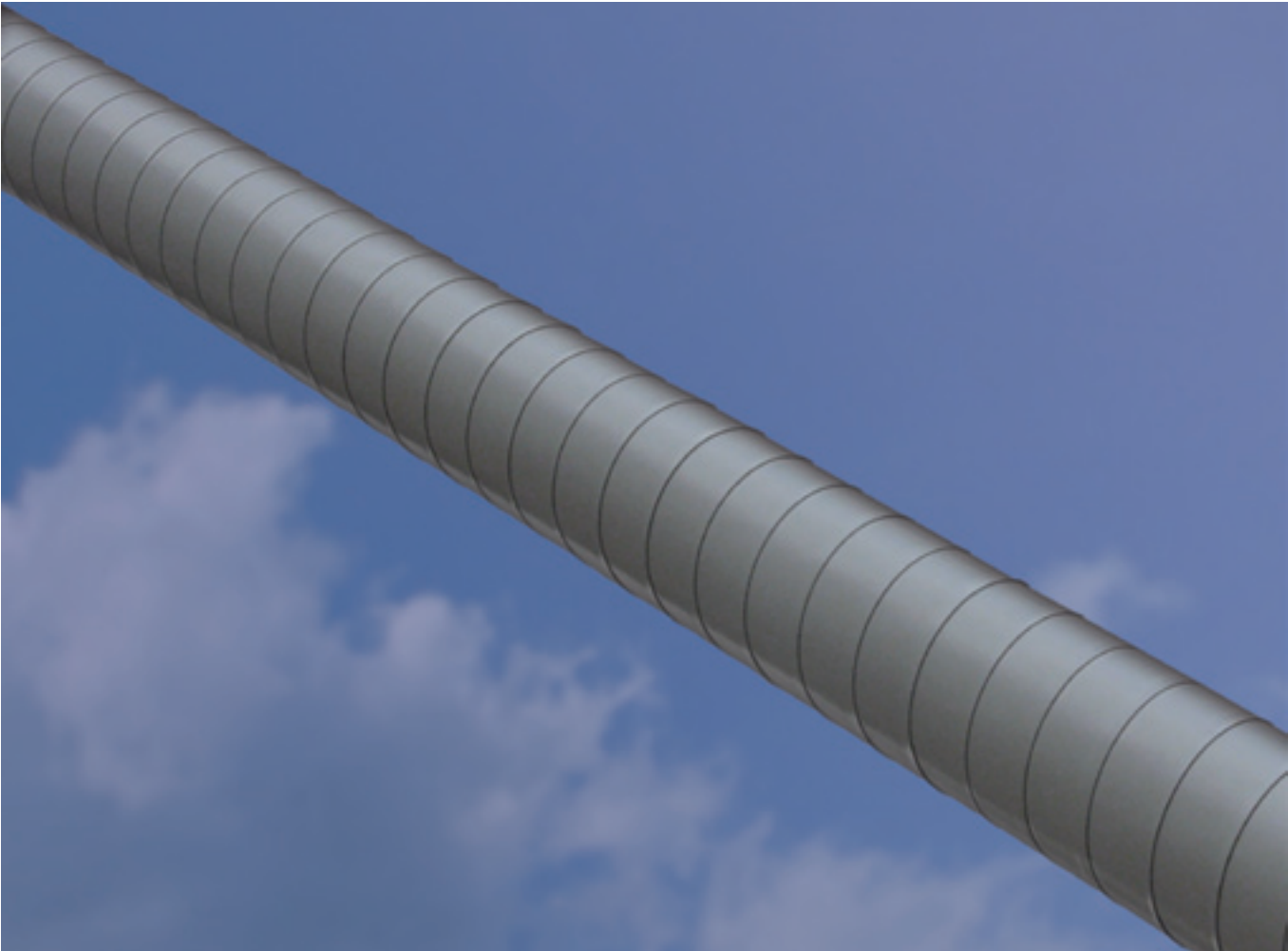


**DYWIDAG Corrosion Protection System DYNA Protect®
for Stay Cables and Bracings**



DYWIDAG Corrosion Protection System DYNA Protect®

Perfect corrosion protection is an essential precondition for the durability of steel parts. This applies to an even greater extent to tension members which are exposed to dynamic loads.

