

# Submersible pumps in underground face and sump installations

Mining product & application spotlight



July 2025



# Presenters



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# Host & Housekeeping



**Everyone is in listen only mode**

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**Your cameras are turned off**

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**Raise your hand for technical support**

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**Q & A**

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**This webinar is being recorded!**

A follow up email will be sent to all registrants and will include:

- A link to the recording
- A link to the presentation in PDF format

# Agenda

- Introduction to sump and face dewatering
- Typical U/G sumps design, layout and best practices
- Common issues related to sump design, installations and the application
- Installation, commissioning and operation best practices
- Question & Answers



# Mine Water Life Cycle

Our touch point within mining spans the complete water life cycle through all mining types, mining infrastructure an applications.

## Connection to Water

Source Water



Water Management



Off Site Discharge





# Water cycle in underground mines



Aboveground source water supply

- High dissolved solids
- Low suspended solids
- Relatively clean water
- Water salinity can be high



Underground dewatering

- High dissolved solids
- High suspended solids
- Silt and sand
- Dirty water

# Sump & face dewatering

**Sump dewatering** is the removal of unwanted excess water and any water which flows down declines and drives using sumps which were created during the development of declines and drives.

**Face dewatering** is the removal of unwanted water at working headings or faces during drilling.

The water is typically pumped using smaller portable electrical submersible pumps.



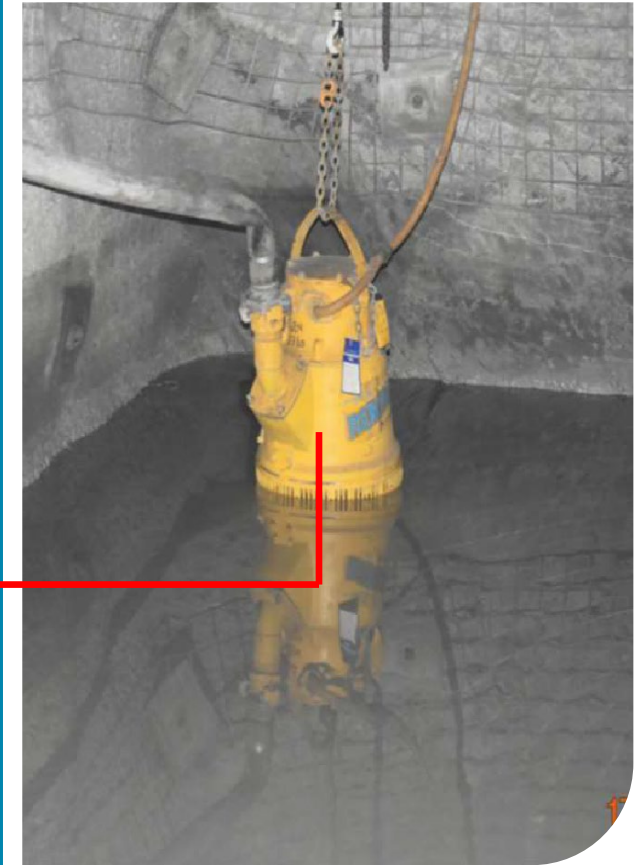
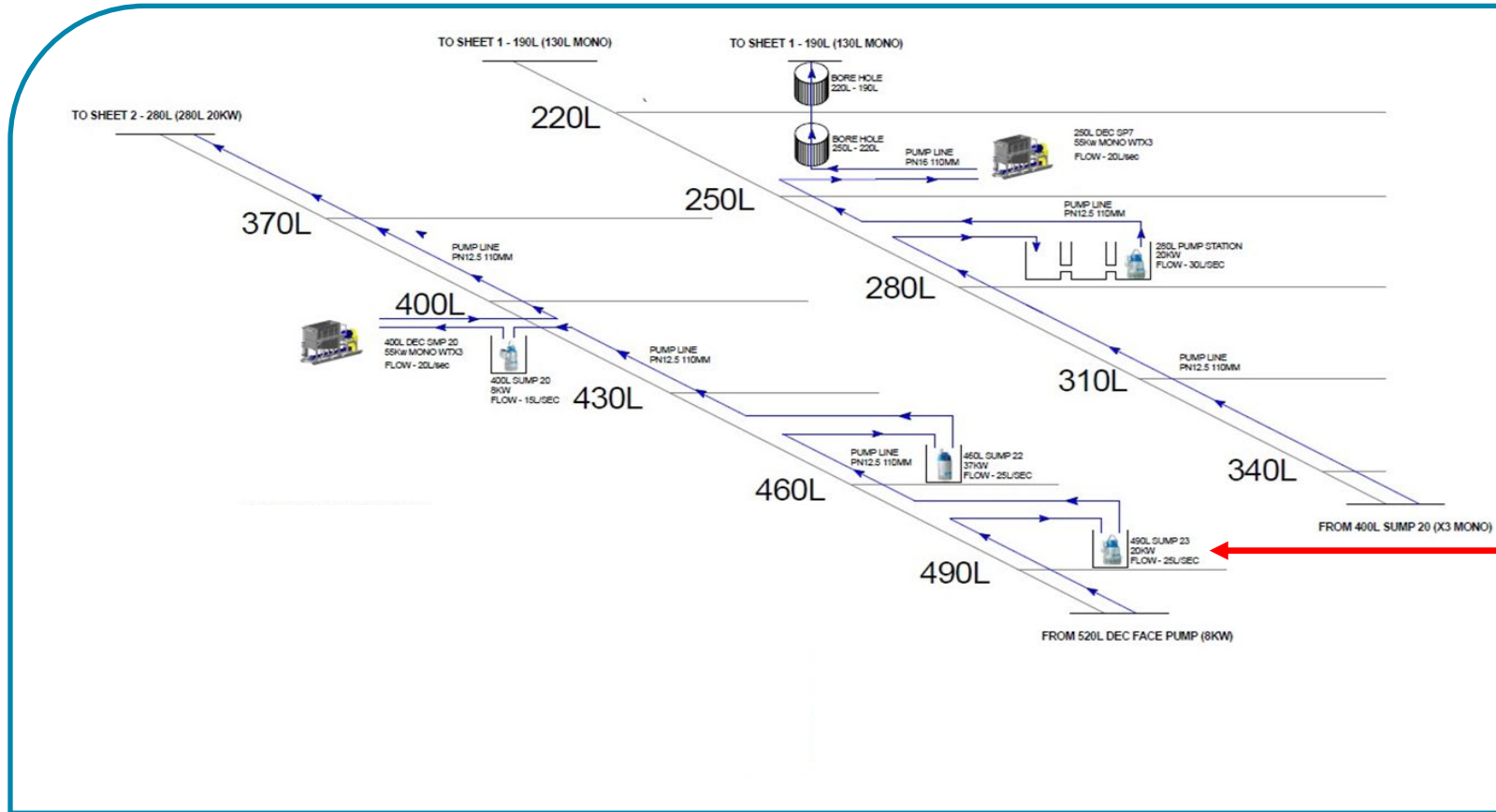
# Typical mine face dewatering system layout



