



**CANADIAN
CUSTOM
METALWORKS**

www.CCMfabrication.com

905.677.2475

Getting the best out of your Centrifugal Pump

- Located in Mississauga on the Oakville border
- Complete Machine shop
- We Build Tanks, Skid based systems and piping for liquid delivery
- Provide onsite troubleshooting and or service
- 3D CAD design – See how your system will integrate into existing space
- A deep well of practical knowledge to draw from



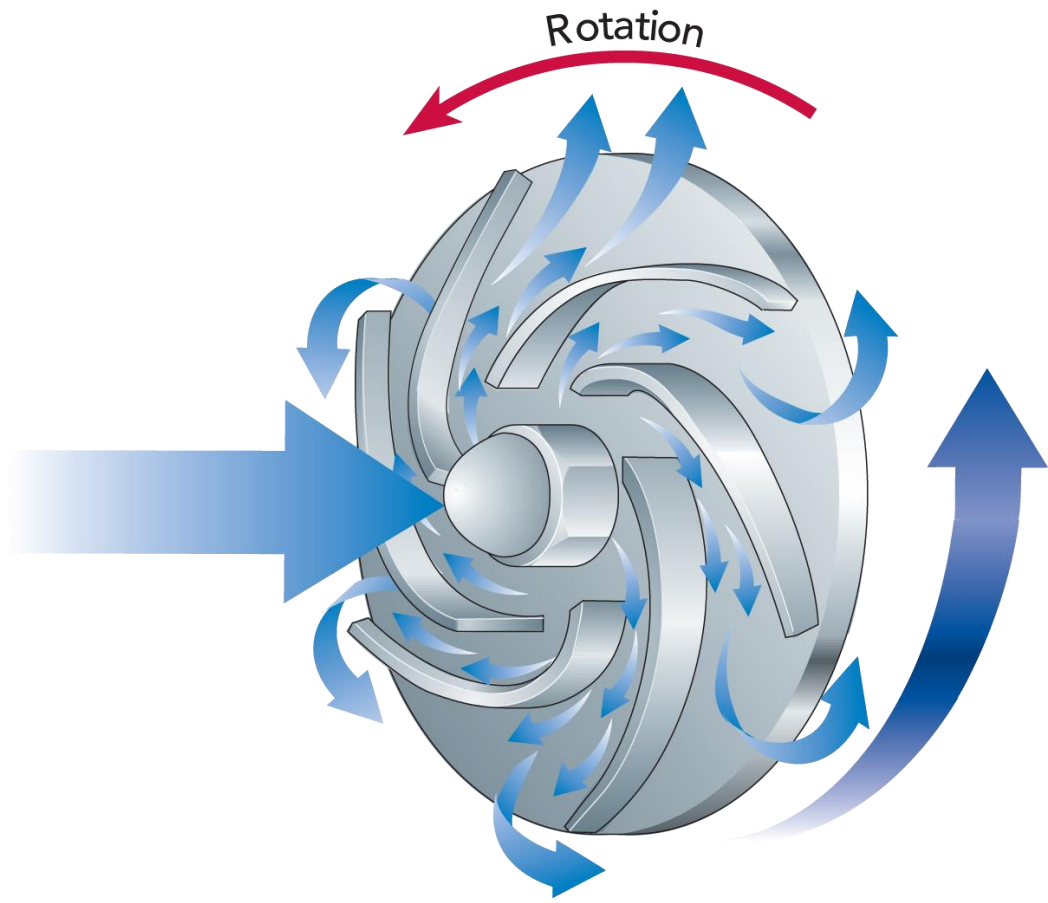
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OUTLINE

- Centrifugal Pumps
 - Identification of Parts
 - Positives and Negatives
 - Available Seal Systems
 - Common Issues with Seals
 - Cavitation and its causes
 - Proper Set up of Inlet Piping
 - When should a pump be replaced



