INTRODUCTION

Welcome to Pump Select! You will soon see how Pump Select can be a valuable tool for selecting a Honda centrifugal pump!

Selecting the proper centrifugal pump can be a challenge. Although Honda does supply performance (head-capacity) curves for its pumps, it can be difficult predicting the point on the curve where the pump will perform. The total static head is often only considered when selecting a pump. However, because of frictional losses, this method can often lead to large error, and in many cases, the pump performance will not meet expectations. The selection process becomes even more complicated when a nozzle or sprinklers are used.

In order to accurately predict the performance of a centrifugal pump in a specific application, the total dynamic head must be calculated. The total dynamic head is the sum of the static suction head, static discharge head, and all additional losses in the system. These losses include, but are not limited to: friction losses due to pipe size, length, and material, and losses from sprinklers or a nozzle. Simply put, the total dynamic head is the actual head on the pump during operation.

Accurately predicting the discharge and pressure for a given pump in a specific application requires tedious calculations and a lot of trial and error.

Pump Select takes the guesswork out of choosing the proper pump by performing the difficult calculations for you!

PROGRAM FEATURES

Pump Select calculates and provides the following predicted performance data:

- Dynamic suction head in feet
- Total dynamic head in feet
- Discharge capacity in gallons per minute
- Discharge pressure at the pump in psi
- Pressure at the nozzle in psi (if used)
- Nozzle velocity in ft/sec (if used)
- Pressure at the sprinklers in psi (if used)
- Displays an alert if cavitation is likely.
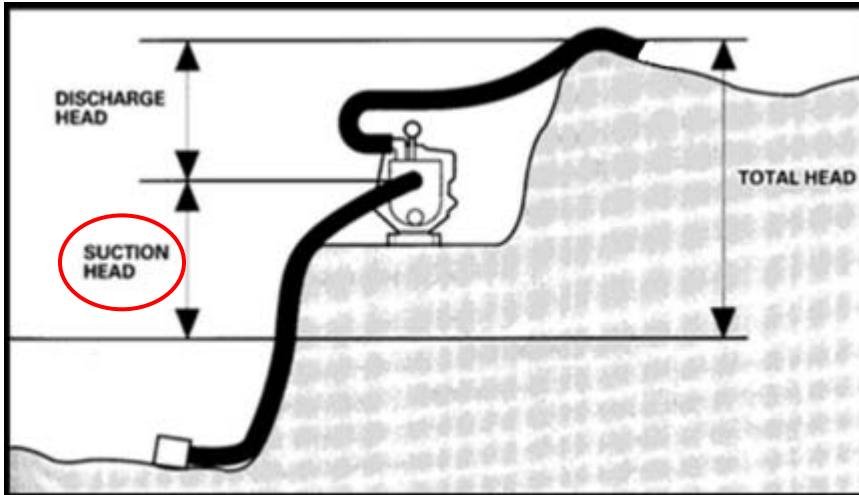

PUMP MODEL SELECTION

A Honda pump model must first be selected.

If you are considering a pump where high pressure and low discharge volume are needed, which is usually the case when using sprinklers or a nozzle, you should select a WH series (high-pressure) pump. However, if discharge volume is the major concern, a WB or WT series may be preferred. A WSP pump can be chosen if an electric submersible pump is preferred.

Pump Select allows your inputted system data to be saved while the model is changed. This allows the performance of different pumps to be quickly compared.

SUCTION HEAD

The suction head is the vertical distance from the surface of the water to the center of the pump. A positive value indicates the pump is positioned above the surface of the water, as shown below. The suction head must be inputted in feet.
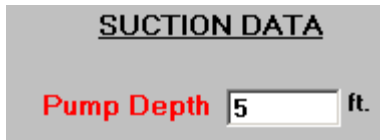

A negative value can be entered if the pump is positioned lower than the surface of the water. For example, if the suction hose is attached to the bottom of a vented tank, the vertical distance from the pump to the surface of the water in the tank (which is above the pump) would be entered as a negative value.

The design of Honda pumps as well as atmospheric pressure limits the suction head for Honda centrifugal pumps to 26 feet (the WX10A4 is limited to 23 feet). Pump Select will not allow the user to input values greater than this.

The suction head field will not be shown if a WSP submersible pump is chosen.