Pumps are used at the face to remove ground water and drill hole flushing water where machines are drilling. The pump is positioned at the lowest point. The water from face is pumped to the closest sump.



# Typical mine sump dewatering system layout



Pumps are installed in working levels or on declines to capture water and pump it to higher head staging pumps.

Underground dewatering

# Inground and Mobile Sumps

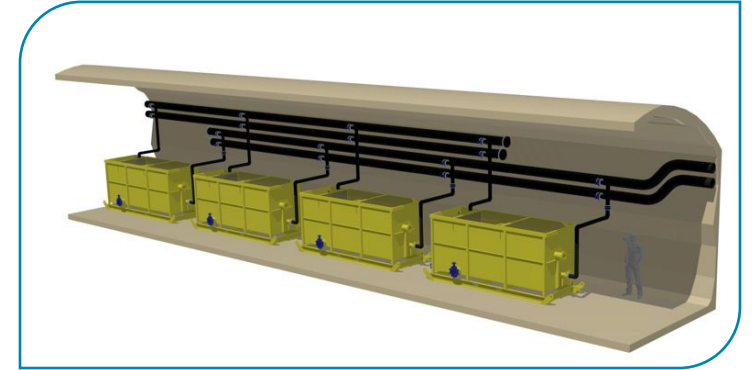
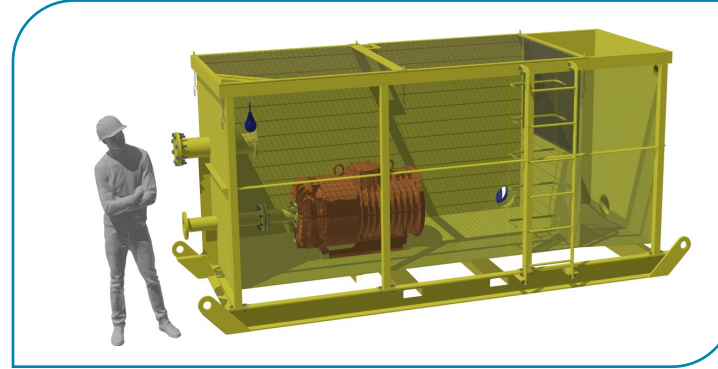
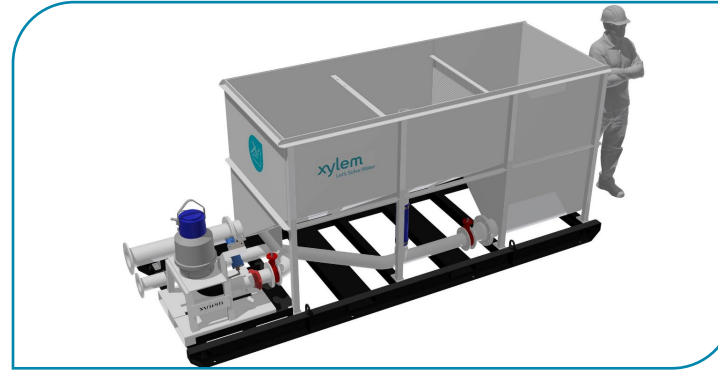


Inground sump



Hopper(Mobile sump)

# Typical mobile sump installations





# Typical inground sumps installations



# Why good practice of sump design is important

A pump and sump system is a foundational part of a mine's operations, including pipes and handling equipment.

Having a good dewatering strategy and system design in place, enables production activities.

- **Extends** pumping equipment life cycle.
- **Ensures mine operation reliability**, leading to less downtime, maintenance, wear and tear, manpower.
- **Reduces hazards**, creating safer working conditions for mining professionals.
- **Protects the environment** by preventing groundwater contamination and reducing flood risk.
- **Mitigate abrasion and pump clogging**, which can lead to pump failure.
- **Lowers operational costs** of dewatering.





