



# CIVILS

## Penstocks

- Easy and quick installation – no need for grout between frame and wall
- Manufactured to class 5 standard of DIN19569-4 and BS7775
- Lightweight range of wall mounted penstocks
- Little to no maintenance required
- Robust and rigid construction
- Corrosion resistant
- UV stable



### HDPE Penstocks from Fernco provide a high strength, easy to install solution to control the flow of water and wastewater

Penstocks, in their basic form, are permanent water gates that control the flow of water from one area to the next, which can be manually adjusted to produce the desired flow. They are often used on Waterways, Power Plants, Industrial Effluent Plants, Hydro Power, Sewerage/Wastewater Treatment Plants, Drainage and Flood Control.

With a core range manufactured from HDPE (High Density Polyethylene), Fernco's range offers considerable benefits over other materials including:

#### 1. Operational

The range is considerably lighter than alternatives, resulting in easier installation with no grout required between frame and wall.

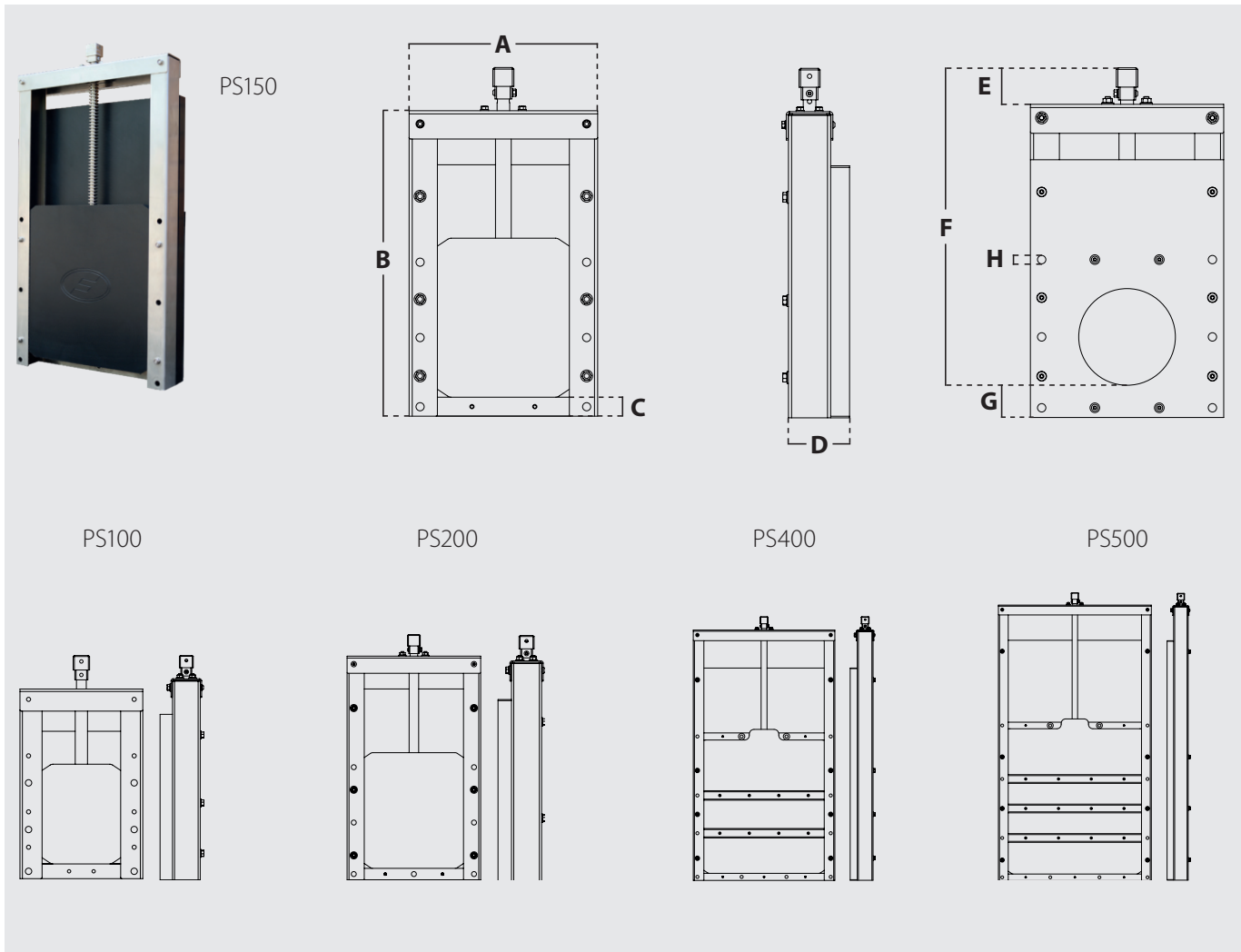
#### 2. Maintenance

The product mechanism is self lubricating between the frame and the door resulting in a longer life product. The range has leakage rates that are better than those required in DIN 19569-4 class 5.

All Fernco Penstocks come with a BS Cap supplied.

