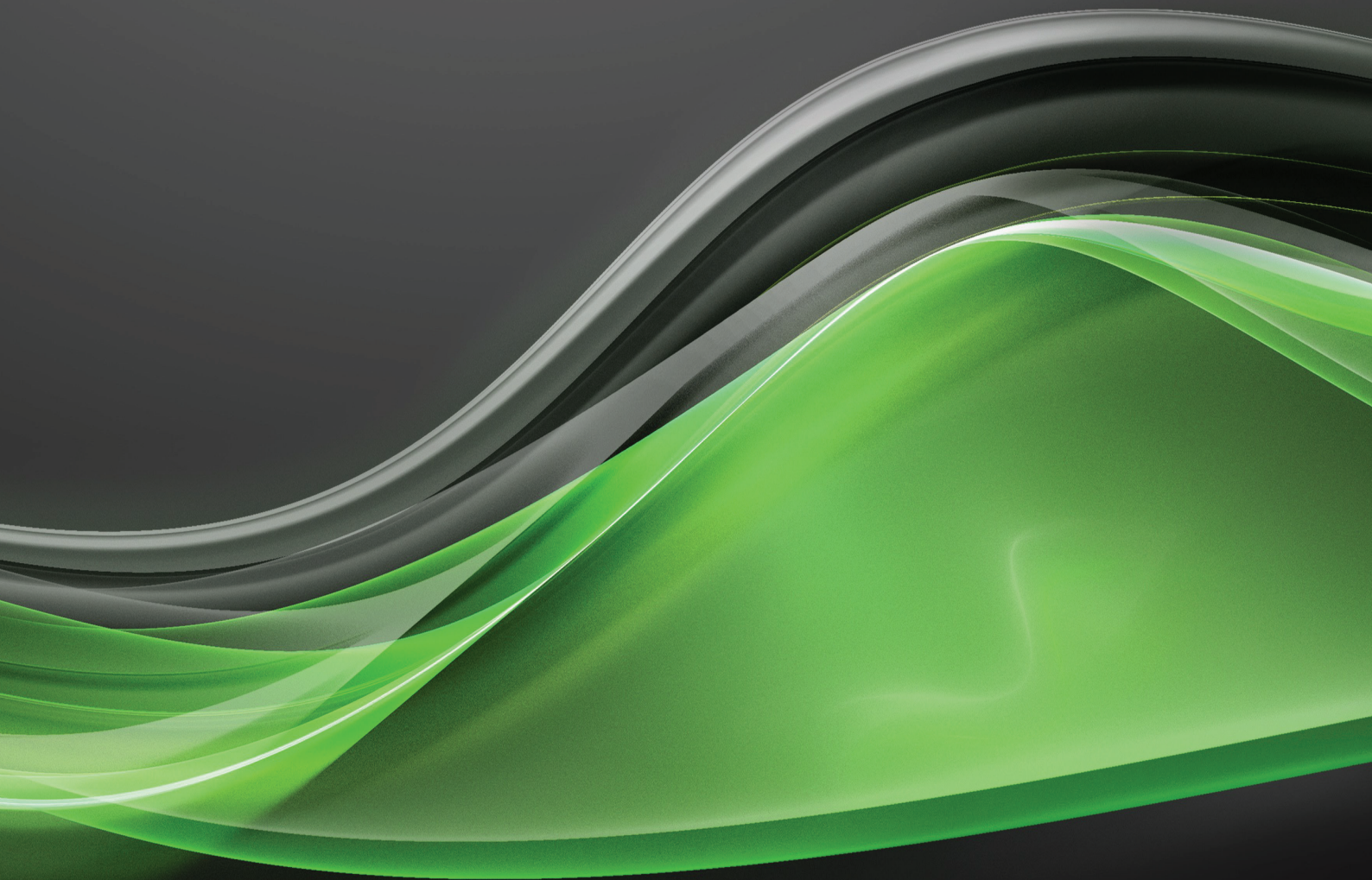




FIGHT CORROSION AND WATER CONTAMINATION WITH

FRP PUMP COLUMN FRP BORE CASING



Permaglass FRP bore casing is corrosion resistant, lightweight and extremely strong making it the perfect material for lining groundwater bores. It will outlast any other material in corrosive and/or warm water conditions. In addition to corrosion resistance, Permaglass bore casing has high external collapse ratings, making it suitable for extremely deep installations.

Permaglass FRP bore casing is designed to BS7159, manufactured to AS2634 and ISO9001 for quality procedures.

