

Guidelines for purchasing a pump

- Test details/certificate on your unit.
- Unpack the unit carefully to avoid damage to motor, pump or lead-out cable.
- Compare motor, pump and control equipment to ensure that they match.
- Check the power source with a voltmeter and compare with the motor and control box or starter.
- Ensure that sufficient earthing is present. The earthwire should be at least equivalent to motor drop cable size and preferable stainless steel.
- Ensure that the correct length of surface and submersible cable is selected.
- Check the borehole depth and rest water level.
- Ideally the motor should be set just above the level at which water enters the borehole, if this level is uncertain a "flow inducer" must be fitted.
- Check that sufficient drop pipe, GMS, HDPE or Boreline pipe is available to correctly position the pump in the borehole.
- Check that the rest of the essential components for the installation are available: borehole base plate, fittings, valves, cable clips and other fittings necessary for your surface reticulation.
- Make sure you have the correct motor protection with correct selection of thermal overload relays, conforming to VDE standards.

Requirements for installing a pump

Please note: Failure to comply with the essential electrical requirements will invalidate the warranty of the pump unit in the event of a claim.

Transformer capacity required for submersible pumps:

Three phase distribution transformers must be adequately sized to satisfy the kVA requirements of the submersible motor. When transformers are too small to supply the load there is a reduction in voltage to the motor.

Use of engine driven generators:

Generators must be sized to deliver at least 65% of the rated voltage during motor starting to ensure adequate motor starting torque. Besides sizing, generator frequency is important as the motor speed varies with the frequency (Hz). Due to pump affinity laws, a pump running at 1 to 2 Hz below design frequency will not meet its performance.

Conversely, a pump running at 1 to 2 Hz above design frequency may overload the motor. Always start the generator before the motor is started and always stop the motor before the generator is shut down.

Cables for submersible motors must be suitable for submerged operation and adequate in size, to operate within rated temperature and maintain required voltage at the motor. The cable selected may not exceed a 5% voltage drop at maximum rated running current. Cable temperature and starting Voltages must also be checked.

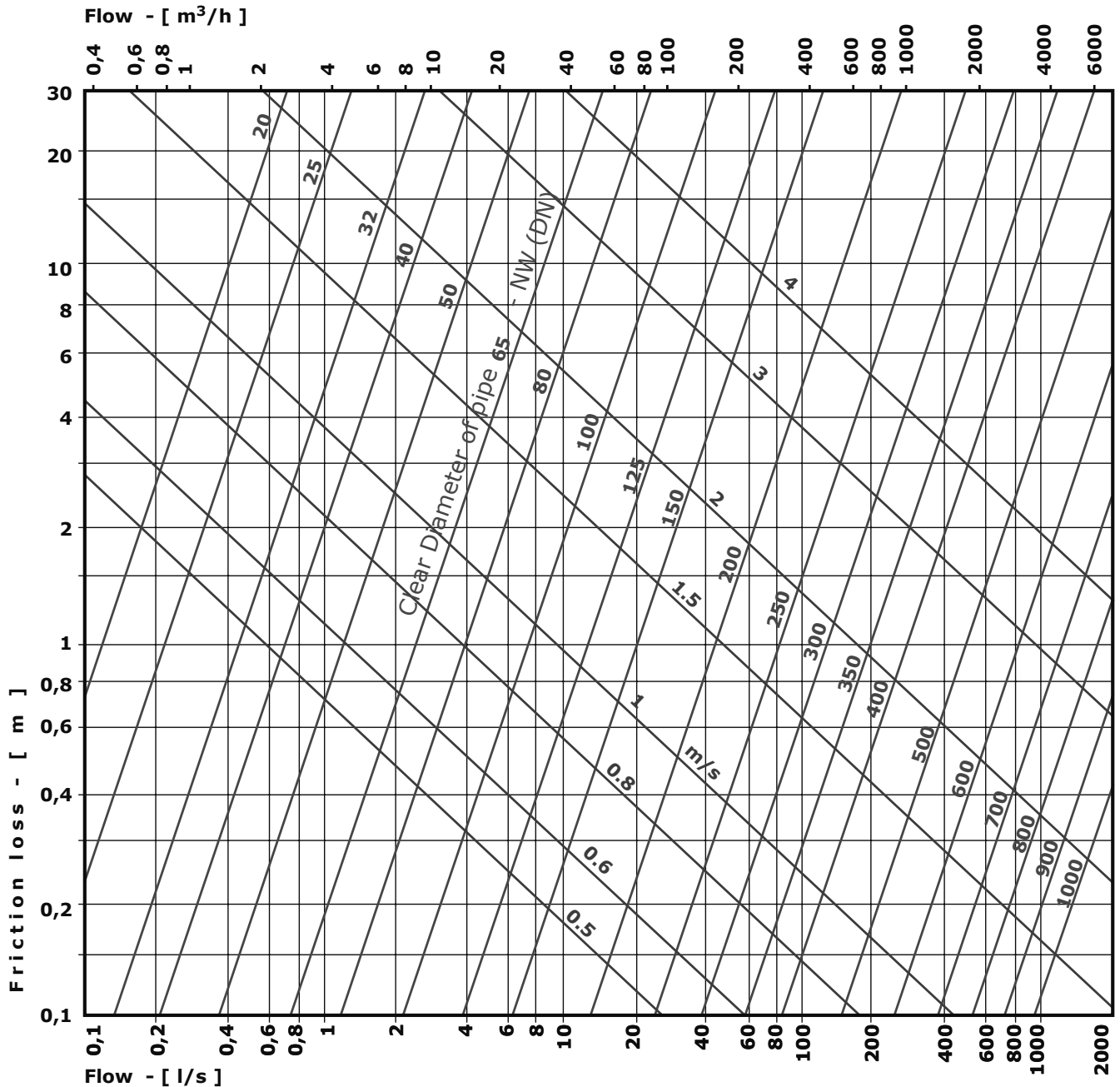
Water temperature and flow:

The submersible motors are designed to operate under load in a maximum water temperature up to 30°C.

If the operation is above 30°C moving water, the motor rating must be increased to maintain safe motor operating temperatures.

GUIDELINES AND REQUIREMENTS

Friction loss chart

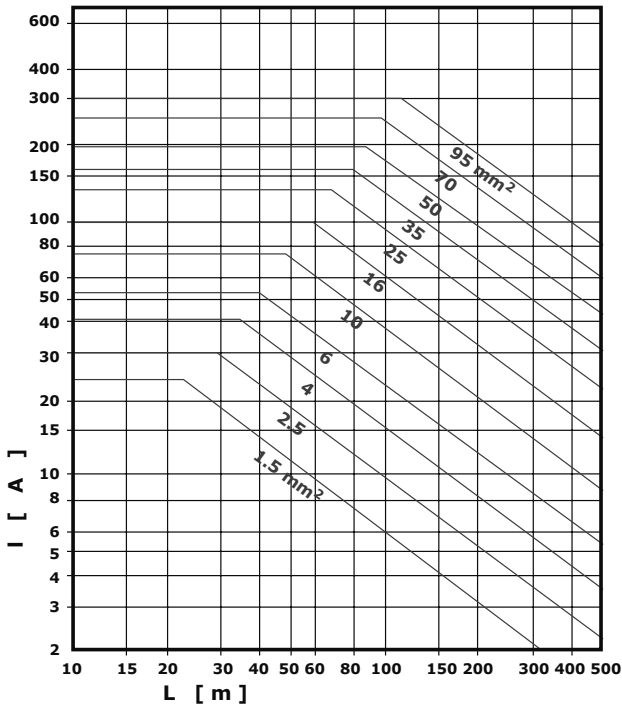


Friction loss in metres for 100m new pipeline of cast iron

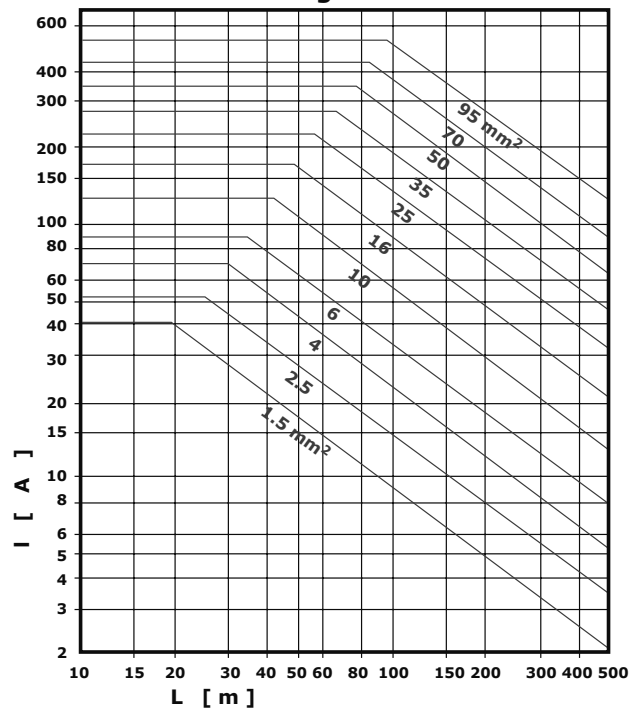
The friction loss for:	
New rolled steel pipes :	0.8 times
New plastic pipes:	0.8 times
Older, rusty cast iron pipes about:	1.25 times
Pipes with encrustations up to:	1.7 times

To determine the cable diameter take note that the voltage losses should not exceed 3%. For your selection take into account all regulations of local electricity supply boards and end users' requirements for an economic operation of the installation.