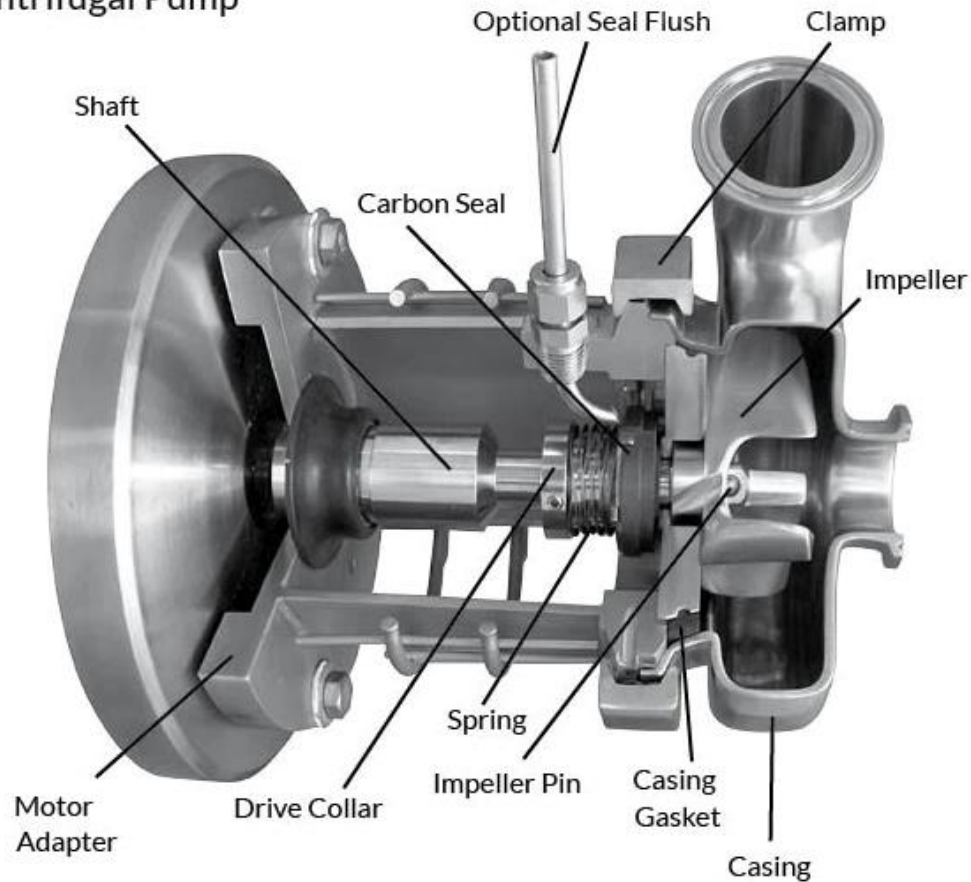
HOW DOES A CENTRIFUGAL PUMP WORK?



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COMPONENTS OF A PUMP

Centrifugal Pump



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CENTRIFUGAL PUMP SEAL SYSTEMS

Single Mechanical – Carbon
Rotating Seal to stationary
Stainless Back Plate

Single Mechanical – Carbon
Rotating Seal to stationary Ceramic
Face

Double Mechanical – Carbon
Rotating Seals to stationary
Ceramic faces



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SINGLE MECHANICAL – STAINLESS BACK PLATE

- Pros:
 - Cheap
- Cons:
 - Cheap
 - Wears easily
 - Uneven wear surface
 - Susceptible to particle damage
 - Limited ability to correct
 - Requires complete back plate replacement on failure
 - Higher maintenance period required



SINGLE MECHANICAL – CARBON TO CERAMIC

- Pros:
 - Longer service life
 - Replaceable
 - Seal surface is optically flat
 - Increases Carbon Seal life
 - Less surface area for light syrups to bond to
 - Increased service period
 - Ceramic component replacement cheaper than an entire back plate
- Cons:
 - Increased cost of installation



DOUBLE MECHANICAL – TWIN CARBON TO CERAMIC FACES – FULLY ENCLOSED

- Pros:
 - Seal faces are constantly bathed in liquid
 - Back seal can be swapped for front in case of an emergency
 - Cleanest of all the options
 - Lowest service factor of all seal options
- Cons:
 - Most Expensive option
 - Harder to service due to complexity
 - Double the replacement parts during service
 - Ideally should have a treated water supply for the flush.

