

Customer's preparations

Before installation, the company responsible must assume responsibility for the following:

- making adequate storage and working space for building vehicles, tools and other materials available in the immediate vicinity of the planned pipeline without charge;
- ensuring there are adequate paved and accessible access roadways to the site (planned pipeline route) and the storage space;
- ensuring there are adequate power outlets (3 x 380 V / Mp / earth) and a water mains supply connection is available without charge to the construction company;
- ensuring general order is maintained on site and regulating co-operation between all the construction companies involved, and
- obtaining all necessary approvals from the appropriate authorities.

Offloading the STEEL-CASED PIPING

Offloading the special units from lorries is a matter for the construction company concerned. Only textile, nylon or slings of similar material and at least 150 mm in width are to be used to ensure the PE coating is not damaged.

When the special units arrive on-site, they must be checked for any external damage. The delivery/deliveries is/are also

to be checked for completeness according to the delivery note/s.
Any deficiencies are to be noted on same.

During offloading of the **STEEL-CASED PIPING**, the PE coating is to be checked using an ISO tester (20 kV). Damage must be repaired immediately.

Storing STEEL-CASED PIPING

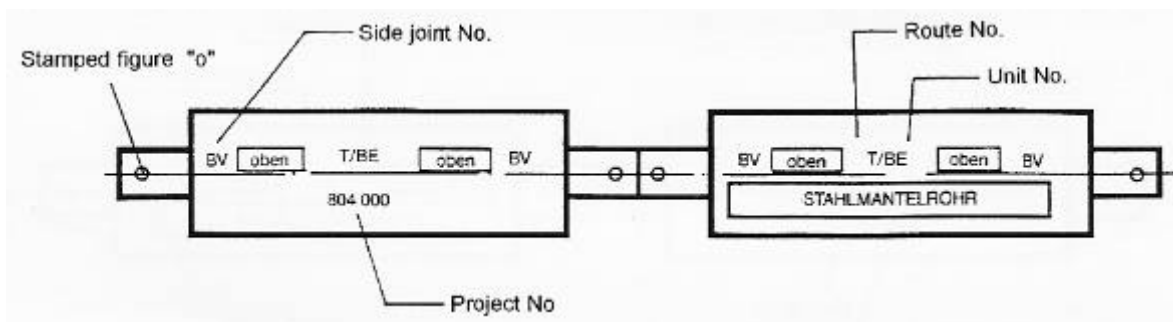
The storage area must be level and free of rubble and the like.
STEEL-CASED PIPING is to be stored on padded timber. Piping must not have ground contact during storage.

Laying the special units

The special unit ends are sequentially numbered on the casing piping. Contiguous such units carry the same site joint number. Laying sequence is in accordance with the pipeline planning. Each unit is also stamped "oben" on the casing pipe. The carrier piping 12 o'clock position is marked by a stamped figure "0". When aligning the units for welding, both markings must be at the top in the 12 o'clock position. Ensure further that no twist or torsion is present.

Before laying the units on their sand bedding (piping may not be laid on squared timber), the undersides of the casing piping must be subjected to ISO testing (20 kV). Any faults found must be repaired immediately.

Pipes are to be immediately placed in their correct position on the trench bed and their positioning checked by spirit level. If height correction is required, the piping may not be propped with squared timber but only with sand. The final correct position is to be made permanent by backfilling sand at sides and underneath and tamping it down. Site joints are to be so made that no water, contamination or the like can get into the piping.



Welding steel-cased piping

Only welders with the welder's examination certificate and valid certification may weld the carrier and casing piping as a matter of principle.

Welding itself is to be carried out in accordance with the recognised rules and usage of this technology and the valid standards and regulation or guidelines. The required weld evaluation is to be specified in individual cases.

The special units are to be so aligned in the trench bed before welding that a welding gap of about 2 mm is created and no vertical or horizontal difference exists between the piping ends to be welded. The piping ends each have a welding bevel ex works.

