6 Detecting the installed Pipeline and checking Integrity

egeplast SLM® DCT

Table of Contents

6 Detecting the installed Pipeline and checking Integrity

6.1 Procedure Description

Fig 6-1

Conductive strips integrated in the pipe enable subsequent location

Parallel installation of a locating strip is virtually impossible during trenchless pipeline construction. Subsequent detection of a pipeline which has been laid using trenchless techniques is, however, precisely what is often required for later construction work. The location of such pipelines, particularly in inner city areas, can thus be located for later construction work.

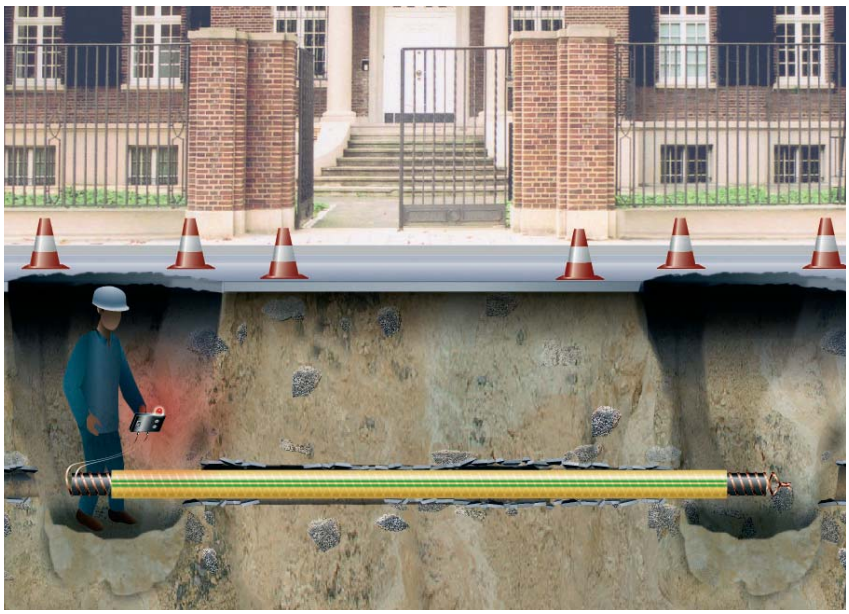


Fig 6-2

Verification of the integrity of plastic pipes installed by trenchless methods

Common to all methods of trenchless installation is the fact that, in contrast to open trench techniques, the pipeline surrounding cannot be prepared during trenchless installation. The pipe is therefore frequently pulled through stony soil or building rubble; during pipe bursting, it is pulled past the shards which are pushed into the soil in this procedure. The extent of the damage to the pipe surface can only be seen, at the earliest, in an interim pit.

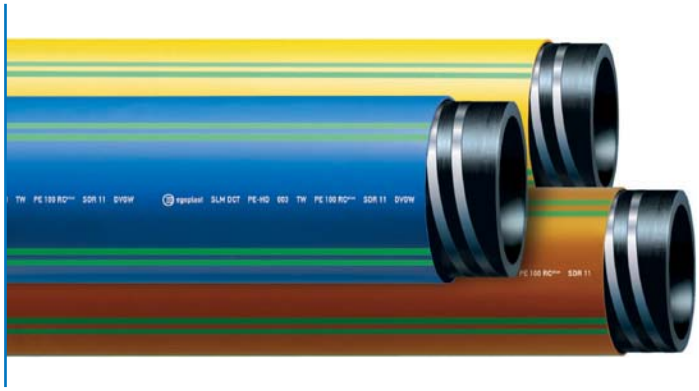
Black box installation under adverse conditions often leads many network operators to ask the question: How safe is the soil-covered pipeline, especially when transporting sensitive media?
For this reason, DVGW Worksheet GW 323 stipulates, for pipe bursting, the newly laid pipeline to be checked.

6 Detecting the installed Pipeline and checking Integrity

6.2 Product Description

egeplast SLM® DCT

Detection and **C**hecking **T**echnology



Drinking Water Pipes · Gas Pipes · Sewage Pressure Pipes

The use of two integrated spirally wound conducting strips further enhances the already outstanding properties of the egeplast SLM® pipe. Not only does this enable the egeplast SLM® DCT to be exactly located, but it also provides proof of the integrity of the pipe after laying for acceptance of the work. This option gives both the customer and contractor maximum reliability, even under the most unfavourable soil conditions.

egeplast SLM® DCT pull-in checking

Fig 6-3: Pulling in an egeplast SLM® DCT gas pipeline under adverse soil conditions

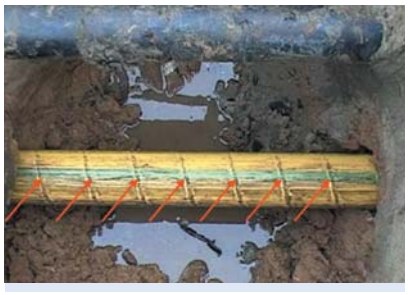


Fig 6-4: egeplast SLM® DCT protectively coated pipe with integrated damage indicator (arrow) in an interim pit

Fig 6-5: Verifying the integrity with a continuity tester

Common to all methods of trenchless installation is the fact that, in contrast to open trench techniques, the pipeline surroundings cannot be prepared. The pipe is therefore frequently pulled though stony soil or building rubble; during pipe bursting, it is pulled past the shards which are pushed into the soil in this procedure. The extent of the damage to the pipe surface can only be seen, at the earliest, in an interim pit.

Pipes with special protective functions are therefore a sensible alternative way to avoid risks due to damage.

In order to monitor the integrity of the new pressure pipe (score depth = 0% of the standard wall thickness) during and after the pulling-in procedure (e.g. during pipe bursting of cast iron pipelines), there exists the alternative of using an egeplast SLM® RC^{plus} pipe with integrated damage indicator.

If notching as far as the base of the protective coating should occur as the pipe is pulled in, then the spirally wound electrical conductors are cut through.

The electrical continuity can be checked with a simple continuity tester after the pipe has been pulled in and the integrity of the new pressure pipe thus proved.

A further advantage, especially in inner city areas, is that multiple layer pipes of this type can be detected even below ground by virtue of the electrical conductor and can thus be precisely located for later construction work.

6.3 PE 100 RC^{plus} Quality Assurance

Modern installation procedures make special demands of pipe material. The materials used must satisfy additional requirements, over and above the material properties monitored according to the applicable standards and DVGW Worksheet GW 335 Part A2. The resistance of the pipe material to slow crack growth is critical for the lifespan of the pipe under extreme operating conditions, if the pipe is to achieve the standard service life of 100 years in spite of the increased demands. In particular, resistance to stress-induced cracking can be improved enormously through optimised polymerisation. The qualities of today's PE 100 RC^{plus} allow it to almost reach the resistance to stress-induced cracking of cross-linked polyethylene PEX, which has been used for years in harsh conditions.
The notch test and the FNCT test provide information about the stress-induced cracking behaviour (slow crack growth) of a pipe material.

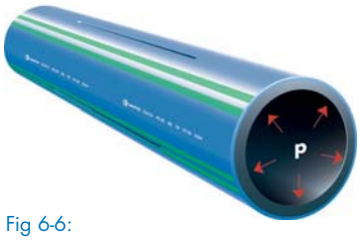


Fig 6-6:
Notch test (ISO 13479)

Fig 6-7:
Full notch creep test FNCT (ISO 16770)

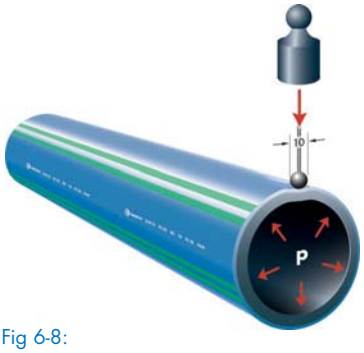


Fig 6-8:
Point load test using the Dr. Hessel method

In the notch test according to ISO 13479, a section of pipe is notched as specified, and afterwards tested to destruction at a test temperature of 80°C and test pressure of 9.2 bar (SDR 11, PE 100).

ISO 16770 describes a further development of the notch test. In the FNCT, small test bars of the material to be tested are incised with a sharp edge and, at 80°C (+2% Arkopal N 100), subjected to a constant tensile load of 4 N/mm^2 until they fail. The test simulates localised stress concentrations.

An additional check is the point load test using the Dr. Hessel method. This test reproduces very well the effect of a stone pressing against the pipe. A pipe, which has been internally pressurised, is also dented inwards using a round punch as a point load (penetration depth: 8.2% of the external diameter) in order to simulate the stress caused by a stone. The test is carried out at a temperature of 80°C (+2% Arkopal N 100).

So as to be able to make estimates of the service life of pipes under additional point loading, Dr. Hessel Ingenieurtechnik compared tests of pipes under internal pressure, and with additional point loading, to the results from the FNCT test (3R international 4/2001 and 6/2001). With this comparison, the stresses to which a pipe installed without a sand bed is exposed during its operating life may be related to the results of FNCT testing, and thus the FNCT test may be adopted for regular quality monitoring.

