ANTICOR SYNTETIX® CF

Contents:

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1. Purpose of the instruction.

Casing Filler Technology – is used in the anti-corrosion protection of pipelines there where casings are applied, and it consists in filling the space between the carrier pipe and the casing pipe with the material ANTICOR Syntetix® CF. This material is applied as a liquid, then it turns into a viscoelastic, non-crystalline gel and its plasticity is maintained in the temperature range of its application, viz. from -15^{0}C to + 38^{0}C.

2. Reference documents.

Company standards, operational requirements (Technical Approval of the Institute of the Oil and Gas Institute) as well as recommendations of the Commercial Chamber of Gas Industry (Technical Standard ST-IGG 0601: 2008).

3. (Indispensable) Equipment and accessories

- generating set,
- welding equipment,
- compressor,
- torch with a gas bottle,
- gas detector,
- set of stub pipes (inlet pipe, outlet pipes, drainage pipe-if necessary),
- insulated tank with a coil pipe (the so-called hot tank) and accessories (pump, discharge pipes, flow meter of liquid being pumped),
- insulation putty *ANTICOR Syntetix® Mastic*,
- two-component polyurethane foam, extruded polystyrene (STURODUR),
- Rubber ends seal, heat shrinkable sleeve
- anticorrosion tapes PE Polyken 930-35 or 905-40,
- two-component protective coating PUR PROTEGOL- U 32-55,
- solvent, abrasive paper, cleaning cloth,
- angular grinder,
- thermometer,
- protective clothes.

4. Description of the filling material used

ANTICOR Syntetix® CF is a viscoelastic, non-crystalline material, efficient in the corrosion protection; it contains stress corrosion cracking inhibitors (SCC) and antioxidants. Good adhesion to steel, concrete surfaces and plastics (incl. PE, PP, PUR, epoxy and other coatings).
It can be applied with all types of anti-corrosion protective coatings on steel pipelines (no reactions). The product is not harmful to humans and the natural environment. Certified by the National Institute of Public Health.

4.1. Properties of the material

- It guarantees chemical stability in the entire period of use.
- Its antioxidant properties allow to inhibit the process of natural degradation of the carrier pipe insulation coating.
- Effective in corrosion protection.
- Contains stress corrosion cracking (SCC) inhibitors.
- Good adhesion to steel, concrete surfaces and plastics (incl. PE, PP, PUR, epoxy and other coatings).

4.2. Advantages related to the use and operation

- Guarantee of tight closure on the casing pipe.
- Guarantee of efficient and long-time anti-corrosion protection on the pipe surface
- Is an efficient method for repairing electrolytic joint and for containing the effects of galvanic short-circuit.
- Displaces water, humidity, air and other gases – viz. factors which favor corrosion – from the casing space.
- Eliminates aerobic bacteria and fungi – eliminating thus microbial corrosion.
- Guarantees a reliable operation and low maintenance costs in the period of the pipeline service life, which means a reduction of cathode protection expenditure.
- In case of uncontrolled mass leakage as a result of a breakdown, there will be left a protective coating on all surfaces.

5. Technological operations

Preparatory works:

- Available maps of existing underground infrastructure are to be acquainted with.
- Be confirmed and traced the route (depth and direction) of the infrastructure said by making use of an radio detection cable and pipe locator.
- Be arranged the construction site in conformity with the effective labor safety and hygiene rules.

5.1 Exposing of the pipeline (in emergency):

- Remove the outer layer of humus with an excavator and put it aside in the demarcated place.
- Make 0.5 m deep exploratory cuts (horizontally and vertically to the pipeline route) with hand spades so as to avoid a possible collision between an excavator and an underground infrastructure.
- Remove the earth mechanically (with an excavator) down to the depth already checked.
- Continue the works in the cycle said until finding a structure or an underground infrastructure.
  Attention:
  - Work in continuous measurement of the concentration of gas (methane). In case of exceeding 2% volume of methane in the ambient atmosphere or 0.7% by volume of propane-butane, i.e. exceeding 40% LEL, or if a reduction in oxygen levels below 18% in the workplace, stop work and notify the appropriate unit.
  - Nearby underground utilities all cuts can be performed only by hand.
  - Earthworks within a distance of 0, 5 m from the pipeline may be performed by hand – with spades; in exceptional cases, there may be used pickaxes provided that extreme caution is used.
  - Earthworks are considered as completed when:
    - The ends of a casing pipe have been exposed at least along a 2 m segment.
    - At both the ends the distance between the casing pipe and the cutting wall is at least 0.8 m .
    - The cutting depth under the casing pipe is at last 0,7 m.
    - The profile angle of the cutting walls must guarantee safety for the workers. In case of landslides, you must use a system of barriers (e.g. Larsen).
      Additionally, in case of underground waters appearing in the cutting, provide an appropriate system for water draining.

