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OMK Structure

United Metallurgical Company (OMK) is one of the largest Russian producers of pipes, fittings and other metal products for fuel and energy, transport and industrial enterprises.

OMK unites seven large metallurgical enterprises: Vyksa Steel Works (Nizhny Novgorod region), Chusovoy Metallurgical Works (Perm region), Almetyevsk Pipe Plant (Tatarstan), Trubodetal Plant (Chelyabinsk region), the Casting and Rolling Complex (Nizhny Novgorod region), Blagoveschensk Valve Plant (Bashkortostan) and OMK Tube plant (Texas, USA).

More than 30 thousand employees work at the enterprises of the Company.

OMK delivers complete solutions for Oil & Gas and Power Industries

Products manufactured in pipe and steel rolling mills make part of the following chain:
PRODUCTION - DEVELOPMENT - PROCESSING - DISTRIBUTION

1. Casing and tubing pipes
   - Diameter — 60 to 245 mm
   - Wall thickness — 0.8 to 6.3 mm

2. Large diameter pipes
   - Diameter — 508 to 1422 mm
   - Wall thickness — 8.0 to 50 mm
   - Operating pressure — up to 250 bar

3. Shaped pipes
   - Squares — 10×10 to 200×200 mm
   - Rectangles — 15×10 to 200×160 mm

4. Pipes for installation of gas-, oil-, water-, and product pipelines and heating systems
   - Diameter — 114 to 530 mm
   - Wall thickness — 4.0 to 12.7 mm

5. Water and gas pipes and conventional pipes
   - Diameter — 12.7 to 108 mm
   - Wall thickness — 0.8 to 6.3 mm
OMK Geography

OMK Pipe and Steel Rolling Mills

Vyksa Steel Works (VSW)
One of the oldest metallurgical centers in Russia was established in 1757. The facility produces steel pipes with diameter starting from 12.7 up to 1422 and wall thickness 1 to 50 mm. Pipes are produced with external anti-corrosive 3-layer polyethylene and polypropylene coating or with one- or two-layer epoxy coating, as well as with internal smooth or corrosion resistant coating.

OMK North America, Inc.
- OMK-Tube (Houston, Texas) – production of casing and tubing pipes;
- Tubular Solutions (Houston) – pipe-finishing facilities.

The division's plants produce and sell casing and tubing pipes on one of the largest oil extraction markets of North America. Diameter: 60-178 mm. Wall thickness: 4.8-12.7 mm. 200,000 tons of pipes per year is the division's maximum production.

Trubodetal Plant
This is one of largest facilities in Russia and CIS, specializing in production of pipeline fittings made of carbon and low-alloyed steel with diameter 57 to 1420 mm. This facility is one of key suppliers for oil and gas utility systems construction as well as for trunk systems.

Blagoveshchensk Valves Plant (BVP)
This plant established in 1756 is one of Russia`s largest valves production facilities. The BVP JSC primary product is pipeline valves made of carbon, low-alloyed and stainless steel grades with nominal diameter 25 to 800 mm and working pressure 16 to 250 kgf/cm².

Hot Rolled Coils Mill (HRC Mill)
HRC Mill produces hot-rolled coils and flat stock with thickness 1 to 12.7 mm and width 30 to 1750 mm.
The mill includes 2 slitting units with the following characteristics:
- Strips with width 30 to 1750 mm.
- Plate with length 1500 to 12200 mm and width 750 to 1800 mm.

Heavy Plate Mill-5000 (Mill 5000)
Heavy plates manufactured at Mill 5000 are designed for production requirements of large diameter pipes used for main oil and gas pipelines. Mill 5000 products can be used in shipbuilding, mechanical engineering, nuclear power industry and other metal-intensive sectors.

OMK major customers include some leading Russian and foreign companies such as: Gazprom, Russian Railways, Lukoil, JSC Transneft, Surgutneftegaz, Rosneft, TNK-BP, ExxonMobil, Royal Dutch/Shell, General Electric, Samsung.

OMK exports to over 30 countries worldwide.


Participation in the mentioned major projects is a result of construction of new advanced facilities, complete upgrade of existing capacities and integration of unmatched technologies.
Certification

One OMK’s priority task is to continuously improve products quality, and to meet customers’ requirements and expectations.

OMK plants operate with a quality management system in place which serves as the basis for the global management process and results as a way of achieving performance targets.

VSW’s Quality Management System (QMS) is applied to the design and production of electric-welded pipes with plain ends manufactured. Using the submerged arc welding method; electric-welded pipes with plain ends manufactured using HFC welding method; electric-welded pipes with external anticorrosion coating and with internal anticorrosion or anti-friction coating; HFC-welded casing or tubing pipes (with plain ends or with thread and couplings); hot-formed seamless pipes manufactured from round billets; seamless couplings; solid-rolled railway wheels; steel ingots; hot-rolled steel products; and constructed according to the following standards and specifications:

• ISO 9001 (GOST ISO 9001);
• ANSI/-API Q1/ISO 29001;
• Gazprom company standard 9001;
• 97/23/EC instructions.

The comprehensive management system according to ISO 14001, Environment Management Systems, and OHSAS 18001, Occupational Health and Safety Management Systems standards has been in place at the plant since 2009.

Beside QMS certification, VSW applies direct certification of the pipe production. To meet requirements of customers from Russia and near-abroad countries, the Vyksa plant’s pipes are certified in accordance with the GOST R system. And VSW offers its products not only on Russian markets, but on international markets as well.