Permaglass bore casing has been in service for over 30 years. Compare the service life and installation benefits against stainless steel, galvanised steel, ABS, PVC, etc. and you will see that Permaglass bore casing is the perfect choice for aggressive water and/or deep installations.

APPLICATIONS:

- Salt, brackish or low pH water bores
- Potable water bores (AS4020 approved)
- Dewatering bores
- Service bores to underground operations

FITTINGS AND ADAPTERS:

- Stainless steel crossovers
- Flanges
- Reducers - fabricated in FRP
- Threaded / plain adaptors in stainless steel

FEATURES / BENEFITS:

- Corrosion resistant
- Kwik-Lok joints
- Lightweight casing
- High external collapse
- Handles up to 100°C
(Contact Advanced Pump Technologies for temperatures greater than 80°C)
- Readily available
- Resistant to lightning conductivity
- AS4020 approved
- Resin sealed slotted pipe available
- FRAS (Fire Resistant Anti Static) available
- Australian owned
- AS/NZS ISO 9001:2008



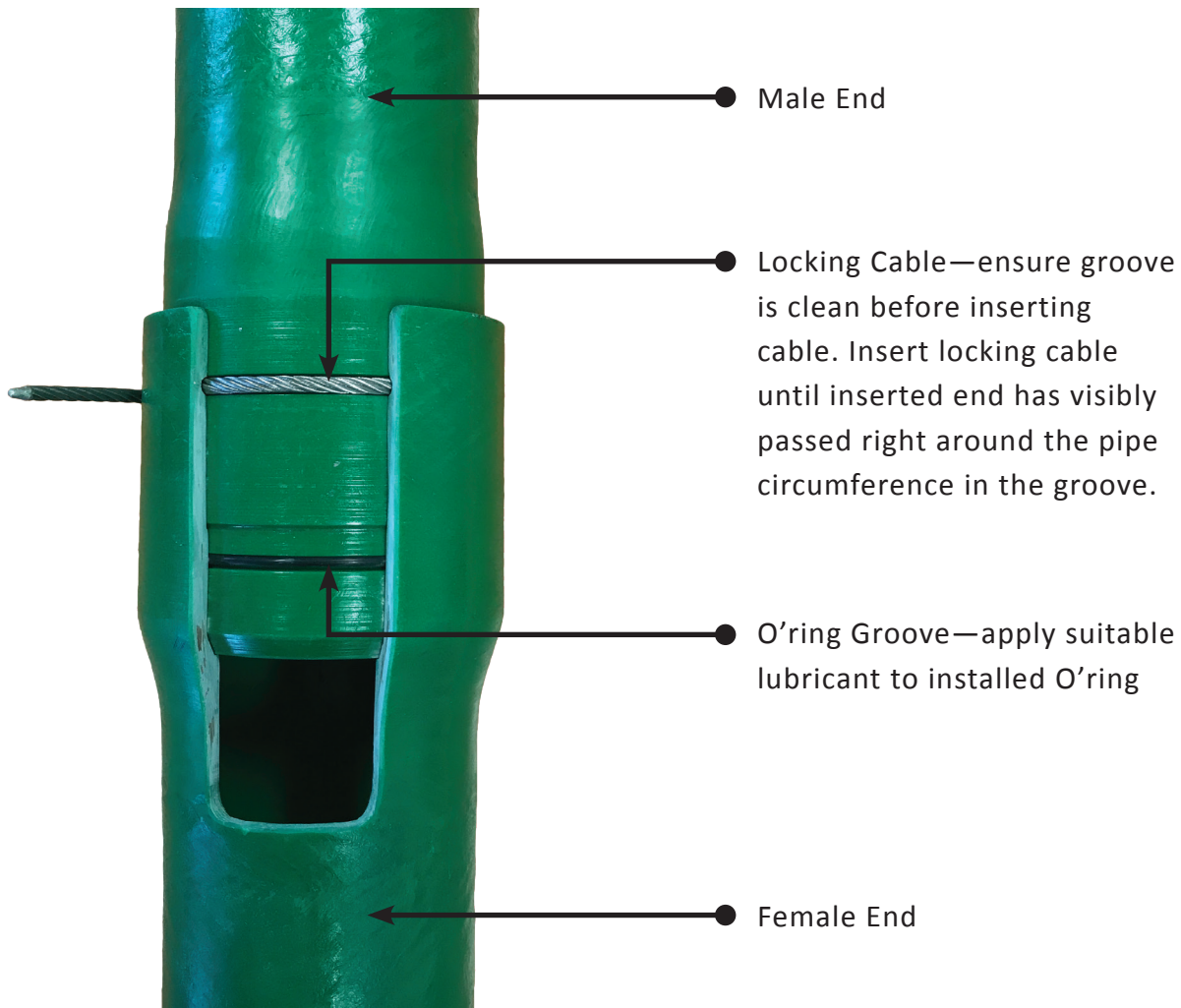
BORE CASING SPECIFICATIONS

| Nominal Size mm (In) | Wall Thickness mm | Internal Diameter mm (In) | Coupling O.D. mm (In) | Operating Collapse Kpa | Ultimate Collapse Kpa | Max. Internal Pressure Kpa | Max. Tensile Load Kg | Weight Kg/m |
|----------------------|--|---------------------------|-----------------------|------------------------|-----------------------|----------------------------|----------------------|-------------|
| 75 (3) | 5 | 76 (3) | 109 (4.3) | 4330 | 6490 | 6440 | 3790 | 2.4 |
| 75 (3) | 6.5 | 76 (3) | 112 (4.4) | 9230 | 13850 | 8420 | 5150 | 3.1 |
| | | | | | | | | |
| 100 (4) | 5 | 101.7 (4) | 137 (5.4) | 1960 | 2940 | 4880 | 5000 | 3.2 |