Performed within the framework of the full quality testing cycle are: monitoring of the material properties of all PE 100 RC^{plus} raw material charges by FNCT tests, and monitoring of the material properties after processing of the raw material. The latter is carried out on the produced pipe by a testing laboratory which is accredited to perform such analyses. The PE 100 RC^{plus} materials perform distinctly better than the standard PE 100 types in both the notch and FNCT tests, with values that lie well above those stipulated for pipes with protective properties.

6 Detecting the installed Pipeline and checking Integrity

egeplast SLM® DCT

	Internal Pressure Creep Test	S4 Test (Fast Crack Growth) 110x10 mm	Notch Test	FNCT	Point Load Test, Dr. Hessel Method
PE as per GW 335 Part A2	σ =12,4N/mm²; 20°C ≥ 100 h as per DIN 8075	pc ≥ 8 bar	80°C; 9.2bar ≥ 500 h	250 - 800 h [1]	1000 – 3000 h [1]
PE 100 + [2]	σ =12,4N/mm²; 20°C ≥ 200 h	pc ≥ 10 bar	80°C; 9.2bar ≥ 500 h	250 – 800 h [1] >300 h [3]	1000 – 3000 h [1]
PE 100 RC^{plus}	σ = 12,4N/mm²; 20°C ≥ 200 h	pc ≥ 10 bar	80°C; 9.2bar ≥ 5000 h	**≥ 8760 h**	**≥ 8760 h**

Tab 6-1

1) Values from 3R-international 4/2001 and 6/2001
2) The PE 100+ Association is an amalgamation of polyethylene manufacturers who voluntarily exceed the standard requirements
3) Data from a few manufacturers

The quality of the material utilised can be documented on request with a 3.1 B certificate.

egeplast uses only selected PE 100 materials (PE 100 RC^{plus}) for the egeplast SLM® DCT pipe. These materials must demonstrate a time to failure of at least 8760 h in the FNCT.

As an additional control, the quality of PE 100 RC^{plus} is monitored within the framework of the full quality testing cycle. The quality of these materials is such that their suitability for a 100 year service life for a pipe under point loading may be confirmed by structural testing. egeplast SLM® DCT pipes are subjected regularly to such structural testing: an internal pressure creep test lasting for one year, with additional point loading, at 80°C (+2% Arkopal N 100).
The PE 100 RC^{plus} materials perform distinctly better than the standard PE 100 types in both the notch and FNCT tests, with values that lie well above those stipulated for pipes with protective properties.

6 Detecting the installed Pipeline and checking Integrity

Testing of the Material PE 100 RC^{plus}			
Property	**Requirement**	**Test Procedure**	**Frequency**
Melt index	as per specifications	EN ISO 1133:1999 Condition T 5 kg, 190°C 10 minutes	Min. 1 x per week as well as on every change of material and on every dimension check
Loss on drying	≤ 0.1%	Infrared method	per charge
Homogeneity	≤ grade 3	ISO 18553	per charge
Density	≥ 930 kg/m^3	DIN EN ISO 1183-2, DIN EN ISO 1872-1	per charge
Colour	as per DVGW GW 335 Part A2		regularly
Resistance to weathering	as per DVGW GW 335 Part A2 DIN EN 12201-1 DIN EN 1555-1	Black as per ISO 6964, blue and yellow as per DIN EN 921 and following DIN EN ISO 6259-1	regularly
Thermal stability	>20 minutes at 200°C	DIN EN 728	per charge
Microbiology	as per KTW recommendation as well as DVGW GW 335 Part A2	DVGW W 270	approval testing
Fast crack growth	as per DVGW GW 335 Part A2 DIN EN 12201-1 DIN EN 1555-1	ISO 13477	1 x annually
Gas resistance	as per DVGW GW 335 Part A2 DIN EN 12201-1 DIN EN 1555-1	DVGW GW 335 Part A2	approval testing
Hygiene	as per KTW recommendation as well as DVGW GW 335 Part A2		approval testing
Odour and taste	as per KTW recommendation as well as DVGW GW 335 Part A2		per charge
Rapid crack propagation	as per DVGW GW 335 Part A2 DIN EN 12201-1 DIN EN 1555-1	Notch test DIN EN ISO 13479	1 x annually
Slow crack growth	>8760 h as per Full Quality Testing Cycle	FNCT ISO 16770 80°C, 4 N/mm^2, 2% Arkopal	per charge

Tab 6-2

6 Detecting the installed Pipeline and checking Integrity

egeplast SLM® DCT

Additional Testing of the Finished PE 100 RC^{plus} Piping			
Property	Requirement	Test Procedure	Frequency
Labelling	as per DVGW GW 335 Part A2 DIN EN 12201-2 DIN EN 1555-2	visual inspection	regularly every 2 hours
Texture	as per DVGW GW 335 Part A2	visual inspection	regularly every 2 hours
Colour	as per DVGW GW 335 Part A2	visual inspection	regularly every 2 hours
Warm storage	as per DVGW GW 335 Part A2		1 x per week
Homogeneity	as per DVGW GW 335 Part A2	visual inspection	1 x per week
Thermal stability	>20 minutes at 200°C	DIN EN 728	1 x per week
Internal pressure creep test	as per DVGW GW 335 Part A2 DIN EN 12201-2 DIN EN 1555-2	80°C, 165 h; PE 80 σ = 4.6 N/mm^2 PE 100 σ = 5.5 N/mm^2	on every start at least 1 x per week
Melt index	max. 20% variation from the raw material	EN ISO 1133:1999 Condition T 5 kg, 190°C 10 minutes	on every change and on every dimension check at least 1 x per week
Hygiene	as per KTW recommendation as well as DVGW GW 335 Part A2	DVGW W 270	1 x annually
Labelling	as per DVGW GW 335 Part A2 DIN EN 12201-2 DIN EN 1555-2	visual inspection	regularly every 2 hours
Slow crack growth	>8760 h as per Full Quality Testing Cycle	FNCT ISO 16770 80°C, 4 N/mm^2, 2% Arkopal	6 x annually
Point loading test	>8760 h as per Full Quality Testing Cycle	HESSEL PA PLP 2.2-2 2004-05 80°C, 4 N/mm^2, 2% Arkopal	3 x annually

Tab 6-3

The egeplast SLM®DCT pipe is, as a consequence of its excellent resistance to stress-induced cracking, insensitive to point loads and therefore need not be bedded in sand. It is suitable for installation without a sand bed, and for trenchless installation.

HESSEL Ingenieurtechnik

Confirmation of continuous Quality Inspection

Subject:	Inspection of pipes made from PE 100 RC^{plus} within the scope of the ***„Full Quality Testing Cycle"***
Product:	egeplast **SLM® DCT-pipe** for drinking water, gas supply and waste water for non-conventional pipe installation
Manufacturer:	egeplast Werner Strumann GmbH & Co. KG Robert-Bosch-Str. 7, DE-48268 Greven, Germany
Scope of inspection: (Full Quality Testing Cycle)	1. Prove of the transfer-function from testing to service conditions 2. Inspection of the materials properties of all raw material batches designated as PE 100 RC^{plus} using the FNCT 3. Inspection of the materials properties after processing 4. Prove of the expected minimum service life using pipes under point load in type tests every year 5. Statistical validation of the minimum requirements of PE 100 RC^{plus}

This is to certify that due to the above mentioned inspections the following minimum requirements are fulfilled:

FNCT (PA FNCT 2.1-3 2004-03): 4 N/mm², 80 °C, 2% Arkopal N-100 testing time: >8760 h

Point loading test (PA PLP 2.2-2 2004-05): 4 N/mm², 80 °C, 2% Arkopal N-100 testing time: >8760 h

The egeplast SLM® DCT-pipes made from PE 100 RC^{plus} are qualified for sandless and trenchless installation techniques.

HESSEL Ingenieurtechnik GmbH

Am Vennstein 1a
D-52159 Roetgen

Tel.: +49 2471/ 920 220
Fax: +49 2471/920 2219
E-Mail: info@hessel-ingtech.de
Net: www.hessel-ingtech.de

Officially approved as a test, inspection and certification facility (NRW 37).