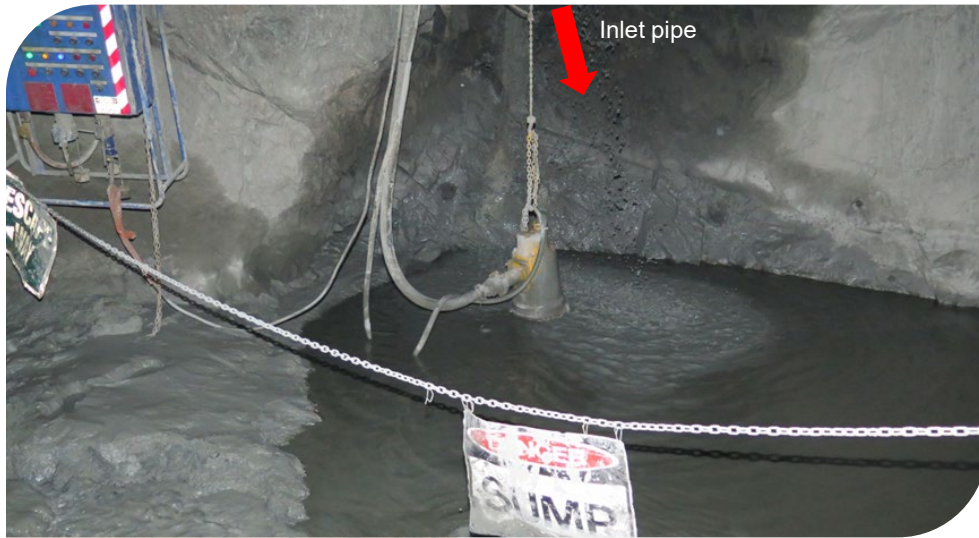
# Sump equipment and accessories - best practices

- The pump should be suspended preferably by using a chain block as it allows the pump to be lifted when it is time to clean the sump and preventing it from sitting on the bottom of the sump in sediment.
- The pump power cable should be suspended to prevent damage.
- The discharge hose should be installed and supported to prevent kinking which will restrict pump flow.
- Suitable size discharge hose, generally 3".
- Non return valve should be fitted on discharge line.
- The area should be barricaded for safety and to prevent unauthorized access.