The transport locking elements are only to be removed after completion of carrier pipe welding; this is especially important for compensator units. In centring the carrier piping with pipe clips, the transport locking elements may only be removed on one side sequentially. Special information on this will be drafted during project planning.

X-ray testing of the carrier piping

The number of such tests and the method of evaluation depends on operating conditions and the client's requirements. In all other respects, Isobruigg's regulations apply.

Pre-stressing (mechanical)

Pre-stressing natural piping expansion compensators (expansion bends and elbows).

Only the carrier pipe is pre-stressed.

In laying piping expansion compensators, pre-stressing must be allowed for where applicable. The carrier pipe must therefore be pre-stressed according to the site requirements given (degree of pre-stressing, pre-stressing point and direction).

These details are to be taken from the design drawings for the Isobruigg steel-cased piping concerned.

The units are to be so aligned before welding that a welding gap of about 2 mm is created and no horizontal or vertical differences exist between the piping ends to be welded. These ends have welding bevelling ex works.

Welding is to be carried out according to the recognised rules of this technology and the valid DIN standards, regulation and guidelines. The weld evaluation required is to be determined in each individual case. Transport locking elements are only to be removed after carrier pipe welding. Before removing them, ensure that the carrier piping is in its final position and secured against movement (partial backfilling or tiebars between casing pipes).

Pre-stressing is carried out at BV (= site joint) 17 and 23 with 45 mm after the carrier piping has been welded at BVs 14, 15, 16, 18, 19, 20, 21, 22, 24, 25 and 26.

Pre-stressing expansion bends and elbow joints

In designing these, 50% pre-stressing was allowed for where necessary. The carrier piping must therefore be so pre-stressed on site in such cases.

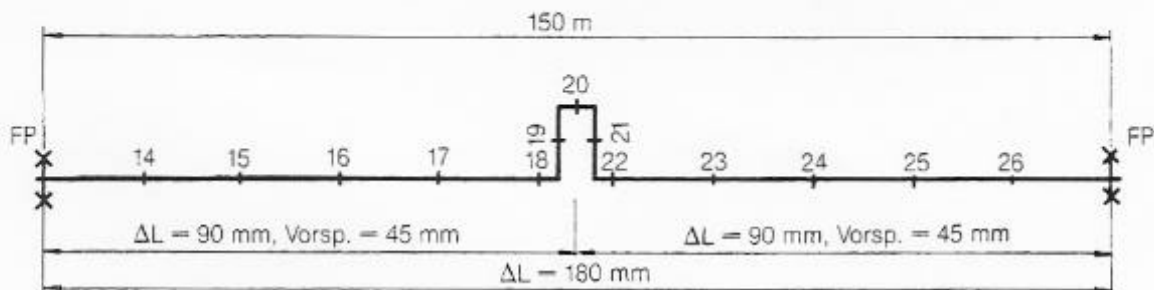
The piping design plans we draft include the necessary data for this work. These values must be adhered to.

The carrier piping is shortened by the given amount at BVs 17 and 23 for the purpose, welding bevelling installed, and suitable tools then used to draw the piping together again, which is then welded.

Our piping design plans show the BVs in which the expansion bends are to be prestressed.