Deutscher Akkreditierungs Rat
DAP-PL-3760.00

According to DIN EN ISO/IEC 17025 accredited Test-Laboratory by DAP Deutsches Akkreditierungssystem Prüfwesen GmbH

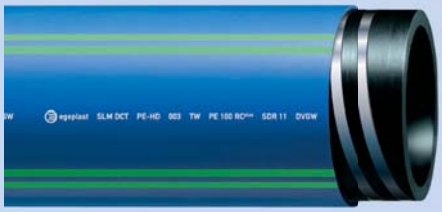
Date: 11.05.2007

Authorized to sign: (Dr.–Ing. Joachim Hessel)

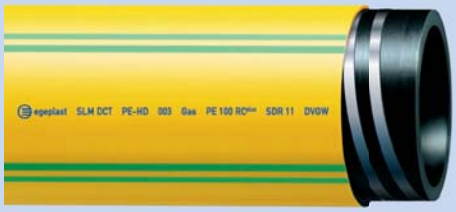
Fig 6-9

6.4 Technical Information

6.4.1 Product Data Sheet for egeplast SLM® DCT Drinking Water Pipes

Dimension:	OD 25 mm – OD 1200 mm
Pipe construction:	 • Medium-bearing pipe black • Protective coating on the outside blue to identify the medium as drinking water with 4 green double stripes to signify a pipe with a protective coating SDR 17; SDR 11; SDR 7.4
Material:	Medium-bearing pipe: PE 100 RC^{plus} (Resistance toCrack) DCT: Two electrical conductors, laid down helically under the protective coating Protective coating: Patented, mineral-reinforced polypropylene coating, continuously extruded on during the manufacturing process
Approval:	DVGW*, SVGW, ÖVGW*, DIN-Gost*, IGNG*, DWI* *The approvals pertain to the medium-bearing pipe
Standards:	DVGW GW 335; DIN 8074/75; DIN EN 12201
Welding group:	003
Labelling:	With coloured metre marking on the medium-bearing pipe and additional marking of the protective coating
Delivery form:	• 6, 12 or 20 m straight lengths (up to max. 30 m) • Bundled coils of 100 m (up to OD 160/180 mm) • Custom lengths on request • Larger lengths on drums
Regulatory code / installation methods:	DVGW W400-1/2, GW 320, GW 321, GW 323; DIN EN 805; DIN 4124
Material testing:	HESSEL Ingenieurtechnik

6.4.2 Product Data Sheet for egeplast SLM® DCT Gas Pipes

Dimension:	OD 25 mm – OD 1200 mm
Pipe construction:	 • Medium-bearing pipe black • Protective coating on the outside orange to identify the medium as natural gas with 4 green double stripes to signify a pipe with a protective coating SDR 17; SDR 17.6; SDR 11
Material:	Medium-bearing pipe: PE 100 RC^{plus} (Resistance toCrack) DCT: Two electrical conductors, laid down helically under the protective coating Protective coating: Patented, mineral-reinforced polypropylene coating, continuously extruded on during the manufacturing process
Approval:	DVGW*, SVGW, ÖVGW*, DIN-Gost*, IGNG* *The approvals pertain to the medium-bearing pipe
Standards:	DVGW GW 335; DIN 8074/75; DIN EN 1555
Welding group:	003
Labelling:	With coloured metre marking on the medium-bearing pipe and additional marking of the protective coating
Delivery form:	• 6, 12 or 20 m straight lengths (up to max. 30 m) • Bundled coils of 100 m (up to OD 160/180 mm) • Custom lengths on request • Larger lengths on drums
Regulatory code / installation methods:	DVGW G 472, GW 320, GW 321, GW 323; DIN EN 12007; DIN 4124
Material testing:	HESSEL Ingenieurtechnik

6.4.3 Product Data Sheet for egeplast SLM® DCT Sewage Pressure Pipes

Dimension:	OD 25 mm – OD 1200 mm
Pipe construction:	 • Medium-bearing pipe black • Protective coating on the outside brown to identify the medium as sewage with 4 green double stripes to signify a pipe with a protective coating SDR 17; SDR 11; SDR 7.4
Material:	Medium-bearing pipe: PE 100 RC^{plus} (Resistance toCrack) DCT: Two electrical conductors, laid down helically under the protective coating Protective coating: Patented, mineral-reinforced polypropylene coating, continuously extruded on during the manufacturing process
Approval:	The egeplast SLM® DCT sewage pressure pipes are manufactured according to ZP 14.3.1 and bear the DIN Certco mark of conformity
Standards:	DVGW GW 335; DIN 8074/75; DIN EN 13244
Welding group:	003
Labelling:	With coloured metre marking on the medium-bearing pipe and additional marking of the protective coating
Delivery form:	• 6, 12 or 20 m straight lengths (up to max. 30 m) • Bundled coils of 100 m (up to OD 160/180 mm) • Custom lengths on request • Larger lengths on drums
Regulatory code / installation methods:	Recommended: by analogy to DVGW W400-1/2,GW 320, GW 321, GW 323; DIN EN 805; DIN 4124
Material testing:	HESSEL Ingenieurtechnik

6.4.4 Protection from Abrasion during Trenchless Installation

The egeplast SLM® DCT is the result of consistent development of the well proven SLM® pipe. Confirmation of its improved quality has been provided by established, independent testing institutes.
The pressure bearing pipe wall consists of PE 100 RC^{plus} (optionally PE 80), which guards reliably against damage by virtue of its excellent crack resistance.
The protective coating of polypropylene reliably protects the medium-bearing pipe against scratches and scoring from outside. In addition, point loads, such as those which can arise through stones or shards, are spread over a greater surface area by the protective coating, thus reducing the stress concentration.
The hardness of the pipe coating results from the special composition of the material. egeplast incorporates mineral microparticles into the polypropylene protective coating; these permit noticeably less scoring and abrasion.

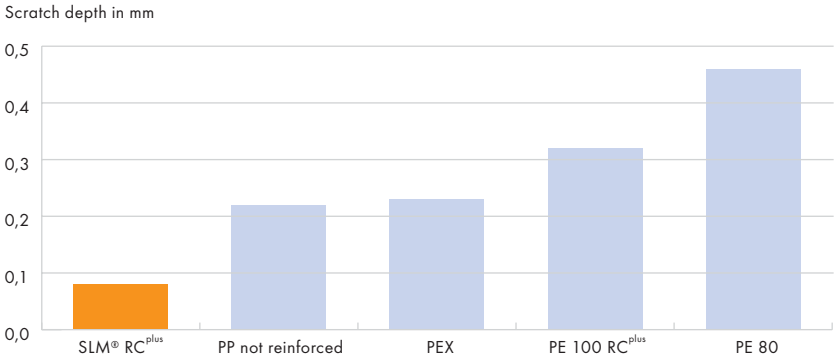


Fig 6-10: Results of scratch testing, official materials testing institute at the University of Hanover

These clear improvements in the product characteristics have been verified through scratch testing by the Materialprüfanstalt (Materials Testing Institute) in Hanover, amongst others (Fig 6-10).

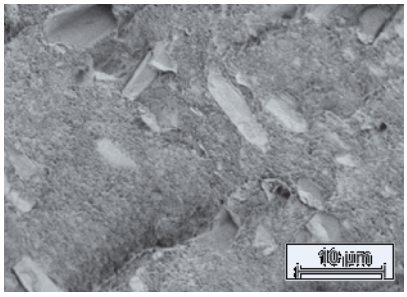


Fig 6-11: Mineral microparticles in the coating material

6.4.5 Double Protection against Point Loads

Pipes with protective coatings offer double protection against point loads:

- Like a "hard" shell, the protective coating keeps the direct load away from the pressure bearing pipe and distributes the additional stress. Analyses using the finite element method show what advantages a pipe with a protective coating has with regard to its resilience to point loading. No stress concentration acts on the core pipe in the immediate area of contact.
- The selected high-quality, extremely crack resistant PE 100 RC^{plus} polyethylene materials of the pressure bearing core pipe give crack formation no chance. For pipe bursting, the DVGW demands FNCT values of 2700 h for drinking water pipes and 3300 h for gas pipes in its Worksheet GW 323. All PE 100 RC^{plus}-materials are checked during the incoming goods inspection for >8760 h. These requirements are met by the core pipes of the egeplast SLM® DCT.

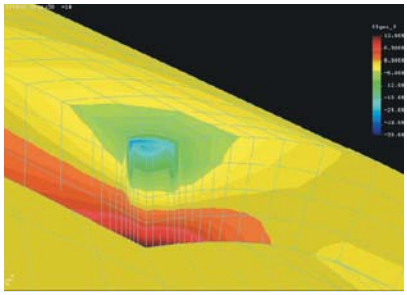


Fig 6-12: Finite element method (FEM) computational model, Muenster University of Applied Sciences, stress concentration: point and linear load safety line for coated pipe

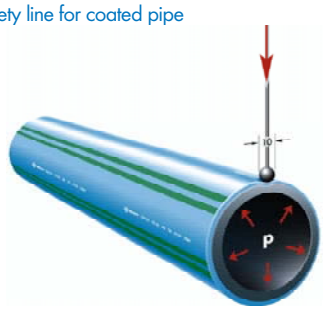


Fig 6-13: Point load test using the Dr. Hessel method

6.5 Installation Guidelines for egeplast SLM® DCT Pipes

Supplement to the installation instructions for PE pressure pipes A 135 and A435 from the Kunststoffrohrverband e.V. in Bonn

6.5.1 General Information on Installation

The egeplast SLM® DCT consists of a core pipe in accordance with DIN 8074/75, upon which a protective coating is additionally extruded in order to increase its scratch and abrasion resistance. Two spirally wound conductive strips are integrated between the protective coating and the medium-bearing pipe. The four green double stripes serve to identify it as a multiple layer pipe.

Scope of application

The installation instructions apply to soil covered egeplast SLM® DCT pipes with core pipes made of HDPE in accordance with DIN 8074 and DIN 8075 for use as drinking and domestic water pipelines, and as gas pipelines. The pipe joints and pipeline components must be rated for use with their respective operating pressures. The serviceability of the system is guaranteed only if the joints are implemented in accordance with the egeplast installation guidelines.

