PRESENTATION AGENDA

≡ Prior to installation
≡ Pipe, Fittings, and Valves
≡ Nozzle Strain, Couplings and Offsets
≡ Seals, Packing and Gauges
≡ Pump Pedestal, Anchors and Grout
Questions? Fire Away

Pump Orientation
PRIOR TO INSTALLATION:

≡ Get customized (annotated) O&M manuals
≡ Off loading
≡ Maintenance (storage and prior to installation)
≡ Installation
≡ Maintain (rotate shaft) while in storage
Suction Pipe

≡ Important hydraulically (for centrifugal pumps)
≡ Straight runs – 4-6 diameters
  ≡ Example: 6” pipe 2 ft. to 3 ft. straight run min.
≡ Reducer
  ≡ Eccentric
≡ Connect to the pump
Discharge Pipe

≡ Not as important hydraulically (Get it out of the way)
≡ Vertical – use Base elbows (watch out for check valves)
≡ Horizontal – go back to suction header
≡ Reducer
  ≡ Connect to pump
  ≡ Concentric reducer
≡ Provide air vents stop cocks
≡ Consider 45 Degree Fittings, Wyes and Laterals
FIGURE 3a: Suction Piping.
Correct Source of supply below pump.

Incorrect

Air pocket

Eccentric reducers should be arranged with the bottoms flat when source of supply is above the pump.

Correct
Recommended

Alternate acceptable position

Long radius elbow

Not recommended

Suction

Path of water
Couplings

- Use to help disassemble pipe – pump
- Install btw isolation valve and pump
- Dresser, Victaulic (grooved) Disassembly style coupling
- Thrust restrained on discharge (always, sometimes on suction)
- Generally best to use on suction side
- Not suitable for offsets
- Use mitered fitting
Nozzle Strain, Pipe Alignment, Couplings and Offsets

≡ Nozzle strain
≡ Couplings (Dresser style)
  ≡ Excellent to align in X axis
  ≡ Only 4 degrees in off-set direction
≡ Mechanical vs flanged fittings – Rotate
≡ Flex Connectors
≡ Bevel and filler flanges
≡ Fabricated off-set pipe (best for significant off-sets)
Isolation Valves

Generally both suction and discharge sides of pumps

Suction: Install upstream of straight diameters

Discharge: Install downstream of check valve

Type – very dependent on the service
Check Valves

- Always on the pump discharge
- Install check valve after reducer
- Be careful of check valves in the vertical
- Foot Valves – generally not a good idea
Reducers – Connect at the Pump
Energy Considerations

- Laterals, Wyes, 45’s and Long Radius 90’s’
- Watch out for checks valves – WIDE variety of Headloss
Eccentric on Suction Side
Mag meters

≡ 3 to 1 straight pipe diameters, suction to discharge minimum

≡ Ideal 10 to 3 pipe diameters

≡ Example 6” pipe:
  ≡ 3 x 6” = 18” straight pipe suction (min.)
  ≡ 1 x 6” = 6” straight discharge pipe (min.)
  ≡ 60” and 18” ideal
SEALS AND PACKING

≡ Mechanical seals – MANY styles and materials, consult mfr.

≡ Generally silicone-carbide seals work for WW applications, carbon-ceramic for W applications

≡ Single seal fine with flush-water, double if not available

≡ Consider split seals for large diameter shafts

≡ Seal water pressure greater than stuffing box pressure

≡ Packing rings – make sure gland is centered at flushing port

≡ Adjust periodically, but don’t overtighten
GAUGES AND INSTRUMENTS

≡ Gauges
  ▪ Required start-up, and to assess pump performance / trouble shoot
  ▪ Gauge not necessarily required, just fittings
  ▪ Compound gauges required on suction lift pumps

≡ Consider vibration monitoring, amp draw, temperature monitors, preferable on critical assets and larger ($$$) pumps

≡ Get baseline data and compare over time
Installation

Seal Water System
Pipe Installation Directions

≡ To the pump from both sides – not good
≡ To the pump, then away from the pump - best
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PUMP BASEPLATE, PEDESTAL, ANCHORS, AND GROUT

≡ System, act in unison
≡ Pedestal: anchors pump mass to structural base slab
≡ Gap required to adjust and align pump baseplate
≡ Grout: fill void between pump baseplate and pedestal
≡ Baseplate designed to HI Standard 1.3.8
≡ Anchors tie the baseplate, grout and pedestal together in unison
Concrete Pedestal

- Size 3 – 5 times pump – motor mass
- Set 6” + away from pump baseplate edge (all sides)
- Bush hammer floor slab
- Install Reinforcing steel into floor slab
- Apply bonding agent
- Pump anchors system:
  - Locate with template
  - Secured in pedestal or embedded into floor slab
Anchor System

- Sized by Mfr. (or Engineer) but Owner/Contractor can purchase
- J-bolt (new) epoxy anchors (existing)
- Anchor, nut, plate, and sleeve
- Protect sleeve void (foam insulation) and threads (grease, putty, tape, etc.)
Pump Base Alignment

≡ Wedges / Shims vs jacking screws
≡ DON’T use double nuts
≡ Front to back first (X), then side to side (Y)
≡ Always remove shims
FINISHED GROUTING

¾” TO 1¼” ALLOWANCE FOR GROUT

LEVELING WEDGES OR SHIMS. REMOVE PRIOR TO TORQUE BOLTS

BASEPLATE

NON-SHRINK GROUT MUST BE HARDENED PRIOR TO TORQUE ANCHOR BOLTS. GROUT MUST BE CURED PRIOR TO TESTING

PIPE SLEEVE

ANCHOR SYSTEM BY PUMP MFR.

TOP OF FOUNDATION LEFT ROUGH—CLEAN AND WET DOWN
TOP OF FOUNDATION
LEFT ROUGH—CLEAN
AND WET

COAT THE BOLT WITH AN
APPROVED BOND BREAKING
COMPOUND TO PREVENT
GROUT ADHERENCE

ANCHOR BOLT
WITH SLEEVE

NOTE:
AFTER GROUT SET

FORM
Grout Course

≡ Use non-shrink grout or flowable epoxy under baseplate
≡ 1” to 2” thick
≡ Some baseplates are fabricated and entire void needs to be filled (i.e. chopper pump)
≡ Require air vent
≡ Consult with manufacturer. Grout must harden (~25+ hours) prior to torqueing
≡ Remove shims / wedges prior to torqueing
≡ Grout must cure (72+ hours) prior to testing
Pump Installation
Alignment

Check pump/motor alignment (angular alignment)

Mechanical Displacement - dial indicators

Eyesight – straight edge & feeler gauges
Alignment

Check pump/motor alignment (parallel alignment)

Eyesight – straight edge & feeler gauges
How NOT to install a Pump
Away from Electrical Panel

Rubber SS
Any Questions?
(I may have an answer)

Thank you!
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