| 100 (4) | 6.5 | 101.7 (4) | 140 (5.5) | 4280 | 6420 | 6410 | 6760 | 4.1 |
| 100 (4) | 8 | 101.7 (4) | 143 (5.6) | 7730 | 11600 | 7910 | 8570 | 5 |
| 100 (4) | 9.5 | 101.7 (4) | 146 (5.7) | 12380 | 18570 | 9360 | 9290 | 5.8 |
| | | | | | | | | |
| 125 (5) | 6.5 | 127.1 (5) | 163 (6.4) | 2340 | 3510 | 5190 | 8360 | 5.1 |
| 125 (5) | 8 | 127.1 (5) | 166 (6.5) | 4290 | 6430 | 6410 | 10570 | 6.2 |
| 125 (5) | 9.5 | 127.1 (5) | 169 (6.6) | 6950 | 10430 | 7610 | 12820 | 7.3 |
| | | | | | | | | |
| 150 (6) | 6.5 | 152.5 (6) | 196 (7.7) | 1410 | 2120 | 4360 | 9960 | 6.2 |
| 150 (6) | 8 | 152.5 (6) | 199 (7.8) | 2610 | 3920 | 5400 | 12560 | 7.4 |
| 150 (6) | 9.5 | 152.5 (6) | 202 (7.9) | 4290 | 6430 | 6420 | 15220 | 8.7 |
| 150 (6) | 11 | 152.5 (6) | 205 (8.1) | 6460 | 9690 | 7420 | 17920 | 10 |
| 150 (6) | 12.5 | 152.5 (6) | 208 (8.2) | 9160 | 13740 | 8400 | 20670 | 11.3 |
| 150 (6) | 14 | 152.5 (6) | 211 (8.3) | 12390 | 18590 | 9360 | 23460 | 12.8 |
| | | | | | | | | |
| 200 (8) | 8 | 203 (8) | 252 (9.9) | 1190 | 1780 | 4100 | 16530 | 10.1 |
| 200 (8) | 9.5 | 203 (8) | 255 (10) | 1970 | 2950 | 4890 | 19970 | 11.7 |
| 200 (8) | 11 | 203 (8) | 258 (10.2) | 3000 | 4500 | 5660 | 23470 | 13.3 |
| 200 (8) | 12.5 | 203 (8) | 261 (10.3) | 4310 | 6460 | 6430 | 27010 | 15 |
| 200 (8) | 14 | 203 (8) | 264 (10.4) | 5890 | 8840 | 7180 | 30600 | 16.7 |
| 200 (8) | 15.5 | 203 (8) | 269 (10.6) | 7770 | 11660 | 7920 | 34230 | 18.4 |
| 200 (8) | 17 | 203 (8) | 272 (10.7) | 9960 | 14940 | 8650 | 34230 | 20.6 |
| | | | | | | | | |
| 250 (10) | 11 | 256 (10.1) | 313 (12.3) | 1590 | 2380 | 4540 | 29290 | 16.9 |
| 250 (10) | 12.5 | 256 (10.1) | 316 (12.4) | 2290 | 3440 | 5150 | 33670 | 19 |
| 250 (10) | 14 | 256 (10.1) | 319 (12.6) | 3170 | 4750 | 5770 | 38090 | 21.1 |