Installation, ploughing and milling


Ploughing


Cutting

The egeplast SLM® DCT pipe is flexible and manoeuvrable.

These attributes make installation using the ploughing or milling procedures possible. The minimum allowable bend radius should be observed. The bend radius can, however, be under-stepped for a short time during the installation process, provided that the pipe string is supported by some mechanism, e.g. guide rollers, that makes kinking of the pipe impossible.

The increased stretching of the outer fibres which results from this is not critical for PE 100RC^{plus}, the material used here.

Installation, open trench method


Open with sand bed


Open without sand bed

egeplast SLM® DCT pipes are suited for installation without a sand bed because they are made of PE 100 RC^{plus}, which is highly resistant to stress-induced cracking. Their suitability for installation without a sand bed is verified by an independent testing institute on the basis of continual quality checks.

The excavated soil is suitable for backfilling if it can be compacted. egeplast does not make any provisos for its composition in terms of grain size. Considerable cost savings result from eliminating the need to dispose of the excavated soil.

For assessment of individual cases, it is necessary to determine the total cost of soil replacement and weigh that against the additional cost of the egeplast SLM® DCT pipe.

Installation, trenchless method


Soil displacement


Relining


Water jet drilling

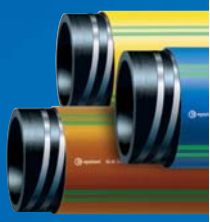

Pipe bursting

There is a higher risk of damage during trenchless installation and renovation procedures.

For this reason, pipes with a protective coating are essential. Multilayer pipes such as the egeplast SLM® DCT constitute a practicable solution here: they allow continued use of the approved and tested egeplast gas, drinking water, and sewage pipes, while ensuring that the outer surfaces of the pipes are abrasion resistant for use with innovative installation methods. DVGW Worksheets GW 321 (horizontal directional drilling) and GW 323 (pipe bursting) recommend the use of pipes with protective coatings. Verification of the integrity of the pipes after installation, for acceptance of the work, is also possible. The DVGW regulations specify the maximum permitted tractive forces for trenchless installation procedures; these may not be exceeded. Overshooting these limits leads to permanent damage to the new pipeline. egeplast recommends the use of suitable data loggers for complete documentation of the construction project. The minimum allowable bend radius should be observed.

Longitudinal force-locked joining procedures must be carried out according to the current regulatory codes of the DVGW and DVS.

The egeplast installation guidelines should be followed so as to avoid edges at the joints.



6.5.2 Joining Techniques

Open trench installation – electrofusion welding

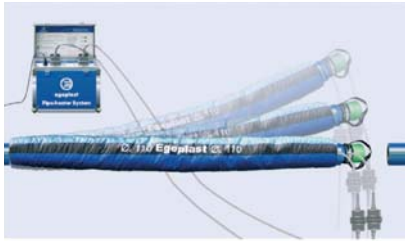


Fig 6-14: Straightening bundled coil and drum ends with the egeplast pipe-heater system

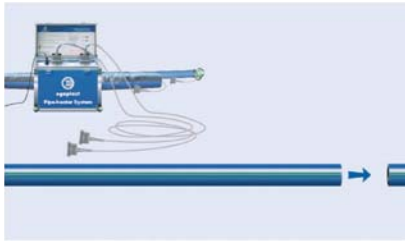


Fig 6-15: The pipe ends are prepared optimally for secure welding

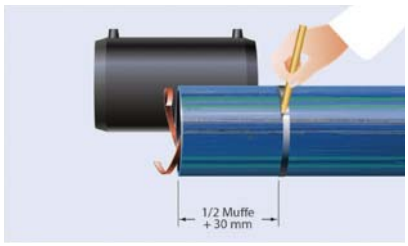


Fig 6-16: Marking the area from which the coating is to be peeled

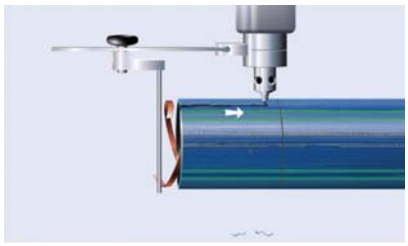


Fig 6-17: Removal of the protective coating with the egeplast coating cutter

Fig 6-18: Removal of the protective coating with the egeplast M10 peeling tool

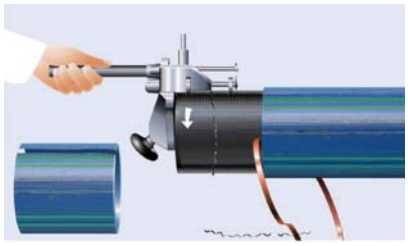


Fig 6-19: Removal of the oxide layer using a rotary scraper

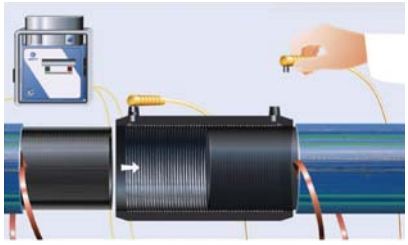


Fig 6-20: Welding in accordance with DVS 2207, Part 1

egeplast SLM® DCT pipes may be welded to all the commonly used moulded fittings made from PE 100 and PE 80 for electrofusion welding, after peeling the coating from the pipe ends. The guidelines and specifications given by the fittings manufacturers must also be followed.

Before electrofusion welding of SLM® DCT pipes, the protective coating must be removed for at least half the length of the electrofusion coupler, plus 30 mm, using an egeplast peeling tool (Fig 6-16–18). Coat peeling of the pipe ends can be carried out by egeplast on request.

Care must be taken that the conductive strips lying under the protective coating are not also cut in the process. It is recommended to use the M10 peeling tool and the coating cutter for this. Rotary scrapers are not advisable.

The contact surfaces must be prepared by scraping and cleaning before welding (Fig 6-19). The conductive strips should be bent to the side when doing this.

For stress free welding of pipe supplied as bundled coils, egeplast recommends use of the egeplast pipe-heater system. Once the electrofusion couplers have been mounted, the treated areas are heated to fusion temperature by passing electric current through integrated resistance wires (heating coil) in the electrofusion couplers, and thereby welded together (Fig 6-20). The welding process starts automatically if the device is set up appropriately. The assembly instructions given by the respective manufacturers are to be followed. Standards for workmanship are laid out in DVS 2207, Part 1.

Continued on the next page →

Continued: open trench installation – electrofusion welding

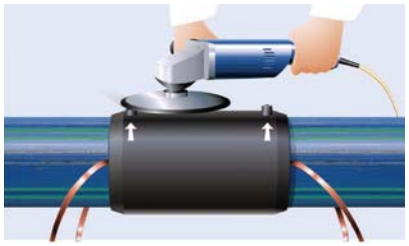


Fig 6-21: Removing the projecting wrap connectors with a suitable tool

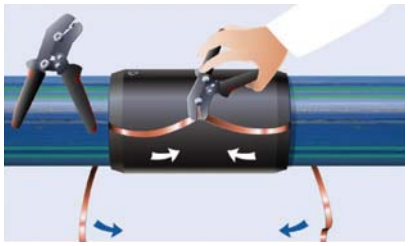


Fig 6-22: Removing the conductive strip coatings and connecting using the egeplast DCT hand riveter

Fig 6-23: Wrapping the weld fitting with Densolen Tape AS 40

Fig 6-24: Weld fitting protected with Densolen Tape AS 40

After the pipe ends have been welded, the DCT conductive strips are electrically connected using the egeplast DCT hand riveter. The conductor coatings are to be removed by suitable means such as burning, before the conductors are connected. The protruding ends of the conductors can be extended using suitable conductive strips if they are too short. egeplast recommends wrapping with a self-sealing tape (e.g. Densolen Tape AS 40 plus from the Denso company, or equivalent) with 50% overlapping to protect the connected DCT conductors.

The installation guidelines "Open trench installation – electrofusion welding" apply analogously to butt fusion welding.