Starting from 1995 Vyksa Plant has American Petroleum Institute (API) certificates with API 5L and API 5CT specifications.

As requested by Polish customers, certification was carried out for steel longitudinal electric-welded pipes with anti-corrosion coating and uncoated pipes with diameters from 114 to 530mm and wall thicknesses from 4.5 up to 10mm of L245NB, L290NB, 415NB, L245MB, L290MB, L360MB, L415MB steel grades, manufactured in accordance with EN 10208-2 with the right to use the W safety sign in marking. The certification was performed by ZETOM Katowice (Poland).

Moreover, Vyksa Steel Works has received a certificate of conformity from TÜV Rheinland for electric-welded steel pipes with diameters from 21.3 to 508mm and hollow sections sized 20x20 to 80x80mm and 30x20 to 100x60mm manufactured from construction steel with the strength level from S235 to S355, produced to EN 10219-1:2006 with the right to use the CE marking, starting from March 2011.

These certificates guarantee that the production process is in accordance with applicable standards, technical regulations and specifications.
Contacts

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www.omk.ru

Pipe Production

Pipe Production Catalogue
OMK manufactures versatile electric-welded pipes with diameters from 12.7 to 1422mm (0.5" to 56") and wall thicknesses from 1 to 50mm (0.04" to 1.97").

Pipes have two- or three-layer anti-corrosive polyethylene or epoxy coatings. Equipment and production process employed in pipe shops have been designed using advances in pipe welding technology in Russia and worldwide – to meet current requirements.

OMK’s piping products are designed to operate at critical temperatures and in aggressive environments. The Company successfully participates in prestigious international tenders. In 2008 OMK was the only Russian supplier of pipes for the first stage of the Nord Stream project and was among the winners of the tender to supply pipes for the Central Asia-China pipeline and OML 58 O.U.R. gas pipeline in Nigeria.
General Purpose pipes
General Purpose pipes

Water and gas pipes with small diameters from 12.7 to 108mm (0.5 to 10.6") are produced from carbon steel grades S185, S195T, S235JR, P195TR1, P235TR1 (and other).

Pipes are produced by high-frequency welding with induction current lead.

Pipes are subjected to hydraulic and mechanical tests. Welds undergo non-destructive testing.

Square and rectangular section pipes are shaped from round electric-welded pipes on the line of the electric welding mill.

At the consumer’s request pipes are packed in hexagonal and box bundles. Pipe bundles are provided with removable shipping straps for fixing in trans-shipment points and storage without additional pulling appliances.

Product range and scope of application

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• Producing mill: Vyksa Steel Works
**General Purpose pipes**

**Product range and scope of application**

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*Producing mill: Vyksa Steel Works*

**Product range and scope of application**

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*Producing mill: Vyksa Steel Works*
General Purpose pipes

ERW water and gas line pipes manufacturing process

1. Coils examination
2. Uncoiling, leveling and shearing
3. Welding
4. Looper
5. Skelp forming
6. HF welding
7. Inside & Outside weld bead removal
8. Cooling
9. Sizing
10. UT of weld
11. Sizing
12. Cutting-to-length
13. Facing and Beveling
14. Hydrostatic test
15. Final inspection
16. Packaging & storage

Hollow Sections
Hollow Sections

Square and rectangular section shaped pipes are produced by sectioning circular pipes on the electric-welding mill line. Application: building structures for different applications.

Weld shaped pipes are produced from St 1, St 2, St 3 carbon steel grades, 08, 10 and 20 steel grades, as well as from S235JRH, S355J2H, E155, E190, E195, E220, E235, E260 grades.

Pipes are manufactured at the electric-weld pipe units by high-frequency induction welding.

Producing mill: Vyksa Steel Works

Product range and scope of application

<table>
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<th>Wall-thickness, mm</th>
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</table>
Hollow Sections

Hollow sections manufacturing process

1. Coils examination
2. Uncoiling, leveling and shearing
3. Welding
4. Looper
5. Skelp forming
6. HF welding
7. Inside & Outside weld bead removal
8. Cooling
9. Stabilizing stand
10. Pipe sizing, straightening and sectioning
11. Sizing
12. Cutting-to-length
13. Final inspection
14. Packaging & storage
Oil and Gas Line Pipes

ERW pipes are made by Vyksa Steel Works. Pipes fully comply with requirements of international standards.

Oil and gas line pipes are made with diameters from 114 to 530mm (4½ - 20") and wall thicknesses from 4.0 to 12.7mm (0.16-0.5”).

Pipes are produced by high-frequency welding from carbon and low-alloy grades: up to X70.

During production pipes undergo multi-stage non-destructive testing, acceptance mechanical tests of base metal and weld and 100% hydraulic pressure test.

All pipes are supplied pre-treated: with local heat treatment of weld or bulk heat treatment.

Pipes undergo multi-stage non-destructive testing using an eddy current flaw detector, automatic and manual ultrasonic flaw detector, mechanical and 100% hydraulic tests.