| 250 (10) | 15.5 | 256 (10.1) | 322 (12.7) | 4210 | 6310 | 6370 | 42550 | 23.3 |
| 250 (10) | 17 | 256 (10.1) | 325 (12.8) | 5420 | 8130 | 6970 | 42775 | 25.6 |
| | | | | | | | | |
| 300 (12) | 12.5 | 305 (12) | 376 (14.8) | 1410 | 2120 | 4360 | 39820 | 23.2 |
| 300 (12) | 14 | 305 (12) | 379 (14.9) | 1960 | 2940 | 4880 | 45010 | 25.8 |
| 300 (12) | 15.5 | 305 (12) | 382 (15) | 2610 | 3920 | 5400 | 50250 | 28.3 |
| 300 (12) | 17 | 305 (12) | 385 (15.2) | 3390 | 5090 | 5910 | 55530 | 30.9 |
| 300 (12) | 18.5 | 305 (12) | 388 (15.3) | 4290 | 6430 | 6420 | 60860 | 33.5 |
| | | | | | | | | |
| 350R (14) | 15.5 | 350 (13.8) | 438 (17.2) | 1630 | 2450 | 4580 | 59200 | 33.2 |
| 350R (14) | 17 | 350 (13.8) | 441 (17.4) | 2130 | 3190 | 5020 | 65380 | 36.2 |
| 350R (14) | 18.5 | 350 (13.8) | 444 (17.5) | 2690 | 4040 | 5450 | 65380 | 38.8 |
| | | | | | | | | |
| 350 (14) | 15.5 | 362 (14.3) | 438 (17.2) | 1630 | 2450 | 4580 | 59200 | 33.2 |
| 350 (14) | 17 | 362 (14.3) | 441 (17.4) | 2130 | 3190 | 5020 | 65380 | 36.2 |
| 350 (14) | 18.5 | 362 (14.3) | 444 (17.5) | 2690 | 4040 | 5450 | 65380 | 38.8 |
| | | | | | | | | |
| 400 (16) | 15.5 | 413.0 (16.3) | 496 (19.5) | 1131 | 1696 | 4030 | 67200 | 38.9 |
| 400 (16) | 17 | 413.0 (16.3) | 496 (19.5) | 1470 | 2210 | 4420 | 74180 | 42.6 |
| | | | | | | | | |
| 450 (18) | 18.5 | 454 (17.9) | 542 (21.3) | 1450 | 2170 | 4390 | 88940 | 50.8 |
| 450 (18) | 20 | 454 (17.9) | 545 (21.5) | 1810 | 2710 | 4740 | 96650 | 54.5 |
| | | | | | | | | |
| 500 (20) | 20 | 499 (19.6) | 587 (23.1) | 1390 | 2080 | 4330 | 105840 | 58.2 |
| | | | | | | | | |
| 600 (24) | 24.5 | 600 (24.1) | 721 (28.4) | 1410 | 2110 | 4350 | 159530 | 89 |
| 350R | REDUCED ID AVAILABLE ON REQUEST | | | | | | | |



