Working instructions for splicing fabric belts using a cold process
Working instructions for splicing fabric belts - cold process

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## Working instructions for splicing fabric belts - cold process

### Material requirement

<table>
<thead>
<tr>
<th>Material</th>
<th>Item No.</th>
<th>Material</th>
<th>Item No.</th>
<th>Material</th>
<th>Item No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>K 0605</td>
<td>Cobbler’s knife</td>
<td>K 0623</td>
<td>Pulling hook</td>
<td>K 0482</td>
<td>Stop bracket</td>
</tr>
<tr>
<td>K 0661A</td>
<td>Chalked string</td>
<td>K 0745</td>
<td>Pliers</td>
<td>K 0642 - K 0644</td>
<td>Double roller</td>
</tr>
<tr>
<td>K 0646</td>
<td>Wire grip</td>
<td>K 0609</td>
<td>Angled blade</td>
<td>K 0634</td>
<td>Whetstone with wooden handle</td>
</tr>
<tr>
<td>K 0792-A</td>
<td>Rotary sander for</td>
<td>K 0747 / 62 / 61</td>
<td>Wheel wire brushes</td>
<td>K 0613</td>
<td>Piercing roller</td>
</tr>
<tr>
<td>K 0612</td>
<td>Working rubber</td>
<td>K 0615</td>
<td>Flat roller</td>
<td>K 0654</td>
<td>Screw clamp</td>
</tr>
<tr>
<td>K 0627</td>
<td>Hand brush</td>
<td>K 0620</td>
<td>Rubber scissors</td>
<td>K 0607</td>
<td>Layer-separating knife</td>
</tr>
<tr>
<td>K 0624</td>
<td>Folding rule</td>
<td>K 0628</td>
<td>Rubber hammer</td>
<td>Available upon request</td>
<td></td>
</tr>
<tr>
<td>K 0740</td>
<td>Sanding machine,</td>
<td></td>
<td>TOPGUM TD / TDG</td>
<td>Filling layer with adhesive covering on one side</td>
<td></td>
</tr>
<tr>
<td></td>
<td>flexible shaft</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Available upon request**: TOPGUM TD / TDG

**Filling layer with adhesive covering on one side**
# Working instructions for splicing fabric belts - cold process

## Material requirements and legend

<table>
<thead>
<tr>
<th>Material</th>
<th>Item No.</th>
<th>Material</th>
<th>Item No.</th>
<th>Material</th>
<th>Item No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>COLD</td>
<td>H 0050-K TOPGUM TL-T50, 700 g can Two-component cold adhesive, benzine-based</td>
<td>COLD</td>
<td>H 0259-K TOPGUM TL-T60, 700 g can Two-component cold adhesive, benzine-based</td>
<td>COLD</td>
<td>H 0257-K TOPGUM TL-T70, 1000 g can Two-component cold adhesive, dichloromethane-based</td>
</tr>
<tr>
<td></td>
<td>H 0315</td>
<td></td>
<td>H 0050-H Universal hardener, 40 g bottle</td>
<td></td>
<td>K 0626 Brush</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>K 0658</td>
<td></td>
<td>K 0662</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Legend

- **Processing time**: 00:00:00
- **Stir**: Add hardener - activate cold adhesive
- **Coat thinly and evenly**: Ready for processing
- **Remove protective film**: Test on back of hand

### Materials

- **TOPGUM TL-T50**, 700 g can Two-component cold adhesive, benzine-based
- **TOPGUM TL-T60**, 700 g can Two-component cold adhesive, benzine-based
- **TOPGUM TL-T70**, 1000 g can Two-component cold adhesive, dichloromethane-based
- **Cleaning agent**, benzine-based
- **Universal hardener**, 40 g bottle
- **Brush**
- **Safety goggles**
- **Protective gloves**
TOPGUM TL-T50/60

Safety instructions:
P 301+310: IF SWALLOWED: Contact poison center or doctor immediately. P 303+361+353: If contact with skin or hair: Remove all wet clothes and wash/shower skin/hair.
P 305+351+338: Rinse with water for a few minutes. Remove lenses and rinse again. P 331: Do not bring to anacatharsis.

Danger instructions:

TOPGUM TL-T70

Safety instructions:

Danger instructions:
Working instructions for splicing fabric belts - cold process

Universal hardener

Safety instructions:

Danger instructions:

Cleaning agent type B

Safety instructions:

Danger instructions:
Working instructions for splicing fabric belts - cold process
1. Preparations

1.1 Belt transport
For transportation, conveyor belts are usually wound onto wooden cores or, for greater loads, steel cores. (Steel cores are only used in the case of excessive stress and multiple-use, however.) To protect the belt edges and cover plates from excessive sun exposure, you can wrap up the entire belt coil in a film that will also simultaneously protect the belt from transport damage. The belts are often dispatched on drums with no flanged pulleys. This applies specifically to dispatches overseas, as special protection and added security are often desired for the belt edges of transport coils. The belt is then secured against slipping out of place too.