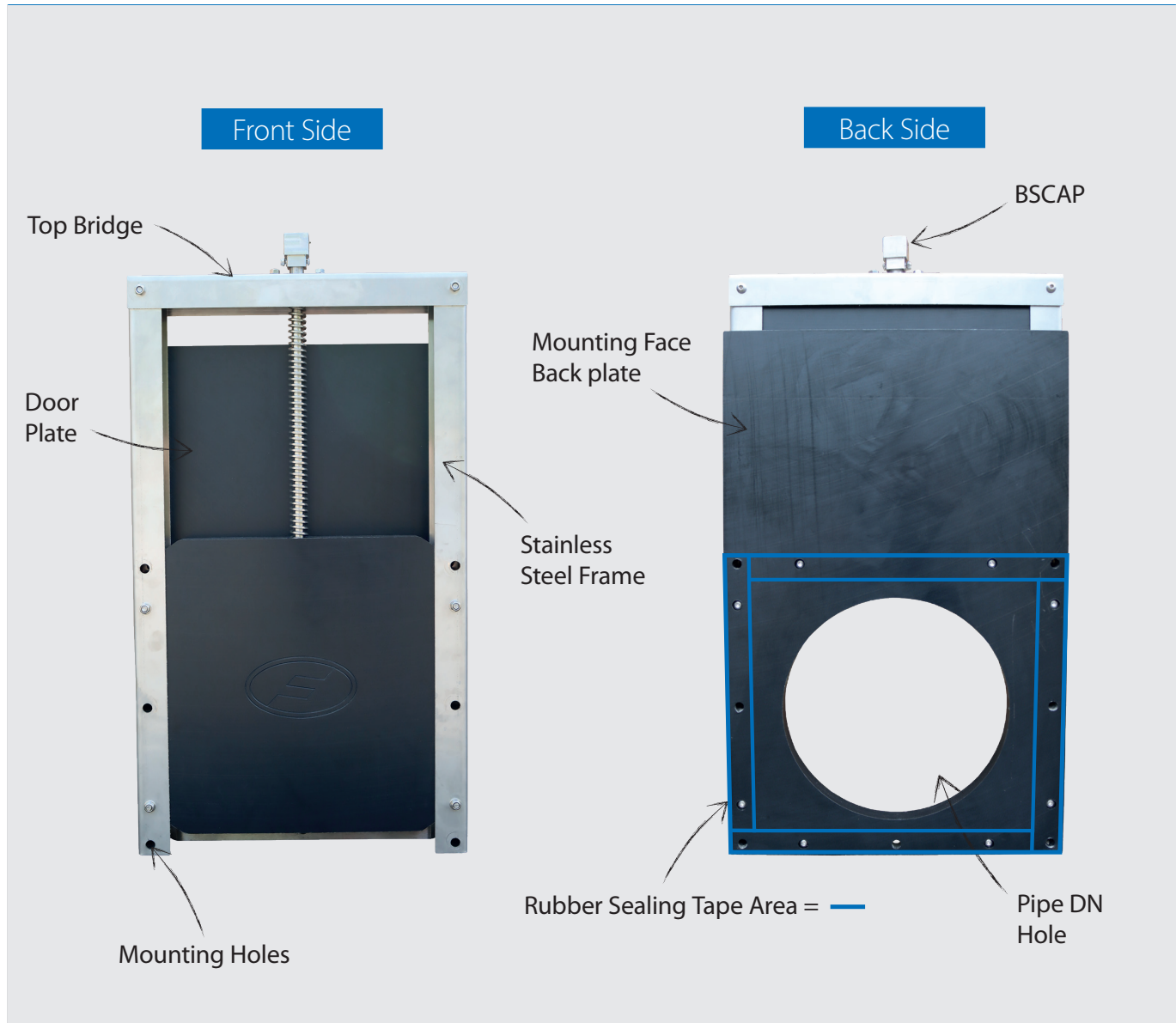


## Stainless Steel & HDPE Penstock



Product Code	Diameter (Ø)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (mm)	Pressure (mwc)	Weight (kg)	Mounting Set
PS100	100	250	386	30	97	68.7	404.7	50	13	6	11.8	PSMS-01
PS125	125	275	436	30	97	68.7	454.7	50	13	6	13.3	PSMS-01
PS150	150	300	486	30	97	68.7	504.7	50	13	6	15.6	PSMS-01
PS200	200	350	586	30	97	68.7	604.7	50	13	6	18.9	PSMS-02
PS225	225	375	636	30	97	68.7	654.7	50	13	6	22.5	PSMS-02
PS250	250	400	686	30	97	68.7	704.7	50	13	6	24.6	PSMS-02
PS300	300	450	786	30	97	68.7	714.2	50	13	6	29.6	PSMS-02
PS400	400	600	1123	30	97	68.7	1111.7	80	13	6	53.5	PSMS-03
PS500	500	700	1323	30	97	68.7	1311.7	80	13	6	72.2	PSMS-03
PS600	600	800	1523	30	97	68.7	1511.7	80	13	6	86.1	PSMS-03

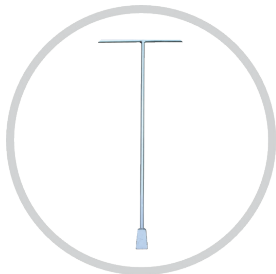
## Stainless Steel & HDPE Penstock



Construction Materials	
Component	Standard materials
Frame	Grade 316 stainless steel (1.4401)
Door plate	HDPE 500