Product mix and scope of application

<table>
<thead>
<tr>
<th>Standard</th>
<th>Outside dia., inch (mm)</th>
<th>Wall thickness, mm</th>
<th>Steel grade</th>
<th>Scope of application</th>
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<td>API Spec 5L, ISO 3183:2012</td>
<td>8½ (219.1)</td>
<td>4.8-12.7</td>
<td>up to X70</td>
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<td>14 (355.6)</td>
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<td>16 (406.4)</td>
<td>6.3-12.7</td>
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<td>18 (457.0)</td>
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<td>20 (508.0)</td>
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<td>4.5-12.5</td>
<td>S235 - S460</td>
<td>For multi-purpose structures</td>
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<td>18 (457.0)</td>
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<td>20 (508.0)</td>
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</table>
Oil and Gas Line Pipes

ERW line pipes manufacturing process

1. Coils examination  
2. Uncoiling, leveling and shearing  
3. Strips slitting  
4. Welding  
5. Looper

6. Edges preparation  
7. Skelp forming  
8. HF welding  
9. Inside & Outside weld bead removal

10. UT of weld  
11. Seam-annealing  
12. Sizing  
13. Cutting-to-length  
14. Marking

15. Entire heat treatment (upon agreement)  
16. Facing and beveling  
17. Hidrostatic test

18. AUT of body, weld & ends of pipe  
19. Final inspection  
20. Packaging & storage

Pipe Production Catalogue

Casings
Casings

Electric welded casings are produced by Vyksa Steel Works and fully comply with API 5CT requirements. Consistent quality of pipes is ensured by optimised production process. Pipes are high-frequency welded with constant current lead. Pipe quality control is ensured by automatic control of welding, ultrasonic inspection of pipe weld and body, and tracking system.

Electric-welded pipes are supplied with Buttress threads, short (STC) and long (LTC) round threads. To increase tightness of Buttress threads pipes can be supplied with a fluoroplastic sealing ring. Tightness of pipes and threads is tested by means of hydraulic testing of each pipe.

According to Customer’s requirements a protective coating can be applied on the external surface of pipes.

Electric-welded pipes made by VSW have the following advantages in comparison with seamless pipes:
- Less out-of-roundness that increases pipe collapse resistance from formation pressure in a well.
- Out-of-roundness tolerance limits – by 3 times less than for seamless pipes resulting in increased threshold pressure for pipes in design of casings by 15% and more depending on pipe diameter and wall thickness with enhanced performance.
- High-precision tolerance for wall thickness (± 5% from nominal wall thickness) as compared with seamless pipes (±12.5%, positive tolerance is limited by pipe weight that is equal to ± 6.5%).
- Better surface quality preventing defects inherent in seamless pipe rolling.
- Pipe lengths - 13 ± 0.2 m (42.64 ft ± 0.66 ft) that improve conditions of casing string fit-up and running.

The Mill is a regular supplier of casing pipes for Exploreco Energy Inc (USA), TNK-BP, Surgutneftegaz, Lukoil, GazpromNeft, Rosneft, KazMunayGas and other oil producers.

The Mill guarantees supply of casing pipes in full conformity with customer’s requirements and on time.

Product range and scope of application

<table>
<thead>
<tr>
<th>Standard</th>
<th>Outside dia., inches (mm)</th>
<th>Nominal linear mass, lb/ft</th>
<th>Wall thickness, mm</th>
<th>Steel grade</th>
<th>Scope of application</th>
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<td>API Spec SCT</td>
<td>4¼ (114.30)</td>
<td>9.50-11.60</td>
<td>5.21-6.35</td>
<td>H40, J55, N80, P110, K55, R95, L80(1)</td>
<td>Casing with &quot;Buttress&quot;, round thread, STC, LTC, tight joints VMZ-1 and threadless casing for oil and gas wells fastening</td>
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<td>5⅞ (139.70)</td>
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<td>7.32-11.05</td>
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Producing mill: Vyksa Steel Works
### Casings