5.2 Basic works:

- Remove the existing closures from a casing pipe.
- Inspect the condition of the space between the pipes with visual techniques.
- Rinse the space between the carrier and the casing pipes with pressurized water so as to remove contaminations which may be present inside the casing (if necessary).
- Dry the inside of the casing pipe with air heaters (if necessary).

  Important:

  When vent pipes are welded on the casing pipe, they must be cut off and secured when the insulation material is being applied. Applied the material, the vent pipes are to be welded again and the welds are to be protected with corrosion protection materials (e.g. polyurethane PUR applied by hand or anti-corrosion tapes POLYKEN,).
- Fit a system of fill connections:
  - On the higher side (level), incorporate a fill connection (inlet pipe) at 12.00 position and an exhaust stub (outlet pipe) at a distance of 1 m + 0,5 m from the end of the pipe.
  - In the lower side (level), incorporate an exhaust stub (outlet pipe) at 12.00 position at a distance of 1 m from the casing pipe end
  - In the lower side (level), incorporate at 6.00 position a drainage stud at a distance of 1 m from the casing pipe end (if required).

  Important:

  Stub sizes:
    - DN 50
    - length 70-80 mm
    - with R 2" thread
- Mill ø 48 mm holes inside the stubs in the casing pipe wall.
- Close the casing pipe end using a ANTICOR CC (Casing Closure) technology, using:
  - A two-component polyurethane foam and an extruded polystyrene „XPS" (Styrodur) board ANTICOR Syntetix® Mastic insulation putty
  - Rubber ends seal, or heat shrinkable sleeve
  - anticorrosion tapes PE Polyken 930-35 or 905-40

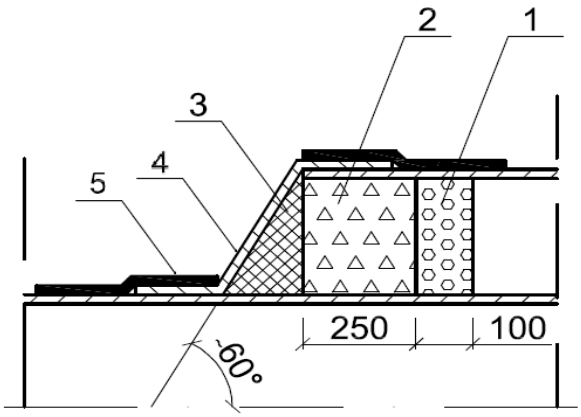

Fig. 1. A diagram illustrating the closure of the casing pipe ends with ANTICOR CC (Casing Closer) system 1 – „XPS" board 2 – ANTICOR Syntetix® Mastic insulation putty, 3 – two-component polyurethane foam , 4 – rubber ends seal or heat shrinkable sleeve 5 – PE anticorrosion tape (Polyken 930-35 or 905-40)

