

SSAB water mains

HANDLING AND STORAGE OF COATED PIPES DN 400-1200

SSAB manufactures coated steel pipes in the diameter range of DN 400-1200. This data sheet gives information on how to prevent the coating from getting damaged during storage, transport and installation.

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GENERAL INFORMATION

When handling coated pipes, pay special attention to the following:

- plan storage, lifting and transport in advance
- make sure there is sufficient and correct auxiliary equipment
- carry out an acceptance inspection
- be careful not to damage the pipe ends
- support and bind the bundles properly
- use a sufficient number of appropriate packers and wooden bases.

See also SSAB's handling instructions for pipe products and the following publications:

- API RP 5L1, Recommended Practice for Railroad Transportation of Line Pipe
- API RP 5LW, Recommended Practice for Transportation of Line Pipe on Barges and Marine Vessels.

To make it easier to handle pipes, we can deliver base packers, lifting lines, end stoppers and bevel protections.

External sheathings

PE coating

The line pipes for ground installations are usually furnished with an external sheathing of polyethylene. Usually this is a so-called 3-layer sheathing for which a thin epoxy layer is first melted onto the shot-blasted steel pipe, over which the coats of adhesive and polyethylene are then applied (Figure 1). When the coatings cool down, bonds form between different components, which ensures the high level of adhesion and good mechanical and chemical properties of the coating.

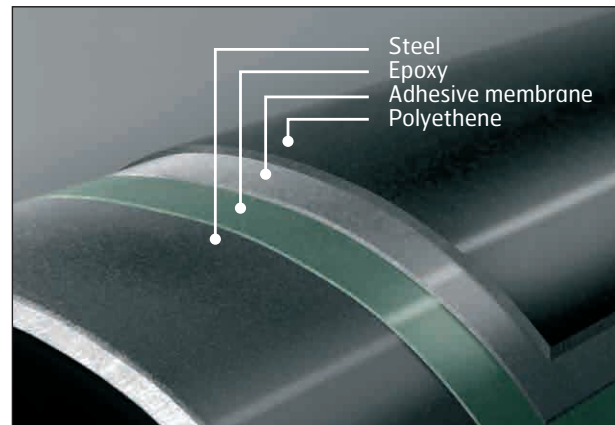
The epoxy layer protects the pipe against corrosion. The polyethylene coating protects the epoxy layer against damages. The adhesive layer functions as a glue between the epoxy and polyethylene layers. If the polyethylene layer remains intact there is little or no corrosion. The coating also protects the pipe during transport and installation.

The external coating can be damaged by mechanical impact, chemical substances, UV light and abrasion. Due to the different thermal expansion of the coating material and steel, the long-term storage of pipes in sunshine may decrease the adhesion of the coating in pipe ends.

Protective painting and storage lacquer

Protective painting and storage lacquer are intended only for temporary protection during storage. They must be removed before the actual primer coating and coating by means of shot blasting, for example.

Figure 1. External 3-layer coating of pipes



Coatings of pipe fittings

Pipe fittings refer to the fittings of pipes for water mains such as fabricated bends and tee fittings.

Pipe fittings are now most commonly coated with polyurethane.

Polyurethane provides excellent protection against mechanical wear during the storage, transport and installation of pipes.

Internal coatings

Pipes for water mains

Steel pipes for water mains and their components are supplied with a lining of concrete or epoxy.

The concrete cast used consists of

- SR-cement
- Dried, pure natural sand
- Tap water

The thickness of the concrete lining is 7–15 mm, depending on the diameter of the pipe.

Ferric hydroxide, which forms on the interface of the concrete lining and steel pipe, protects the pipe against corrosion and fastens the concrete firmly to the steel. Minor cracks appearing in the concrete during e.g. transport or installation are not dangerous, because when exposed to water, concrete expands and thus fills the minor cracks. If necessary, the concrete can be moistened by watering with tap water.

The epoxy lining of pipes for water mains is made of food-quality 2-component epoxy that is practically solvent-free. The lining has good wear resistance and gathers no sediment. The thickness of the lining is about 0.5 mm.

Handling of pipes

Special attention must be paid to the handling and storage of coated pipes in order to prevent damage to the coatings and pipes. Pipes must be handled so that they do not get battered and, under such conditions, that no foreign material, such as gravel, stones or pieces of wood, enters into or between the pipes.

Pipes delivered with bevelled ends must be handled so that they are not damaged by impact or bumps etc. The pipes or pipe bundles may not be placed on an uneven or dirty surface. Use wooden bases and separators.

Pipes must always be handled with lifting and transport gear that is in working order and in good condition. Only soft, non-metallic lines can be used to bind coated pipes.