DSI has developed the DBGM-patented corrosion protection system DYNA Protect® for tension members with metallic surface such as stay cables or bracings.

This system can be used both for new construction and for structures that are already in use.

Corrosion Protective Tapes

The corrosion protective system DYNA Protect® is based on the corrosion protective tapes DYNA Protect® -B and DYNA Protect® -C which have been derived from the butyl rubber tapes established by DENSO GmbH, Leverkusen, more than 40 years ago.

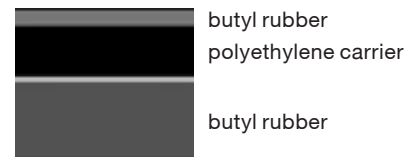
These tapes were optimized especially for this application.

In the overlap area between the single layers, the butyl rubber compound adheres by cold amalgamation.

Thus, a closed, tubular, mechanically highly resistant and stable coating is formed which is practically impermeable to water vapor and oxygen.

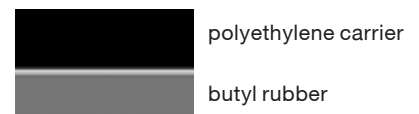
DYNA Protect® -B:

3-ply tape consisting of a stabilized polyethylene carrier film which is coated on both sides with a duroplastic butyl rubber based compound.



DYNA Protect® -C:

2-ply tape consisting of an outer colored polyethylene carrier film which is coated with a butyl rubber based compound on one side. Standard colors are white, yellow and black. Other colors are available on request.



Corrosion protection tape DYNA Protect®		B	C	Test standard
Tape thickness	mm	≥ 0,8	≥ 0,5	
Tensile strength (23°)	N/10mm	100	≥ 65	DIN EN 12068
Elongation at break	%	600	≥ 500	DIN EN 12068
Permeability to water vapor	g/m ² .24h	≤ 2.10 ⁻¹	≤ 2.10 ⁻¹	DIN 53122
Permeability to oxygen	g/m ² .24h	≤ 10 ⁻⁴	≤ 10 ⁻⁴	DIN 53536
Continuous operating temperature	°C	-60°C to 50°C	-60°C to 50°C	
Electrical insulation resistance	Ohm m ²		>10 ¹⁰	DIN EN 12068
Impact resistance	J		16	DIN EN 12068

B: Base Tape

C: Cover Tape

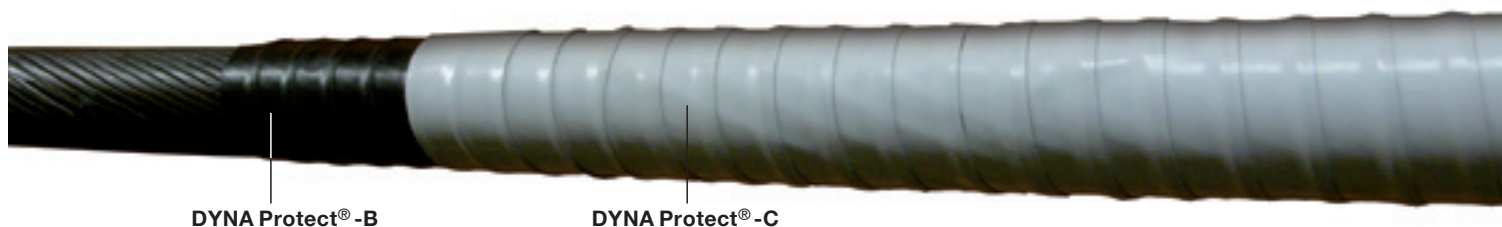
Layout of the Corrosion Protection System DYNA Protect®

The corrosion protection tape DYNA Protect® -B is applied on the mechanically cleaned cable surface. The corrosion protective tape DYNA Protect® -C is

wrapped around the corrosion protective tape DYNA Protect® -B.

Both tapes are wrapped with an overlap of 50 % each. Thus, a 3-layered, locked butyl rubber coating with a colored

polyethylene surface is produced. The total thickness of the corrosion protective coating is at least 2,6 mm.



DYNA Protect® -B

DYNA Protect® -C

Application of the Corrosion Protection System DYNA Protect®

The corrosion protection tapes DYNA Protect® -B and DYNA Protect® -C are wrapped helically onto the surface of the installed tension members.