PUMP DEPTH (Submersible Pumps Only)

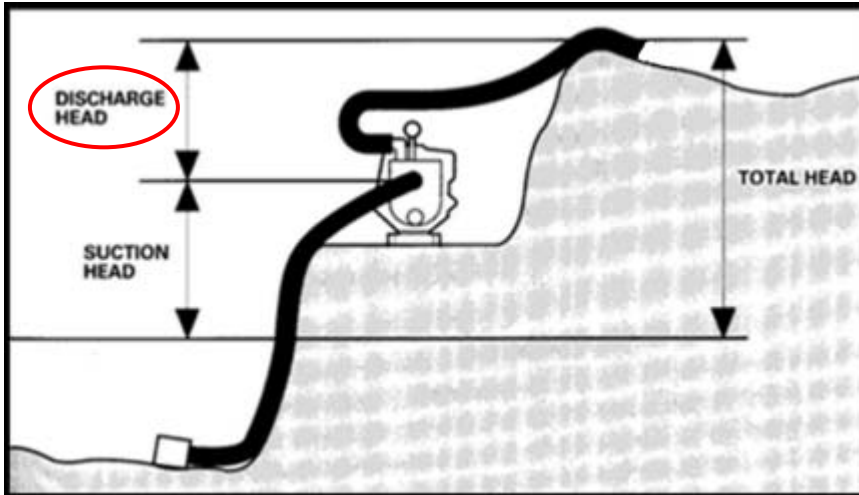This field will only be shown if a WSP submersible pump is chosen.

The pump depth is the depth at which the base of the submersible pump is submerged. The maximum allowable pump depth is determined by the pump's cord length. Pump Select will alert the user if the pump depth exceeds the cord length and will require a new value to be inputted.

The pump depth value will show up as negative static suction head under System Data.

DISCHARGE HEAD

The discharge head is the vertical distance from the center of the pump to the end of the discharge hose. If the discharge hose is submerged in the water or attached to the base of a vented tank, the discharge head is the vertical distance from the center of the pump to the surface of the water. The discharge head must be entered in feet.
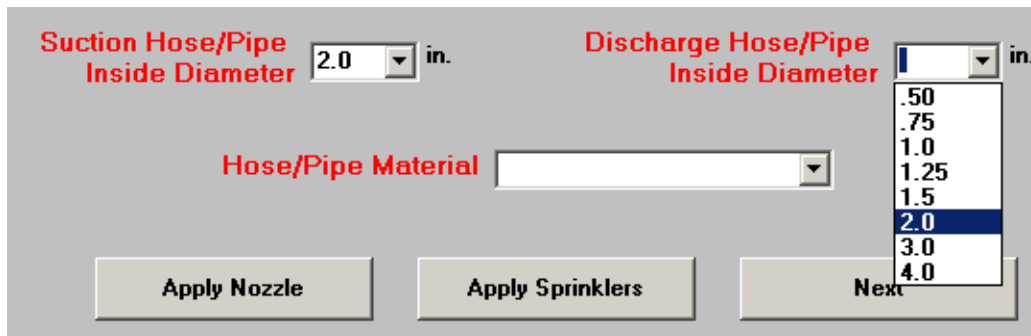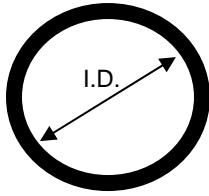

For submersible pumps (WSP models), the discharge head is the vertical distance from the base of the pump to the end of the discharge hose. Pump Select will not allow the user to enter a discharge head value that is less than the pump depth.

Pump Select adds the suction head and discharge head values together and calculates the total static head. If the total static head for the inputted pump model exceeds the capability of the pump, Pump Select will alert you and require a new model be selected and/or a new discharge head value be entered.

SUCTION AND DISCHARGE HOSE/PIPE INSIDE DIAMETERS

The inside diameters of the suction and discharge hoses/pipes must be entered in inches.

The inside diameter of the suction hose/pipe is especially important because excessive dynamic suction head can cause the pump to cavitate. Cavitation will result in poor pump performance and possibly damage to the pump. To avoid cavitation, the inside diameter of the suction hose/pipe should be as large as possible. Ideally, the suction hose/pipe should be no smaller than the pump's suction port diameter.