Storing

Plan and arrange the storage of pipes in a way that makes it possible to avoid unnecessary moving of pipes. It is recommended to reserve a storage area away from common transport routes in order to avoid bumping of the pipes etc. Pipes should not be stored in the immediate vicinity of a high-voltage power line.

Protective plastic sheets, plastic stoppers and metallic bevel protections must be kept in their correct places and intact during storage.

If stored outdoors, the pipes must be placed on wooden bases located on an even, load-bearing surface at regular intervals. The bases must be thick enough to prevent the pipes from becoming damaged by possible moisture.

The wooden bases and separators can be omitted in a temporary storage area of a construction site and the pipes can be stored in a pile if fine sand can be used to make two even lines. The sand lines can be covered with plastic before storing the pipes on top.

Bases and separators

A sufficient number of wooden bases and separators must be used when storing pipes indoors and outdoors (Tables 1 and 2). The wood must not contain bark or other material (nails, nail heads, branches etc.) that may harm the product. In site conditions, pipes can also be stored without bases and separators on carefully made sand beds.

Table 1. The maximum number of layers when storing externally PE-coated pipes separated with separators

Pipe diameter mm	Internal concrete lining	Without concrete lining
400 – 700	5	10
750 – 1200	3	6

Table 2. The impact of pipe load on the number of wooden bases

Weight of the pipe load tonnes	Number of wooden bases pcs
< 10	2
10 – 20	4
> 20	6

Figure 2. Recommended distances of bases and separators

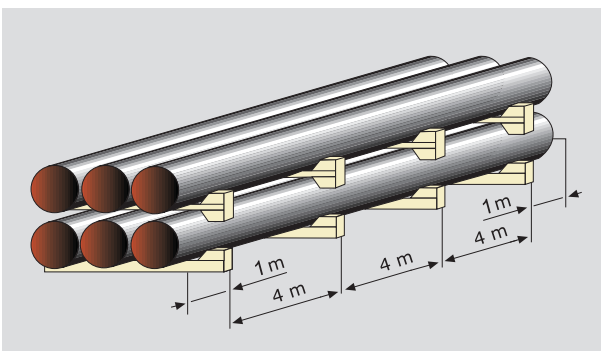
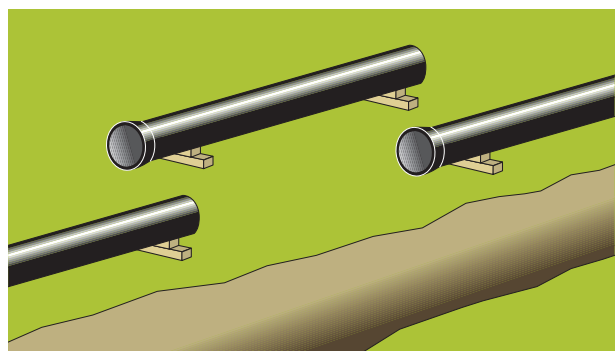


Figure 3. Overlap of pipe storing



Wooden bases

There must be a minimum of 4 bases and they must be placed on the same level as each other (the outermost bases are located about 1 metre from the pipe ends) (Figure 2). The bases must be of the same thickness and their width must be a minimum of 100 mm. If several bundles are placed side by side on the bases, the bases must be long enough for the bundles to be in contact with the bases along their entire width. The height/width ratio of bases must be enough to prevent the bundles from falling.

Wooden separators

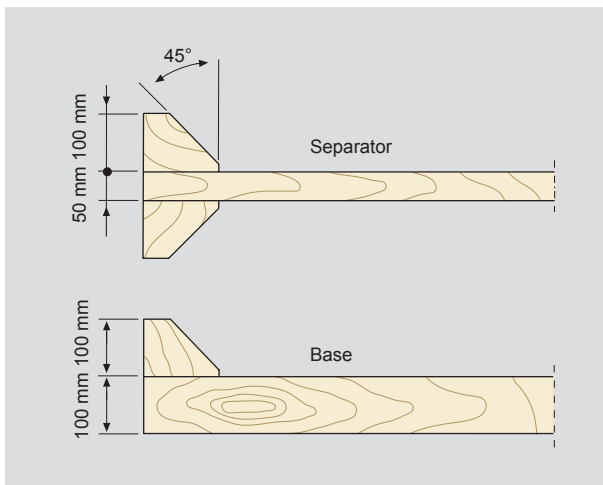
Wooden separators with a minimum width of 100 mm are used between the layers of pipes. The separators are placed between the bundles with the wider end facing the bundle. The separators must to the same length as the bases. The distance between the separators must also be the same as the distance between the bases. The separators are placed vertically in the same line. The vertical thickness of the separators must be large enough to permit lifting lines or a lifting fork to enter between the bundles without damaging the products.

The pipes can be stored without separators in a pile such that they overlap each other. Foam plastic strips or something similar can be used between the pipe layers. Care must be taken to prevent stones and other sharp objects from getting between the pipes.