Ploughing, milling, pipe bursting, horizontal directional drilling and relining – butt fusion welding

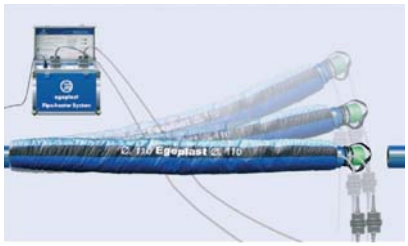


Fig 6-25: Straightening bundled coil and drum ends with the egeplast pipe-heater system

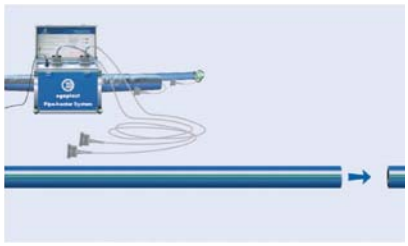


Fig 6-26: The pipe ends are prepared optimally for secure welding

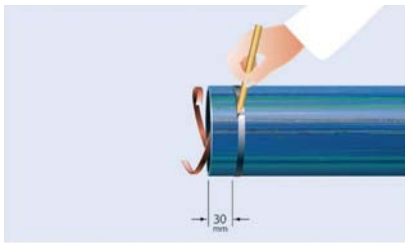


Fig 6-27: Marking the area from which the coating is to be peeled

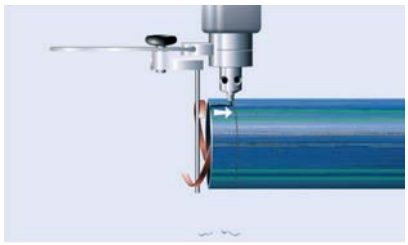


Fig 6-28: Removal of the protective coating with the egeplast coating cutter

Fig 6-29: Removal of the protective coating with the egeplast M10 peeling tool

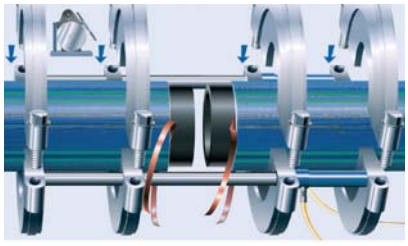


Fig 6-30: Fastening the special inserts available from egeplast (see Table 6-5)

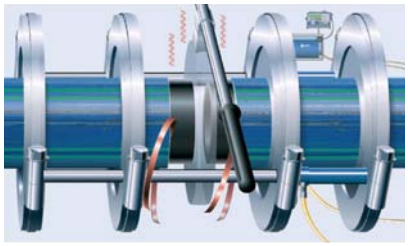


Fig 6-31: Welding in accordance with DVS 2207, Part 1

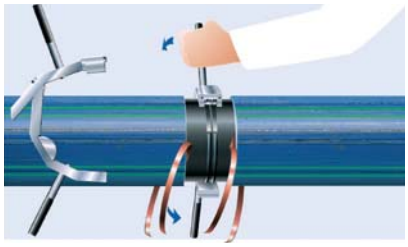


Fig 6-32: Removing of the weld bead with an external bead remover

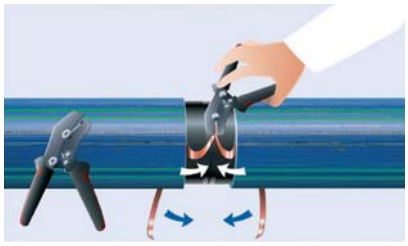


Fig 6-33: Removing the conductive strip coatings and connecting using the egeplast DCT hand riveter

egeplast SLM® DCT pipes are manufactured from PE 100 RC^{plus} materials belonging to welding group 003. The protective coating is extruded onto the medium-bearing pipe, and is removed according to the egeplast installation instructions before joining. After this, welding with one another and with any other approved material is possible.

Before butt fusion welding of egeplast SLM® DCT pipes can take place, the protective coating must be removed for at least 30 mm using an egeplast peeling tool* (Fig 6-27–29). Care must be taken that the conductive strips lying under the protective coating are not also cut in the process. It is recommended to use the M10 peeling tool and the coating cutter for this. Rotary scrapers are not advisable. After removal of the protective coating, the conductive strips can be bent to the side for pipe welding. Welding should be carried out in compliance with DVS 2207, Part 1 in standard welding machines, in which the use of inserts adjusted to the specific external diameter is recommended (Fig 6-30). Inserts suitable for welding machines from the Widos company can be supplied on a loan basis by egeplast.

After the pipe ends have been welded, the DCT conductive strips are electrically connected using the egeplast DCT hand riveter. The conductor coatings are to be removed by suitable means such as burning before the conductors are connected (Fig 6-33). The protruding ends of the conductors can be extended using suitable conductive strips if they are too short.

When installing the egeplast SLM® DCT pipe by means of trenchless methods, it is mandatory to protect separately both the area about the weld and the conductive strips. The weld bead is to be removed using an external bead remover (e.g. from the Widos company, or equivalent). Then the conductive strips are to be connected electrically with one another.

Continued on the next page →

Continued: ploughing, milling, pipe bursting, horizontal directional drilling and relining – butt fusion welding

The unprotected area between the peeled ends of the coating has to be evened out and protected. In this way, a smooth pipe surface is created which does not offer any point of mechanical contact. The exposed PE pipe is to be roughened with sandpaper (or similar) to guarantee strong bonding. egeplast recommends the following alternative procedures for covering afterwards:

Alternative A: Covering with Densolid HK7

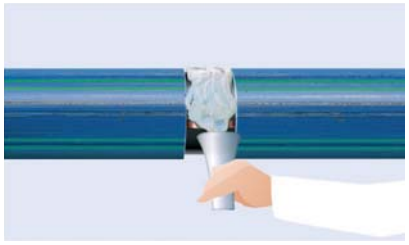


Fig 6-34: Coating with Densolid HK7

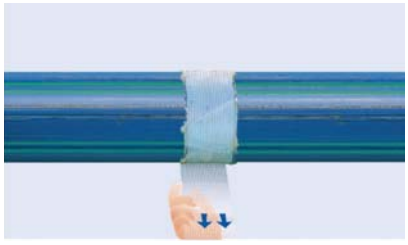


Fig 6-35: Laying down the fabric tape

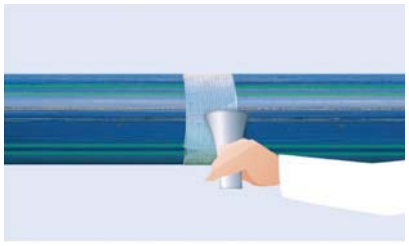


Fig 6-36: Smoothing out the filler material

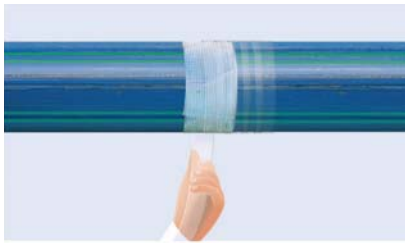


Fig 6-37: Smoother surface by wrapping with adhesive tape

Densolid HK7 is a fast curing, impact resistant two-component filler material based on polyurethane. To reduce the curing time at lower temperatures, the faster reacting Densolid HK7-W should be used in winter.
The filled ring should be reinforced additionally with polyester fabric mesh (e.g. Densolan ES) for external pipe diameters ≥ 110 mm (Fig 6-35). A single layer wrapping is sufficient for dimensions of 110-180 mm; for dimensions ≥ 180 mm, the fabric should be laid down in two layers in the filling coat before it has hardened. When using fabric tape, care should be taken to press the tape well into the resin so that the filler material permeates the mesh of the fabric well. The manufacturer's recommendations for handling are to be observed.

Alternative B: Covering with resin-impregnated glass fibre wrapping

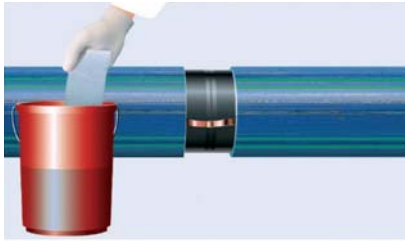


Fig 6-38: Soak the wrapping in clear water for 10-15 sec. according to the manufacturer's instructions

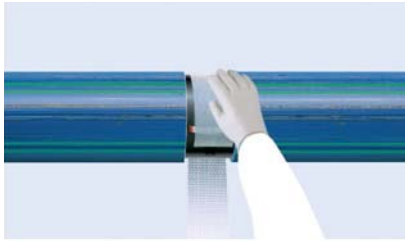


Fig 6-39: Wind the wrapping tautly around the weld area until it is flush with the protective coating

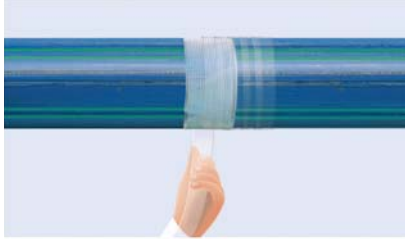


Fig 6-40: Bind the covered area liberally with adhesive tape for a more even hardening

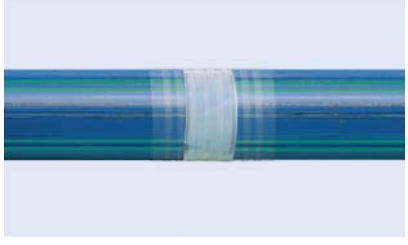


Fig 6-41: Do not put any strain on the pipeline until the wrapping has fully hardened

As an alternative to Densolid HK7, egeplast offers resin-impregnated glass fibre wrappings. These are activated with water. After soaking in clear water for ca. 10-15 sec, the wrapping is wound around the area to be insulated. In doing so, care should be taken that this area is fully wrapped, and that it is wrapped until it is flush with the protective coating. The wrappings are obtainable in widths between 2.5 cm and 12.5 cm, according to the exposed area to be covered. The finished area is bound liberally with adhesive tape afterwards for a more even hardening of the wrapping.
No strain should be put on the pipeline until the wrapping has fully hardened. The manufacturer's instructions are to be followed in doing so.
The continuously flush external surface required for pipe strings intended for use in trenchless installation procedures is guaranteed by the covering process described above.

