

# Line Pipes

## HIGH PRESSURE PIPES DN400-1200

Large-diameter high pressure pipes are made from SSAB's own high-grade thermomechanically hot-rolled steel. Steels for pipes have been developed with a particular view to the cold forming properties and weldability, in close cooperation between pipe and steel mill. This has allowed the development of suitable steel grades for special applications.

### Applications:

- High pressure pipelines

SSAB is a Nordic and US-based steel company. SSAB offers value added products and services developed in close cooperation with its customers to create a stronger, lighter and more sustainable world. SSAB has employees in over 50 countries. SSAB has production facilities in Sweden, Finland and the US. SSAB is listed on the NASDAQ OMX Nordic Exchange in Stockholm and has a secondary listing on the NASDAQ OMX in Helsinki. [www.ssab.com](http://www.ssab.com).

## General

Large-diameter high pressure pipes are manufactured at SSAB's Oulainen Works. Oulainen Works produces submerged arc welded steel pipes with a spiral seam (SAWH) in the dimension range Ø 406.4 – 1220 mm (Table 1).

Spirally welded pipes produced by SSAB are characterized by close dimensional and shape tolerances and consistent mechanical properties. Typical properties of spiral welded pipes are described in Table 2.

Submerged arc welded pipes are manufactured according to the following standards:

- EN 10208-2: up to L485MB
- EN ISO 3183: up to L485ME
- Customers specifications

Submerged arc welded pipes are supplied in lengths up to 18 metres.

## Submerged Arc Welding of steel pipes with spiral seam (SAWH)

The basic process entails splice-welding of steel strips and submerged arc welding of the spiral seam on both sides after forming. Cutting pipes to specified lengths is carried out automatically. Pipe ends are ultrasonically inspected for laminar imperfections. All pipes undergo hydrostatic tests to ensure that they are leak-proof and that they meet pressure resistance specifications. Pipe ends are trimmed and the weld is inspected by ultrasound, fluoroscope and x-ray. Product quality is further ensured by destructive tests. (Figure 1)

## External coating

External coating is done according to international standards (e.g. DIN 30670, DIN 30678, NF A 49-710, NF A 49-711) or customer's specifications. An external 3-layer coating consists of epoxy, adhesive and high-density polyethylene or polypropylene layers. When dry, the pipe is shotblasted to achieve suitable surface cleanliness and roughness. Before the external coating is applied, the pipe is preheated to over 200 degrees Celsius. Epoxy powder blown onto the pipe melts on the heated surface to form the first layer of the coating. The adhesive and polyolefine coatings are applied immediately after the epoxy powder. The resulting coating protects the steel against mechanical damage during handling, transportation, storage, drilling and laying of the pipes, but above all environmental corrosion. The pipe surface is cooled with water and the cut-backs of the pipe ends are steel-wire brushed. Finally, coating integrity and quality is ensured (Figure 2). Typical properties of a HDPE-coating are described in Table 3.

## Inspection documents

Inspection documents are supplied in accordance with EN 10204-3.1 or -3.2 by agreement. In addition, specific final documentation is prepared as customers request.

## Quality Assurance

High production and quality standards are maintained by dedicated and highly qualified employees. In recognition of their achievements, a wide range of domestic and international certification and inspection bodies have consistently approved production and products. The comprehensive quality control system covers the entire process, from raw materials selection to end products.