BASIC INSTRUCTIONS FOR JOINING PERMAGLASS FRP BORE CASING

Permaglass FRP bore casing is joined using the Kwik-Lok joint, consisting of an O’ring for pressure sealing and a 316 stainless steel locking cable.



Wrap PERMATAPE around inserted locking cable and pipe joint to ensure cable end is secured flat. This also prevents silt build-up in the joint.

Fibreglass reinforced plastic (FRP/GRP) or GRE are all material names for “Fibreglass” pipe. Permaglass FRP bore casing is a high quality fibreglass pipe manufactured with vinyl ester resin, which has been used in Australia and overseas for over 30 years. Permaglass is made to Australian Standards, and incorporates testing and post curing to ensure the highest quality and strength is achieved.

FRP BORE CASING & FRP PUMP COLUMN ACCESSORIES



PERMATAPE

Permatape is a heavy duty, 72mm wide tape coated with an anti-corrosive and aggressive adhesive. Recommended installation is for Permatape to be wrapped around the locking wires for both casing and column, as well as the joint of pump column to prevent silt build up, making removal easier. Permatape can also be used to hold smaller diameter electrical cable to the pump column.

PERMASTRAP & TOGGLE

Permastrap is a user-friendly product, designed to provide ease and flexibility in fastening electrical cables to Permaglass pump column.

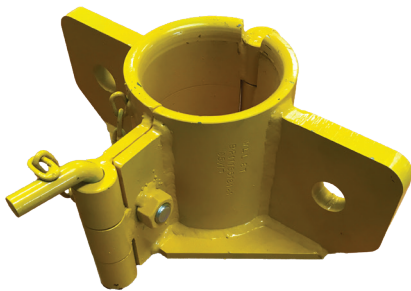
Permastrap is a weather resistant cable support system offering superior resistance to sunlight, moisture and salt environments.

The toggles are marine grade, corrosion resistant silicon copper alloy.



LUBRICANT

Permaglass lubricant should be used to lubricate all O'rings and locking wires during installation. AS4020 (potable water) approved.



LIFTING CLAMPS

Certified lifting clamps are designed to ensure the safe handling and installation/removal of Permaglass FRP pump column and bore casing, and should be considered a necessary tool for every installation.

Genuine Permaglass lifting clamps are certified tested with SWL stamped on each clamp. Certification documents are provided with purchase. Available for Permaglass up to DN300.

END CONNECTORS (PUMP COLUMN)

Top Connector standard construction 316 S/S with BSP thread. Bottom connector standard construction 316 S/S with BSP thread and break off pin. Optional duplex construction, flanged or weld prepared.



INSERTS (BORE CASING)

Standard 304 S/S, optional 316 S/S or duplex. Flanged or weld prepared.

Permaglass FRP pump column is a lightweight, rigid rising main for submersible pump installations. It will not corrode like steel and is very quick and easy to install. Permaglass FRP pump column is suitable for pump settings nominally to 200 metres (standard duty) and 350 metres (heavy duty). Permaglass FRP pump column is designed to BS7159, manufactured to AS2634 and ISO9001 for quality procedures. For technical information regarding deeper installations contact Advanced Pump Technologies.

APPLICATIONS:

- Salt, brackish or low pH water bores
- Potable water bores (AS4020 approved)
- Deep installations
- Regular removal & re-installation for pump maintenance

FITTINGS AND ADAPTERS:

- Certified lifting clamps
- End connectors, flanges and reducers
- 316 stainless steel (standard) or Duplex (SAF2205 & SAF2507) by request
- Break off pins (B.O.P.)
- Locking wires & O'rings available as spares
- Permatape
- Lubricant (AS4020 approved)
- Permastrap & toggles

FEATURES / BENEFITS:

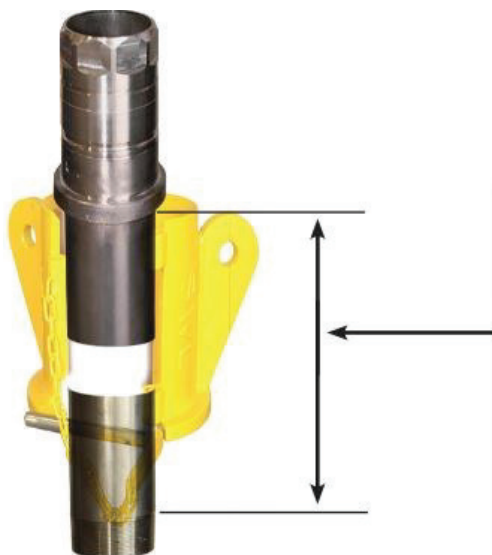
- Kwik-Lok joints
- Fast installation & removal
- Corrosion resistant
- Anti-torque non rotating connections
- Lightweight column
- Long service life
- Reuseable
- Easily extended
- Rigid design – does not stretch, expand or twist which alleviates potential cable/pump failure in the bore
- High pressure rating
- AS4020 approved
- Readily available
- FRAS (Fire Resistant Anti Static) available
- Australian owned
- AS/NZS ISO 9001:2008