The continuity of the electrically conductive strip is to be tested and recorded in writing before the pipe is pulled in (see section 6.5.7)

Screw-clamp joints

egeplast SLM® DCT pipes can be joined using clamp connectors made of plastic or metal. Clamp connectors made of plastic must conform to DIN 8076 Part 3; those made of metal must conform to DIN 8076 Part 1 or 2.

The pipe end must be flared when using clamp joints with support bushings. This is usually accomplished by driving in the support bushings.

When assembling clamp joints, the pipe end should be chamfered on the inside without notching, and the protective coating is to be removed appropriately.

Flanged joints

The following types of design are commonly used for making flanged joints (see DIN 16963 Parts 4 and 8):

- Stub end for electrofusion welding
- Stub end for butt fusion welding

The axes of the pipeline sections to be joined must be aligned when making flange joints. The bolts should be tightened evenly in a crosswise sequence.

Note: Use lapped flanges with steel inserts.

6 Detecting the installed Pipeline and checking Integrity

Welding of tapping fittings

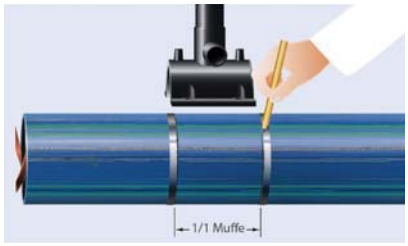


Fig 6-42: Marking the area from which the coating is to be peeled

Fig 6-43: Removal of the protective coating with the egeplast M10 peeling tool or with the egeplast coating cutter

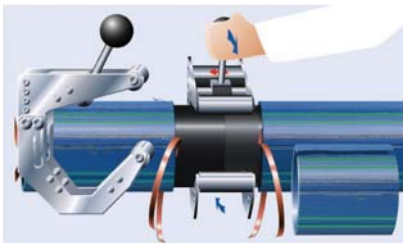


Fig 6-44: Removal of the oxide layer using a suitable scraping tool

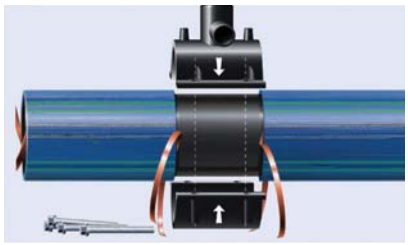


Fig 6-45: Mounting the tapping fitting according to the manufacturer's installation instructions

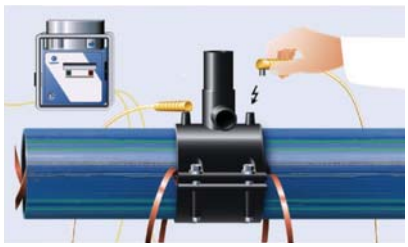


Fig 6-46: Welding in accordance with DVS 2207, Part 1

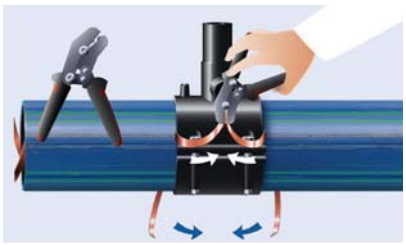


Fig 6-47: Removing the conductive strip coatings and connecting using the egeplast DCT hand riveter

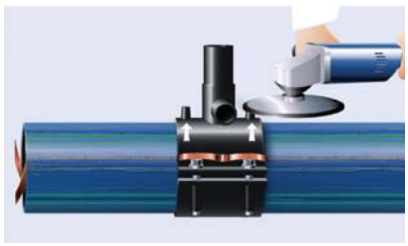


Fig 6-48: Removing the projecting wrap connectors with a suitable tool

Fig 6-49: Wrapping the tapping fitting with Densolen Tape AS 40

Fig 6-50: Tapping fitting protected with Densolen Tape AS 40

There are, in general, two methods of mounting tapping fittings:

- Mounting of tapping valves with drill hole sealing bushes, System EWE for drinking water. These seal in the tapping hole and can therefore be used for pipes with multiple-layer protective coatings. Care must be taken here that the conductive strips are not cut through during mounting.

- Mounting of welded tapping fittings

Mounting of welded tapping fittings

When mounting welded tapping fittings, the protective coating on the relevant length of pipe must be removed.

We recommend the use of the egeplast coating cutter or the M10 peeling tool for this purpose, so as not to damage the DCT conductors. For OD above 160 mm, egeplast recommends the combined use both devices.

A starting point must first be formed when using the M10 coat peeling tool. This can be done e.g. using a standard file. Great care should be taken to only file a hole in the coating and not the damage the core pipe. It is then possible, beginning from the prepared starting point, to cut back a section for the tapping fitting using the peeling tool.
Before welding, the conductive strips must be cut through and bent away from the weld area. Welding of the tapping fitting is to be carried out in accordance with DVS 2207, Part 1 and the technical guidelines given by the manufacturer of the welded fitting. The DCT conductors are to be reconnected afterwards. Before they are connected, their coatings are to be removed by suitable means such as burning. The protruding ends of the conductors can be extended using suitable conductive strips if they are too short. egeplast recommends using a self-sealing tape (e.g. Densolen Tape AS 40 plus from the Denso company, or equivalent) to protect the connected conductors.

6.5.3 System Techniques

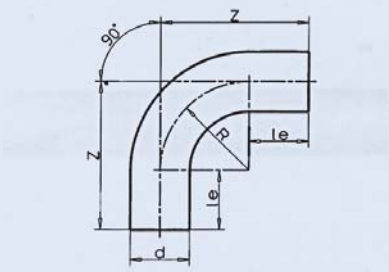
Moulded fittings

egeplast SLM® DCT pipes can be integrated into the pipeline network with all the moulded fittings and joining elements normally used in the trade. The manufacturers' instructions should be followed in doing so.

Moulded fittings with integrated conductive strips are also offered as part of the egeplast SLM® DCT pipe product range.

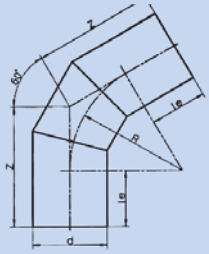
Seamlessly drawn elbow made of PE 100 RC^{plus}

Constructed according to requirements



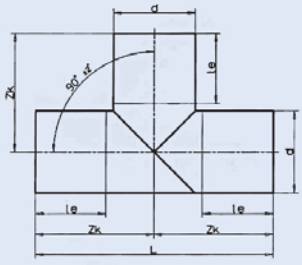
Segmented elbow made of PE 100 RC^{plus}

Constructed according to requirements



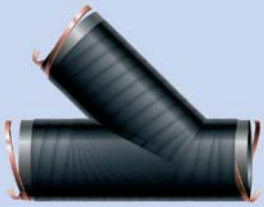
Segmented T-Pieces made of PE 100 RC^{plus}

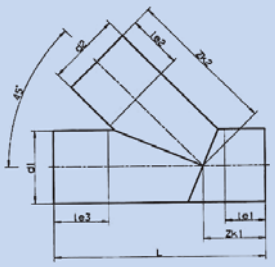
Constructed according to requirements



Branches made of PE 100 RC^{plus}

Constructed according to requirements





Accessories

- DCT hand riveter

Fig 6-51

For easy connecting of DCT conductive strips after welding

- Telescoping cable guide

egeplast offers telescoping ducts for attachment to the usual installed fittings. These offer a practical method of selectively signalling and earthing the pipeline for location purposes.

Telescoping duct, with caps and seals for both ends, including braid cable, for bringing out the DCT conductive strips to the surface, with pipe clips top and bottom for attaching to the installed fitting

Fig 6-52

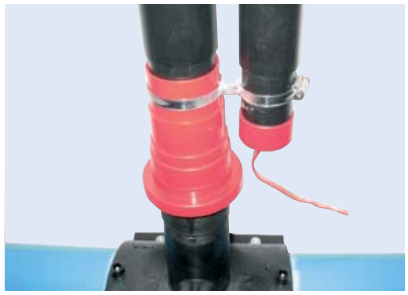


Fig 6-53

Length 0.6 m – 1.0 m
Length 1.0 m – 1.8 m
Length 1.8 m – 3.0 m

- Plastic bridge

For tapping clamps with threaded inlet into which the above duct can be screwed

DN 50 – 90
Other sizes on request

6.5.4 Tables

Coating backcut recommended

Before electrofusion welding or butt fusion welding of egeplast SLM® DCT pipes can take place, the protective coating must be removed with egeplast coat peeling tools.
Coat peeling of the pipe ends can be carried out by egeplast on request. For this we need an indication of the welding procedure to be used.