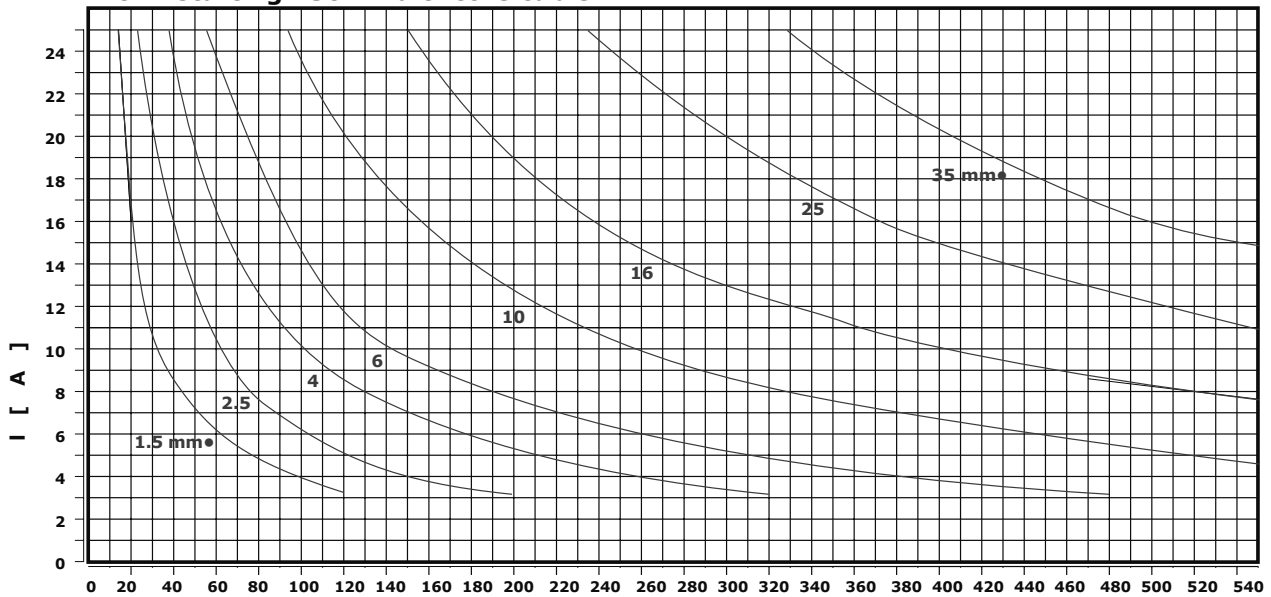
D.O.L. starting 400V multi-core cable



Star Delta starting 400V multi-core cable



D.O.L. starting 230V multi-core cable



LIGHTNING PROTECTION

for submersible motors



High voltage surges travel through power lines looking for the best and closest connection to ground. Given the fact that true ground is the water strata below the earth's surface and that a borehole pump is submerged into this strata, the surge will dissipate into the water through the windings of the motor.

A surge is over within a fraction of a second and completely untraceable without lightning protection. The surge has jeopardized the insulation integrity thus creating a "short circuit to earth".

Only at next start up or if the motor was currently running, the real damage occurs. Due to the current dissipating to earth, severe burning of windings and insulation will result in damaging the motor.

All submersible motors are susceptible to this hazard. **To replace the motor is more expensive than fitting proper protection.**

To provide motor surge protection, the high voltage surge should be discharged through an arrestor to a true ground. True ground being the water strata just below the earth's surface. If the lightning arrestor ground is not properly connected, inadequate protection is provided.

A lightning arrestor is merely a device which connects the supply lines to ground when activated by high voltage. If the arrestor ground is not as good as that of the motor, most of the high voltage surge will go to ground through the motor and damage the motor windings, even though a lightning arrestor is installed.

For all single phase and three phase motors, above-ground protection is furnished in the el-pro or super el-pro motor control panels.

1. The best possible protection exists when the well metal casing extends to within 6 meters of the motor. In this situation the arrestor should be grounded to the well casing by means of a 6 mm² or larger bare copper wire.

2. Earthing between the motor control panel and metal rising main provides adequate protection.

3. If PVC (plastic) casings and HDPE pipe or Boreline is used, then protection is only provided if the arrestor is grounded to a 6 mm² or larger bare copper wire run with the power cable to the motor stud. This wire should also be connected to the top of the well.

All connections must be clean and tight and should be with screw terminals or stainless steel water pipe clamps. If unsuitable connections are made proper grounding is not achieved.

If the submersible pump installation is not done according the code of practice as laid down by the Borehole Water Association and no el-pro or super el-pro is protecting the elsumo pump unit warranty will only be considered after the Elsumo claim report is completed and a thorough investigation has been conducted.