Back plate	HDPE 500
Reinforcements	Grade 316 stainless steel (1.4401)
Non-rising spindle	Grade 316 stainless steel (1.4401) TR25 x 5
Door nut	POM (self lubricating)
Mounting Set & Fixings	Grade 316 stainless steel (1.4401)
Seal	EPDM
On and off seating pressure	6mWC



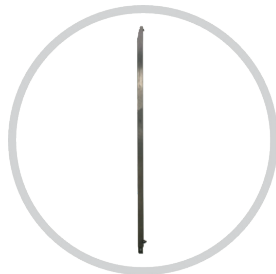
Additional Component Parts		
Product Code	Description	Product Weight (kg)
PSTK	Penstock Tee Key 985mm	3.0
PSGB	Penstock Guide Bracket	0.52
PSHW	Penstock Handwheel	0.81
PSES500	Telescopic Extension Spindle 500-750mm	1.24
PSES750	Telescopic Extension Spindle 750-1000mm	1.62
PSES1000	Telescopic Extension Spindle 1000-1500mm	2.27
PSES1500	Telescopic Extension Spindle 1500-2000mm	3
PSES2000	Telescopic Extension Spindle 2000-2500mm	3.64
PSES2500	Telescopic Extension Spindle 2500-3000mm	4.1
PSES3000	Telescopic Extension Spindle 3000-3500mm	5.02
PSES3500	Telescopic Extension Spindle 3500-4000mm	6.05
PSES4000	Telescopic Extension Spindle 4000-4500mm	7.28



