

Specification- Fabricated Stainless Steel high Duty In-situ serviceable Cotswold Penstocks / Intovalve .
Material- Stainless steel UNS32750 Grade 2507- Pren 40

Site- TBA

The penstocks shall be designed and manufactured to BS 7775:2005 with quality assurance to ISO 9001 OHSAS 18001, and health, safety, and environmental compliance in accordance with ISO 14004. The quality system shall ensure that all materials used in the penstocks manufacture are fully traceable. The quality system must also identify any elements of manufacture which are not carried out in house and the quality procedures in place to ensure that outsourced manufactured items are of suitable quality.

The supplier is requested to offer embedded carbon data for all the Penstock products offered.

The penstocks shall be designed for a maximum differential head of XXm on and XXm off seating pressure unless otherwise specified. The factor of safety will be compliant with BS7775:2005 standard and materials selected.

The supplier must demonstrate that you have at experience in the design, fabrication, and supply of these types of Penstocks.

Under the resultant full working load considering both the hydraulic and actuator rated values, the distortion in the gate frame and the operating shaft shall be within the resultant constraints for the selected material. The penstocks frame and door shall be manufactured to a flatness tolerance along sealing faces of +/- 1mm to conform to the leakage requirement of BS 7775:2005, for EPDM seal systems.

Penstocks frame and door shall be manufactured from stainless steel UNS32750 Grade 2507 Pren40. After fabrication, the stainless steel shall be fully cleaned in an environmentally acceptable manner. The method shall be to the approval of the engineer and shall be for the entire penstock. Sandwich and or plastic type doors are not accepted. The manufacturer must be able to demonstrate knowledge of working and using such materials, with a local reference list. The frame should be suitable for a life expectancy of 120 years, and therefore all serviceable components is best served with fitment onto the gate.

Welders shall all be fully coded to BS EN 1090 structures Welding consumables shall be fully traceable. 10% of welds shall be subject to NDT using dye penetrant testing, and all welds shall be pickled and passivated.

The penstock shall be designed to be totally demountable from the civil structure, without damage to the frame during this process. The design shall be such that during installation and removal, it will not damage the local structure, membrane, fixings or reinforcing bars.

Any wall fixings for the frame / guides shall be to the approval of the Engineer and shall be stainless steel UNS32750 2507 Pren 40 Grade resin anchors, in the first instance. The Penstock supplier to supply them with the penstock, and confirm size qty and make, together with a calculation conforming ETAG 0001 Edition 1997. Calculation shall be based on the concrete strength being 35N/mm². **(To be confirmed by client)**

The penstock seals shall all be replaceable in situ without damage to the frame or door. There should be no requirement to remove the frame from the wall to undertake this procedure. The seals shall be double P section EPDM to BS EN 2430:1995 and shore hardness 70, allowing for designed pressure and mechanically fixed allowing ease of replacement. The seal corners must be produced using an hot vulcanised manufacturing method. Manufacturers should for approval demonstrate their compliance with this feature. All seals should be mechanically fixed to the gate/frame and **not glued/bonded**.

The seal system shall be proven in service, and the penstock company must be able to demonstrate an in-service duty of 5 years or more, in a similar location. Bonded seals and **parallel slides** are **not acceptable**.

The penstock design shall be of the taper design aiding operation for opening closing and sealing. No parallel designs will be acceptable. Rollers will be suitably sized and mounted off the gates.

The frame mounted wedges will incorporate unique hydraulic rams at each wedge position both on the its vertical and horizontal soffit positions. The hydraulic wedges will ensure tight shut off closure against full operational heads, and then release the gate for operation with minimum friction load onto the sealing faces.

The seal, wedge and frame guide system must incorporate high density polyethylene rubbing strips to BSEN ISO 17855-1 when the gate is in operation.

The invert shall offer no obstruction to the flow and shall be manufactured from stainless steel Grade UNS32750-Pren40. All penstocks shall have a full double L invert seal. The seal system shall be proven in service, and the penstock vendor / Company must be able to demonstrate in service duty of 5 years or more as above. The seals shall be replaceable in situ without damage to the frame and or door. All seals should be mechanically fixed and **not glued/bonded**.

The stem shall be stub acme type either rising or non-rising type and manufactured in stainless steel Grade UNS32750. For rising screw stems the door nut shall be stainless steel, the same grade as the stem, for non-rising the door nut shall be phosphor to BSEN 1652.

The stem drive nut shall be made of phosphor to BSEN 1652 or aluminium bronze BS1400 AB2 if actuated then the manufacturers standard (refer to the actuator manufacturer) which is subject to engineer's approval.

A clear transparent polycarbonate protection tube shall be fitted to all rising screw spindles when gearbox or electric actuator is utilised. Open/ close indication shall also be indicated on the tube.

The operating gear comprising of floor pillars, footplate brackets, coping brackets, guide brackets and all fasteners all be manufactured from BSEN ISO 3506 stainless steel UNS32750 Grade 2507-Pren40.

Operation of penstocks shall be by a manual hand wheel, electrical actuators, and/ or hydraulic actuators. If a manual hand wheel operational effort shall be limited to 250N at the hand wheel rim.