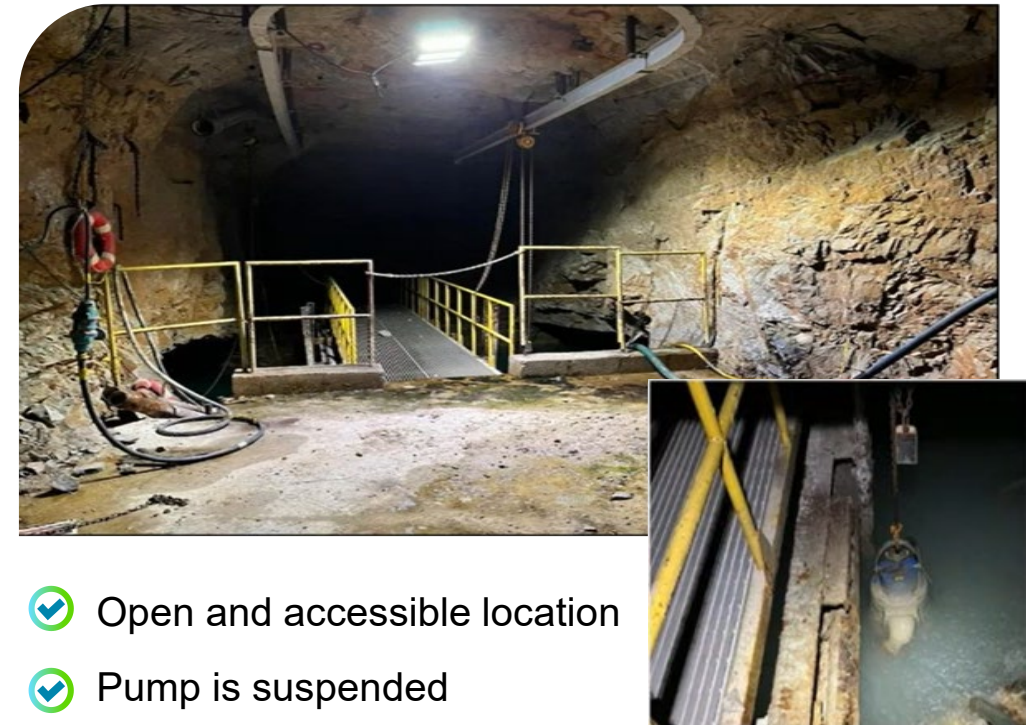




# Good vs better sump design



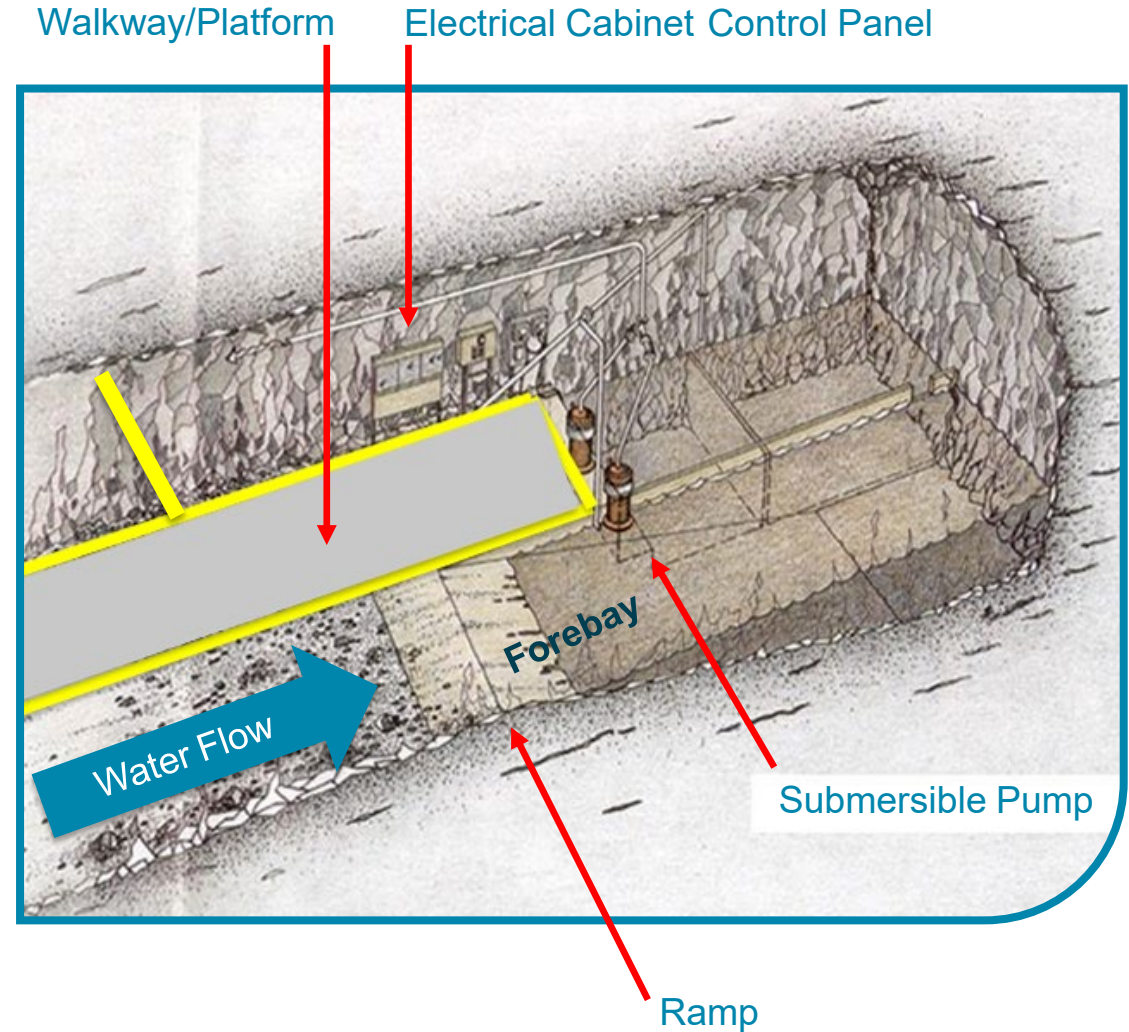
- ✓ Open and accessible location
- ✓ Pump is suspended
- ✓ Discharge pipe and power cable are supported
- Basic safety measures
- No overhead lighting
- Access point for pump maintenance and operation is not ideal.
- Water inlet pipe is above the pump. The pump should be located away from inlet pipe to allow solids to settle first.



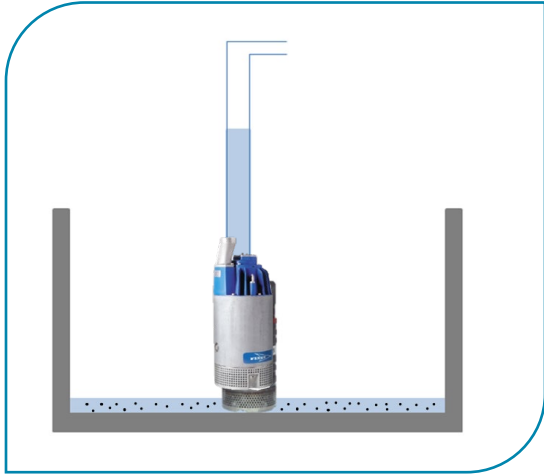
- ✓ Open and accessible location
- ✓ Pump is suspended
- ✓ Walkway for safe access
- ✓ Improved safety measures
- ✓ Overhead lighting
- ✓ Crane for easy pump removal



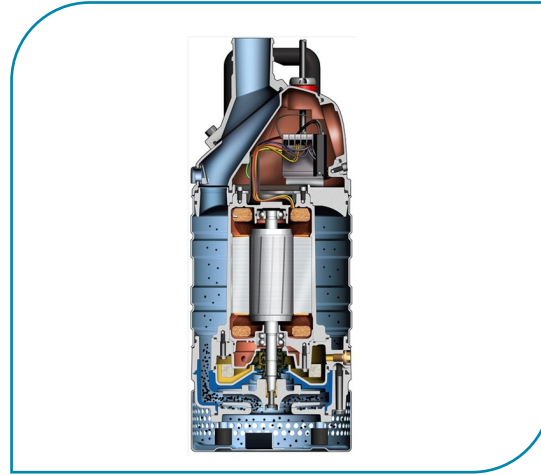
# An Ideal inground sump design / layout



