



# DENSOLEN<sup>®</sup> Tape-Systems

## Application Guide

### Conditions of Application

#### Application temperature

Pipe surface	-10 up to +70 °C
Ambient	-20 up to +50 °C
DENSOLEN-Primer (HT)	-10 up to +40 °C
DENSOLEN-Primer (MT)	-10 up to +50 °C
DENSOLEN-Tape	-10 up to +50 °C

Temperature of pipe surface and DENSOLEN products should always be at least 3 °C above dew point.

In order to avoid wrinkling due to thermal elongation of the PE carrier film, the temperature difference between pipe surface (before and after tape application) and tape roll should be max. 30 °C. Under prolonged exposure to sunlight, the finished wrapping should be covered by a suitable reflecting material (e.g. rockshield). Alternatively a white outerwrap should preferably be used in case of two tape systems.

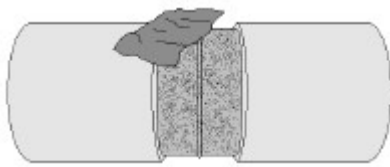
#### Steel surface condition

Cleanliness (ISO 8501-1)	min. ST2
Roughness (ISO 8503-1)	20 - 50 µm

#### Rel. Humidity

< 80 %

### Cleaning



- The areas to be coated (steel surface and adjacent factory coating) have to be clean, dry, and free from grease and dust.
- All contamination which might act as a release agent (e.g. grease, oil, varnishes, temporary protecting paints, coupling agents) have to be completely removed prior to tape application. Use suitable solvent if necessary.

### Drying



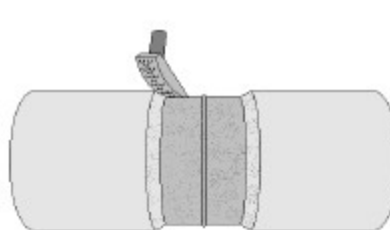
- Humidity and ice have to be removed by drying with a torch flame.

### Surface Preparation



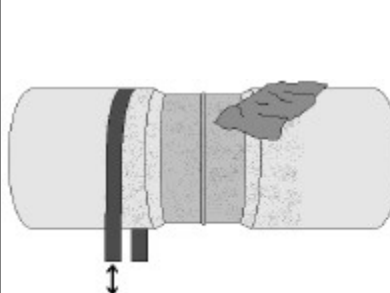
- Cleaning of steel surface can be done by wire brushing or abrasive blast cleaning.
- Any existing scale has to be removed by abrasive blast cleaning.

### Transition to Factory Coating



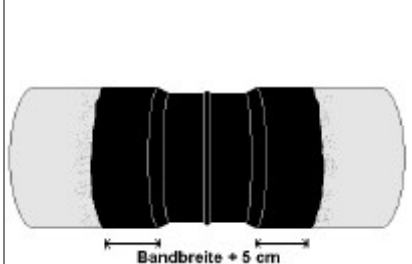
- Transition to adjacent factory coating should be bevelled by use of a round shaped rasp. Recommended angle: app. 30 °). Remove grinding dust.

### Preparation of Factory Coating



- Adjacent factory coating has to be cleaned in a width of app. 150 mm. Use suitable solvent if necessary.
- Cleaned factory coating has to be circumferentially roughened with coarse emery cloth. Remove grinding dust.

### Priming



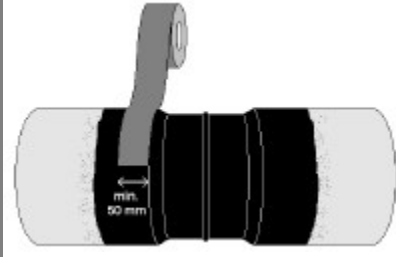
- Thoroughly stir DENSOLEN-Primer in original container until any bottom settlings are solved.
- By use of brush or roller apply an even coat of primer to cleaned and dried surface.
- Factory coating has to be primed in a width of "tape width + 5 cm".
- After use immediately seal primer drum. Clean brush or roller with suitable solvent (e.g. white spirit).

### Priming - Drying



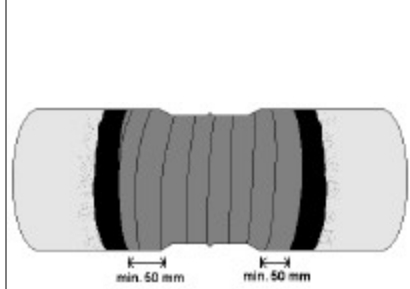
- Let primer dry until it is tack free.
- The drying time depends on ambient temperature and air movement.
- The primed surface should be wrapped within 8 h. Otherwise or in case of contamination (e.g. dust) the primer coat has to be renewed.

### Innerwrap



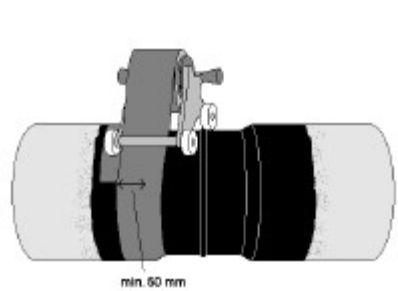
- In case of hand wrapping (tape width max. 50 mm) start with one circumferential wrap before spirally wrapping the tape. (start of wrapping: min. 50 mm on factory coating).
- Spirally wrap tape (DENSOLEN 3-ply tapes with grey side facing the pipe surface) under tension with min. 50% overlap around the pipe.

### Innerwrap



- Tape tension is sufficient, if tape width is narrowed by app. 1% during application.
- Remove interleaving.
- The tape wrapping should cover the full circumference of the adjacent factory coating by a width of min. 50 mm.

### DENSOMAT Wrapping



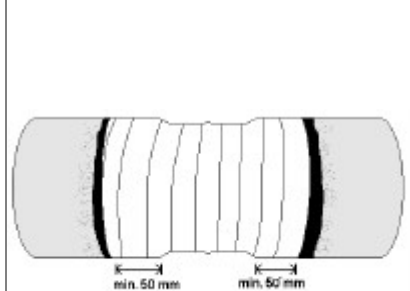
- When employing DENSOMAT wrapping machines, wrapping can start in spiral motion instead of one circumferential wrap (inner- and outerwrap).
- Start of wrapping on factory coating: min. 1,5 tape width.

### Outerwrap



- In case of hand wrapping (tape width max. 50 mm) start with one circumferential wrap before spirally wrapping the tape.
- The outerwrap should at least fully cover the innerwrap. It is recommended to start wrapping by covering the innerwrap by ½ tape width.
- Spirally wrap tape (DENSOLEN 3-ply tapes with grey side facing the pipe surface) under tension with min 50% overlap around the pipe.

### Outerwrap



- Tape overlap: Min. 50% to achieve a 4-layer-coating, min. 10 mm to achieve a 3-layer coating.
- Tape tension is sufficient, if tape width is narrowed by app. 1% during application.
- Remove interleaving.
- The tape wrapping should cover the full circumference of the adjacent factory coating by a width of min. 50 mm.

### Testing

- No wrinkles are allowed in the finished wrapping on visual testing.
- The wrapping has to be tested for freedom from pores with high voltage holiday detector. Test voltage: 5 kV + 5 kV per mm of coating thickness.

### Recommendations

- It is highly recommended to use DENSOMAT wrapping machines for application of tapes wider than or equal to 50 mm.
- In order to ensure that tapes are applied with sufficient wrapping tension, the tape width should be limited to max. 150 mm.

- The above application instruction can also be transferred to the wrapping of full pipe length or pipe bends.

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