Installation Instructions
email250/light
1. General

Glass lined steel pipe parts are robust in process application. They can be used in many and varied applications with certain investment but demand careful handling during transportation and installation. This is why we would like to give you some instructions and make suggestions as to how to handle glass lined steel pipework. The contained information refers to email250light.

2. Transport and Storage

As a standard these pipe parts are delivered to you with protective caps in strong wooden boxes. Please check all the parts for any possible damage incurred during transport and immediately report such damage to Düker. It is best to leave the parts in the transport packaging for intermediate storage. Should this be not possible ensure careful storage on wood pallets, for example, or similar surface and make sure:

- That the parts are safeguarded against rolling or sliding off
- To avoid external loads
- To avoid vibration and impact
- To prevent the external and g/l surfaces from being scratched

Do NOT remove the protective caps from the pipeline parts!
3. Installation

3.1. Before installation

- Ensure that the parts with the protective caps are not subject to impact during transportation to the installation site.
- Take measures to prevent the pipelines being damaged by other construction work carried out at site (when scaffolding is being erected, etc.).
- Do not place unprotected glass lined parts with their glass surfaces on the ground or on gratings.

3.2. Installation procedure

As a matter of principle glass lined pipelines must be installed without stress and external loads!

- The line is to be laid from a connection point (tank, pump, flange etc.).
- The pipe parts are to be set up at the right height and be held temporarily in position (using suspension fasteners, mounts, anchors, etc.).
- Freely suspended pipeline parts are to be avoided.
- Now fit and close the flanges (cf. section 3.3). Make sure that the sealing surfaces are parallel and flat.
- If necessary fit supports (cf. section 3.5).
- Note falls and changes in length due to thermal expansion.
- Create falls by means of angle spacers or by turning the elbows.
- Finally, align pipeline and tighten bolting.
- Continue similarly with further pipeline elements.
- Spacers are to be used in the pipeline to adjust to the required length.

In no event the pipework shall be subject to tension through compression or stretching.

3.3. Fitting of flange connections

- Fit the two halves of the loose flange on one side with a flange connection bolt.
- Hinge the connected halves and place them around the stub ends with the recessed end of the flange (centring) towards the collar.
- Close the connected halves and bolt together.
- Proceed in the same way and fit the counter flange.
- Offset the flange and counter flange joints by 90°.
- Tighten the bolts crosswise alternately and consistently until the recommended torque is reached (cf. section 6.1).
- We recommend the use of studbolts for connecting the spacers, angle spacers and instrument tees (cf. section 6.2.1).

3.4. Gaskets

For connecting the glass lined steel pipes Düker recommends gaskets comprising corrugated stainless steel ring with a soft layer on both sides and PTFE envelope as well as gaskets of modified PTFE. Selection and application depends on the applied strain and stress and the properties of the gaskets must be agreed between the gasket manufacturer and the user. The range of gaskets that have been tested in practice can be seen in the following table:

<table>
<thead>
<tr>
<th>Type</th>
<th>Structure</th>
<th>Thickness not-compressed/compressed mm</th>
<th>Temperature/ application area °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PTFE envelope graphite gasket</td>
<td>2.0 / 1.5</td>
<td>-20 / + 200</td>
</tr>
<tr>
<td>2</td>
<td>from DN 250 PTFE with corrugated steel ring and graphite layers on both sides</td>
<td>2.0 / 1.5</td>
<td>-20 / + 200</td>
</tr>
<tr>
<td>3</td>
<td>Gylon blue</td>
<td>2.0/1.5</td>
<td>-20/ +200</td>
</tr>
</tbody>
</table>

- Ensure centring of the gasket between the stub ends of the pipes
- Gaskets that have been fitted once must not be reused!
3. Installation

3.5. Selection and installation of supports

Examples of specific support systems used for glass lined pipelines:

- flexible; fixed

![Fig. 1 fixed support](image1)

![Fig. 2 fixed support with two rings](image2)

![Fig. 3 guiding support](image3)

![Fig. 4 loose support](image4)

As a matter of principle the types of supports and distances listed in the isometric shall be adhered to. However, the following maximum distances between the supports are applicable:

<table>
<thead>
<tr>
<th>DN</th>
<th>Distance mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>50–300</td>
<td>3000</td>
</tr>
</tbody>
</table>

![Fig. 5 U-type support](image5)

![Fig. 6 U-type guiding support](image6)

To be considered when laying and positioning the supports:

- The different pipe sections must have a fixed point to ensure controlled expansion of the pipelines.
- Rising lines are to be fixed by means of fixed points so that the horizontal systems below or above these points are not subject to any additional cross forces due to their weight.
- Apparatus and pumps are considered as fixed points.
- Compensators must be given a fixed point on one end and a guiding or loose support on the other end.
- Heavy fittings are to be supported separately.
- All types of supports are to be fitted to prevent any stress being transferred to the installed pipeline.