# Pump snoring



Low water level



Solids recirculation



Air entrainment



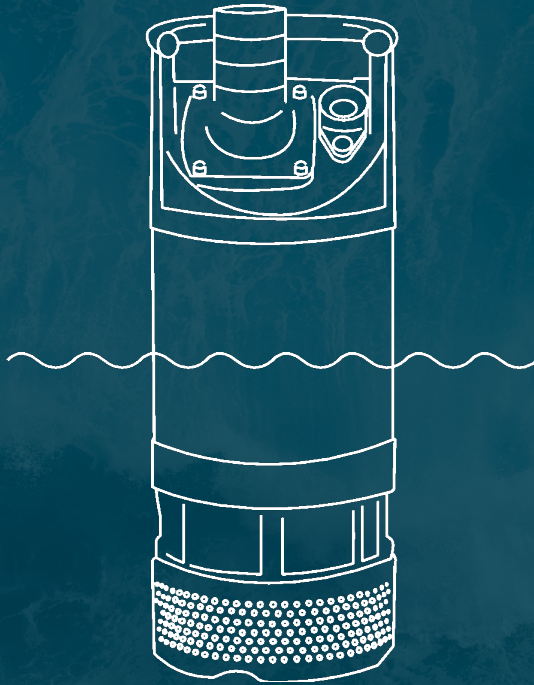
Pump strainer

Snoring is when the pump is fed too little water to pump continuously and intermittently sucks air. This condition starts when pump is operating at low water level where pump strainer is partially submerged.

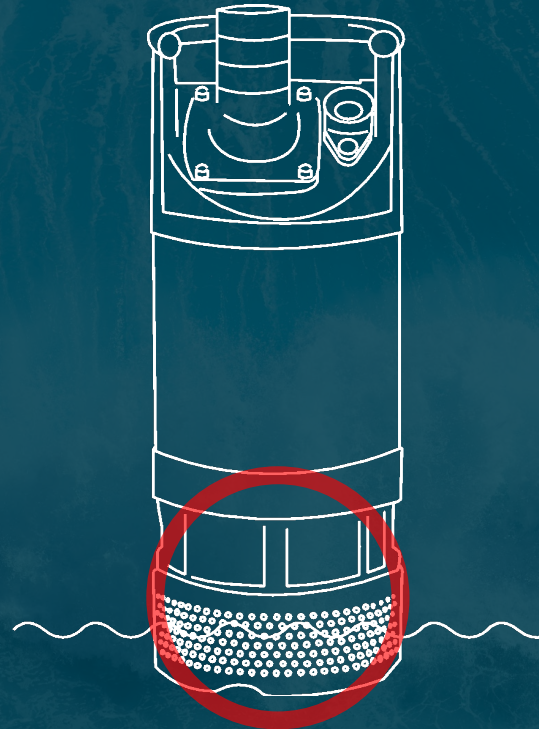


# Low water level issues

Pumping water



Snoring



Wear

Dry running



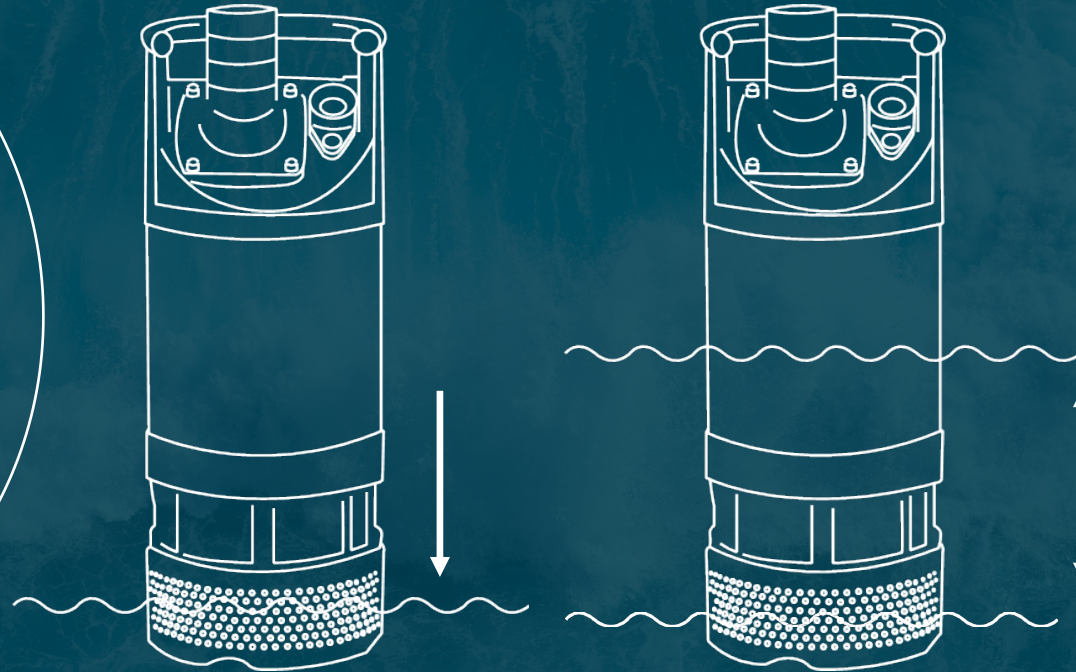
Overheating



# Solution: Snoring Detection and Level Control

1. Snore point is identified and set as the low water level for pumping

- Snore detection is set in pump controller.
- The controller will detect snore condition based on current changes.
- Pump will run short period at this level before it is automatically switched off.



2. Setting active sump volume

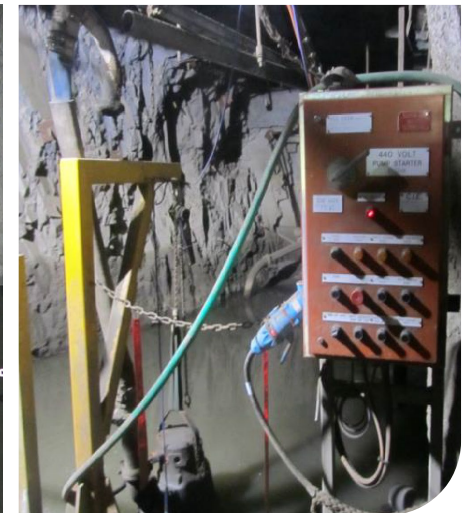
- Top water level is set using float switch or level sensor.
- Pump will operate between two pre-set levels.
- The delta between the two levels is called the active operating volume.

