DESIGNING FOR SUCCESS
WHAT ABOUT PURGING AND FLUSHING

Commercial Applications
Learning Objectives

• Discuss the importance of proper piping design to accommodate purging and flushing.
• Discuss design considerations to facilitate flushing and purging.
• Discuss the potential benefits of different design features.
• Introduce new IGSHPA Inspectors Course
Outline/Agenda

- Improper Flushing and Purging and pipe design/sizing can break an otherwise potentially successful project....

- Design philosophy for flushing and purging

- Pipe sizing considerations.

- Valve location and location preferences and limitations....

- Header / manifold considerations
Protection/Purging of Piping

• During all phases of the installation it is critical that all piping is protected from debris and foreign objects entering the pipe.

• After the heat exchanger is completed the system should be purged of all air and debris.
  • Debris can clog or foul the heat exchanger
  • Entrained air can corrode metallic components, cause noise, and can possibly prevent flow in sections of the system.

• Trapped air can be separated from water and therefore removed by power flushing the system at a minimum flow velocity of 2 feet per second (FPS).
There are two basic flow regimes defined in fluid mechanics to describe the nature of fluid flow in any situation: laminar and turbulent. In the low-velocity laminar regime, fluid flow is streamlined and smooth. Once the fluid velocity has been increased above a critical value, flow becomes chaotic and disordered and enters into the turbulent regime.

The mixing of fluid in turbulent flow maximizes the heat transfer capability.

Ground-loop piping should be sized such that fluid flow through each loop is turbulent to ensure maximum heat transfer.

Turbulent flow can also produce higher levels of friction between the fluid and pipe walls, pressure drop needs to be evaluated to minimize pump HP.
Before the system is placed in operation, flushing of all heat exchanger piping shall be performed to remove debris and air.

Flushning shall be performed at 135% of design flow, but in no case less than 2 FPS.

Each subfield shall be separately flushed and purged.

Last stage of flushing and purging should be thru the unit heat exchanger; heat exchangers should be bypassed until piping system is flushed and purged.

A closed loop-flushing unit with a volume tank filters shall be utilized.

The flushing volume shall be at least 3x the system volume.
PURGE PORT DETAIL

SUPPORT STRAP ATTACHED TO WALL BEYOND

POLY BALL VALVE, REFER TO SPECIFICATIONS FOR MORE INFORMATION.

PORT WITH PETE'S PLUG AND GAUGE COCK
PORT FOR EMS PRESSURE SENSOR WITH BALL VALVE
PRESSURE GAUGE WITH BALL VALVE

2" BALL VALVE WITH CAP

THERMOWELL FOR EMS TEMP. SENSOR

THERMOMETER WITH THERMOWELL

SUPPORT STRAP ATTACHED TO WALL BEYOND

1 1/2" R
1 1/2" S
1 1/2" R

U-BEND, NO VALVE

1 S

VALVE BOX, REFER TO DETAILS D1 & F2/M501

(TYPICAL ROW OF 6 WELLS)
WELL FIELD
- 250'-0" DEEP WELLS AT
  - 15'-0" O.C. (EACH WAY)

TYPICAL OF SINGLE WELL FIELD ROW

1" (TYPICAL OF WELLS)

WELL FIELD MIN. DEPTH OF 4'-0"
B.F.G.

SIZING BASED ON HEADER SIZING TABLE. SEE SHEET M1.01 FOR ADDITIONAL INFORMATION.
(MIN. 1-1/2")

WELL FIELD NOTE:
REFER TO RESPECTIVE WELL FIELD FOR LAYOUT AND MANIFOLD/BUILDING PIPING SIZE AND ROUTING.

WATE...
WELL FIELD NOTE:
REPLACE WITH RESPECTIVE WELL FIELD FOR LAYOUT
AND MANIFOLD/BUILDING PIPING SIZE AND
ROUTING.

PURGE PORT ASSEMBLY, REFER
TO DETAIL FOR MORE
INFORMATION

TO/FROM WELL BLDG.
PIPING

TO/FROM WELL BLDG.
PIPING

WELL FIELD MIN.
DEPTH OF 4'-0"
B.F.G.

SYSTEM PURGE VALVE
(NORMALLY CLOSED)

EXPANSION TANK

WATER SOURCE:
HEAT PUMP ABS.
CEILING (TYP)

1" TAPS
(TYP)
Questions?

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