" | 3"
3" | 3" | 3"
4" | 4" | 4"
6" | 6" | 6"
8" | 6" | 6"
10" | 6" | 6"

LOCATE VALVE APPROX. 4'-6" FROM FLOOR.

3" LONG NIPPLE WELDED TO VALVE DISCHARGE. EYDOT NIPPLE TO HAVE MALE PIPE THREAD.