Figure 1. Manufacturing of Spirally Welded Pipe

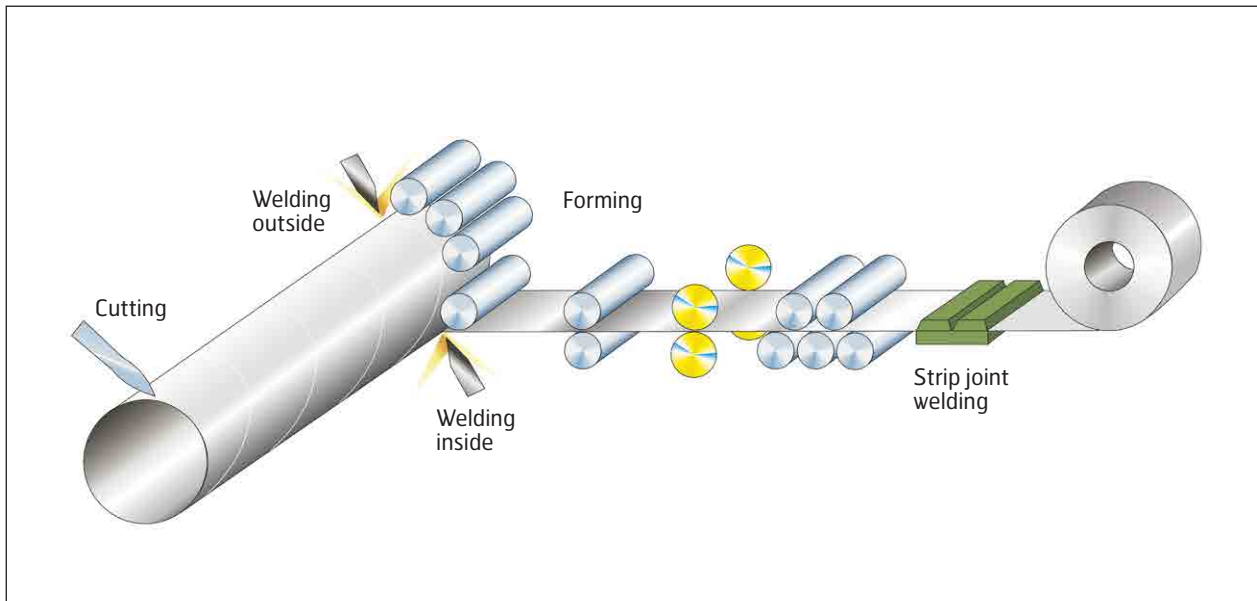


Figure 2. External Coating

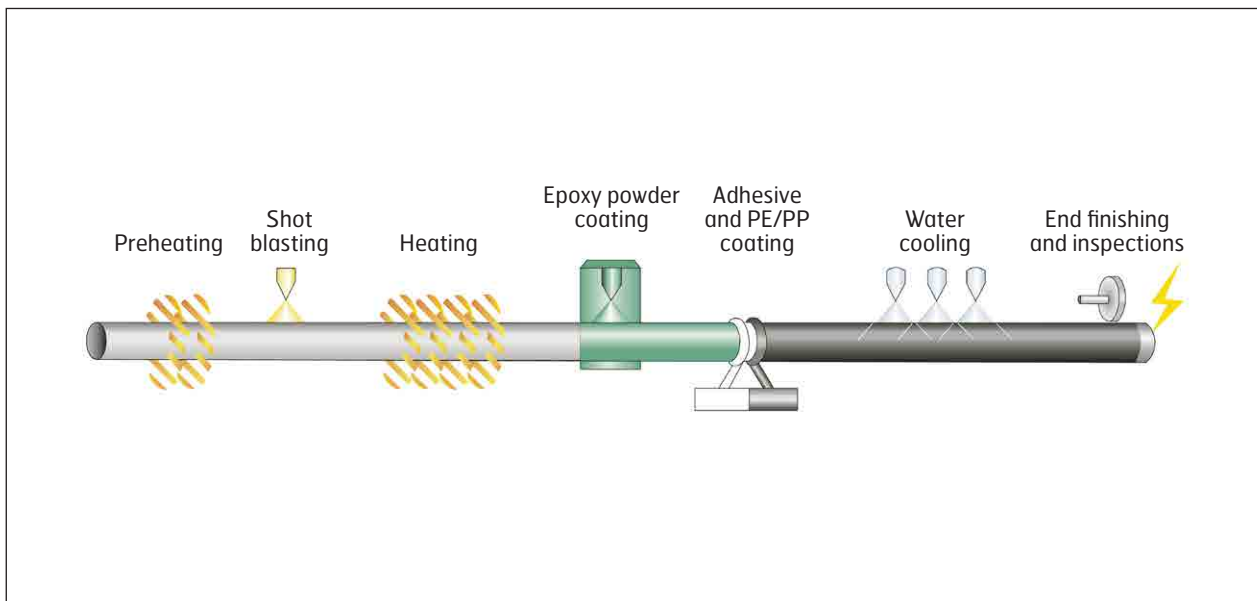


Table 1. Dimensions<sup>1)</sup> and mass per unit length (weight) in kg/m for steel pipes<sup>2)</sup> and PE-coatings<sup>3)</sup>

Outside diameter D		Steel pipes, wall thicknesses in mm									Coating	
mm	in	6.3	7.1	8.0	8.8	10	11	12.5	14.2	16.0	PE-n	PE-v
406.4	16	62.2	69.9	78.6	86.3	97.8	107	121			3.2	4.0
457	18	70.0	78.8	88.6	97.3	110	121	137			3.6	4.5
508	20	77.9	87.7	98.6	108	123	135	153			4.4	5.5
559	22	85.9	96.6	109	119	135	149	168			4.8	6.0
610	24	93.8	106	119	130	148	162	184	209		5.3	6.6
660	26		114	129	141	160	176	200	226		5.6	7.1
711	28		123	139	152	173	190	215	244		6.2	7.7
762	30			149	165	185	204	231	262		6.5	8.2
813	32			159	175	198	218	247	280	314	8.3	10.1
864	34			169	186	211	231	262	298	335	8.6	10.7
914	36			179	196	223	245	278	315	354	9.3	11.3
1016	40			199	219	248	273	309	351	395	10.3	12.5
1067	42			209	230	261	286	325	369	415	10.8	13.0
1118	44			219	241	273	300	341	387	435	11.3	13.8
1168	46			229	252	286	314	356	404	455	11.9	14.5
1219	48			239	263	298	328	372	422	475	12.4	15.1

<sup>1)</sup> Also other dimensions not mentioned in the table can be produced.

