Vertical pumps used for booster service are usually installed in a can (barrel). By definition, the can is receptacle for conveying the liquid to the pump. Because the whole bowl assembly is included in the can, as shown on figure 1, the bowls are subjected to the difference of the bowl (inside) and suction (outside) pressures. The can is subjected to the suction pressure. The pump discharge head is sealed to atmosphere but it should be provided with valve for air release.

There are many possible design configurations. Most of the time the pump is designed to suit the job pipe arrangement. See the following pages with figures 2 to 6 of typical Peerless Pump design configurations.

The Sales Manual Hydro-Line sections 3410, 3420, and 3445 show some of these configurations in more detail including pump parts list and overall pump and can dimensions.

Figure 7 shows multiple can installation. Figures 8 and 9 show submersible motor in a can installation.

*Can or barrel is used alternatively by Hydraulic Institute
FIGURE 2. Typical Hydro-line Pumps

Mechanical seal and spacer-type coupling shown. Pumps equipped with packing use a coupling with no spacer.
FIGURE 3. Typical Hydro-Line Pumps

Mechanical seal and spacer-type coupling shown. Pumps equipped with packing use a coupling with no spacer.
Other variations of Model HE are similar to Model HL except that vertical hollow-shaft motor and threaded coupling are used.

FIGURE 4. Typical Hydro-Line Pumps
FIGURE 5. Typical Hydro-Line Pumps with column between discharge head and bowl unit. Mechanical seal and spacer-type coupling shown. Pumps equipped with packing use a coupling with no spacer.
FIGURE 7. Multiple Can Installations

V₁ = 6 Ft/Sec Maximum
V₂ = 5 Ft/Sec Maximum
FIGURE 8. Submersible can pump installation
FIGURE 9. Submersible can pumps
DESIGN PARAMETERS
There are a number of factors that can influence the can design. However, there are some design guidelines for successful installation which should be sued where possible.

Flow Velocity
Can inside diameter should be selected so the annular velocity in the area between the bowl assembly outside diameter and the can inside diameter does not exceed 4 to 5 ft/sec. Liquids containing solids require 3 ft/sec minimum velocity.

Diameter
Approximately 1.2 to 1.5 bowl or suction bell (case) diameter whichever is larger. Can diameter is selected in conjunction with flow velocity above.

Length
The length of the can is defined by the length of the pump assembly and NPSH required.

Hydraulic losses
The hydraulic losses (He) between the can inlet flange and pump suction bell, figure 11, are available from the following curves 2826482 to 85 (Sales Manual, section 3410) for our typical pump and can design configurations. In case the can size or pump is different than those on the curves, the following approximate formula (from Vertical Pumps by J. Diemas) can be used:

\[ He = \left( K \times Vc^2 \right) / 2g \]

Where
- \( K = 3.5 \)
- \( Vc = \) annular velocity in can, ft/sec
- \( g = 32.17 \) ft/sec

These losses will affect not only pump’s head but also NPSH available at impeller eye. In critical NPSH applications \( Vc \) should be less than 3 ft/sec.

Location of pump suction bell opening with reference to can suction pipe inlet
A minimum distance of 2 can diameters from can suction pipe inlet center line to pump suction bell, figure 12. For additional information, see Hydraulic Institute Standards 9.8.

Distance of pump suction bell to bottom of can 0.5 bell diameters.
It is recommended for all Hydro-line pumps to have a vortex suppressor. In this case, the distance to be adjusted, if needed, to accommodate the vortex suppressor. The distance between the vortex suppressor and the bottom of the can to be approximately 0.125 bell diameters. In general, vortex suppressor would improve any pump installation intake flow conditions.

NPSH available (figure 11)

\[ NPSH = Ha - Hvpa + Hs - Hf \]

Where
- \( Ha = \) absolute pressure on the surface of the liquid where the pump takes suction in feet; in open system it is equal to atmospheric pressure
- \( Hvpa = \) vapor pressure in feet
- \( Hs = \) elevation from impeller eye to fluid level in feet; it is negative if the fluid level is bellow the impeller eye
- \( Hf = \) friction and entrance head losses in suction piping in feet

Design features of can (figure 12)
If the can and pump discharge column are long and the can suction pipe inlet is located close to the bottom of the pump, the impact of the fluid jet could impose sufficient force to deflect the column. Use of baffle plate in front of the pump column or bowl unit is recommended.

A splitter along the inside of the can helps in preventing vortex formation.

IMPORTANT NOTE
The information contained herein is for general information only. Please consult the Peerless Pump Application Department for design details of a specific application, giving pump design head, flow, liquid temperature, specific gravity, vapor pressure, NPSHa and mechanical details of proposed installation. Peerless Pump will provide recommendations for pump ordering purposes.
HYDRAULIC PERFORMANCE

GUARANTEED AT THE DESIGNATED POINT ONLY AND IS CONTINGENT ON WELL PROPERLY PUBLISHING PUMP WITH NON-AERATED OR NON-GASEOUS WATER FREE FROM ABNORMAL AERATION. CURVES ARE FOR TURBINE TYPE ONLY. CURVES ARE PROPERLY ADJUSTED FOR THE HEAD AT WHICH THEY OPERATE AND MUST BE SUBMERGED.

1. 6LB - 2 x 3 x 8
2. 7LB - 3 x 4 x 10

Head loss between suction flange and bowl assembly suction manifold in hydrolines.

Peerless Pump Company
Indianapolis, IN 46207-7025

Sheet No. 28264B2
Hydraulic Performance

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<th>Curve No.</th>
<th>Hydrolines</th>
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<tr>
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<td>8LB - 3 x 4 x 10</td>
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</tr>
<tr>
<td>2</td>
<td>8LB - 4 x 6 x 10</td>
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<tr>
<td>3</td>
<td>9LA - 4 x 6 12</td>
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Head loss between suction flange and bowl assembly suction manifold in hydrolines.

Peerless Pump Company
Indianapolis, IN 46207-7725

Sheet No. 282-683

Revised 07/06
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Head loss between suction flange and bowl assembly suction manifold in hydrolines.

Peerless Pump Company
Indianapolis, IN 46201-7025

Sheet No. 28864185

Revised 07/06
FIGURE 11

\[ \text{NPSH avail.} = h_a - h_{vpa} + h_s - h_f \]
Suction Location for Hydro-Line Pumps

- **Satisfactory**
  - **Vortex Suppressor**
  - **BAFFLE**
  - **INLET VELOCITY SHOULD BE LESS THAN 4 FT/SEC**
  - **2 Dc MINIMUM**
  - **CAN DIA. - Dc APPROXIMATELY 1.2 to 1.5D**

- **UNACCEPTABLE**

**FIGURE 12**