#### API Spec 5CT

| Diameter | Inch | mm   | 0.208  | 0.228  | 0.235  | 0.248  | 0.250  | 0.256  | 0.279  | 0.307  | 0.317  | 0.322  | 0.358  | 0.367  | 0.368  | 0.401  | 0.406  | 0.414  | 0.422  | 0.424  | 0.442  |
|----------|------|------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|          |      |      | 0.208   | 0.228   | 0.235   | 0.248   | 0.250   | 0.256   | 0.279   | 0.307   | 0.317   | 0.322   | 0.358   | 0.367   | 0.368   | 0.401   | 0.406   | 0.414   | 0.422   | 0.424   | 0.442   |
|          |      |      | 0.208   | 0.228   | 0.235   | 0.248   | 0.250   | 0.256   | 0.279   | 0.307   | 0.317   | 0.322   | 0.358   | 0.367   | 0.368   | 0.401   | 0.406   | 0.414   | 0.422   | 0.424   | 0.442   |
| 48       | 5⅝   | 146.09| 26.3  | 27.9  | 30.9  | 32.3  | 36.0  | 40.0  | 43.5  | 51.0  | 56.0  | 62.0  | 69.0  | 76.0  | 82.0  | 90.0  | 100.0  | 110.0  | 118.0  | 130.0  | 138.0  | 146.0  |
|          | 5⅛   | 133.38| 24.3  | 26.3  | 29.1  | 31.7  | 35.5  | 40.1  | 44.2  | 52.0  | 57.1  | 63.5  | 71.1  | 77.8  | 84.6  | 92.4  | 102.8  | 113.6  | 124.4  | 135.3  | 146.2  | 157.1  |
|          | 5⅝   | 133.38| 24.3  | 26.3  | 29.1  | 31.7  | 35.5  | 40.1  | 44.2  | 52.0  | 57.1  | 63.5  | 71.1  | 77.8  | 84.6  | 92.4  | 102.8  | 113.6  | 124.4  | 135.3  | 146.2  | 157.1  |
| 5⅝       | 133.38| 24.3  | 26.3  | 29.1  | 31.7  | 35.5  | 40.1  | 44.2  | 52.0  | 57.1  | 63.5  | 71.1  | 77.8  | 84.6  | 92.4  | 102.8  | 113.6  | 124.4  | 135.3  | 146.2  | 157.1  | 168.2  |
| 5⅛       | 133.38| 24.3  | 26.3  | 29.1  | 31.7  | 35.5  | 40.1  | 44.2  | 52.0  | 57.1  | 63.5  | 71.1  | 77.8  | 84.6  | 92.4  | 102.8  | 113.6  | 124.4  | 135.3  | 146.2  | 157.1  | 168.2  |
| 6⅝       | 168.28| 42.7  | 46.9  | 51.0  | 55.6  | 60.3  | 65.1  | 70.0  | 75.0  | 81.7  | 87.6  | 94.0  | 101.6 | 108.6 | 115.6 | 122.6 | 130.2 | 137.8 | 145.4 | 153.0 | 160.6 |
| 7⅝       | 215.08| 54.6  | 59.7  | 64.8  | 70.5  | 76.2  | 82.0  | 87.9  | 93.8  | 100.5 | 106.4 | 112.8 | 119.4 | 126.1 | 132.5 | 139.2 | 145.9 | 152.5 | 159.2 | 165.8 |
| 8⅝       | 244.48| 62.0  | 67.2  | 72.4  | 78.2  | 84.0  | 90.0  | 96.0  | 102.0 | 108.8 | 115.6 | 122.4 | 129.2 | 136.0 | 142.8 | 149.6 | 156.4 | 163.2 | 169.9 | 176.7 |
| 9⅝       | 277.00| 70.0  | 76.0  | 82.0  | 88.0  | 94.0  | 100.0 | 106.0 | 112.0 | 118.0 | 124.0 | 130.0 | 136.0 | 142.0 | 148.0 | 154.0 | 160.0 | 166.0 | 172.0 | 178.0 |
| 10¾      | 335.58| 85.0  | 93.0  | 100.0 | 107.0 | 114.0 | 121.0 | 128.0 | 135.0 | 142.0 | 149.0 | 156.0 | 163.0 | 170.0 | 177.0 | 184.0 | 191.0 | 198.0 | 205.0 | 212.0 |

#### ERW casing manufacturing process

1. Coils examination
2. Strips slitting
3. Uncoiling, leveling and shearing
4. Welding
5. Looper
6. Skelp forming
7. HF welding
8. Inside & Outside weld bead removal
9. UT of weld
10. Seam-annealing
11. Sizing
12. Cutting to length
13. Entire heat treatment (upon agreement)
14. Straightening
15. Facing & beveling
16. UT of pipe ends
17. UT of pipe body
18. Threading
19. MPI of thread, visual inspection of geometry
20. Coupling manufacturing
21. Coupling
22. Coupling Screwing-on
23. Hidrostatic test
24. UT of body, weld of pipe
25. Protector Screwing-on
26. Weighing and length measuring
27. Marking & Stamping
28. Final Inspection
29. Packaging
Large Diameter Pipes
Large Diameter Pipes

LDPs are manufactured by Vyksa Steel Works, one of the key plants within OMK.

Product range:
- SAWL pipes of 508 - 1422 mm (20-56"), wall thickness up to 50 mm (1.97"");
- ERW pipes of 508 - 530 mm (20-21").

Standard length of all pipes is from 11.6 to 12.2 m (38 – 40 ft).

At customer’s request, VSW will supply pipes with external three- and two-layer anti-corrosive coating and internal flow or anti-corrosive coating. Pipes are certified by American Petroleum Institute according to API Spec 5L (License No. 5L-0276) ISO and according to Shell requirements.

In 2007 a compliance certificate was issued for VSW’s products according to Det Norske Veritas requirements. DNV-OS-F101 standard for offshore pipeline systems. This allowed OMK to win an international tender for supply of 280 thousand tons of pipes with diameter of 1220 mm (48") and wall thickness 30.9, 34.6 and 41.0 mm (1.2", 1.4", 1.6") in 2008-2009 to construct an offshore section of the Nord Stream gas pipeline on the Baltic Sea bed. Currently VSW has won a tender for supply of 440 thousand tons of pipes with diameter of 813 mm (32") and wall thickness 39 mm for an offshore section of the South Stream Project (1,2 lines) gas pipeline on the Black Sea bed, and has already started deliveries.

Basic Equipment
Pipes are produced on two separate lines using different production methods – UOE Line and JCO Line. Pipes can be made with either one or two longitudinal welds.

UOE Line
Produces pipes with diameter of 508 - 1067 mm (20-42") and wall thickness from 8 to 32 mm (0.28-1.26"), strength grade X80. Design capacity is 1012 thousand tons of pipes per year.

JCO Line
Produces pipes with diameter of 508 - 1422 mm (20-56") and wall thickness from 8 to 48 mm (0.28-1.89"), strength grade up to X100, and working pressure up to 24.7 MPa (250 atm.). Design capacity is 950 thousand tons of pipes per year.