Trench section

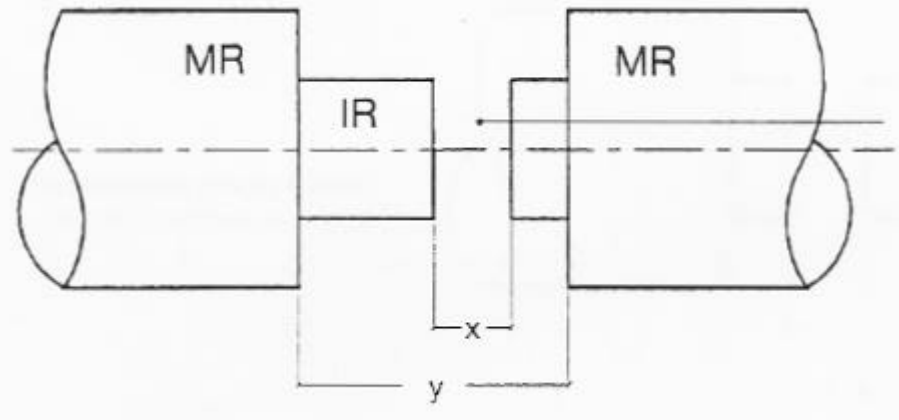
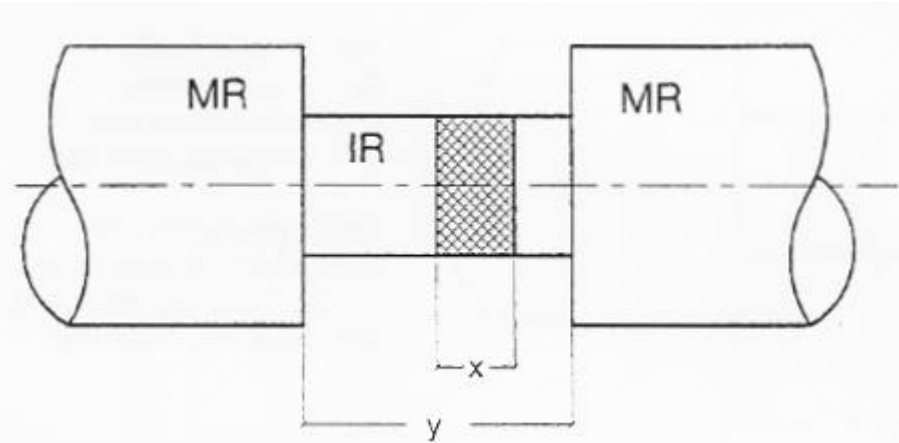
L = 150 m
 $\Delta L = 180 \text{ mm}$



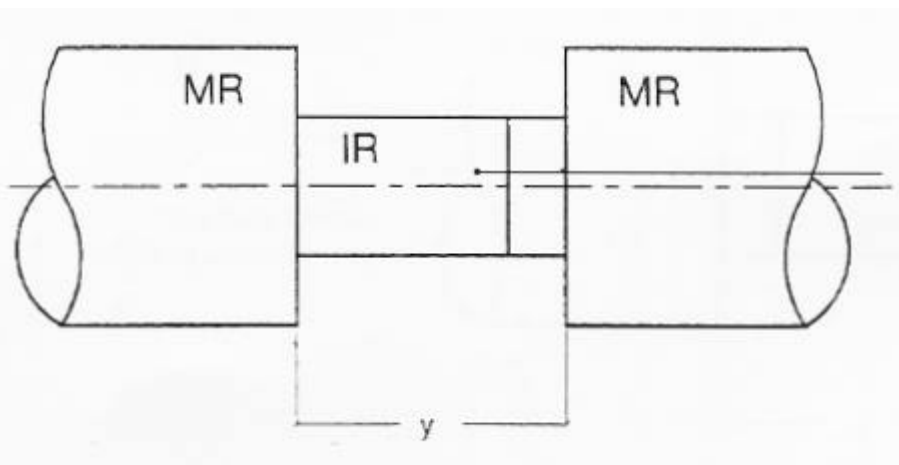
Steel-cased piping installation instructions

The carrier piping must be shortened by the pre-stress amount given and at the pre-stressed site joint (BV) specified in the plans, equipped with welding bevelling and then drawn together again with suitable tooling and welded

MR = casing pipe
 IR = carrier pipe
 x = pre-stress amount
 y = casing piping gap
 The casing piping gap y may not be changed (backfill with sand, secure) during pre-stressing (= drawing).



Carrier piping abbreviated by the pre-stress amount



Carrier piping in pre-stressed position

Please observe the following

During pre-stressing (= drawing together) of the carrier piping, the casing piping of the expansion compensator (expansion bend or elbow joint) must not be drawn with the carrier piping or moved from its position.