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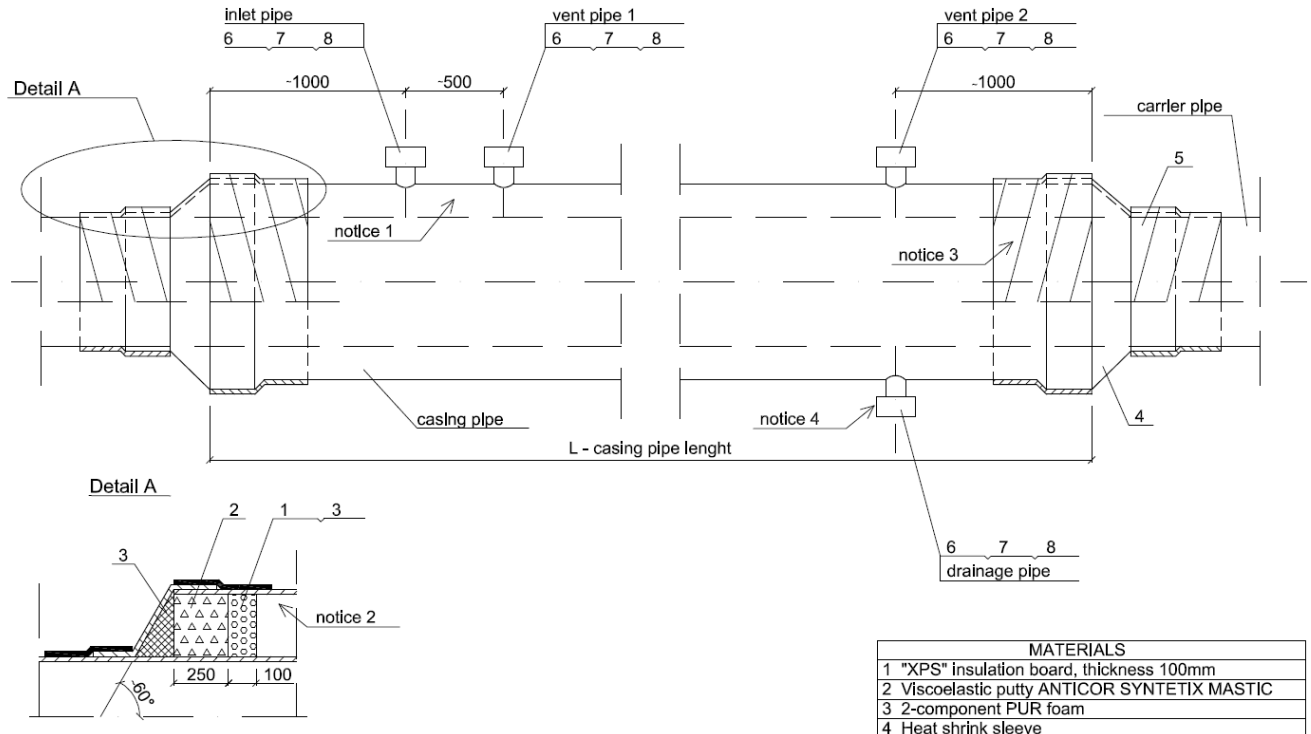
- Fit a filling system with a flow meter.
- Fit a ball valve DN 50 in open position on the drainage stub (6.00 position).
- Switch on the insulation mass filling system. The temperature of the material being applied is +65^{0}C +90^{0}C.
- Close the drainage valve after overflowing 'pure' material (without water or contaminations – if fitted).
- Shut the valve on the lower part of the casing pipe upon overflowing the insulation material..
- Switch off the material feeding system through the inlet pipe placed on the higher side of the casing pipe.
- Make up the material loss caused by a thermal shrinkage (at least after 3-4 hours of having completed the application of material).

Important:

The filling operation is considered effective if the actual value on the flow meter is ± 5 % against the value calculated theoretically.

- Remove the installation and the filling system.
- Remove the ball valve from the drainage stub (if fitted).
- Close the subs with caps 2".
- Insulate the DN 50 stubs and their connections with the casing pipe by applying (by hand) a PUR polyurethane coating.
- Check the completed PUR coating for tightness by using a holiday detector (testing voltage: 15 kV).
- Bury the excavation following the requirements and standards applied by the customer.

TECHNICAL DRAWING



MATERIALS
1 "XPS" insulation board, thickness 100mm
2 Viscoelastic putty ANTICOR SYNTETIX MASTIC
3 2-component PUR foam
4 Heat shrink sleeve
5 PE tape - POLYKEN 930-35
6 Steel pipe DN50, L=70mm
7 DN50 (R2") caps
8 PUR coating PROTEGOL 32-55

Notice:
1. Inlet pipe and vent pipe 1 install only on the higher side of the casing pipe.
2. "XPS" insulation board (pos. 1) install inside the casing pipe using 2-component PUR foam (pos. 3).
3. Secure heat shrink sleeves ends with PE tape (pos. 5).
4. When filling process is finished insulate vent pipes (pos. 6) and caps (pos. 7) with PUR coating (pos. 8).

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