The “Uralmashplant” JSC, is a key equipment supplier for basic industry sectors: mining, metallurgical, and oil-and-gas industries.

In 2013 the “Uralmashplant” marked its 80s anniversary.

The main shareholder of the “Uralmashplant” is the “Gazprombank” JSC, one of the three largest Russian banks.

Today, the “Uralmashplant” JSC is a company providing the state-of-the-art engineering, welding, metal-working, mechanical assembly, and tool production works.

Main product assortment includes:

### Mining equipment
- walking and track-type draglines,
- track-type open-mine excavators,
- cone and jaw crushers for all crushing stages,
- ball and rod grinding mills, semiautogenous and autogenous grinding mills,
- concrete-production equipment.

### Metallurgical equipment
- sintering equipment,
- indurating equipment,
- blast furnace equipment,
- continuous casting machines,
- rolling equipment,
- press-forging equipment,
- rolling mill rolls

### Oil-and-gas drilling equipment
- complete movable, stationary, and cluster drilling rigs with loading capacity from 160 to 600 tons,
- drilling equipment packages.

### Handling equipment
- heavy cranes for metallurgical works,
- handling equipment for nuclear plants,
- general purpose special and bridge cranes.

### Power equipment and nonstandard equipment
- hydraulic turbine units,
- transfer and homogenizing equipment units.

A company development strategy is aimed at creating a world-class machine-building company able to fully fulfill customers’ needs for modern equipment.
The first in the USSR rolls for hot-rolling mills were produced from ingots weighing up to 40 tons at Uralmashplant in 1934. The plant began producing large ingots, weighing 60 tons and more, in 1935-1936, which allowed to manufacture large backup rolls for rolling mills.

Because of exceptionally high requirements to the quality of metal used for production of cold mill rolls, re-tooling and modernization of the production plant were carried out by the 1940. Since then, rolls for cold-rolling mills have become an integral part of Uralmashplant’s assortment.

Uralmashplant is rated among the leaders at the world’s roll market due to renovated production capacities.

Based on the manufacturing facilities, the plant has mastered production of a new type of rolls with 3 to 5 percent Cr content, as well as higher content of alloying elements, which allows to make the service life of rolls 1.5 to 2 times longer.
## Rolls for Hot-rolling Mills Specifications

<table>
<thead>
<tr>
<th>Roll type</th>
<th>Barrel size, mm</th>
<th>Material</th>
<th>Maximum barrel/neck hardness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Max. Dia.</td>
<td>Max. Length</td>
<td></td>
</tr>
<tr>
<td>Work Rolls for Sheet Mills</td>
<td>1500</td>
<td>4500</td>
<td>50, 55X, 60XH, 75XMФ, 150XHM</td>
</tr>
<tr>
<td>Backup Rolls for Sheet Mills</td>
<td>1600</td>
<td>3030</td>
<td>60XH, 75XMФ, 75X2MF, 45X5MF, 75X3MF1</td>
</tr>
<tr>
<td>Rolls for Blooming and Slabbing Mills</td>
<td>1700</td>
<td>2800</td>
<td>50, 50XH, 60XH, 75XMФ, 90XMФ</td>
</tr>
<tr>
<td>Rolls for Billet Mills</td>
<td>1290</td>
<td>2060</td>
<td>50, 50XH, 60XH</td>
</tr>
<tr>
<td>Rolls for Rail-and-structural Mills</td>
<td>1565</td>
<td>2850</td>
<td>50, 55X, 60XH, 75XMФ, 75XMФА</td>
</tr>
<tr>
<td>Rolls for Section and Bar Mills</td>
<td>1400</td>
<td>2300</td>
<td>45, 50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>50XH, 60XH, 150XHM, 56NiCrMoV7</td>
</tr>
<tr>
<td>Vertical rolls for sheet mills</td>
<td>1200</td>
<td>900</td>
<td>55X, 50XH, 60XH, 150XHM, 75XMФА</td>
</tr>
<tr>
<td>Roll Seeves</td>
<td>1600</td>
<td>2400</td>
<td>60XH, 90XФ, 5XHM2, 150XHM</td>
</tr>
<tr>
<td>Rolls for Tubular Mills</td>
<td>875</td>
<td>1000</td>
<td>55X, 50XH</td>
</tr>
</tbody>
</table>
**Rolls for Cold-rolling Mills. Specifications**