# Control panel design and layout

- The control panel should be located near the pump in a dry and accessible location.
- The panel is designed and built to meet local electrical and mining regulations.
- Sized to cover a range of pump kW ratings and voltage.
- Can be built free standing or in a hanging frame.
- Xylem's Pareo controller is available for order.

## Features and Benefits include:

- Mains Isolator
- Earth fault protection
- Overload protection
- Earth continuity monitoring
- **Snore control – stops the pump when the water level is low and starts the pump after a set time.**
- Float control if required





# Common issues related to sump design & maintenance

Frequent starts & stops of the pump due to low active volume between **Top** and **Bottom** water levels.

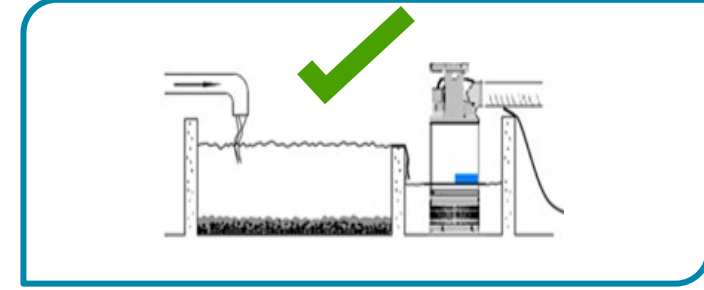
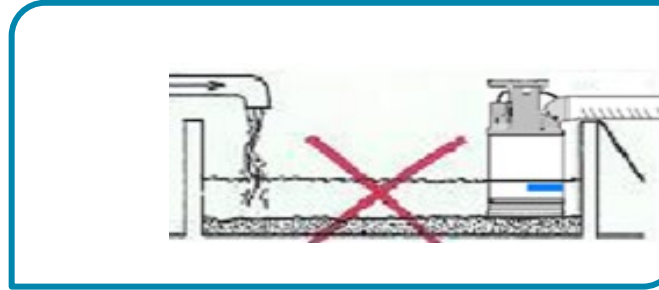
Regular sump cleaning is neglected resulting in:

- Active sump volume and capacity shrinking due to solids buildup
- The incoming flow to the pump is restricted.
- The pump is buried under the sediment and starts to pump solids until eventually clogs.



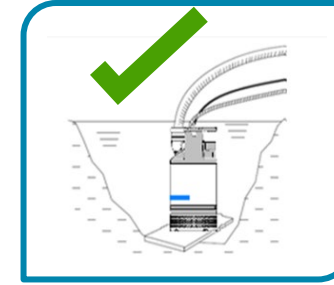
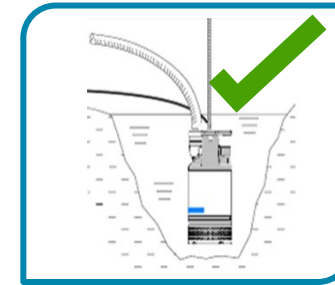
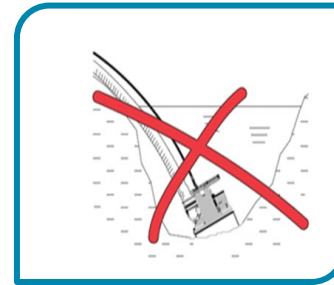
# Common issues related to installation/commissioning

In mobile sumps it is recommended to use a settling chamber prior to the pump chamber to prevent solids from entering the pump as much as possible.



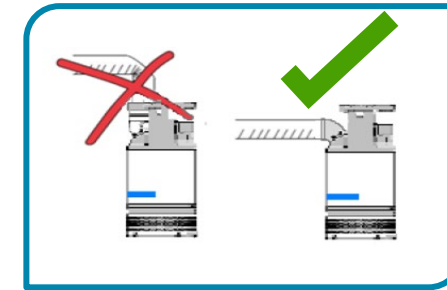
The pump is sitting in sediment and its strainer is partially blocked. Pump should be suspended using a chain or elevated using a plate and relocated to a deeper area of the sump.