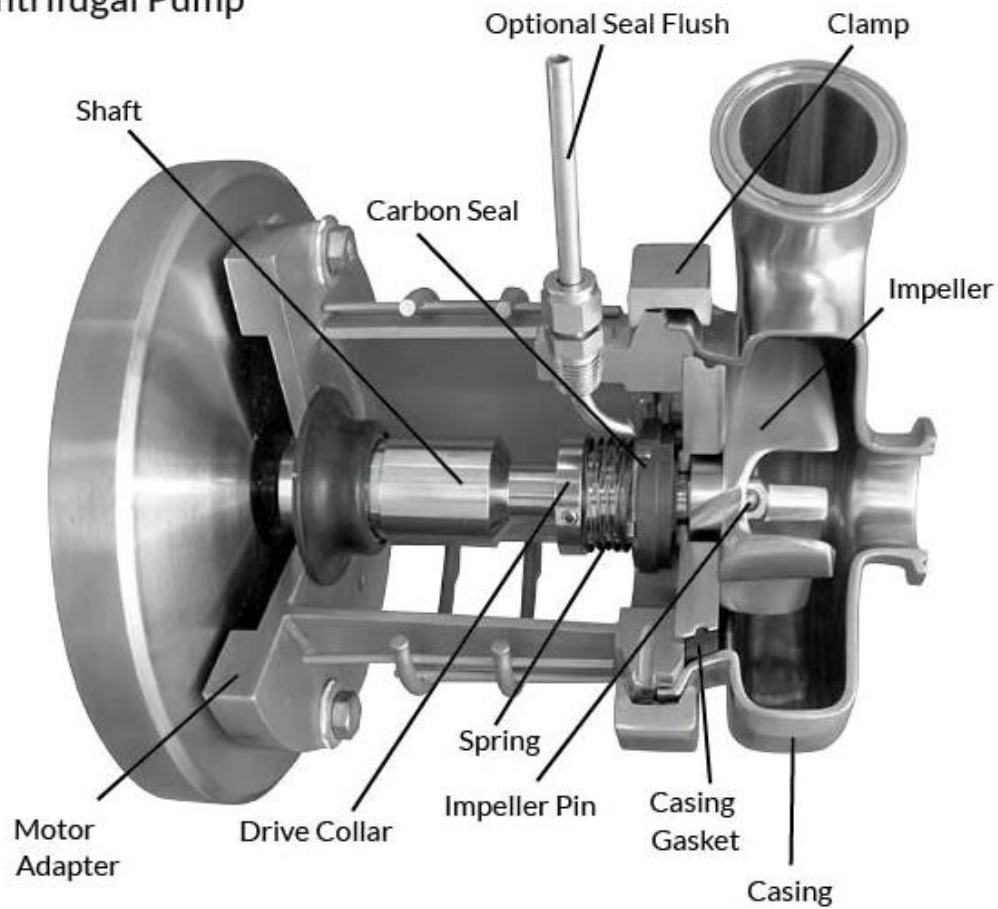


COMMON SEAL ISSUES

- Chipping
- Cracking
- Improper Installation
- Non OEM parts used in replacement
- Mechanical Separation of the Drive Collar from the shaft
- Impact Damage – Physical shock from foreign objects
- Improper clearance between the internal spaces of the pump and the impeller.



Centrifugal Pump



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CAVITATION

- 1.) What is it?
- 2.) Why does it occur?
- 3.) How do we avoid it?



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WHAT IS IT?

- Simply put, cavitation occurs when your pump starts to pull a vacuum or reaches an inlet pressure low enough for the liquid in your pump to boil at room temperature. The hotter the liquid the worse the effect.
- Some symptoms are:
- Your pump sounds like it has gravel in it.
- Frost like patterns or nicks and cuts appear on the face of your impeller and back plate.
- Liquid temperatures post pump can fluctuate wildly.



WHY DOES IT OCCUR?