Tee Key



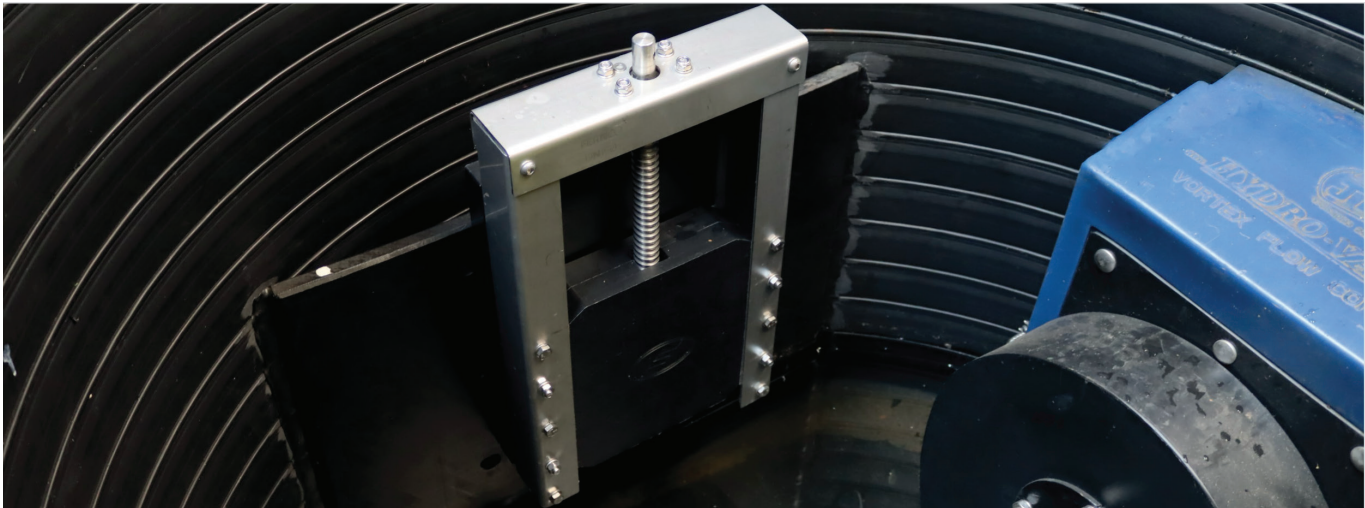
Guide bracket



Extension Spindle



Hand Wheel



## Installation

### Introduction

The Fernco HDPE penstock is constructed using HDPE and Grade 316 stainless steel (1.4401).

The Penstock has a vertically moving door manufactured in HDPE with stainless steel supports. The door incorporates an EPDM rubber lip seal to provide a seal against the back plate and is guided within a stainless steel frame with HDPE guides.

A rubber sealing tape is secured between the frame and the mounting wall, which is compressed during installation to provide a seal.

### Handling

The HDPE Penstock should only be transported when laid flat with the door plate facing upwards. It can then be lifted by means of suitable equipment. Where chains or slings are used for handling purposes, the frame should be protected using cloth sacking or similar material. Fully trained personnel should carry out all necessary lifting.

### Storage

It is recommended to store the penstock laid down flat with the door plate facing upwards, free of dust, dirt and moisture.

### Mounting Set:

1. Rubber sealing tape (5mm thick)
2. Chemical anchor capsules
3. Fixtures and accessories

### Recommended Max Temperature

- Constant 80°C
- Intermittent 100°C

### Penstock Installation Sequence

Before commencing installation, check that the civil work is correct to all appropriate drawings and that there are no obvious obstructions or undulations on the mounting wall. The performance of the sealing tape will be affected if the mounting surface is not flat and that there are no obvious obstructions or surface deformities that could impede product performance.