PERMAGLASS FRP PUMP COLUMN TECHNICAL DATA

| Size | Internal Diameter | OD at coupling | Standard Wall Thickness | Locking Cord Diameter | Weight | Maximum Equivalent Tensile Load* | Maximum Allowable Torque | Maximum Allowable Internal Pressure |
|--------|-------------------|----------------|-------------------------|-----------------------|--------|----------------------------------|--------------------------|-------------------------------------|
| | mm (in) | mm | mm | mm | Kg/m | Kg | Kg.m | kPa |
| 75 SD | 76 (3) | 112 | 5 | 6 | 2.1 | 4520 | 40 | 6430 |
| 75 HD | 76 (3) | 112 | 6.5 | 6 | 2.7 | 4630 | 56 | 8420 |
| 100 SD | 101.7 (4) | 143 | 5 | 6 | 2.8 | 6390 | 71 | 4875 |
| 100 HD | 101.7 (4) | 143 | 8 | 6 | 4.5 | 8070 | 125 | 7905 |
| 125 SD | 127.1 (5) | 169 | 6.5 | 6 | 4.6 | 8110 | 151 | 5190 |
| 125 HD | 127.1 (5) | 169 | 9.5 | 6 | 6.7 | 9850 | 235 | 7610 |
| 150 SD | 152.5 (6) | 202 | 6.5 | 8 | 5.5 | 11340 | 215 | 4355 |
| 150 HD | 152.5 (6) | 202 | 9.5 | 8 | 8 | 14250 | 334 | 6415 |
| 200 SD | 203 (8) | 267 | 8 | 10 | 8.9 | 14840 | 479 | 4100 |
| 200 HD | 203 (8) | 267 | 11 | 10 | 12.3 | 18920 | 688 | 5660 |
| 250 SD | 256 (10) | 324 | 9.5 | 10 | 15.5 | 24970 | 918 | 9910 |
| 250 HD | 256 (10) | 324 | 12.5 | 10 | 19.7 | 32370 | 1249 | 5150 |

- *Tensile load = axial stress due to the combination of internal pressure, weight of pump and motor, electrical cable, shutoff head, column and water in the column
- Refer to Advanced Pump Technologies if uncertain of load calculation or should load exceed maximum load
- Effective lengths available—5m (standard), 3m, 2m, 1m
- Handles up to 100°C contact Advanced Pump Technologies for temperatures greater than 80°C
- Suitable for potable water (AS4020 approved)
- Locking wires in 316 stainless steel (standard)
- PEEK locking cord for highly corrosive water



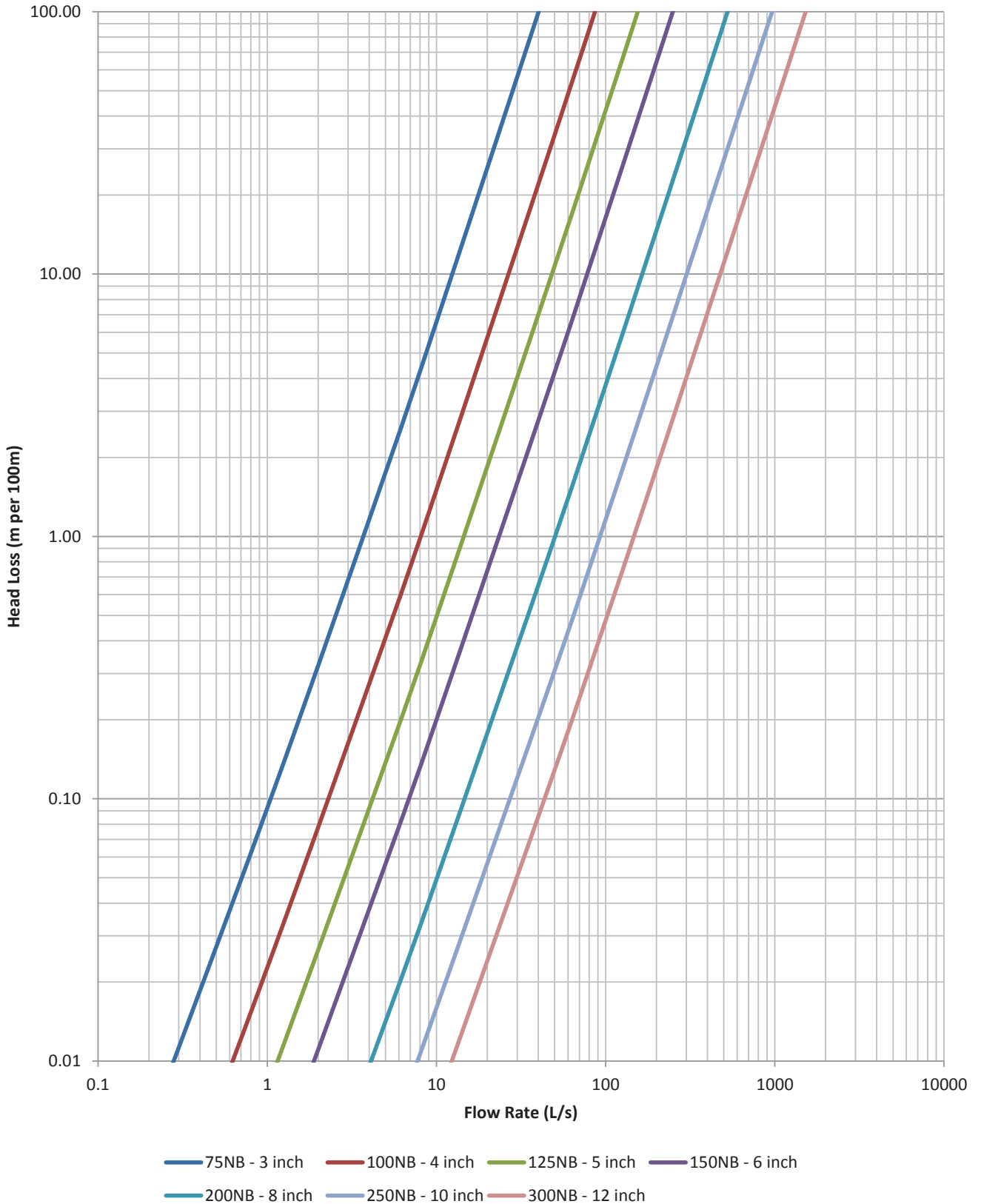
Exposed Length of Connector
(Allow 2x in overall Length)