1.2 Loading and unloading
Avoid damaging the belt edges and cover plates when loading and unloading using forklifts, cranes, fixings, etc. Remember before unloading that the belt must be rolled counter to the winding directions. This saves you from having to reposition the belt. If the belt is especially heavy, set distancing beams between the cords and place old belt material or something similar underneath the coil if the surface is sharp-edged.

1.3 Storage
To prevent premature ageing, the formation of cracks, hardening and swelling, protect the belt from the following during storage:
1. Heat and sun exposure
2. Mechanical damage
3. Contact with chemicals, grease and oils
4. Moisture (especially if storing outdoors)

When storing, please observe DIN 7716 for rubber products, guidelines for storage, maintenance and cleaning.

1.4 Jacking up the belt coil
Fit the belt reels and winding shafts to the belt weights and coil diameters. Use cable drum winches with appropriate load-bearing capacity when jacking up. If your belt is heavier, and if it is delivered in a spiral angle, please contact the belt manufacturer regarding the details for jacking up.

1.5 Feeding in the belt
Prepare the start of the belt according to the size. Lift a narrow / short belt using a cable hand winch and in the case of heavy belts, fasten a draw bar at the start of the belt so that it can be connected to a pulling cable. Heavy belts require a motor-driven cable winch or cables in conjunction with a tractor unit such as a lorry or tracked vehicle. Tie up the corners at the start of the belt in the form of a trough before the feed-in or cut them back diagonally.

Safety instructions for descending or ascending areas of the facilities: Install a retaining device. If the brakes should fail or the cord should rupture during the feed-in process, significant damage and safety risks could occur.
2. Preparing the ends of the belt

2.1 Splicing guidelines

When preparing for vulcanisation, pay attention to the corresponding splicing guidelines that apply to the type of belt you are working with. These guidelines can be found in DIN 22102 - 3.

For a better overview, please refer to the following table:

2.2 Splice lengths in accordance with DIN 22103 - 3

<table>
<thead>
<tr>
<th>Type of belt as per DIN</th>
<th>No. of steps</th>
<th>Minimum step length</th>
<th>Splice length</th>
<th>Breaking force</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>ℓ_{st}</td>
<td>ℓ_{l}</td>
<td></td>
</tr>
<tr>
<td>315/3</td>
<td>2</td>
<td>150</td>
<td>300</td>
<td>80 - 100</td>
</tr>
<tr>
<td>400/3</td>
<td></td>
<td>200</td>
<td>400</td>
<td>125 - 160</td>
</tr>
<tr>
<td>500/3</td>
<td></td>
<td>200</td>
<td>400</td>
<td>125 - 160</td>
</tr>
<tr>
<td>630/4</td>
<td>3</td>
<td>200</td>
<td>600</td>
<td>125 - 160</td>
</tr>
<tr>
<td>800/4</td>
<td></td>
<td>250</td>
<td>750</td>
<td>200 - 250</td>
</tr>
<tr>
<td>1000/5</td>
<td></td>
<td>250</td>
<td>1,000</td>
<td>200 - 250</td>
</tr>
<tr>
<td>1250/5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,600/5</td>
<td>4</td>
<td>300</td>
<td>1,200</td>
<td>315 - 400</td>
</tr>
<tr>
<td>2,000/5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2,500/5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3,150/5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.3 Belt splice for conveyor belts

(with two or more plies and bonding layers)

\[ \ell_b = \text{bevel} \]
\[ \ell_l = \text{splice length} \]
\[ \ell_{st} = \text{min. step length} \]
\[ B = \text{belt width} \]

If \( b = 16^\circ 42' \) \[ \ell_b = 0.3 \cdot B \]

If \( b = 22^\circ \) \[ \ell_b = 0.42 \cdot B \]

2.4 Running direction

Please observe the running direction of the conveyor belt.

Drive drum (running direction)
2.5 Plotting the belt splice

01. First lift the ends of the belt to the prepared work surfaces. Align them and fix them.
02. Next, draw a horizontal crossline at one end of the belt.
03. Push the two ends of the belt together to inspect them. This will allow you to determine whether the centrelines drawn on both ends of the belt are identical and whether they form one long line without interruption.
04. Now draw the individual splice sections and a right-angled crossline (see Figure). The crossline serves as a reference line for plotting the bevelled splice.

2.6 Conveyor belts with three plies: Two-step splice

2.7 Activating the adhesive

Stir the adhesive for 2 mins. Thoroughly mix the hardener with the adhesive for 2 mins.
3. Processing the ends of the belt

3.1 Work steps for producing the splice

The following work steps must be performed mirror-inverted for each end of the belt.

01. Score the rubber edge using a cobbler’s knife and remove the seam strips using pliers.

02. Next, score the layer using a layer-separating knife and peel up the steps using a wire grip or a pulling hook. Always take care to ensure that the fabric is not harmed or damaged!