Important note: NO welding work is to be undertaken on glass lined pipes!
4. Earthing of Glass Lined Pipework

To discharge electrostatic charges through glass lined pipe systems, such systems must be earthed, either by earthing studs or by galvanisation of the external surface of the pipework.

To improve earthing of static loads the laying of flat metal inserts between stub flange and loose flange is possible/recommended.

Earthing by studs

- The pipeline parts (depending upon construction length) are provided with 1 or 2 earthing studs.
- The studs are to be connected with the fastening bolts of the loose flanges by an earthing wire.
- Bellows of non-conductive material are to be bridged by a wire.
- Düker also offers gaskets with earthing studs. Upon installation these studs are to be connected with the flange bolts.

Earthing by external galvanization

- The galvanisation replaces the external corrosion paint and the earthing wires.
- Flangeless components such as spacers, angle spacers or instrument tees must be equipped with earthing studs in all cases.

Fig. 7 Flange connection with earthing stud and wire

5. Leakage Test

The tightness of installed pipework are to be guaranteed and provided due to the guidelines of the operating company.

6. Connections

6.1. Bolt tightening torques

The connection bolts are to be fastened with a torque wrench consistently crosswise and then repeatedly until the required torque is reached.

<table>
<thead>
<tr>
<th>DN mm</th>
<th>NB inch</th>
<th>Bolt dimensions</th>
<th>PTFE envelope graphite gasket torques / Nm</th>
<th>graphite gasket torques / Nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>2&quot;</td>
<td>M 8</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>80</td>
<td>3&quot;</td>
<td>M 8</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>100</td>
<td>4&quot;</td>
<td>M 8</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>150</td>
<td>6&quot;</td>
<td>M 8</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>200</td>
<td>8&quot;</td>
<td>M 10</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>250</td>
<td>10&quot;</td>
<td>M 10</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td>300</td>
<td>12&quot;</td>
<td>M 10</td>
<td>54</td>
<td>54</td>
</tr>
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</table>

When using reducers please consider the torques as enlisted in the installation instructions of email800 to be taken for the stub/loose flange edges.
6. Connections

6.2. Bolt dimensions – for flange connections

Bolt dimensions for flange connections

<table>
<thead>
<tr>
<th>mm</th>
<th>inch</th>
<th>Thread</th>
<th>Number</th>
<th>L</th>
<th>L₁</th>
<th>L₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>2</td>
<td>M 8</td>
<td>8</td>
<td>40</td>
<td>35</td>
<td>65</td>
</tr>
<tr>
<td>80</td>
<td>3</td>
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<td>8</td>
<td>40</td>
<td>35</td>
<td>70</td>
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<tr>
<td>100</td>
<td>4</td>
<td>M 8</td>
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<td>40</td>
<td>35</td>
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<td>12</td>
<td>50</td>
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<td>90</td>
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<td>250</td>
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<td>M 10</td>
<td>12</td>
<td>60</td>
<td>50</td>
<td>100</td>
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<tr>
<td>350</td>
<td>12</td>
<td>M 10</td>
<td>16</td>
<td>70</td>
<td>55</td>
<td>120</td>
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6.2.1. Studbolts with spacers

Dimensions for studbolts with spacers

<table>
<thead>
<tr>
<th>DN mm</th>
<th>NB inch</th>
<th>Thread</th>
<th>Number</th>
<th>10 L</th>
<th>15 L</th>
<th>20 L</th>
<th>25 L</th>
<th>30 L</th>
<th>40 L</th>
<th>45 L</th>
<th>50 L</th>
<th>60 L</th>
<th>70 L</th>
<th>80 L</th>
<th>90 L</th>
<th>100 L</th>
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<tbody>
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</table>

Recommended screw length was calculated without washers.
GLASS LINING TECHNOLOGIES
JOBBING FOUNDRY
FITTINGS AND VALVES
DRAINAGE TECHNOLOGY