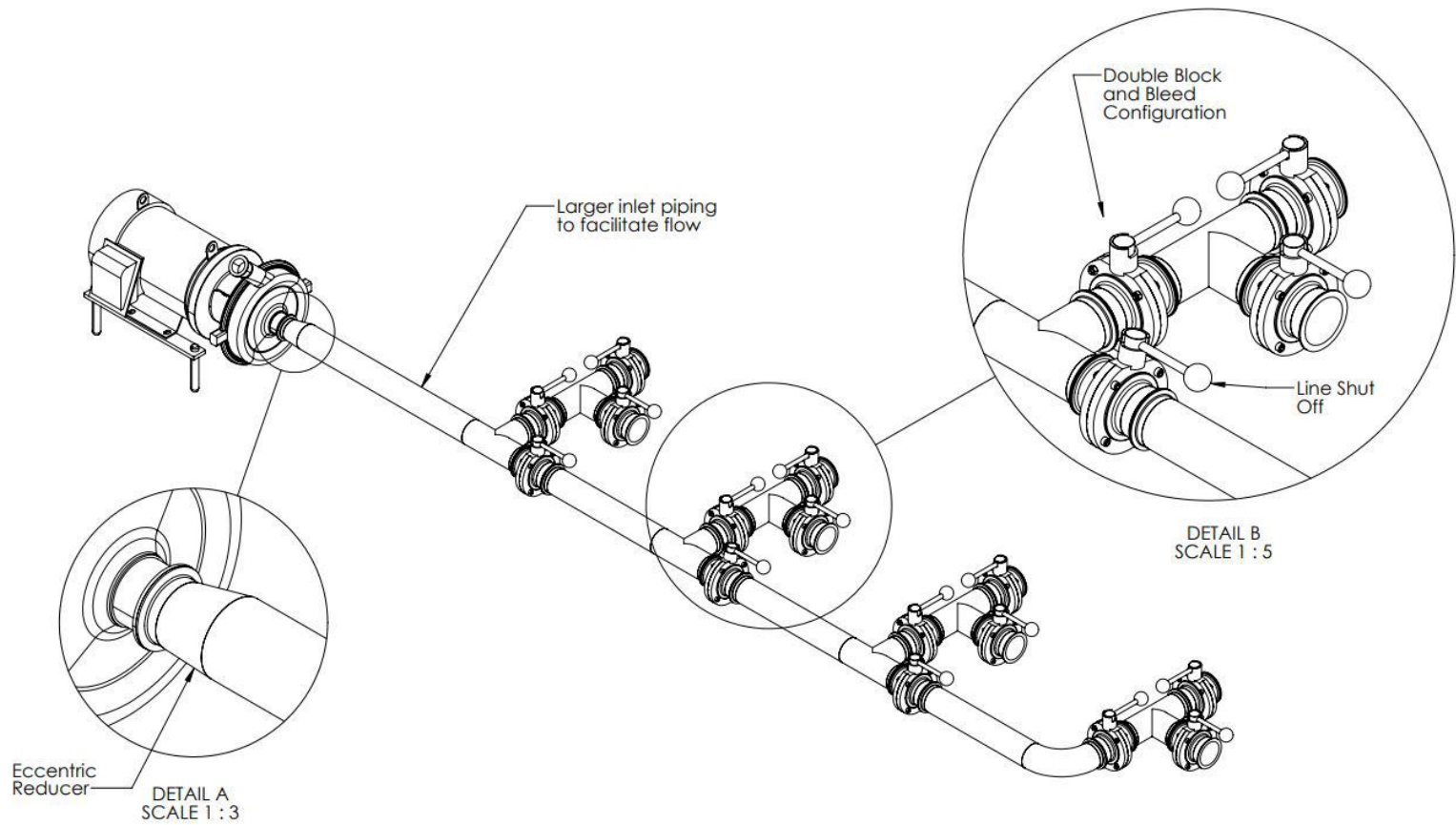
- Cavitation is almost always related to a drop in inlet pressure at the pump.
- The inlet piping is sized incorrectly for the application...
- Or
- There is an obstruction in the line restricting inlet flow and causing a low pressure situation.



HOW DO WE AVOID CAVITATION?

- Calculate the proper inlet piping for your pump.
- Size and length matter.
- The more direct line the liquid takes to the pump the better.
- The shorter the path, the better.
- In some instances you can trim the impeller.
- Avoid multiple connection points in a line and if you must have them, make sure all connections are tight and sealed.





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YOUR PUMP'S MOTOR THE OTHER SIDE OF THE EQUATION

Using the correct Horsepower and RPM to deliver success.

Do I need a VFD?

What can fail in my motor that will effect my pump?

Single phase or three phase power?



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WHEN TO REPLACE A PUMP?

- If you treat your pump right, it should be in service for many years.
- In my experience the majority of, “Total,” pump failures are caused by foreign object damage or failure to service them at regular intervals.
- If your pump makes a weird noise, it’s talking to you and telling you, something is wrong.





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