The bends of the anchor units in single- and twin-pipe conduits are to be completely fixed in position with backfilled sand before pre-stressing in the trench so that the prestress forces cannot pull or move them. If this is impossible, then other measures must be taken to ensure they will remain unaffected by pulling and moving forces.

Pneumatic carrier piping pressure testing (pipeline sections)

If this is required during installation, air at pressures between 0.5 and a maximum of 1.3 bar can be used to test sections if all safety precautions are first taken.

Hydraulic carrier piping pressure testing (with water) after installation

The required test pressure is 1.5 times the operating pressure, or at least 16 bar. During filling and after filling and damping time, the piping must be ventilated. Damping period: about 2 to 3 hours.

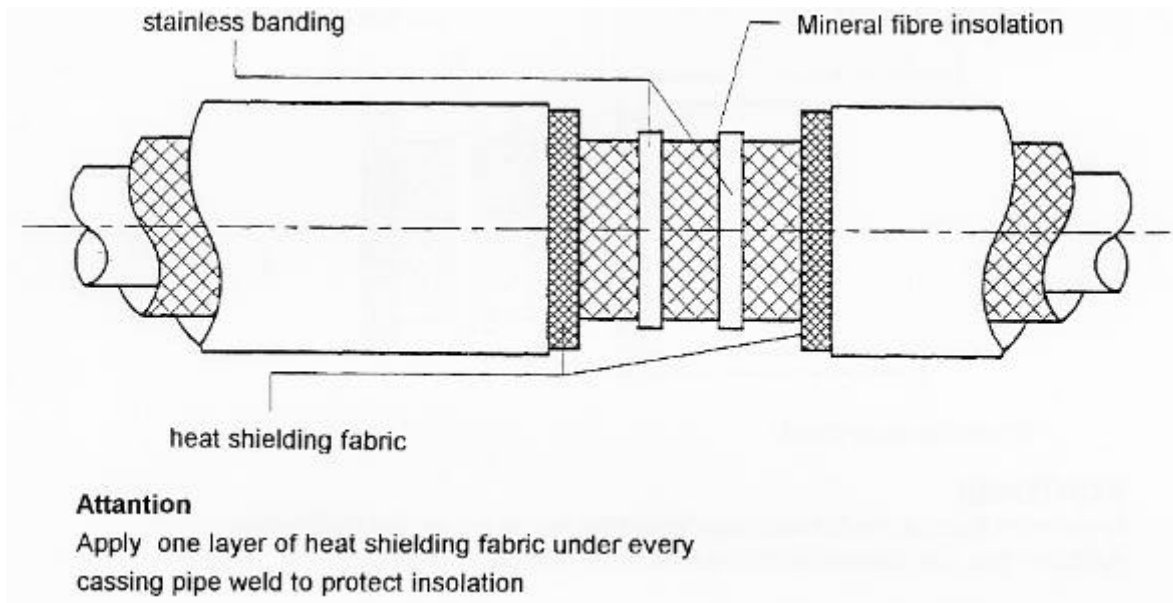
The actual pressure test is to be carried out over a period of 24 hours. During filling, damping and testing, a pressure print-out device must be connected up.

We would also attract your attention to the relevant standards and guidelines, especially the VdTÜV leaflet 1051, "Water pressure testing of piping laid in the ground" before the test is performed.

Re-insulating carrier piping (site joints)

Only the insulating materials supplied may be used to reinsulate carrier piping in the site joint area.