Product range and scope of application

<table>
<thead>
<tr>
<th>Standard</th>
<th>Outside dia., inches (mm)</th>
<th>Wall thickness, mm</th>
<th>Steel grade</th>
<th>Scope of application</th>
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<tbody>
<tr>
<td>API Spec 5L/ISO 3183</td>
<td>20&quot; (508) - 56&quot; (1422)</td>
<td>8.0 - 48.0</td>
<td>Straight class G.B - X100 Steel L245 - L555</td>
<td>For construction of gas and oil pipelines, water, and gas industry</td>
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<tr>
<td>DNV-OS-F101</td>
<td>20&quot; (508) - 56&quot; (1422)</td>
<td>8.0 - 48.0</td>
<td>Steel L245 - L555</td>
<td>Subsea pipe systems used in the oil and gas sector</td>
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<td>DIN 10217</td>
<td>23&quot; (508) - 54&quot; (1422)</td>
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<td>Steel P235 - P265</td>
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<td>DIN 10219</td>
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<td>8.0 - 40.0</td>
<td>Steel S235 - S460</td>
<td>Multi-purpose pipes</td>
</tr>
</tbody>
</table>

Producing mill: Vyksa Steel Works
### Large Diameter Pipes

**Production of large diameter SAWL pipes**

- Longitudinal electric-welded large diameter pipes are manufactured by submerged arc welding (SAW).
- At present large diameter pipes can be manufactured by two independent lines having different pipe forming processes: UOE and JCO.

#### API Spec 5L, ISO 3183

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<thead>
<tr>
<th>Diameter (inch)</th>
<th>Diameter (mm)</th>
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<td>22</td>
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<td>56</td>
<td>1422.0</td>
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</tbody>
</table>

- **UOE and JCO process**: pipes are manufactured from В, X42, X46, X52, X56, X60, X65, X70, X80 (API Spec 5L) and L245, L290, L360, L415, L450, L485, L 555 (ISO 3183) grades.
- **JCO process**: pipes are manufactured from В, X42, X46, X52, X56, X60, X65, X70, X80 (API Spec 5L) and L245, L290, L360, L415, L450, L485, L 555 (ISO 3183) grades.

#### LDP manufacturing process flow (UOE)

1. Plate piling
2. Unpiling
3. Plate leveling
4. Plate dimensional examination and UT
5. TAB Welding-up
6. Edge trimming
7. Edges quality control
8. Edge crimping
9. U-forming
10. O-forming
11. Pipe marking
12. Water flushing
13. Hot drying
14. Tack welding
15. Inside welding
16. Outside welding
17. AUT of weld
18. X-Ray TV testing
19. MUT, Visual examination & repair
20. Tab removal
21. Expansion of pipe body
22. Inside and outside weld bead removal on pipe ends
23. Hydrostatic test
24. Weld final AUT
25. AUT of pipe ends
26. X-Ray TV testing of pipe end welds
27. Facing
28. MPI of pipe ends
29. Final inspection
30. Marking
31. Product storage
Large Diameter Pipes

LDP manufacturing process flow (JCO)

1. Plate piling
2. Unpiling
3. Plate dimensional examination and UT
4. TAB Welding-up
5. Edge trimming
6. Edge crimping
7. JCO-forming
8. Water flushing
9. Hot drying
10. Tack welding
11. Inside welding
12. Outside welding
13. AUT of weld
14. X-Ray TV testing
15. MUT, Visual examination & repair
16. Tab removal
17. Expansion of pipe body
18. Inside and outside weld bead removal on pipe ends
19. Facing
20. Hidrostatic test
21. AUT of pipe ends
22. X-Ray TV testing
23. Facing
24. MPI of pipe ends
25. Final inspection & marking
26. Product storage

Anti-corrosive Pipe Coating
Anti-corrosive Pipe Coating

VSW has been producing pipes with external three- and two-layer polyethylene, polypropylene and epoxy anti-corrosion coating since 2000. In 2005 production of pipes with internal flow and anticorrosive coating was started.

External anti-corrosion coating is designed for corrosion protection of oil and gas pipelines, pipe-lines of compressor, gas distribution and pumping stations. Pipes with external three-layer coating are used for pipeline construction, in transition areas by directional drilling with dragging of pipe strings through wells, during production of cold bends, with pipeline installed in soils with inclusions of pebbles, gravel and in rocky soils.

Pipes with external coating produced by the plant are designed for construction of pipelines in different climate and soil conditions with ambient temperature ranging from minus 45°C to plus 60°C for polyethylene coating and from minus 30°C to plus 60°C for polypropylene coating. Temperature of continuous pipe operation is from minus 20°C to plus 80°C for polyethylene coating and from minus 20°C to plus 110°C for polypropylene coating. The minimum service life of the protective coating is 30 years.

Pipes with one- and two-layer epoxy coating are used for construction of oil and gas underground pipelines, water pipelines and utility networks. Pipes with one- and two-layer epoxy coating can be stored from minus 60°C to plus 60°C, transported, constructed and installed - from minus 60°C to plus 60°C. Operating range is from minus 60°C to plus 80°C for two-layer coated pipes, and from minus 60° to plus 110°C for one-layer coatings.

Two-layer coating has increased impact and abrasive resistance.

Today external and internal coatings are applied on six process lines with high-tech equipment:

- 3 lines for three- and two-layer coatings on pipes with diameter of 508-1422 mm (20-56”);
- 1 line for external three- and two-layer coatings on pipes with diameter of 219-1220 mm (8⅝-48”);
- 1 line for external three- and two-layer coatings on pipes with diameter of 219-508 mm (8⅝-20”);
- 1 line for internal flow and anti-corrosive coatings on pipes with diameter of 273-1422 mm (10⅝-56”).