Wrong size of discharge pipe is connected



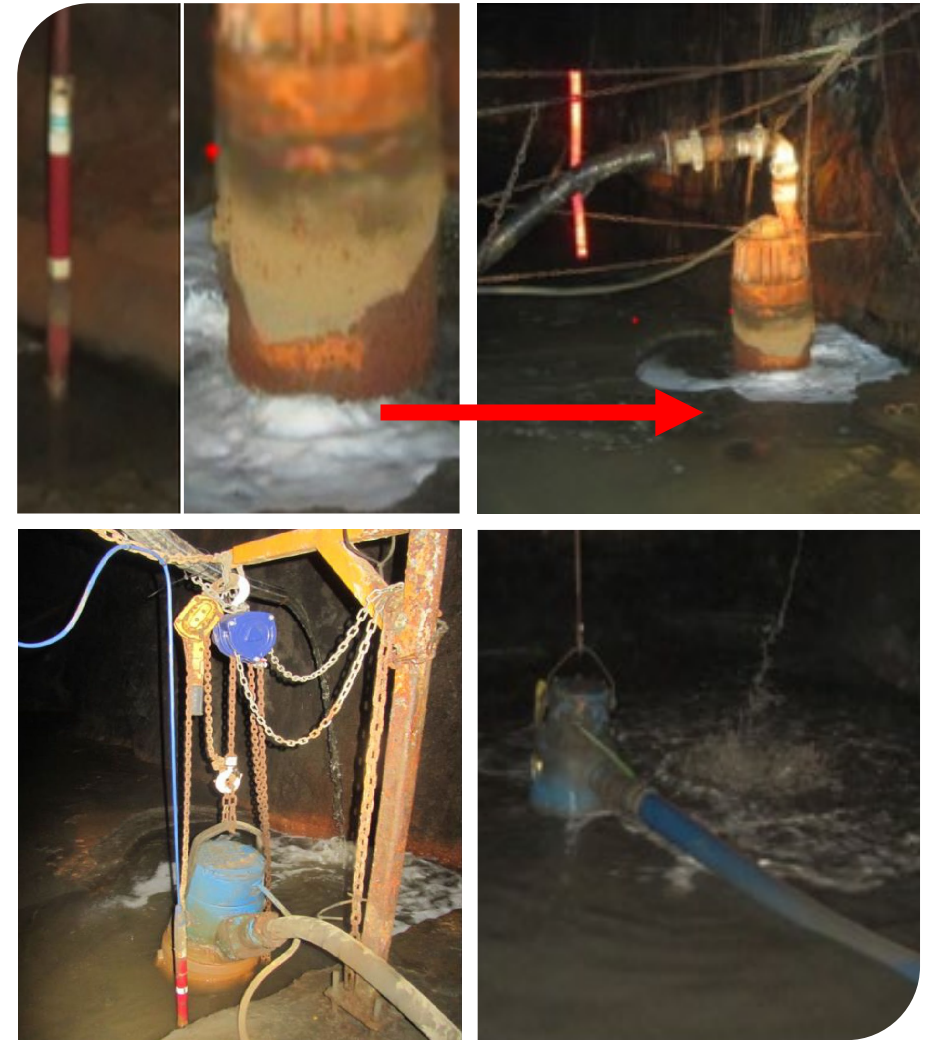
The discharge hose is not supported properly. Hose kinking restricts pump flow.

Power cable is not supported correctly.



# Common issues related to installation/commissioning

- Snore control is not set correctly or not connected, pump will run continuously under snore/dry conditions or frequently start & stop resulting in potential motor failure.
- Level float switches or level sensors are not set correctly or not connected, pump is constantly running at low water level and sometimes dry, resulting in performance reduction and pump failure.
- Non return valve is not installed resulting in water flowing back to the pump/sump through the discharge pipe.





## Poll question

Have you experienced any premature pump failures due to installation issues?

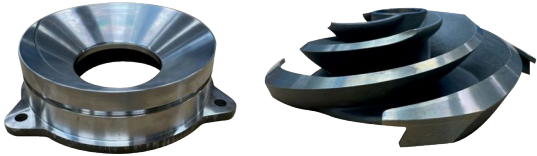
# Shotcrete and fibers



**Shotcrete clogs pumps and causes premature wear/failure**

# Shotcrete and fibers

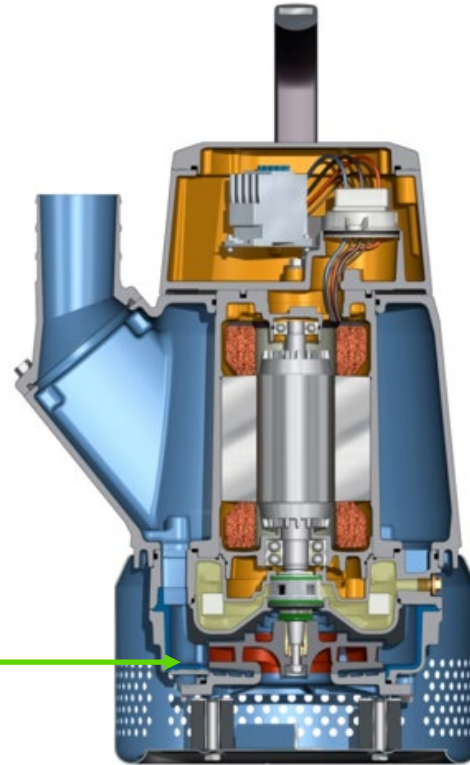
V Impeller



Close Impeller



Semi Open Impeller



Enclosed impeller Vs Semi open



# Godwin Rig Pump

REMOVING WATER SAFELY AND RELIABLY  
EVEN IN THE HARSHTEST OF CONDITIONS





# Godwin Rig Pump Operation – Simplicity and Safety

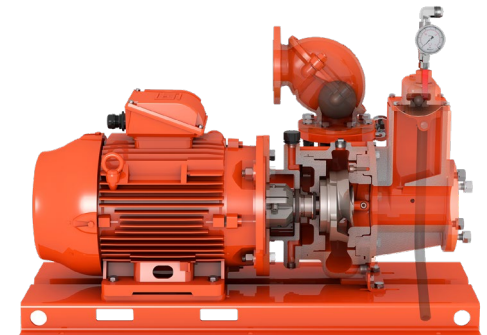


- **Suction line and pan strainer**

- No power cables at the face
- Pump and people safely away from most hazardous areas
- Light and easy to handle
- Self-priming

- **Cabin operated**

- Power on / off switch from safety of drill rig cabin
- Air operated on / off valve on frame





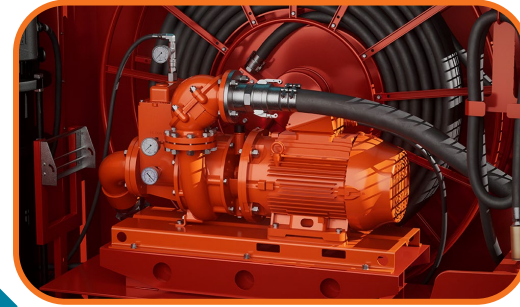
# Face Dewatering: Traditional vs Rig Pump

## Traditional Face Dewatering



Drilling rig operators and miners are forced to manually move submersible pumps around the face to dewater the area as well as avoid damage from drill rig movements and rock fall.