Support wedges

Support wedges are nailed onto the bases and separators to prevent pipes from moving and to avoid abrasion (Figure 4). The support wedges must be a minimum of 50 mm high for pipes of diameter ≤ 500 mm. The minimum height of support wedges for larger pipes is 100 mm.

Figure 4. Support wedges



Lifting

Pipes must always be lifted horizontally positioned. To prevent damage to the coating, coated pipes must not be lifted with chains or cables. The correct location of lifting gear is $\frac{1}{4}$ of the length of the pipe measured from both ends. Bundles must not be damaged when transferring or lifting them. Do not damage pipe coating, ends, welding bevels or their protection during lifting (Figure 5).

If several pipes or bundles have been bound together such that the bundle can be lifted as a whole, the limits set for lifting must be taken into account.

The whole pipe bundle may not be lifted from one separate pipe. The pipes must not be bent to a state of permanent deformation during lifting.

Lifting with lugs

Unprotected lugs shall not be used for lifting pipes because they may damage the internal coating of pipes and bevelled edges and make the pipe ends oval shaped.

The following must be taken into consideration when lifting with lugs:

- The contact surface of the lugs must be made of Teflon, rubber or another similar soft material.
- The angle of inclination of chains must not exceed 30° .

Lifting with a forklift

Coated pipes may be lifted using a forklift. Covering the lifting forks with rubber mats is recommended. During the winter, ensure that there is no ice on the lifting forks.

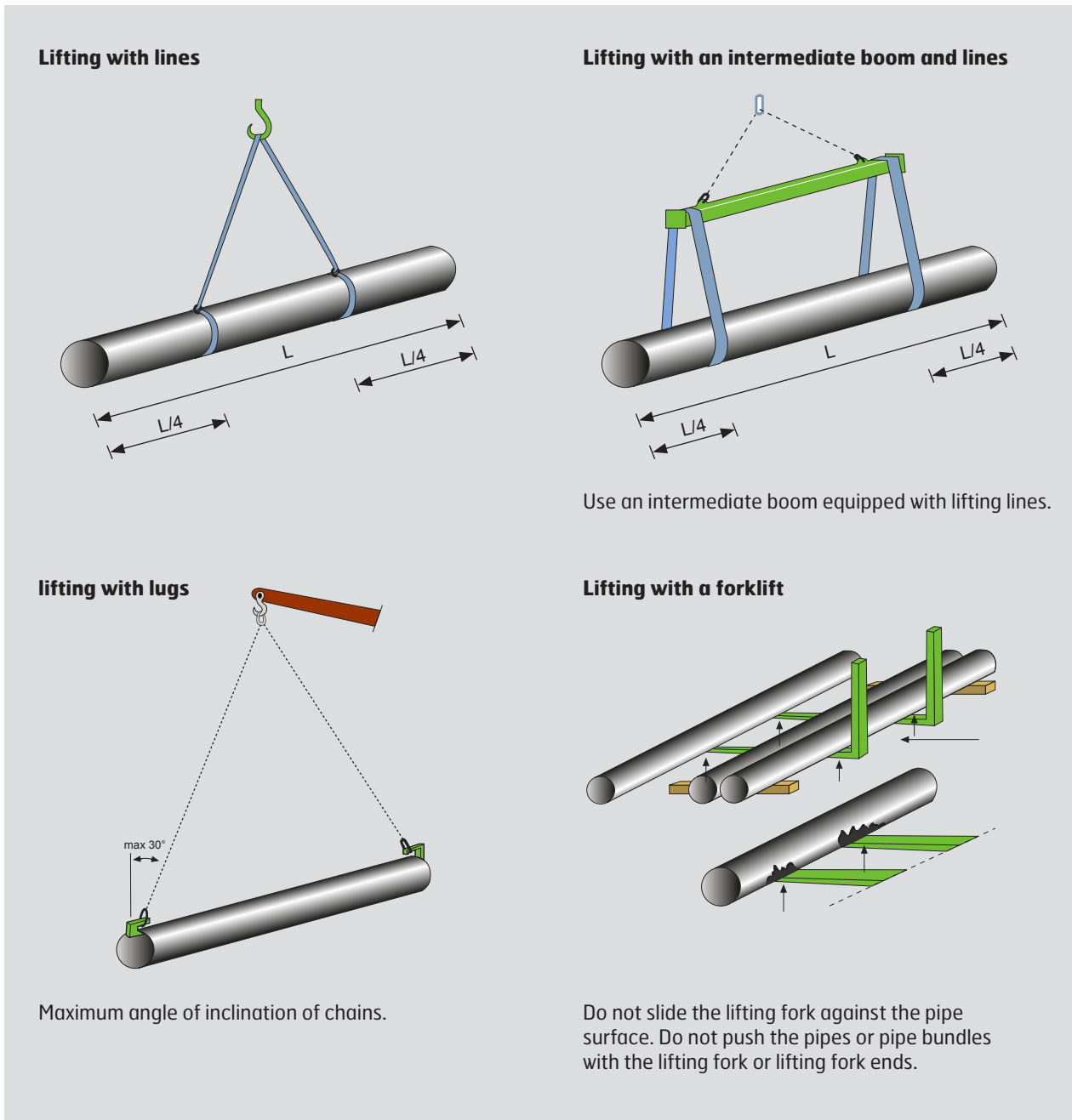
If the pipe bundles are stored side by side, one must avoid damaging the next bundle with the lifting forks. Insert the forks under the bundle in such a way that they do not damage the pipe and that the bundle is well balanced.