At the coating areas the following procedures are used according to ISO 14001:

- incoming inspection of pipes and materials used for pipe coating;
- check of parameters of production and secondary processes;
- acceptance and periodic tests of anti-corrosive coatings;
- quality certificate issued for each pipe batch.
Anti-corrosive Pipe Coating

Technical characteristics of pipe coating

<table>
<thead>
<tr>
<th>Standard</th>
<th>Pipe diameter, mm</th>
<th>Application description</th>
<th>Allowable temperature for coating long-term service °C</th>
<th>Allowable pipe storage temperature °C</th>
<th>Coating structure</th>
<th>Coating thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN 30670</td>
<td>57 - 1420</td>
<td>Pipeline steel surface corrosion protection. For onshore and offshore pipelines.</td>
<td>From minus 60 °C up to plus 50 °C</td>
<td>Normal performance</td>
<td>From minus 60 °C up to plus 70 °C</td>
<td>External two-layer/ three-layer polyethylene</td>
</tr>
<tr>
<td>NFA 49710</td>
<td>219 - 1420</td>
<td>Corrosion protection of offshore pipelines.</td>
<td>From minus 60 °C up to plus 50 °C</td>
<td>Normal performance</td>
<td>From minus 60 °C up to plus 70 °C</td>
<td>External two-layer/ three-layer polyethylene</td>
</tr>
<tr>
<td>CAN/CSA Z 245/21-02</td>
<td>219 - 1420</td>
<td>Corrosion protection of onshore and offshore pipelines. For oil and gas transportation.</td>
<td>From minus 60 °C up to plus 50 °C</td>
<td>Normal performance</td>
<td>From minus 60 °C up to plus 70 °C</td>
<td>External three-layer polyethylene</td>
</tr>
<tr>
<td>Shell DDP 31.40.30.31-Gen</td>
<td>508 - 1420</td>
<td>Corrosion protection of onshore and offshore pipelines. For oil and gas transportation.</td>
<td>From minus 60 °C up to plus 50 °C</td>
<td>Normal performance</td>
<td>From minus 60 °C up to plus 70 °C</td>
<td>External three-layer polyethylene</td>
</tr>
<tr>
<td>DNV RP-106</td>
<td>508-1420</td>
<td>For offshore pipelines.</td>
<td>According to Customer’s requirements</td>
<td>According to Customer’s requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIN 30678</td>
<td>219 - 1420</td>
<td>Pipeline steel surface corrosion protection. For onshore and offshore pipelines.</td>
<td>From minus 20 °C up to plus 100 °C</td>
<td>Normal performance</td>
<td>From minus 60 °C up to plus 70 °C</td>
<td>External three-layer polyethylene</td>
</tr>
<tr>
<td>NFA-4911</td>
<td>219 - 1420</td>
<td>Corrosion protection of onshore and offshore pipelines. For oil and gas transportation.</td>
<td>From minus 20 °C up to plus 100 °C</td>
<td>Normal performance</td>
<td>From minus 60 °C up to plus 70 °C</td>
<td>External three-layer polyethylene</td>
</tr>
<tr>
<td>Projects and tenders</td>
<td>219-530</td>
<td>For onshore pipelines.</td>
<td>From minus 60 °C up to plus 80 °C</td>
<td>Normal performance</td>
<td>From minus 60 °C up to plus 70 °C</td>
<td>External two-layer/ three-layer flow coating up to 1400 microns</td>
</tr>
<tr>
<td>API SLL 3 (BPPU)</td>
<td>508 - 1420</td>
<td>Internal flow coating of pipes for non-corrosive gas transportation.</td>
<td>From minus 20 °C up to plus 110 °C</td>
<td>Normal performance</td>
<td>From minus 20 °C up to plus 70 °C</td>
<td>Internal flow coating</td>
</tr>
<tr>
<td>ISO 15741</td>
<td>508 - 1420</td>
<td>Internal flow coating of onshore and offshore pipes for transportation of non-corrosive gases.</td>
<td>From minus 20 °C up to plus 110 °C</td>
<td>Normal performance</td>
<td>From minus 20 °C up to plus 70 °C</td>
<td>Internal flow, up to plus 110 °C</td>
</tr>
</tbody>
</table>

Anti-corrosive coating application process flow

1. Inspection of external pipe surface quality
2. Pipe drying
3. Shot blasting of external pipe surface
4. Inspection of blasting quality
5. Gas preheating of pipes
6. Chromating of external pipe surface
7. Inductive heating
8. Application of epoxy powder
9. Application of adhesive and PE by side extrusion
10. Water cooling of coated pipes
11. Inspection for discontinuities
12. Coated pipe end stripping
13. Acceptance tests, coated pipe marking

Internal coating application process

1. Pipe quality control (internal surface)
2. Internal surface cleaning and washing
3. Preheating
4. Internal surface shot-blasting
5. Coating application
6. Precuring/final curing
7. Quality control / acceptance test / pipe marking
OMK has been supplying casing and line pipes to the US market since 2003. In 2011, the company acquired Tubular Solutions, Inc., a processing and finishing facility of OCTG pipe, which has been operating on the market since 2006. Having domestic tubing and casing production facilities will allow OMK to expand its presence in North America.

Constructing and commissioning a new ERW pipe mill was performed in less than 10 months, from March through December 2012. The mill is designed to produce over 200,000 tons per year of oil & gas pipes with OD 2 3/8” - 7” and up to .500” wall thickness. The plant uses advanced equipment by Nakata (Japan).

OMK Tube mill site sits on 75 acres, with an access railroad, and just 3 miles away from our pipe processing facilities. Relative proximity of these production facilities minimizes the lead time from order placement to production of finished pipes.