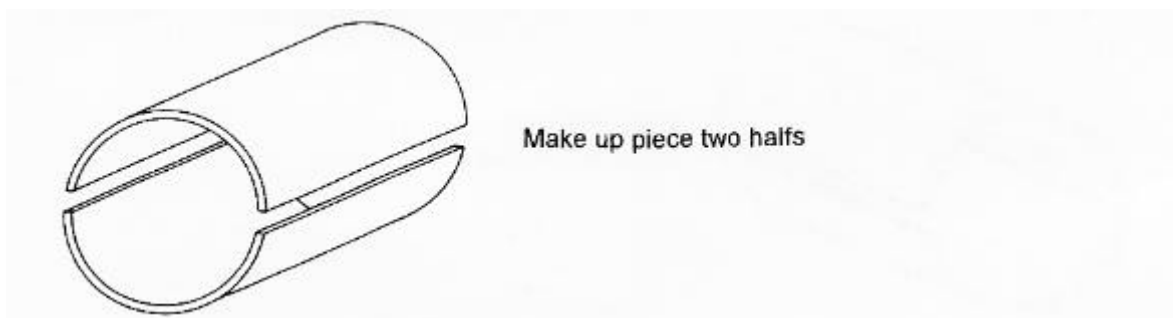
These are capable of adapting themselves so that no gap arises at media hammering points. The material is to be fastened to the carried piping with VA tape.

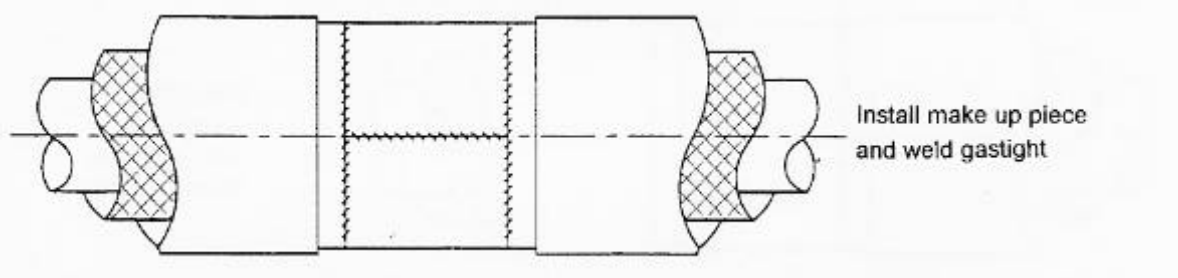


Casing piping connections

(Inserting adaptor pieces in the form of two make-up pieces)

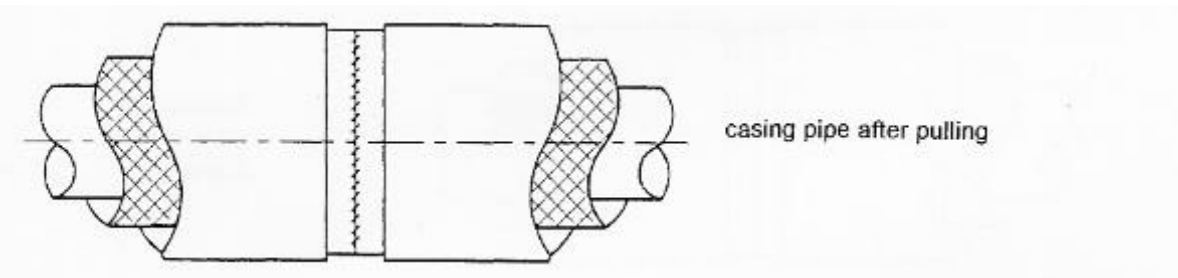
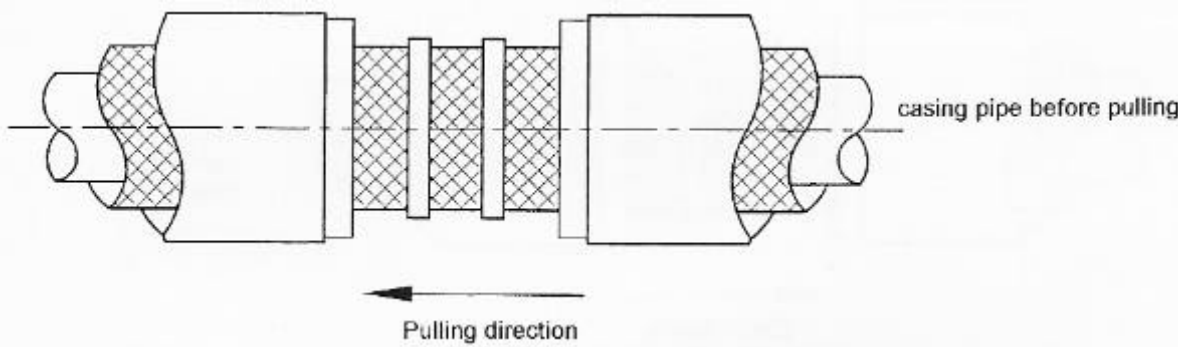
To connect two casing pipe lengths in the site joint area, Isobrugg supplies a longitu-dinally or spirally welded pipe as standard for the pipe-layer to cut any desired length fitting the casing piping on site. Pre-fabrication is impossible due to the tolerances of the piping as supplied.