### Tools Required

- Appropriate PPE
- Utility Knife
- Marker Pen
- Suitable Drill
- 12mm Drill Bit
- Torque Wrench
- 17mm Socket Set (chemical bolt)
- 4mm allen key for BSCAP + 10mm spanner
- 8mm Allen key for M10 countersink
- Hammer

## 1. Marking the Mounting Face

1. With suitable lifting equipment, lift the Penstock and adjust it to ensure it is vertical and level.
2. Check and adjust the Penstock into the correct position, ensuring the invert of the pipe is flush with the invert of the Penstock opening.
3. Mark all of the mounting holes.
4. Penstocks DN300 and over have additional mounting holes above the Penstock opening. These are accessed by fully closing the Penstock. Specific countersunk drop anchors are supplied in the mounting kits for these sizes and are installed using an anchor setting tool that is available for purchase separately (T-M10PUNCH).
5. Remove the Penstock.

## 2. Procedure for installing Chemical Anchor Attachments

Standard Chemical Anchors Set comprising of:

- 316 Stainless Steel M10 Threaded Stud
- Chemical Anchor Capsules
- 316 Stainless Steel Nuts and Washers

1. Using a 12mm drill bit, drill the mounting holes to a depth of 90mm in their required positions.  
**1a) DN300 and above** – Drop In Anchor Installation. For the mounting holes above the door, using a 12mm drill bit, drill the holes to a depth of 40mm.
2. Blow out the drilled holes using compressed air.  
**(Warning: Suitable eye protection to be worn)**
3. Insert a chemical anchor capsule into each hole.  
**3a) DN300 and above** – Drop In Anchor Installation. Place the anchor inside the hole. Drive the anchor setting tool (or an equivalent device) inside the anchor with a hammer, until flush with the anchor base.
4. Attach the M10 stud to a suitable drill.
5. Place the end of the stud into the hole, then in one motion operate the drill at high speed, and push the stud through the chemical anchor to the back of the hole. Once the back of the hole is reached, stop the drill to prevent resin escaping.
6. Carefully remove the drill from the stud. Take care not to move the stud.
7. During the curing time, move on to section 3 (see table 2 for cure times).

Mounting Kit	Number of Bolts	Bolt Size	Drill Bit Required	Drill Depth	Tightening Torque
PSMS-01	7	M10	12mm	90mm	8Nm
PSMS-02	7+2	M10	12mm	90mm	8Nm
PSMS-03	10+2	M10	12mm	90mm <i>(drop in anchor 40mm)</i>	97

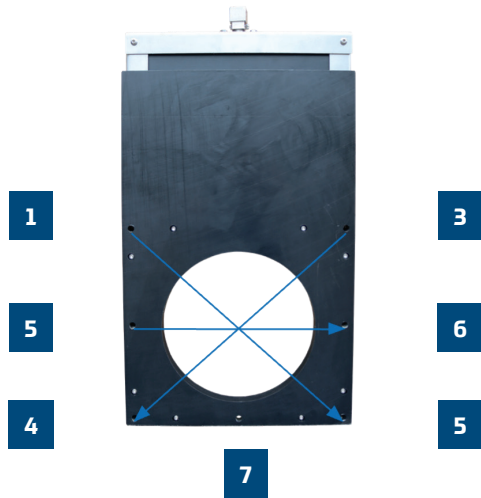
Table 1 – Mounting kit installation data

Temp °C	-15 to -10	-9 to -5	-4 to 0	1 to 5	6 to 10	11 to 20	21 to 30	31 to 40
Cure Time	30h	16h	10h	45min	30min	20min	5min	3min

Table 2 – Curing time data

## 3. Placing the Rubber Sealing Tape

1. Ensure that the Penstock back plate is clean and smooth.
2. The sealing tape has adhesive on one side with a protective layer over it. Cut the tape 20mm larger than necessary, then remove the protective layer and fit it onto the frame.
3. The tape should now be cut to length and squared so that the corners connect properly.
4. Drill holes through the tape by using the mounting holes in the Penstock as a guide.
5. If installing two layers of rubber sealing tape, ensure the second layer overlaps any joints in the first layer.