Starting up this plant, OMK creates opportunity to serve our customers more efficiently: coils supplier - pipe producer - finishing processor - distributors/end-users.

The facilities of "OMK TUBE, Inc" include:

- OCTG and Line Pipe producing mill
  - Mill capacity: 200,000 t/year.
  - Products: casings, tubing and line pipes from carbon and low-alloyed steel according to API 5CT, API 5L.
  - Outside diameter of pipes: min 2⅜”; max 7”
  - Wall thickness: min 0.118”; max 0.500”
  - Pipe length: 20’ - 65’
  - Gas and Induction heat-treat line - 2⅜” - 9½”, 4.70 - 48.00#, 90,000 t/yr
  - 4 Threading lines - 2⅜” - 9¼
  - 2 Upsetting lines - 2⅜” - 4½
  - Two hydraulic testing units
  - Strength grades: J55; K55; N80; L80; L80HC; P110; P110HC; Grade B - X70

Quality Management System (QMS) is put in place at all OMK enterprises and serves as the basis.

For the global process management, QMS is consistent with:

- API Specification Q1.
- DNV OS.
**OMK TUBE**

**Product range:** OCTG tubing & casing
- Sizes: ranging from 2⅜” - 9½” (2⅜” - 7” OMK Tube manufacturing, 4⅝” - 9½” Vyksa Steel Works)
- Grades: J55, K55, N80, L80, L80HC P110, P110HC
- End Finishes: NUE T&C, EUE T&C, PE, STC, LTC, BTC
- Specifications: API 5CT
- Product specification levels: PSL 1, PSL 2
- Casing: 4½” - 9½”
- Tubing: 2⅜” - 4½”

**API SCT casing and tubing dimensions**

<table>
<thead>
<tr>
<th>Diam. (in)</th>
<th>wall thickness (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OD</td>
<td>Schedule</td>
</tr>
<tr>
<td>2⅜”</td>
<td>0.180</td>
</tr>
<tr>
<td>3⅜”</td>
<td>0.217</td>
</tr>
<tr>
<td>4⅝”</td>
<td>0.250</td>
</tr>
<tr>
<td>5⅛”</td>
<td>0.317</td>
</tr>
<tr>
<td>5⅜”</td>
<td>0.350</td>
</tr>
<tr>
<td>6⅞”</td>
<td>0.437</td>
</tr>
<tr>
<td>7⅛”</td>
<td>0.500</td>
</tr>
<tr>
<td>7⅜”</td>
<td>0.562</td>
</tr>
<tr>
<td>8⅛”</td>
<td>0.687</td>
</tr>
<tr>
<td>8⅜”</td>
<td>0.750</td>
</tr>
<tr>
<td>9⅛”</td>
<td>0.875</td>
</tr>
<tr>
<td>9⅜”</td>
<td>1.000</td>
</tr>
</tbody>
</table>

**API 5L line pipe dimensions**

<table>
<thead>
<tr>
<th>Size</th>
<th>wt. in lb/ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0.065</td>
</tr>
<tr>
<td>3½</td>
<td>0.083</td>
</tr>
<tr>
<td>4½</td>
<td>0.109</td>
</tr>
<tr>
<td>5½</td>
<td>0.120</td>
</tr>
<tr>
<td>6½</td>
<td>0.148</td>
</tr>
</tbody>
</table>

**OMK TUBE**

**Product range:** Line pipe
- Grades: B-X80
- Length: DRL & TRL up to 65 ft.

**Pipe Production Catalogue**
- Producing mill: OMK Tube - ERW Tubing
- Producing mill: Vyksa Steel Works - ERW Surface Casing

**Table 1:**

<table>
<thead>
<tr>
<th>Size (in)</th>
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<tr>
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<tr>
<td>5½</td>
<td>0.120</td>
</tr>
<tr>
<td>6½</td>
<td>0.148</td>
</tr>
</tbody>
</table>

**Table 2:**

<table>
<thead>
<tr>
<th>Size (in)</th>
<th>wt. in lb/ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0.065</td>
</tr>
<tr>
<td>3½</td>
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<tr>
<td>5½</td>
<td>0.120</td>
</tr>
<tr>
<td>6½</td>
<td>0.148</td>
</tr>
</tbody>
</table>
ERW casing manufacturing process flow

1. Coils examination
2. Strips slitting
3. Uncoiling, leveling and shearing
4. Welding
5. Looper
6. Skelp forming
7. HF welding
8. Inside & Outside weld bead removal
9. UT of weld
10. Seam-annealing
11. Sizing
12. Cutting to length
13. Entire heat treatment (upon agreement)
14. Straightening
15. Facing & beveling
16. Pipe body UT
17. Threading
18. MPI of thread, visual inspection of geometry
19. Coupling manufacturing
20. Coupling
21. Coupling Screwing-on
22. Hydrostatic test
23. Protector Screwing-on
24. Weighing and length measuring
25. Marking & Stamping
26. Final Inspection
27. Packaging
Trubodetal is one of the major producers of pipe fittings from carbon and low-alloyed steel grades with diameter 57 - 1420 mm (2-56") in Russia and CIS. The plant is one of the key suppliers for oil and gas utility lines construction as well as for trunk systems.

Steel grades: 20, 09G2C, 20A, 20ФА, 09Г2Ф, 09ФА, 08ХМФА, 13ХФА, 15ХФА, 15ХМФА, 20ХФА, 09Г2ФБЮ, 10Г2СФБ, 06Г1НМФБД.