## Rig Pump Dewatering



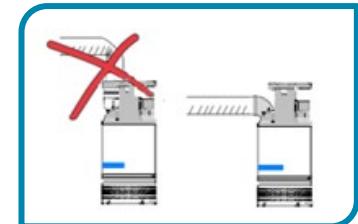
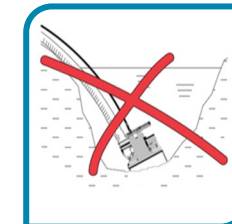
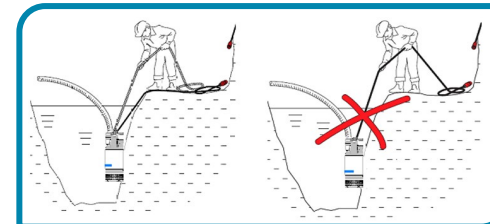
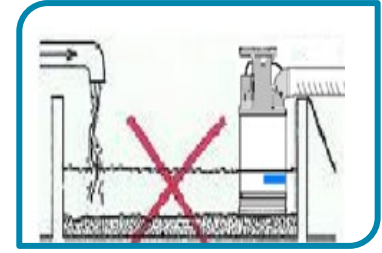
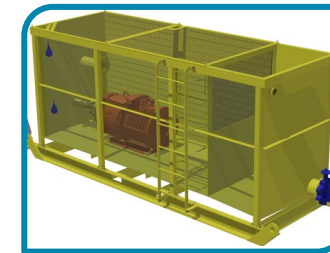
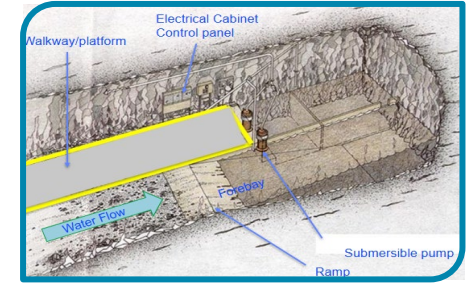
The pump is mounted and installed to the drilling rig, which eliminates the safety hazard of pump trailing power cables. Reduces operator and asset exposure at the mine face and allows operator to operate the pump from the safety of the drill rig.

## Poll question

Do you use submersibles or rig mounted pumps at the face?

# Key take away points - Sump design and Installation

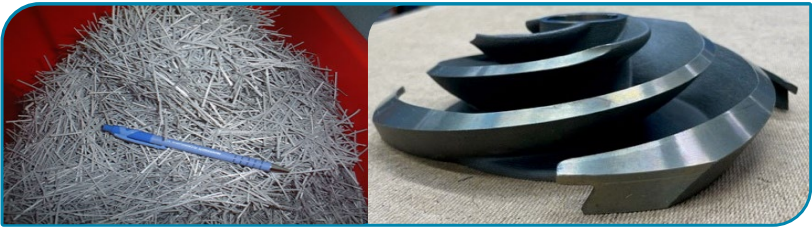
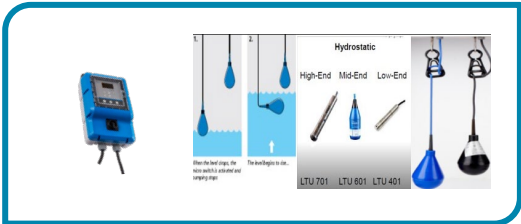
- Following sump design recommendations and good practices will extend the life cycle of the pump, reduce production downtime and provide a safer working condition for the miners.
- Sump maintenance i.e. periodical cleaning is critical for a smooth and continuous pump operation.
- In some cases, it may be more effective to maintain the solids in suspension and pump it out of the mine. This will require pumps which can handle solids and an agitation system, contact Xylem for info.
- For mobile sumps consider using a primary overflow weir or a screen.
- Follow pump installation recommendations is essential for a healthy pump operation and maintenance







# Key take away points- Application & Operation

- Use control devices such as level sensors, snore control, float switches, control panels, etc' to control the operating philosophy of the pump in the sump.
- Snore control not set correctly or switched to manual can lead to premature failures.
- Shotcrete can find its way into the sump and can cause pump clogging, wear and failure. Optional semi-open impeller for shotcrete fibre handling available.
- Water quality analysis including solids content is critical for pump selection.
- Audit tools for installation/application assessment can be offered as a service from your regional Xylem dewatering team.



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Comments / Remarks:

Pump discharge leaking, meaning pump will be moving water but also recycling water straight back into the sump.  
Pump was bogged into the silt/sediment meaning it is introducing more solids into the next level or mono pump.  
This will cause extra wear on every pump involved. Reduced sump volume also means less effective storage – more frequent starts / shorter run cycles reduced service life

## Poll question

Would you like a Xylem mining specialist to contact you with more information?

# Questions & Answers



Please click the Q&A icon and type your question directly into this window



If we don't get to your question, we will follow up directly via phone or email offline



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