| Size | Length | Weight |
|-------|--------|--------|
| | mm | kgs |
| DN80 | 200 | 5 |
| DN100 | 250 | 8 |
| DN125 | 260 | 10 |
| DN150 | 310 | 17 |
| DN200 | 350 | 28 |
| DN250 | 350 | 45 |



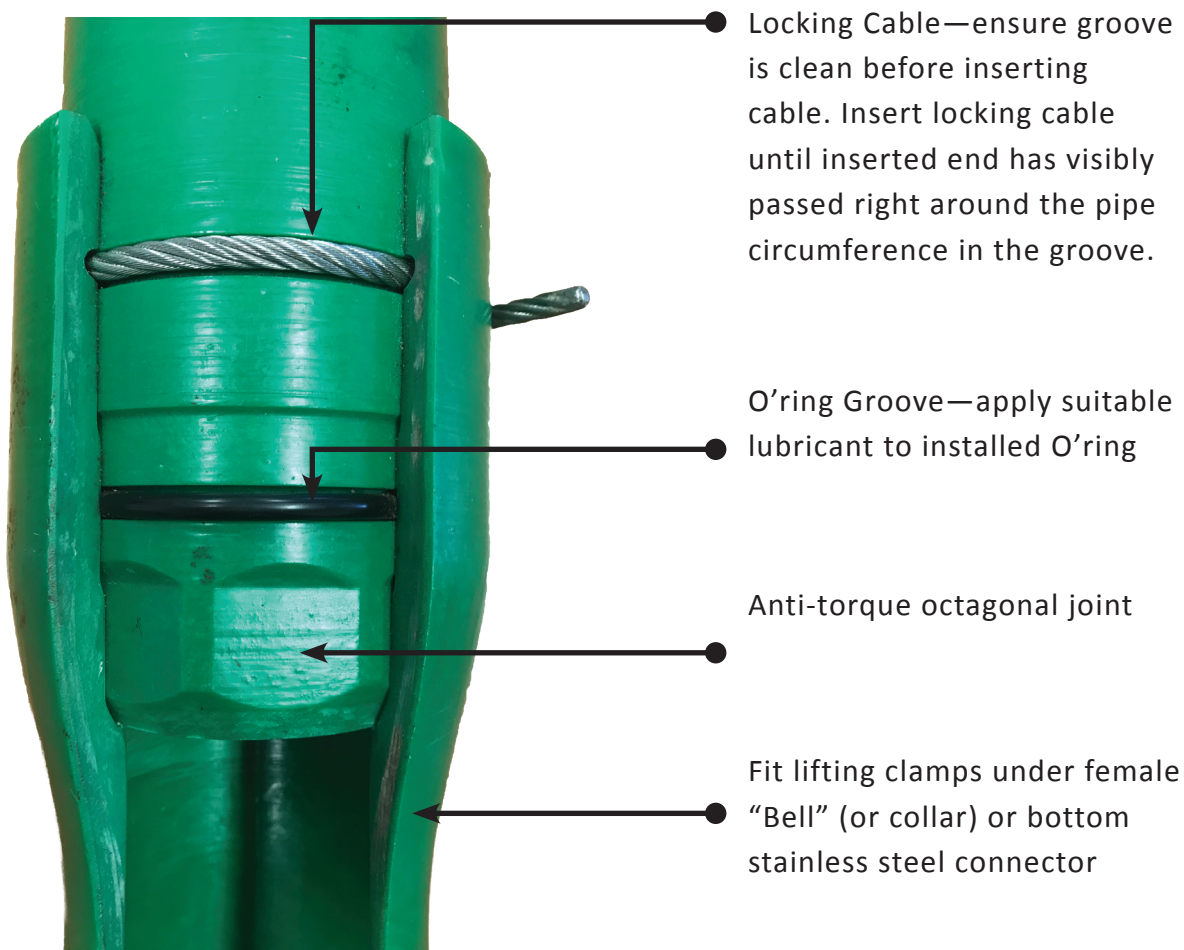
PERMAGLASS FRICTION LOSS CHART

Permaglass Range Head Loss vs Flow Rate Chart at 20 deg C



BASIC INSTRUCTIONS FOR INSTALLATION OF PERMAGLASS FRP PUMP COLUMN

Permaglass FRP pump column is coupled using the Kwik-Lok joint, consisting of an O’ring for pressure sealing and a 316 stainless steel locking cable. Permaglass FRP pump column has anti-torque, non rotating connections. Top and bottom end connectors are 316 grade stainless steel, with BSP thread for connection to pump/headworks, with the opposite end machined to suit the Permaglass female.



Wrap PERMATAPE around inserted locking cable and pipe joint to ensure cable end is secured flat. This also prevents silt build-up in the joint.

Fibreglass reinforced plastic (FRP/GRP) or GRE are all material names for “Fibreglass” pipe. Permaglass FRP Pump column is a high quality fibreglass pipe manufactured with vinyl ester resin, which has been used in Australian and overseas pump installations for over 30 years. Permaglass is made to Australian Standards, and incorporates testing and post curing to ensure the highest quality and strength is achieved.

The Permasafe installation rig for Permaglass pump column was designed specifically to overcome stringent mine site occupational health and safety concerns with regards to overhead suspended loads. The resulting product has made Permaglass pump column installation safer and more efficient.

The PRD 225 allows for hands free operation to safely install and retrieve Permaglass pump column and bore pumps to 225m with 200NB pipe.

OPERATIONAL SPECIFICATIONS:

- No working under suspended loads