Coating Backcut for the egeplast SLM® DCT				
Medium-Bearing Pipe DIN 8074 OD [mm]	Butt Fusion Welding [mm]	Electrofusion Welding* [mm]	When Using Widos External Bead Removers [mm]	
25	30	70	-	-
32	30	75	-	-
40	30	80	-	-
50	30	85	-	-
63	30	95	-	-
75	30	100	-	-
90	30	110	-	-
110	30	120	35	Size 1
125	30	125	35	Size 1
140	30	130	35 40	Size 1 Size 2
160	30	135	35 40	Size 1 Size 2
180	30	140	40	Size 2 Size 3
200	30	145	40	Size 2 Size 3
225	30	155	40	Size 2 Size 3
250	30	165	40	Size 3
280	30	170	40 50	Size 3 Size 4
315	30	180	40 50	Size 3 Size 4
355	30	185	50	Size 4
400	30	195	50	Size 4
450	30	205	50	Size 4
500	30	215	60	Size 5
560	30	220	60	Size 5
630	30	235	5060	Size 5 Size 8

Long sleeve fittings are not considered. Preferred equipment sizes for the Widos external bead remover are given

Tab 6-4* Dimensions specified for the product ranges of the Georg Fischer, Friatec, and Plasson companies

Overview of external and medium-bearing pipe diameters for egeplast SLM® DCT – inserts for butt welding machines

For welding, the pipe ends are gripped with inserts* which are specially adjusted to the egeplast SLM® DCT external diameter so that the pipe ends to be welded can be fixed securely.

Medium-Bearing Pipe DIN 8074 OD [mm]	Outer Diameter of the egeplast SLM® DCT Pipe with Protective Coating [mm]
25	27.4
32	34.9
40	43.4
50	53.6
63	66.8
75	79.0
90	94.3
110	115.0
125	130.3
140	145.7
160	166.4
180	187.0
200	207.0
225	232.0
250	257.0
280	287.0
315	322.0
355	362.2
400	410.6
450	460.0
500	510.0
560	570.0
630	640.0
710	720.0
800	810.0
900	910.0
1000	1010.0
1200	1210.0
Subject to manufacturing tolerances	

Tab 6-5* Special inserts for WIDOS welding machines are available from egeplast for this purpose

Material requirements for covering with DENSOLID HK7/HK7-W, DENSOLAN ES, and DENSOLEN AS 40 plus

Densolid HK7/HK7-W

For a layer thickness of 3 mm, one dual pack is sufficient for an area of ca. 600 cm^2.
The requirements given are based on a backcut of 30 mm to the protective layer, on both sides, for the egeplast SLM® DCT.

Densolan ES fabric tape

The approximate quantity of Densolan ES tape is given for....

...dimensions up to OD 160 mm by

OD 3.2 running metres

...dimensions from OD 180 mm by

OD 6.4 running metres

Densolan ES is supplied as rolls of 15 m in widths of 35 mm and 60 mm.

Densolen AS 40 plus sealing tape

The required quantity of Densolen AS 40 plus is based on a supplied length of 15 m/roll and supplied width of 50 mm. The requirements given assume a backcut of 30 mm to the protective layer, on both sides.

OD [mm]	egeplast SLM® DCT Quantity of HK7/HK7-W Units / Weld Seam	egeplast SLM® DCT Quantity of Densolan ES Tape Metres / Weld Seam	egeplast SLM® DCT Quantity of Densolen AS 40 plus Tape Metres / Weld Seam
25	0.25	-	1.0
32	0.25	-	1.0
40	0.25	-	1.5
50	0.25	-	1.5
63	0.25	-	2.0
75	0.35	-	2.0
90	0.50	-	2.5
110	1.00	0.40	3.0
125	1.00	0.40	4.0
140	1.00	0.50	4.0
160	2.00	0.60	4.5
180	2.00	1.20	5.0
200	2.00	1.40	6.0
225	2.00	1.60	6.0
250	4.00	1.60	7.5
280	4.00	1.80	7.5
315	4.00	2.10	10.0
355	4.00	2.30	10.0
400	5.00	2.60	15.0
450	5.00	2.90	15.0
500	5.00	3.20	15.0
560	5.00	3.60	15.0
630	7.00	4.10	30.0
710	7.00	4.60	30.0
800	9.00	5.20	30.0
900	9.00	5.80	30.0
1000	10.00	6.40	30.0
1200	12.00	7.70	30.0

Tab: 6-6

6.5.5 Verifying the Technical Integrity of the Protective Coating

To detect damage to the pipeline after it has been pulled in, the DCT conductors at the joints are electrically connected with one another separately to give two discrete coils. These two conductive strips are then electrically connected with one another in the exit pit. A successful electrical continuity test gives reliable proof of the technically sound condition of the protective coating and hence of the pipeline itself.

Fig 6-54: Verification of integrity using a continuity tester

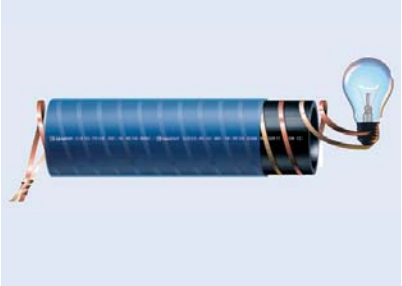


Fig 6-55: Functional principle

6.5.6 Locating the Pipeline

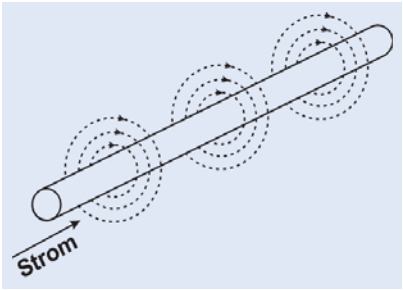


Fig 6-56: Source: Sewerin GmbH, Gütersloh

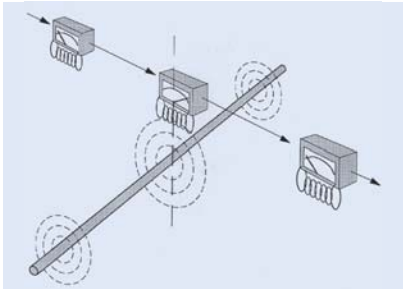


Fig 6-57: Source: Sewerin GmbH, Gütersloh

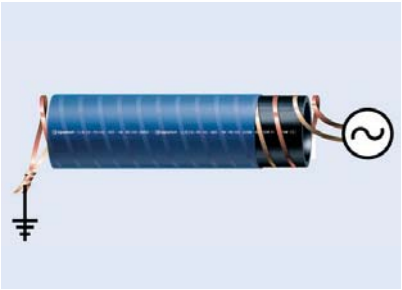


Fig 6-58: Functional principle

Location of the egeplast SLM® DCT under the ground relies on the electrical conductivity of the conductive strips. Passing an alternating current though them causes an electromagnetic force field to build up.

This force field is normally directed concentrically about the midpoint of the pipeline. An electric force field can, however, be set up only when the DCT conductors are electrically connected with one another and earthed on one side. The equipment for pipeline location consists of a transmitter, the generator, and a receiver.
A frequency of between 1.1 kHz and 42 kHz, depending on the local conditions, is applied to the conductive strips via the generator. The current is then able to flow back via earth. For the sake of simplicity, it is advisable to electrically connect both conductive strips with one another, and to pass a wire connected to them upwards to e.g. a valve cap.

The arising electric force field is able to induce a measurable potential in a detector coil.

Depending on the orientation of the detector coil, this potential reaches, vertically above the pipeline, a maximum (for a horizontal coil) or a minimum (for a vertically standing coil). The narrow region defined by the induced potential minimum is especially suited for pinpointing the exact location of the pipeline. Modern locating devices work with 2 horizontal coils for measuring the pipeline depth and a vertical coil to determine the position of the pipeline.
More detailed information about equipment, procedures, and seminars on pipeline locating is given by, amongst others, Sewerin GmbH in Gütersloh.

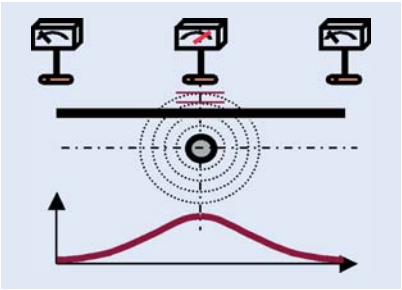


Fig 6-59: Source: Sewerin GmbH, Gütersloh

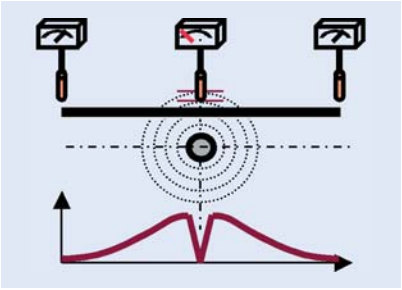


Fig 6-60: Source: Sewerin GmbH, Gütersloh

6.5.7 Electrical Continuity Test Report for egeplast SLM® DCT

Order no.

_____

Name and company of the welding supervisor

_____

_____

_____

_____

Installed pipeline

egeplast SLM® DCT

Dimension

_____

Welding procedure

O butt fusion welding
O electrofusion welding

Test

The DCTconductive strips were tested for electrical continuity.