03. Cut the rubber edges off of the step height accordingly using an angled blade. Carefully remove loose rubber material and then clean it up using a hand brush. Thoroughly brush off the dust. Carefully roughen the rubber edge, the spliced bevel and approx. 30 - 50 cm above the splice with a wheel wire brush.

04. Coat both ends of the belt thinly and evenly with the activated hot vulcanisation solution, depending on the respective quality of the rubber, and allow the coating to dry completely. Repeat the procedure at each end of the belt two more times.
05. Align and bring together both ends of the conveyor belt taking into account the reference line (centre line) and use the hand roller to roll from the centre towards the outside edges in order to expel air cushions.

06. Roll over the entire splice area using the double roller from the centre towards the outside in order to avoid air cushions.

07. Prepare the filling layer strips TD / TDG for the bridges in the rubber cover plate on both the top and bottom sides. Remove the protective film if necessary, and coat the holding surface with adhesive. Allow the adhesive to dry and then test it with the back of your hand. The surface must be tacky.

08. Fill the two bridges with the TOPGUM TD / TDG strips, roll over everything carefully using a hand roller and cut the edges extending past the sides using a cobbler’s knife.

Wait at least 4 hours before commissioning the belt. NILOS recommends a curing / hardening time of 12 hours.

3.14 Splice report
Complete the splice report fully and sign it. The customer must countersign the report. You will find the report on the following pages (page 14 - 15).
**Allgemeine Informationen / General informations**

<table>
<thead>
<tr>
<th>Kunde / Customer</th>
<th>Herstellungsbeginn / Start of cure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gerät/Gurteile / Belt</td>
<td>Herstellungsende / End of cure</td>
</tr>
<tr>
<td>Servicefirma / service company</td>
<td>Auftragsnummer / Order Number</td>
</tr>
</tbody>
</table>

**Details der Gurtverbindung / Details about the belt splice**

**Fördergurt / Conveyor Belt**

<table>
<thead>
<tr>
<th>Gutnummer / Number of Belt</th>
<th>Verbindungsmaterial / Splicing Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anzahl Gewebeeinlagen / Number of plies</td>
<td>Hersteller / Producer Company</td>
</tr>
<tr>
<td>Deckplattenschichtstärke / Thickness of Top/Bottom-Cover</td>
<td>Auftragsnummer / Order Number</td>
</tr>
<tr>
<td>Gurttyp / Type of Belt</td>
<td>Materialnummer / Material Number</td>
</tr>
<tr>
<td>Festigkeit EP / Tension of plies</td>
<td>Gurtverbindung / Splice of Belt</td>
</tr>
</tbody>
</table>

**Vulkanisierpresse / Vulcanizing Equipment**

<table>
<thead>
<tr>
<th>Hersteller / Typ / Producer/ Company</th>
<th>Verbindungslänge / Length of splice mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eigentümer / Owner</td>
<td>Stufenlänge / Step length mm</td>
</tr>
<tr>
<td>Hydraulik/ Wasserdruck / Hydraulic/ Air-Bag</td>
<td>Äußere Bedingungen / Environmental</td>
</tr>
<tr>
<td>Traversenpaare / Number of Cross-beams (pair)</td>
<td>Zelt / Tent</td>
</tr>
</tbody>
</table>

**Heizfolge / Heating**

<table>
<thead>
<tr>
<th>Heizbeginn / Start up time</th>
<th>Uhrzeit / Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vulk.-beginn / Start of cure</td>
<td>Temperatur °C / Temperature F</td>
</tr>
<tr>
<td>Vulk.-ende / End of cure</td>
<td>Temperatur °C / Temperature F</td>
</tr>
</tbody>
</table>

**Qualitätsskontrolle/ Unregelmäßigkeiten / Quality Control/ Irregularities**

**Servicefirma / Service Company**

<table>
<thead>
<tr>
<th>Schicht oder Tätigkeit / Shift or activity</th>
<th>Datum / Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schicht oder Tätigkeit / Shift or activity</td>
<td>Unterschrift / Signature</td>
</tr>
</tbody>
</table>

**Arbeitsvorbereitung / Work preparation**

<table>
<thead>
<tr>
<th>Datum / Date</th>
<th>Unterschrift / Signature</th>
</tr>
</thead>
</table>
Protokoll über die Herstellung der Fördergurtverbindung

Report of making of a splice

Größenbestimmung der Heizplatte
Dimensions of the heating plate

\[
P_b = \text{Plattenbreite / plate width} \quad \text{mm} \\
P_l = \text{Plattenlänge / plate length} \quad \text{mm} \\
C = \text{Kantenlänge / edge length} \quad \text{mm} \\
B = \text{Bandbreite / belt width} \quad \text{mm} \\
\ell_v = \text{Verbindungsänge / splice length} \quad \text{mm}
\]