After the "Next" button is selected, Pump Select will provide an alert if cavitation is likely to occur.
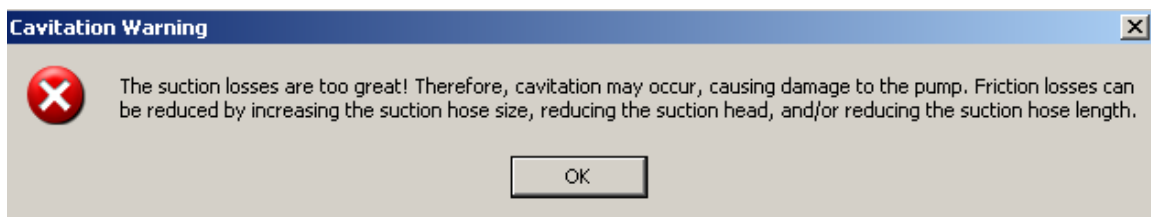
The suction hose diameter field will not be active if a WSP submersible pump is chosen.

Selecting a discharge hose/pipe diameter that is smaller than the pump's discharge port is acceptable and will not cause damage to the pump. However, to minimize friction loss and achieve the greatest pump output, the largest possible discharge hose/pipe size should be used.
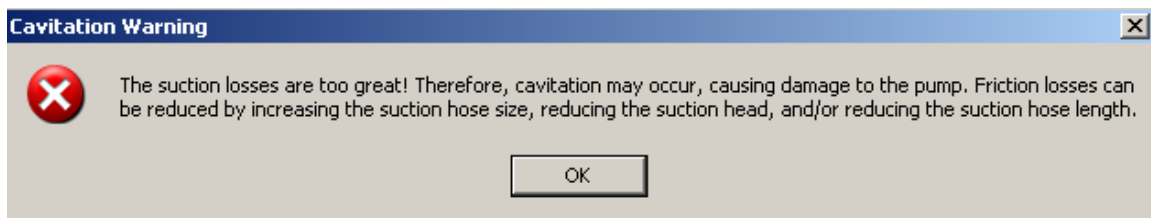
SUCTION AND DISCHARGE HOSE/PIPE LENGTHS

The lengths of the suction and discharge hoses/pipes must be entered in feet. To minimize friction loss and achieve the greatest pump output, the shortest possible hoses/pipes should be used.

Discharge Hose Length

Suction Hose Length

Suction Hose/Pipe Length `20` ft.   Discharge Hose/Pipe Length `100` ft.
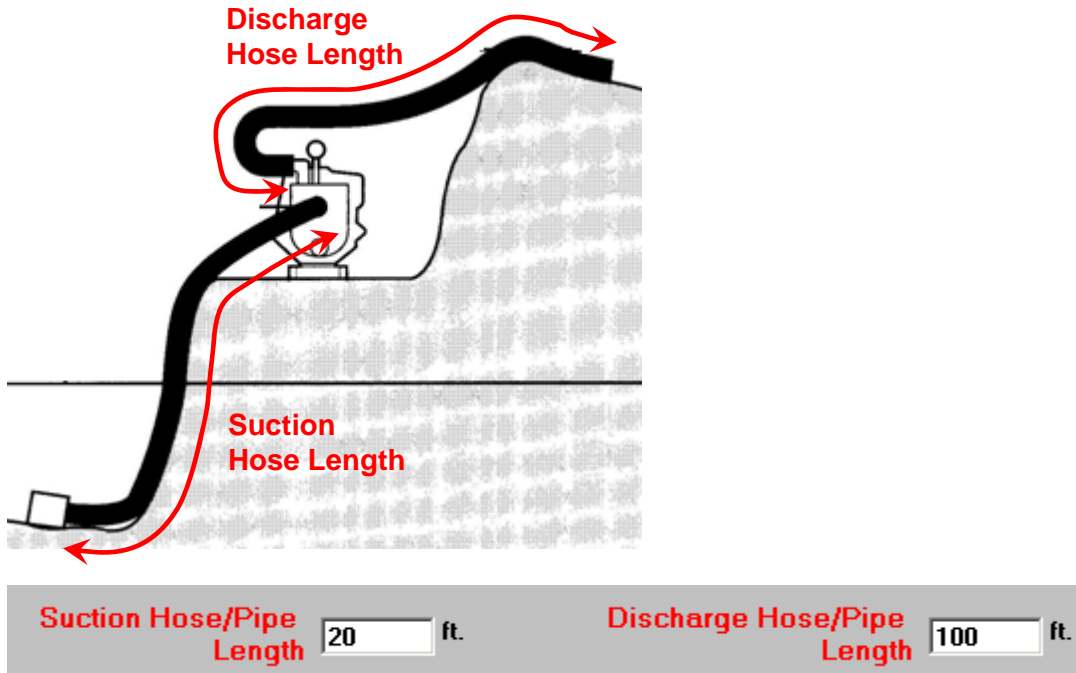
Like the inside diameter, the length of the suction hose/pipe is especially important. Using a very long suction hose/pipe can result in excessive suction head loss and possible cavitation. To avoid cavitation, the suction hose/pipe should be as short as possible.