Trubodetal’s product range:
- elbows - bends, short radius bends, forged and welded bends
- T-pieces - forged, forged and welded;
- hot induction bends;
- reducers and reducing rings;
- caps and bottoms;
- pipeline assemblies;
- stabilizer couplings;
- piping supports;
- manhole hatches, charging chambers;
- nonconventional products;
- corrosion resistant coatings and heat insulation.

The company is a key supplier of components for construction of oil and gas pipelines and utility systems.

The Company is capable of producing up to 60,000 tons of pipe fittings per year.

All Company’s products are provided with API, ISO and GOST R certificates, and meet the requirements of ISO 9001, ISO 14001.
Pipe Valves

Blagoveshchensk Valves Plant is one of the major Russian producer of pipe valves.

The plant produces industrial-grade pipe fittings and uses a complete technological cycle - starting from billets to assembling, testing and quality control of finished products.

BVP’s primary product is pipe valves from carbon, low-alloyed and stainless steel grades, with nominal diameter 25 to 800 mm and nominal pressure 16 to 250 kgf/cm².

**BVP products:**
- cast taper-seat valves;
- spring safety valves;
- change-over valves;
- safety valve units with change-over valves;
- swing check valves;
- TPP fittings;
- API fittings;
- direct-flow gate valves;
- X-tee assemblies;
- ball valves.

BVP’s customers include Russian gas and oil producers and oil processing companies: Gazprom, Rosnefy, Lukoil, Bashneft, Surgutneftegaz, Transneft, Tatneft and others.

Supplies are made to the bordering countries: Ukraine, Byelorussia, Kazakhstan, Turkmenistan and Uzbekistan.
Steel Rolling Mills
Casting and Rolling Complex

Process Flow

Casting and rolling complex consists of two main shops: meltshop and Hot Strip Mill.

Meltshop includes the following main technological equipment:
- Electric Arc Furnace EAF-160/190 with tapping weight of 160 t.
- Two-position Ladle-Furnace.
- Twin-tank Vacuum Degasser.
- Single strand thin slab caster — to produce slabs with the following specifications: width — 830÷1830 mm, thickness 90 mm and 70 mm.

Hot Strip Mill includes the following main technological equipment:
- Tunnel Furnace.
- Roughing Mill.
- Heat Transfer Table.
- Finishing Mill.
- Laminar Cooling.
- Cutting, repositioning, weighing, marking and stripping area.
- Cutting and Slitting area.

Equipment Items:
1. Ladle turret
2. Tundish
3. Casting mold
4. Secondary cooling
5. Soft dynamic reduction
6. Decoiler
7. Rotary shears
8. Tunnel furnace
9. Shuttle section
10. Roughing stands
11. Bleach cooling
12. Heatedtransfer table
13. Crop shears
14. Descaler
15. Finishing stands
16. Laminar cooling
17. Laminar cooling
18. Downcoiler
19. Descale roller
20. Rotary shears
21. Tunnel furnace
22. Shuttle section
23. Roughing stands
24. Bleach cooling
25. Heated transfer table
26. Crop shears
27. Descaler
28. Finishing stands
29. Laminar cooling
30. Laminar cooling
31. Slitter
Casting and Rolling Complex

The Casting and Rolling Complex is capable of producing sheets of 1 to 12.7 mm thick and width up to 1750mm.

Production capacity of the complex amounts to 1.2 million tons of hot-rolled coils per year.

Steel grades:
- 09Г2С; 09Г2Д; 22ГЮ; 20; Ст3сп; Ст3пс; 09ГСФ; К55; К52; 17Г1С-У; Ст2пс; Ст1сп; 20КСХ; 13ХФА; 10; 08; 10Г2ФБЮ; 10ХСНД; 15ХСНД; S355JR; S275JR; S235JR; Х42-Х70 по API 5L; J55 по API 5CT; S235JR; SAE 1006 по ASTM.

The main supplier of process equipment is the Italian company Danieli&C.

The Complex was put into operation in October 2008.

Process flow

- Reheat furnaces
- Descaler
- Four-high stand (12 000 tons force)
- Preliminary leveling machine
- Accelerated cooling unit with high-pressure and low-pressure sections
- Hot Plate Leveler (4 000 tons force)
- Disc cooling bed
- Retarded cooling section of plates
- Cold Plate Leveler (4 000 tons force)
- Inspection platform with titling cradle
- Plate ultrasonic control unit
- Double side-trimming shears and slitting shears
- Dividing shears
- Pull-over gear

Heavy Plate Mill-5000

Heavy Plate Mill-5000 is designed to produce hot-rolled coils in a thickness range of 5 to 50 mm.

- Production line: 5 000 000 tons per year.
- Production capacity: 5 000 000 tons per year.
- Steel grades: S235JR, S355JR, S450JR.
- Equipment: Reheating furnaces, high-pressure and low-pressure sections, plate leveling and several types of shears.
Wide plates produced by Mill-5000 are designed for large diameter pipes production for construction of oil-and-gas pipelines. Mill-5000 products can be used for pipes and steel structures for drilling platforms, ship building, mechanical engineering, atomic power engineering and other metal consuming sectors.

The Complex capacity equals to 1.2 mln tpy of wide plates.

- Width: 900—4850 mm.
- Thickness: 7—150 mm.
- Steel grades:
  - pipe steel of К52–К80, Х42–X120 grades.
  - steel grades with high corrosion resistance.
  - high-strength and wear-resisting steels.

The main supplier of processing equipment is "SMS Siemag" Company, Germany.

Heavy Plate Mill-5000 was commissioned in 2011.