Mantelrohrverbindungen (Beziehen von Mantelrohr)

Um Schweißarbeiten einzusparen, können auch die Mantelrohre an den vorgesehenen Baustellenverbindungen beigezogen werden. Das Ziehen ist mit äußerster Sorgfalt durchzuführen, wobei insbesondere darauf zu achten ist, dass die Festpunkte bzw. die



Welding casing piping seam site joints

Only qualified welders with valid certification may perform this task.

The casing piping connecting seams are to be electrically welded (increasing or decreasing).

The casing piping connecting seams (circular and longitudinal) are to be in V-form.

These seams are to be complete with root, final run and filling layers.

The seam welding must be gas- and vacuum-tight as well as X-ray-proof.

Pressure-testing the casing piping

After welding the site joints, the casing piping as a whole must be subjected to an air pressure test with an overpressure of 0.5 bar. The weld seams are to be coated with foam-building media so that any leaks can be detected immediately due to the formation of bubbles.

Testing casing piping site joint welding seams by vacuum

The following tools are needed:

1. portable vacuum equipment (vacuum pump);
2. vacuum seating fitting the casing piping dimensions, and
3. leak spray or similar.

The advantages of this method are that the connecting casing piping welding seams can immediately be checked for leak proofing after welding without pressurizing the entire casing piping section.

Note. The welded connection seams are to be cleaned with a wire brush, each welding seam sprayed with leak spray, the vacuum fitting set on the seam and the vacuum created (under pressure up to 150 mbar).

Recoating casing piping joints with corrosion-proofing PE banding

Surface preparation in accordance with DVGW leaflet GW 15.

The surface to be proofed, together with the adjacent coating ex works, must be clean with no loose contamination in the form of rust or dirt particles or the like sticking to it, free of any foreign materials such as oil, fat, wax or solvent, and dry.

The coating ex works is roughened for 100 mm adjacent to the area to be recoated and any edging rasped to about 30 degrees with a cambering rasp.

Priming the surface

Primer is to be stirred before use. The clean, dry surface (steel and coated casing piping) is then to be brush-coated with primer for about 100 mm in length. The primer dries in about 5 to 10 minutes. Then the corrosion-proofing banding supplied must be wrapped around the piping within 3 hours.

Recoating surfaces

The corrosion-proofing banding supplied is wrapped round the piping with the adhesive side downward and under tension. Use a 50% overlap. The coated casing piping is included for an adjacent approx. 100 mm both ends. Wrap doubly with 50% overlap.

The materials for reinsulating casing piping site joints (corrosion-proof banding and primer) are supplied by Isobruigg.

CAUTION 100 mm - wide corrosion-proof banding should only be used together with a wrapping automat.

See the manufacturer's instructions.

The finished coating/wrapping must be tested with an ISO tester for non-porosity.

Test current 5 kV

+ 5 kV per mm insulation.