After the "Next" button is selected, Pump Select will provide an alert if cavitation is likely to occur.

Cavitation Warning

The suction losses are too great! Therefore, cavitation may occur, causing damage to the pump. Friction losses can be reduced by increasing the suction hose size, reducing the suction head, and/or reducing the suction hose length.

OK

The suction hose length field will not be active if a WSP submersible pump is chosen.

HOSE/PIPE MATERIAL

The roughness of the hose/pipe material is considered in Pump Select calculations. The user must select one of the following materials for the discharge hose/pipe:

Hose/Pipe Material | Smooth Plastic or Copper ▼
- Smooth Plastic or Copper
- Rubber
- Steel/Wrought Iron
- Galvanized Iron
- Cast Iron

| Apply Nozzle | | Next |

The roughness of the hose/pipe affects the amount of friction loss in the system. This is particularly true if the length of the discharge hose/pipe is very long and sprinklers or a nozzle are not used.

If the actual material of the hose/pipe is not on the list, the material with the closest roughness should be chosen.

NOZZLE OR SPRINKLERS

Pump Select allows you to consider a nozzle or sprinklers in the discharge calculation. However, some nozzle or sprinkler data must be entered for Pump Select to perform the calculation.

Nozzle

Enter the diameter of the nozzle (at the water exit point) or the pressure and gallons per minute rating provided by the nozzle manufacturer.

For adjustable spray nozzles, you must provide the pressure and discharge rating, since a nozzle diameter is not available.

The nozzle diameter is the smallest inside diameter at the point where the water exits the nozzle.
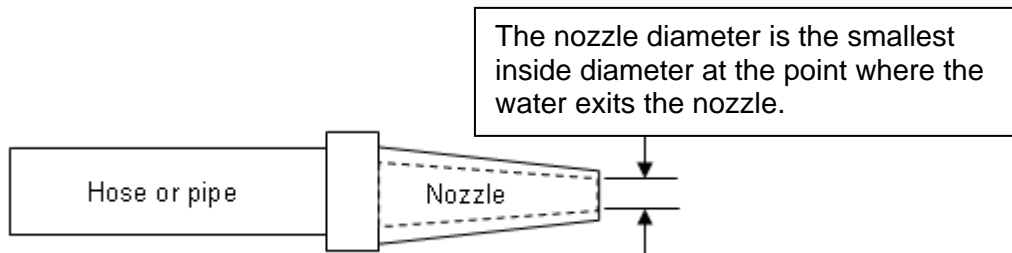
The design of nozzles in the market varies and may result in some difference between the calculated results and the actual results.

Sprinklers

You must enter the diameter of the sprinkler nozzle (at the water exit point) or the pressure and gallons per minute rating provided by the sprinkler manufacturer.

For oscillating sprinklers and sprinklers with multiple spray orifices, you must provide the pressure and discharge rating, since a nozzle diameter is not available.

Enter the number of sprinklers.

The sprinkler nozzle diameter is the diameter of the orifice where the water exits the sprinkler. This value is sometimes stamped on the nozzle and can only be entered for sprinklers with a single nozzle.
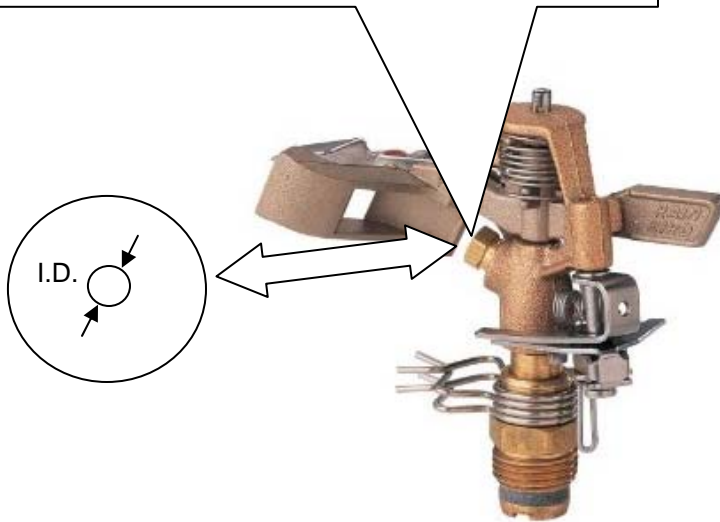
The design of sprinklers or nozzles in the market varies and may result in some difference between the calculated results and the actual results. In addition, the program assumes that all sprinklers are positioned at the same head and distance from the pump.