<table>
<thead>
<tr>
<th>Roll type</th>
<th>Barrel size, mm</th>
<th>Material</th>
<th>Maximum barrel/neck hardness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Rolls for Rolling, Tempering and Reversing Mills</td>
<td>Max. Dia.</td>
<td>Max. Length</td>
<td></td>
</tr>
<tr>
<td></td>
<td>440-500, 585-615</td>
<td>2500</td>
<td>9X2, 9X2МФ, 8X2СГФ, 8X3СГФ, 65Х5МФС, Klesid unit hardening and Power Current 700М unit hardening</td>
</tr>
<tr>
<td></td>
<td>185-700</td>
<td>2800</td>
<td></td>
</tr>
<tr>
<td>Backup rolls for rolling, tempering and reversing mills</td>
<td>650-1600</td>
<td>4000</td>
<td>75ХМФ, 90ХФ, 75Х2МФ, 75Х3МФА, 45Х5МФ, EBR 42 и others</td>
</tr>
<tr>
<td></td>
<td>400-1100</td>
<td>2000</td>
<td>70…75 / 30…55 HSD</td>
</tr>
<tr>
<td>Rollers</td>
<td>185-440</td>
<td>2800</td>
<td>85…102 / 30…55 HSD</td>
</tr>
</tbody>
</table>

**Note**

For hardness testing, Brinell (HB), Shore (HSD, HSC), and Equotype testers (HLE, HLD, HLG) are available with Uralmashplant.

After power current hardening the depth of the working surface is no less than:
- Work rolls for Cold-rolling Mills of 9X1, 9X2, 9X2МФ, 8X2СГФ steel grades – 22 mm; 8X3СГФ – 30 mm
- Backup rolls for Cold-rolling Mills of 90ХФ, 75ХМФ, 75Х2МФ steel grades – 50 mm; 75Х3МФА – 55 mm; 45Х5МФ, EBR 42 – 100 mm on radius.

Hardness variation along the roll barrel length is within 2-3 HSD.
Built-up (sleeved) backup rolls

Sleeves contribute to improvement of material utilization, since the material of sleeves is mostly consumed, and the roll shafts are used more than once. With roll shafts being re-used 3-5 times, the coefficient of material consumption for sleeved rolls is 2-5 times as low as for solid forged rolls.

A built-up (sleeved) roll consists of a steel shaft and a sleeve.

The fundamental advantage of built-up rolls is that sleeves of highly durable materials can be used.

Forged, and especially high-carbon cast structure, changing due to heat treatment and a large quantity of alloying element carbides, provides for high and uniform hardness and wear-resistance.

Longevity of sleeved rolls is 2-3 times as high as that of solid-forged rolls.

**Design features**

- The sleeve makes the working surface 2 or more times thicker
- Roll spindle can be used more than once

**Guaranteed features of built-up (sleeved) backup rolls**

- Required uniform hardness of the sleeve
- Reliability of sleeve fit on the shaft
- No tendency towards cracking or barrel spalling
- No metallurgical or structural defects
- Minimal level of residual stress
- No design flaws impairing the roll performance
Forged steel rolls for Hot-rolling Mills

Blooming, slabbing and breakdown mills, as well as roughing stands of section and structural mills require that the rolls endure high temperatures and heavy dynamic loads.

Solid-forged rolls made of carbon tool steels are characterized by high hardness and wear-resistance. Depending on the service conditions, heat checking resistance is provided by complex alloying using either chromium, molybdenum, or vanadium.