The test performed on _____ was :

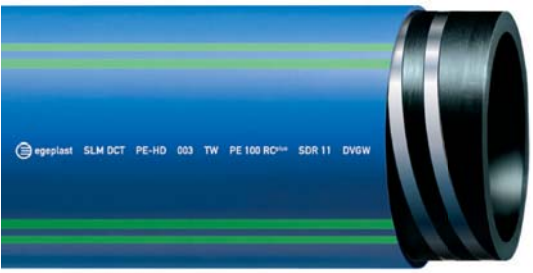
O successful
O not successful

_____ _____

Signature of welder Signature of welding supervisor

6.6 RFP Forms

6.6.1 RFP Form for egeplast SLM® DCT Drinking Water Pipe



Preliminary note:
Drinking water pipe in accordance with DIN 8074/8075, DIN EN 12201, made of PE 100 RC^{plus} with the highest resistance to slow crack growth (FNCT minimum requirement: ≥ 8760 h in accordance with DVS 2203-4; T=80 °C, σ=4 $\frac{N}{mm^2}$, 2% Arkopal), pipe colour black. Verified in accordance with both DIN 8075 and DVGW GW 335 Part A2, with an additional, continuously extruded protective coating made of mineral-reinforced signal blue polypropylene akin to RAL 5005, with 4 green double stripes akin to RAL 6018, in accordance with the recommendations of DVGW Worksheets GW 321 and GW 323. Electrical conductors running spirally under the protective coating enable verification of the integrity of the medium-bearing pipe after trenchless installation and make it possible to locate the installed pipeline.

Monitoring of constant material quality as well as regular structural testing is carried out by an independent testing institute which is accredited according to DIN EN ISO/IEC 17025 to perform such analyses.
The suitability of the product for installation without a sand bed, and for trenchless installation, is verified by an independent assessor.
All necessary pipeline joints created by means of either electrofusion welding or butt fusion welding are to be made according to the requirements of the applicable DVS technical guidelines. The pipeline junctions are to be completed according to the pipe manufacturer's current technical installation instructions. The piping is to be stored and transported on the building site in compliance with the KRV guidelines.

Product:

egeplast SLM® DCT drinking water pipe
made of PE 100 RC^{plus} or equivalent

Manufacturer:

egeplast Werner Strumann GmbH & Co. KG
Robert-Bosch-Str. 7 48268 Greven, Germany
Tel.: +49.2575.9710-0 Fax: +49.2575.9710-110
e-mail: info@egeplast.de http://www.egeplast.de

Specification of services:

egeplast SLM® DCT drinking water pipe
made of PE 100 RC^{plus} with dimensions:

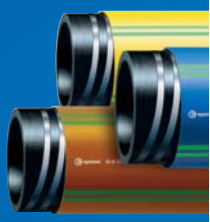
_____mm, SDR_____

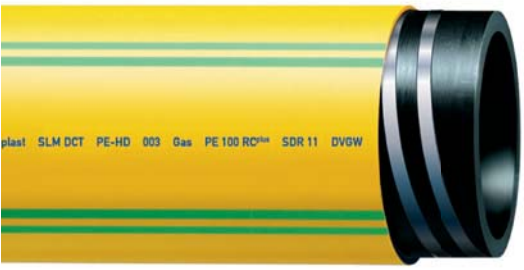
O delivered as straight lengths of 6 / 12 m

O delivered as bundled coils in lengths of _____m

Deliver _____running metres and install professionally according to DIN and appropriate installation guidelines as

drinking water pipe: _____€ / running metre





6.6.2 RFP Form for egeplast SLM® DCT Gas Pipe

Preliminary note:
Gas pressure pipe in accordance with DIN 8074/8075, DIN EN 1555, made of PE 100 RC^{plus} with the highest resistance to slow crack growth (FNCT minimum requirement: ≥ 8760 h in accordance with DVS 2203-4; T=80 °C, σ=4 $\frac{N}{mm^2}$, 2% Arkopal), pipe colour black. Verified in accordance with both DIN 8075 and DVGW GW 335 Part A2, with an additional, continuously extruded protective coating made of mineral-reinforced yellow-orange polypropylene akin to RAL 1033, with 4 green double stripes akin to RAL 6018, in accordance with the recommendations of DVGW Worksheets GW 321 and GW 323. Electrical conductors running spirally under the protective coating enable verification of the integrity of the medium-bearing pipe after trenchless installation and make it possible to locate the installed pipeline.

Monitoring of constant material quality as well as regular structural testing is carried out by an independent testing institute which is accredited according to DIN EN ISO/IEC 17025 to perform such analyses.
The suitability of the product for installation without a sand bed, and for trenchless installation, is verified by an independent assessor.
All necessary pipeline joints created by means of either electrofusion welding or butt fusion welding are to be made according to the requirements of the applicable DVS technical guidelines. The pipeline junctions are to be completed according to the pipe manufacturer's current technical installation instructions. The piping is to be stored and transported on the building site in compliance with the KRV guidelines.

Product:

egeplast SLM® DCT gas pipe
made of PE 100 RC^{plus} or equivalent

Manufacturer:

egeplast Werner Strumann GmbH & Co. KG
Robert-Bosch-Str. 7 48268 Greven, Germany
Tel.: +49.2575.9710-0 Fax: +49.2575.9710-110
e-mail: info@egeplast.de http://www.egeplast.de

Specification of services:

egeplast SLM® DCT gas pipe
made of PE 100 RC^{plus} with dimensions:

_____mm, SDR_____

O delivered as straight lengths of 6 / 12 m

O delivered as bundled coils in lengths of _____m

Deliver _____running metres and install professionally according to DIN and appropriate installation guidelines as

gas pipe: _____€ / running metre

6.6.3 RFP Form for egeplast SLM® DCT Sewage Pressure Pipe

Preliminary note:
Sewage pressure pipe in accordance with DIN 8074/8075, DIN EN 13244, made of PE 100 RC^{plus} with the highest resistance to slow crack growth (FNCT minimum requirement: ≥ 8760 h in accordance with DVS 2203-4; T=80 °C, σ=4 $\frac{N}{mm^2}$, 2% Arkopal), pipe colour black. Verified in accordance with both DIN 8075 and DIN Certco ZP 14.3.1, labelled with the DIN Certco DINplus mark of conformity, with an additional, continuously extruded protective coating made of mineral-reinforced brown polypropylene akin to RAL 8017, with 4 green double stripes akin to RAL 6018, in accordance with the recommendations of DVGW Worksheets GW 321 and GW 323. Electrical conductors running spirally under the protective coating enable verification of the integrity of the medium-bearing pipe after trenchless installation and make it possible to locate the installed pipeline.

Monitoring of constant material quality as well as regular structural testing is carried out by an independent testing institute which is accredited according to DIN EN ISO/IEC 17025 to perform such analyses.
The suitability of the product for installation without a sand bed, and for trenchless installation, is verified by an independent assessor.
All necessary pipeline joints created by means of either electrofusion welding or butt fusion welding are to be made according to the requirements of the applicable DVS technical guidelines. The pipeline junctions are to be completed according to the pipe manufacturer's current technical installation instructions. The piping is to be stored and transported on the building site in compliance with the KRV guidelines.

Product:

egeplast SLM® DCT sewage pressure pipe
made of PE 100 RC^{plus} or equivalent

Manufacturer:

egeplast Werner Strumann GmbH & Co. KG
Robert-Bosch-Str. 7 48268 Greven, Germany
Tel.: +49.2575.9710-0 Fax: +49.2575.9710-110
e-mail: info@egeplast.de http://www.egeplast.de

Specification of services:

egeplast SLM® DCT sewage pressure pipe
made of PE 100 RC^{plus} with dimensions:

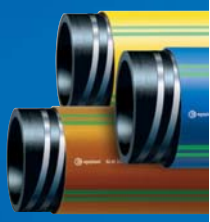
_____mm, SDR_____

O delivered as straight lengths of 6 / 12 m

O delivered as bundled coils in lengths of _____m

Deliver _____running metres and install professionally according to DIN and appropriate installation guidelines as

sewage pressure pipe: _____€ / running metre



6.7 Recycling and Environmental Protection

Fig 6-61

Fig 6-62: Recycling box

Polyethylene is an organic material and consists only of carbon and hydrogen. It has a wholly neutral impact on the environment. PE, being a thermoplastic, can be remelted an almost unlimited number of times and processed into new products. Pipe off-cuts and discarded plastic pipe material, which, for example, accumulate during the installation of plastic pipe systems, should therefore be recycled if at all possible.

At the start of 1994, the Kunststoffrohrverband (KRV), together with the Gütegemeinschaft Kunststoffrohre (GKR), had already introduced a national collection and recycling system for plastic materials, which is free of charge for the trade and its customers and incorporates an obligation to take back these materials. This environmentally conscious system eliminates dumping or incineration together with the high costs which arise from disposal by these methods.

Recycling boxes are provided on a loan basis to the customer as collection containers. The plastic pipe material, at least partially cleaned, is then thrown into these boxes. Once the boxes have been filled, their collection and exchange for empty boxes is arranged. Only boxes which are filled exclusively with plastic pipe material are taken. The recycling boxes are then brought, via regional collection points, to a recycling plant in which the collected pipe material is sorted, cleaned, and cut into small pieces to be employed subsequently for other uses.

6 Detecting the installed Pipeline and checking Integrity