SAVE/NEW INPUT DATA

After Pump Select completes a calculation, it gives you the option to save the inputted data or create new input data. By choosing the save option, the data that was previously inputted will still be available for additional calculations. This feature is useful if you wish to change some, but not all the input variables (try a different model, hose size, add sprinklers, etc).

Calculate Again	⦿ Save Input Data
	○ New Input Data

UNDERSTANDING THE RESULTS

Pump Select calculated results are based on theoretical calculations using clear water. The design of system components (pipe, sprinklers, nozzle) may affect the actual pump performance. In addition, other sources of head loss (pipe fittings, elbows, valves, etc.) often exist and are not considered in the calculations.

Pump Select calculated results are an approximation and are only intended to serve as a guide for choosing a centrifugal pump. If the performance requirements are critical, discharge performance must always be verified by pressure and flow measurements using the actual pump.

The upper section of the screen shows the data you entered and the lower section shows the calculated performance.

```
Pump Select                                                    _ □ X
Exit  Print  Online Help

                        SYSTEM DATA

         Pump Model  WH20X       Suction Hose/Pipe Diameter    2 in.
  Static Suction Head    10 ft.  Discharge Hose/Pipe Diameter  2 in.
Static Discharge Head    30 ft.  Suction Hose/Pipe Length     20 ft.
     Total Static Head    40 ft.  Discharge Hose/Pipe Length  100 ft.
  Hose/Pipe Material  Smooth Plastic   Number of Sprinklers    N/A
                      or Copper

                  CALCULATED PERFORMANCE

 Dynamic Suction Head    10 ft.   Pressure at Nozzle/Sprinklers   41 psi
   Total Dynamic Head   135 ft.   Nozzle/Sprinkler Diameter      .25 in.
 Gauge Pressure at Pump   54 psi  Nozzle/Sprinkler Velocity    78 ft./sec.
 Pump Discharge Capacity  12 gpm

        Calculate Again    ● Save Input Data      Exit
                           ○ New Input Data
```

Dynamic Suction Head

Dynamic Suction Head   10 ft.

This is the sum of the static suction head you entered and the additional head created by friction losses in the suction hose.

Total Dynamic Head

Total Dynamic Head   135 ft.

This is the sum of the static suction and discharge head values you entered and the additional head created by friction losses and restrictions (i.e. nozzle or sprinklers) in the system.

Gauge Pressure at Pump

Gauge Pressure at Pump   54 psi

This is the pressure that would be measured at the pump's discharge port.

Pump Discharge Capacity

Pump Discharge Capacity   12 gpm

This is the actual total discharge you should expect from the pump in your application. If you are running more than one sprinkler, divide the discharge capacity by the number of sprinklers to determine the discharge capacity (flow rate) at each sprinkler.

Pressure at Nozzle or Sprinklers (if applicable)

Pressure at Nozzle/Sprinklers   41 psi

This is the pressure applied at each sprinkler or nozzle. Check with the nozzle or sprinkler manufacturer for the minimum recommended operating pressure.
As a general rule, this pressure should be no less than 25 psi to provide good performance. Of course, the higher the pressure, the better the performance will be. In most applications, the Honda WH15 and WH20 will provide the greatest sprinkler or nozzle pressure.

Nozzle/Sprinkler Diameter (if applicable)

Nozzle/Sprinkler Diameter   .25 in.

If you entered a nozzle diameter, the entered value will be displayed. However, if you entered the pressure and discharge rating provided by the sprinkler or nozzle manufacturer, this is the equivalent calculated diameter (based on a perfect theoretical nozzle).

Nozzle/Sprinkler Velocity (if applicable)

Nozzle/Sprinkler Velocity   78 ft./sec.

This is the velocity of the water as it exits the sprinkler or nozzle. Generally, a nozzle velocity greater than 60 ft/sec will provide the best performance.

QUESTIONS OR COMMENTS?

Please direct any questions or comments about Pump Select to:

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