- 1 x Radio Remote to control all hydraulic functions
- Pullback rated to 13,000kg
- Mast folds for transport and locks vertical during operation
- Todano stiff boom deck crane rated for 1850kg at 3m
- Hydraulic stabiliser jacks with slide out extension
- 6.5m mast travel with interchangeable Permaglass lifting plugs
- Powered cable reel with removable drum for 225m of 25mm² cable
- Safety backup winch rated for 13,000kg
- 4 x LED work lights on mast plus 2 x LED work lights on ROPS
- 3 x heavy duty tool boxes
- Hydraulically operated support table
- Hands free hydraulic pipe clamp with lock to support Permaglass column between lifts
- Rear deck capable of lifting through a maximum diameter of 750mm
- Hands free loading and unloading of pipe in and out of the rod bin
- Grouped lubrication points
- Self lubricating plastic slides used where possible for simple maintenance
- Ball screw height adjustment for pipe slide tray
- Swing-in operator seat for securing cable to Permaglass
- Hydraulically operated slide on guide rollers for power and safety cable
- 65L non-potable water tank



SAFETY EQUIPMENT:

- Winch with safety cable attached to pump preventing column from being lost down hole
- Multiple emergency stop buttons for hydraulics around the truck and one on the remote
- 2 x 9lb fire extinguishers
- All walkways and handrails to AS1657
- All guarding to relevant Australian Standards
- All wiring and hosing to MGD15 specifications
- Outer markers, turn, brake and reversing lights for road use
- Interlocked guards in rear work area access points
- Safety floor in rear work area shuts down the hydraulics when the operator is in the work zone
- Backup manual controls locked out to prevent accidental operation
- Overload controls on crane





PUMPING & BEYOND

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