### Installation Of An Extension Spindle

1. Remove the BS Cap using a 4mm Allen Key and a 10mm spanner.
2. Place the extension spindle over the spindle of the penstock.
3. Place the upper bracket 150mm below the deck or the top of the spindle extension. Divide the other brackets over the length of the extension spindle (one additional bracket for every 3m).
4. Mark the mounting holes of the bracket(s) in such a way that the extension spindle is in the required position.
5. Remove the extension spindle.
6. Install the brackets as required.
7. Reinstall the extension spindle and secure to the Penstock using the bolts provided. Adjust the position of the brackets if necessary to ensure the proper alignment of the extension spindle.
8. Fit the BSCAP in the top of the extension spindle and secure using the bolts provided. The hand wheel and T-Key will also fit onto this.

### Maintenance Recommendations HDPE Penstocks

When correctly installed, the Penstock will give 60 years life expectancy. With regular maintenance and changing the seal, a further 40 years life expectancy can be achieved.

1. The following parts require attention in particular and need to be cleaned if necessary
  - Spindle block
  - Spindle
  - Spindle stop
  - Seals
2. Check for leakage between the frame and the mounting wall. If leakage has occurred, first follow the remaining inspection steps. If all fixtures are now tight, the unit is clean and there is no obvious damage to any components, schedule another inspection to see if leakage continues.
3. Clean the unit by hosing it down to remove any grit or debris.
4. Check the tightness of the bolts and nuts.
5. Check there is no damage to the frame, door or seals.
6. Check the operating equipment for damage and freedom of movement, and ensure that there are no damaged or worn parts.
7. When carrying out any maintenance work with the Penstock door in the open position, always ensure that the door is securely and independently supported.

**Frequency of Inspection:** The inspection frequency should be based on the particular installation requirements. In an aggressive environment or in locations with large amounts of silt or debris, it is strongly recommended to increase the inspection/maintenance interval.

### 4. Final Steps

1. Place the penstock over the studs, then place a washer and a nut onto each stud and tighten by hand. If applicable, screw the corresponding threaded bolts into the anchors by hand.
2. Once all washers and nuts have been placed, proceed to tighten the nuts evenly to the recommended torque. If applicable, also tighten the threaded bolts into the anchors. Countersunk bolts should be flush so that the seal does not get damaged during operation.

It is recommended that all fixtures are tightened following the number pattern illustrated in the image on the left to 8Nm with a torque controller tool. The sealing tape must be compressed evenly to ensure a good seal, however, the frame must not be allowed to deform.

Note: For Penstocks DN300+ there are additional anchor mounting holes. Tighten these within the number pattern, ensuring opposite mounting holes are selected when choosing the next hole.

### Post-Installation Checks

To ensure effective operation, the following checks are recommended before leaving the installation site:

- a. Condition of the frame – This can be distorted during the installation process if due care is not taken.
- b. Debris between the door and the frame at the invert – Remove all debris to ensure effective seal performance.
- c. Seal and Sealing Tape condition – Check the seal and tape for any damage.
- d. Fixtures – Tighten all fixtures where necessary.
- e. Misalignment of the extension spindle.

**Note:** DO NOT use excessive force when opening or closing a Penstock door, as damage could occur.

# General Information

## Quality, Standards and Approvals

Fernco has been certified by the British Standards Institution (BSI) as a company of assessed capability, with a quality management system which meets the requirements of BS EN ISO 9001:2015

Fernco UK, part of a global group of companies, are the leaders in wastewater connection innovation; utilising the most advanced methods and techniques for precision-manufactured products, all of which comply with or exceed relevant British and European standards to ensure reliability and sustainability.

## Environment

Fernco operate Environmental Management Systems which are certified to ISO 14001: 2015.

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