Preparation of the cable surface

The surface of the tension member that is to be protected by the corrosion protection system DYNA Protect® must be dry and free of loose parts. The corrosion protection tape DYNA Protect® -B can then be applied directly to the blank, galvanized or coated steel. In general, it is sufficient to clean the surface by rotating brushes which are driven along the tension member, e.g. by means of a special transport unit. In order to increase the adhesion of the

The optimal working method for this procedure can be chosen according to local conditions.

corrosion protective tape at both ends of the protection area, the butyl rubber based DYNA Protect® -P primer may be painted onto the surface of the tension member. No additional measures are required for intermediate length.

Manual wrapping

The tapes are applied by a hand operated wrapping device which is led around the tension member. This method is suitable for smaller objects

if the access to the wrapping area is possible. It can also be used for repair purposes.

Automatic wrapping

The tapes are applied by an automatic wrapping device especially developed for this application. This device drives the tension member up automatically.

Thus, no putting up of scaffoldings in the area to be wrapped nor any further equipment, such as working platforms or lifts, are required.

Special provisions

Special provisions, such as protection against vandalism in the superstructure area, can be offered according to local conditions and requirements.

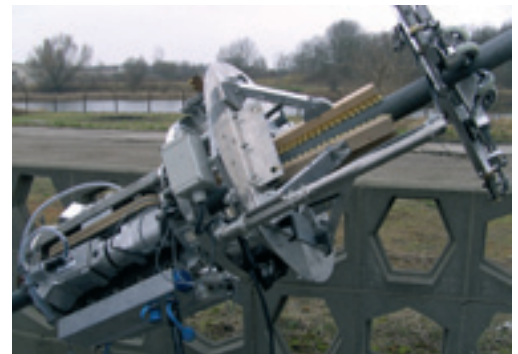
Stainless steel sheathings are suitable for the corrosion protective wrapping above the superstructure.

Tests and Supervision

The corrosion protection system DYNA Protect® was checked for its corrosion protection properties and its long-term durability in extensive tests at the material testing institute of the University of Stuttgart. For all relevant sectors, it has reached or even exceeded the requested values of the TL/TP-KOR-cables/RKS-cables bulletin. Excellent results were achieved for factors such as condensation resistance or the evaluation of permeability to water vapor. Even at the impact of salty mist,

no corrosion was found beneath the wrapped tapes. Artificial weathering with irradiation by xenon lamps and ultraviolet rays showed no change whatsoever at the polyethylene surface. Thus, the durability of material and colour was proved.

Corrosion protection tapes are subject to an external supervision by the certification authority DVGW.



Cleaning of the cable surface



Manual wrapping device



Automatic wrapping device



Salty mist test

Advantages of the Corrosion Protection System DYNA Protect®



Manufacture of corrosion protection tape



Adhesion of the tape on cable surface



Automatic application of the corrosion protection system

The corrosion protection system DYNA Protect® provides the design engineer and the owner with the possibility to easily and permanently protect tension members against corrosion.

In particular, the following advantages are evident:

- Applicable with new tension members or with tension members that are already in use
- Based on the DENSO corrosion protection technology that has been successful for decades
- Meets the demands of the TL/TP-KOR-cables/RKS-cables bulletin, proved during tests at the material testing institute of the University of Stuttgart
- Quality assurance according to DIN EN ISO 9001
- Robust multi-layer system with a layer thickness of at least 2,6 mm
- Elastic properties which can support deformations of the tension member without damages
- Any irregularities in the surface of the tension member are filled
- Good adhesion of the corrosion protection tape on the surface of the tension member
- Positive impact on the behavior of tension members in rain-wind-induced vibrations, achieved through helical application of the corrosion protection tapes
- Surface available in different colors
- Simple and competitive assembly through the wrapping method especially developed for this purpose
- No enclosure, scaffolding or other equipment such as working platforms or lifts are required
- Short assembly time as no waiting time and curing time must be respected between the application of the several layers
- Widely independent of weather conditions during assembly. A dry surface is the only precondition
- Ecologically friendly assembly due to the omission of blasting works
- No flaking or tearing of the wrapping, e.g. after a possible emission of cable filler at full locked cables or at relative displacements between single wires of the cable
- Easy visual control for damages on the corrosion protection surface
- Damages can easily be repaired by wrapping an additional layer of tape
- Little maintenance efforts

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