The standard test current is 20 kV.

Recoating casing piping joints using shrinkage technology per DIN 30672

Prepare the surface per DVGS leaflet GW 15.

The surface to be coated and the adjacent ex works coating must be clean (with no loose contaminant such as rust particles, dirt or the like), dry and free of foreign substances such as oil, grease, solvent or wax.

The ex works coating is to be roughened for 100 mm adjacent to the area to be Recoated and any edging angled to about 30 degrees with a cambering rasp.

The surface to be recoated is then warmed to around 60 C. Installation of the supplied product is then carried out according to the product manufacturer's installation instructions.

No priming is required.

The coating may only be done by staff with valid applicable certification as operatives of this technology per GW 15.

The finished coating must be tested with a ISO tester for non-porosity.

Test current is 5 kV
+ 5 kV per mm insulation.

The standard test current is 20 kV.

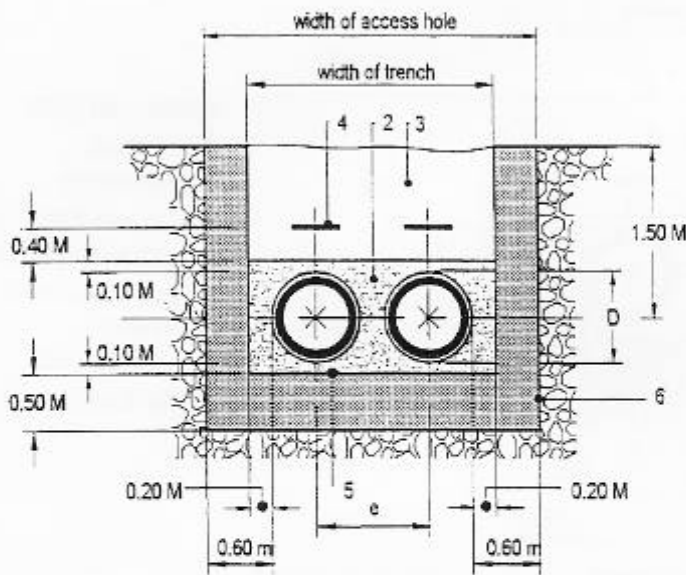
The ISO test must be documented.

Backfill the completed sections as soon as possible

Access holes for field joints

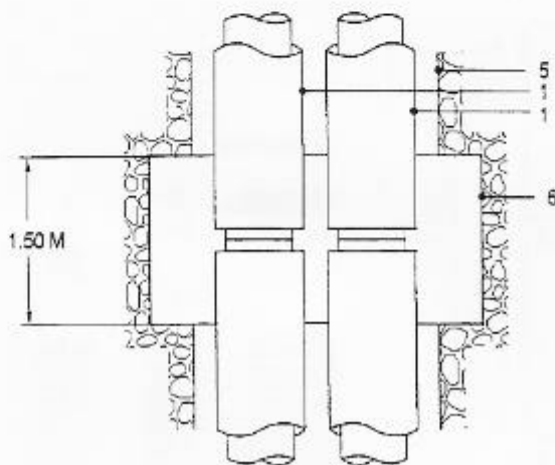
Access holes for field joints are needed to enable welding, reinsulating, testing and recoating works to be carried out.

The dimensions of access holes for field joints, where split pipe casing make-up pieces are to be used (normally only at fittings), are shown below.



cross section at access hole

- 1 ISOBRUGG SCP
- 2 sandfill of trench
- 3 backfill
- 4 pipe warning tape (supplied by others) and to be installed during back filling
- 5 outline of trench
- 6 outline of access hole



dimensions of D and e

DN SCP	D (M)	e min. (M)	e as per MHI drgs. (M)
250/450	0.47	0.80	1.075
500/650	0.67	1.05	1.075
600/800	0.82	1.02	1.550
800/1000	1.02	1.22	1.550
900/1100	1.13	1.33	1.550

Trench cross section at acces hole