**Design features**

Roll ends can be made in the form of tenons, flat (fork type), cylindrical (with splines or key grooves).

**Guaranteed features of forged steel rolls for hot-rolling mills**

- High wear-resistance
- Slight tendency towards heat checking
- High resistance to surface spalling, especially under conditions of high and unevenly distributed pressure on the roll barrel surface.
Solid-forged backup rolls for Cold- and Hot-rolling Mills

Rolls are the primary tool for shaping the material, setting the roll final dimensions, surface finish and mechanical properties.

Depending on the service conditions, the strength of backup rolls is achieved thanks to complex alloying using chromium, molybdenum, vanadium, etc.

The roll metal quality is inspected by means of ultrasonic flaw detectors at all main manufacturing stages.

Design features

- Carbon steels, high-carbon tool steels and alloyed steels are used to ensure high hardness and wear-resistance of rolls
- All backup rolls are made of vacuum degassed steel.

Guaranteed features of solid-forged backup rolls for cold- and hot-rolling mills

- High and uniform hardness after power current hardening (within 1-2 HSD over the barrel)
- Effective layer depth is min. 40–100mm over the radius
- High strength of the roll material combined with ductility
- No tendency towards cracking or barrel surface spalling
- Absence of metallurgical and structural defects
- Minimal level of residual stress
- No design flaws impairing the roll performance
Forced steel work rolls for Cold-rolling Mills

Work rolls for cold rolling are made of alloyed steels.

The complex of heat treatment provides for the necessary mechanical properties of the hardened layer due to creating a uniform fine-grain structure.

Final stabilizing heat treatment is intended to reduce and equalize the residual thermal stresses.

Guaranteed features of forged steel work rolls for cold rolling

- High and uniform hardness after hardening (within 1-2 HSD over the barrel)
- Effective layer depth over the radius (20-40 mm)
- High thermal fatigue resistance during overall and local heat-up, increased heat resistance (high hardness is maintained for a long time under steady-state thermal conditions of the roll);
- High surface quality after heat treatment and machining
- Favourable distribution and minimal value of residual stresses after hardening and machining
- Absence of metallurgical defects and impurities
- Absence of flakes, coarse carbide clusters, carbide network, large-pattern acicular martensite and other macro- and microstructural defects
- Absence of machining defects
Quality control

Quality control during the roll manufacture is carried out at every stage of the workflow.

Main control operations

- Chemical composition of steel – by heat sampling
- Roll surface hardness – using the Brinell, Shore and Equotip Hardness testers;
- Roll material quality – visually, by means of ultrasonic and magnetic particle inspection

Surface roughness – by means of comparison to the reference block, or employing the contact method using profilometer-profilograph SURFTEST

Dimensional conformance – using universal and special means and methods of measuring.

Packing and preservation

Packing and preservation methods depend on the contract conditions and on the climatic zone where the rolls are going to be supplied, as well as on the transportation and storage conditions.

The items ready to be shipped are covered with a preservative coating – several layers of primer and enamel.

The roll necks are wrapped into anticorrosive paper with polyethylene coating and into waterproof paper.

After preservation the roll barrel and necks are covered with wooden bars or sheet rubber.

The covering is fixed with a steel band, which is locked.

At the customer’s request, work rolls can be packed into wooden cases.

Preservation is valid for 6-12 months if the rolls are stored in a covered building in their transport package.

Storage and service

The rolls should be stored at a non-heated storage, on special shelves, resting on their necks.

Ageing or periodical low tempering is strongly recommended during roll operation life.
Map of Deliveries

URALMASHPLANT

Russia
Belarus
Ukraine
Poland
Germany
Czechia
Hungary
Italy
Macedonia
Bulgaria
Iran
Pakistan
Kazakhstan
India
China
Korea
Indonesia
USA
Spain
Morocco
Algeria
Egypt
France
Germany
Czechia
Hungary
Italy
Belarus
Ukraine
Poland
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