When moving separate pipes with a forklift, make sure that there is no risk of rolling. Tie the load if necessary. If the route is over uneven ground, the speed must be slow enough so that the bundle does not move on the fork.

Lifting with a forklift in brief:

- The lifting fork surfaces must be smooth, clean and sufficiently wide.
- Pipe products may not be pushed with the lifting fork or the lifting fork ends.
- It is recommended to cover the lifting fork surfaces with rubber protection.
- Lifting forks may not be slid against the pipe surface.
- Place lifting forks under the pipe or pipe bundle in such a way that the load is balanced.
- Do not damage the pipes positioned behind the load to be moved.
- Choose the driving speed in such a way that the load does not move and the pipes do not roll on the lifting fork.

Figure 5. Lifting



Lifting with lines

When lifting pipes with lines, a minimum of 100-mm-wide rubber-coated or nylon lines must be used.

Transport

Coated pipes are transported by truck, railroad or ship or their combinations.

During transport, make sure that there is no abrasion between the pipes or between the pipes and the support bars of the vehicle. If necessary, cover the support bars with boards or plastic tubes. Bases and separators must be used between the pipes during transport, as is the case when storing them. The pipes are bound with a minimum of four load-fastening lines. The fastening lines must be a minimum of 50 mm wide.

Figure 6. Road transport



Protective plastic covers or end stoppers shall be put on the ends of coated drinking water pipes to prevent dirt and spillages from entering into the pipes. Care must be taken during transport not to damage the protective gear. If the protective gear does get damaged, they must be replaced immediately.

Products may only be loaded on top of each other in such a way that the lowest products do not get damaged. The pipes must be loaded in a transport vehicle in such a way that it can be unloaded without damaging the pipes.

Road transport

Bases of a minimum width of 100 mm must be used in road transport. Separators are used between pipe layers at the same points as the bases. The number of bases required depends on the weight of the pipe load.

Support wedges are nailed on the bases and separators to prevent pipes from moving. The support wedges must be a minimum of 50 mm high when the pipe diameter is ≤ 500 mm. The minimum height of support wedges for larger pipes is 100 mm.

Rail transport

The loading instructions of the railroad company of the country in question will be followed in rail transport.

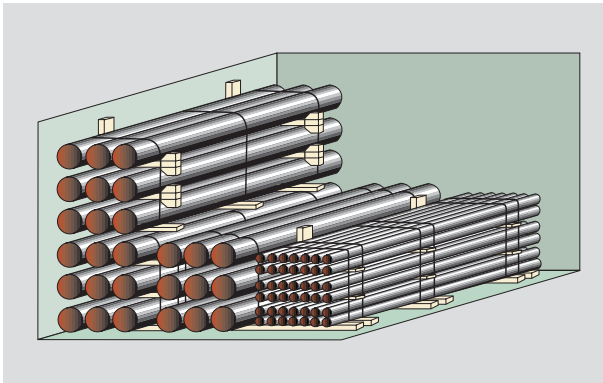
Sea transport

Pipes are always loaded in the cargo compartment (Figure 7). Pipes with thicker walls shall be placed on the bottom and pipes with thinner walls on top. Pipes can be loaded on top of plate and coil products. Other products may not be placed on top of coated pipes. If pipe products are loaded on top of coils or plates, bases of sufficient width must be made under both ends of the pipe bundles using 125 x 125 mm boards. The correct location of the bases is $\frac{1}{4}$ of the length of the pipe measured from both ends.

Coated pipes are preferably loaded as piles without separators. In case separators must be used, a minimum of 4 separators must be used if the length of the pipes is a maximum of 8 metres and 5–6 separators when the pipe length is over 8 metres.

Transversal wooden bases and separators must be placed in the same horizontal line. Additional bases and separators must be used if necessary. Each lifted load is separated from others and the structures of the ship with wooden bars at least 50 mm thick placed horizontally.

Figure 7. Sea transport



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