<sup>2)</sup> All the values for steel pipes are according to EN 10220.

<sup>3)</sup> Minimum layer thickness according to DIN 30670: normal (n), increased (v).



Table 2. Typical Properties of spirally welded pipes <sup>1)</sup>

Property	Requirement as per EN 10208-2	Typical Values	Note
<b>Diameter, Pipe Body</b>	±0.75 % D, max ±3 mm ±0.5 % D, max ±4 mm	< ±1,5 mm < ±1,5 mm	D ≤ 610 mm D > 610 mm
<b>Diameter, Pipe End</b>	±0.5 % D, max ±1.6 mm ±1.6 mm	< ±1,5 mm < ±1,5 mm	D ≤ 610 mm D > 610 mm
<b>Out-of-Roundness, Pipe Body</b>	2.0 % 1.5 %, (max 15 mm) when D/t ≤ 75 2.0 %, when D/t > 75	< 1 % < 1 % < 1 %	D ≤ 610 mm D > 610 mm D > 610 mm
<b>Out-of-Roundness, Pipe End</b>	1.5 % 1.0 %, when D/t ≤ 75 1.5 %, when D/t > 75	< 1 % < 1 % < 1 %	D ≤ 610 mm D > 610 mm D > 610 mm
<b>Wall Thickness</b>	+1.0 mm / -0.5 mm +10 % / -5 %	+0.2 / -0.3 mm +0.3 / -0.4 mm	t ≤ 10 mm t > 10 mm
<b>Straightness</b>	Deviation max 0.2 % of pipe length	< 0.1 %	

<sup>1)</sup> The values in the table represent no guaranteed rates.

Table 3. Typical Properties of a HDPE -coating <sup>1)</sup>

Property	Test Standard	Requirements as per DIN 30670	Typical Values	
<b>Resistance to peeling</b>	+20 °C +50 °C	DIN 30670	≥ 35 N/cm ≥ 15 N/cm	> 120 N/cm > 60 N/cm
<b>Resistance to impact</b>		DIN 30670	≥ 5 J/mm	> 5 J/mm
<b>Resistance to indentation</b>	+23 °C +50 °C	DIN 30670	≤ 0.2 mm ≤ 0.3 mm	0.1 mm 0.2 mm
<b>Ultimate elongation</b>		DIN 30670	≥ 200 %	> 400 %
<b>Specific sheathing resistance</b>		DIN 30670	≥ 10 <sup>8</sup> Ωm <sup>2</sup>	> 10 <sup>8</sup> Ωm <sup>2</sup>
<b>Thermal ageing</b>		DIN 30670	≤ 35 %	< 35 %
<b>Light ageing</b>		DIN 30670	≤ 35 %	< 35 %
<b>Cathodic disbonding radius</b>		ASTM G 8 or BS 3900:Part F11	No requirements	< 5 mm
<b>Service temperature</b>		–	≤ +50 °C	-40 – +80 °C

<sup>1)</sup> The values in the table represent no guaranteed rates.



SSAB is a Nordic and US-based steel company. SSAB offers value added products and services developed in close cooperation with its customers to create a stronger, lighter and more sustainable world. SSAB has employees in over 50 countries. SSAB has production facilities in Sweden, Finland and the US. SSAB is listed on the NASDAQ OMX Nordic Exchange in Stockholm and has a secondary listing on the NASDAQ OMX in Helsinki. [www.ssab.com](http://www.ssab.com)

The accuracy of this instruction sheet has been inspected with utmost care. However, we do not assume responsibility for any mistakes or direct or indirect damages due to incorrect application of the information. The right to make changes is reserved.

Copyright © 2015 SSAB. All rights reserved. SSAB and SSAB brand names are registered trademarks of SSAB.

**SSAB**  
Harvialantie 420  
FI-13300 Hämeenlinna, Finland

Tel. +358 20 5911

[www.ssab.com/infra](http://www.ssab.com/infra)

The SSAB logo consists of the letters 'SSAB' in a bold, blue, sans-serif font. The letters are slightly italicized and have a modern, clean appearance.