

**INDUSTRY, ENERGY AND  
INFRASTRUCTURES  
RELY ON A SOUL MADE OF STEEL,  
FORGED BY OUR PEOPLE WITH  
PASSION, SKILL AND INNOVATION.**

**AN EXTRAORDINARY STRENGTH  
YOU CAN COUNT ON, TO IMAGINE  
THE FUTURE.**



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**FORGED BACK UP  
ROLLS FOR  
STEEL INDUSTRY**

**FORGED BACK UP  
AND WORK  
ROLLS FOR  
ALUMINUM  
INDUSTRY**

PRODUCT CATALOGUE



**FORGED BACK UP ROLLS**

**Steel Quality**

The balance of carbon and alloy elements aims to achieve the best compromise among different properties such as hardenability, hardness, toughness and fatigue, and thermal cracking resistance. Selected scraps and modern steel refining processes allow the residuals content to be minimized: typically, sulphur and phosphorus are below 0.01% and H<sub>2</sub> is less than 1 ppm. Ingots are top poured under vacuum. Ingot weight ranges up to 530 t.



**Arvedi AST: a new integrated company, a new force on the market, with a stainless passion for steel.**

Forgings Division, with a production unit which covers an area of 120,000 square metres, manufactures a wide range of forged artefacts, made from high quality steels, produced according to a century of metallurgical experience updated with the most modern processing techniques.

**Dedicated forging cycle**

An optimum forging ratio on the working layer and the necks is obtained thanks to a specific choice of ingot dimensions. Proper heating and plastic deformation parameters allow good physical and metallurgical properties to be achieved throughout the cross-section, especially on the working layer of barrel.

**Machining and Grinding**

Rolls are supplied according to the customer requests. Società delle Fucine can supply the rolls in the machined status or in fully ground surface (Std Ra = 0.8 μm, on demand till 0.4 μm). Both steps are performed using modern numeric control machines

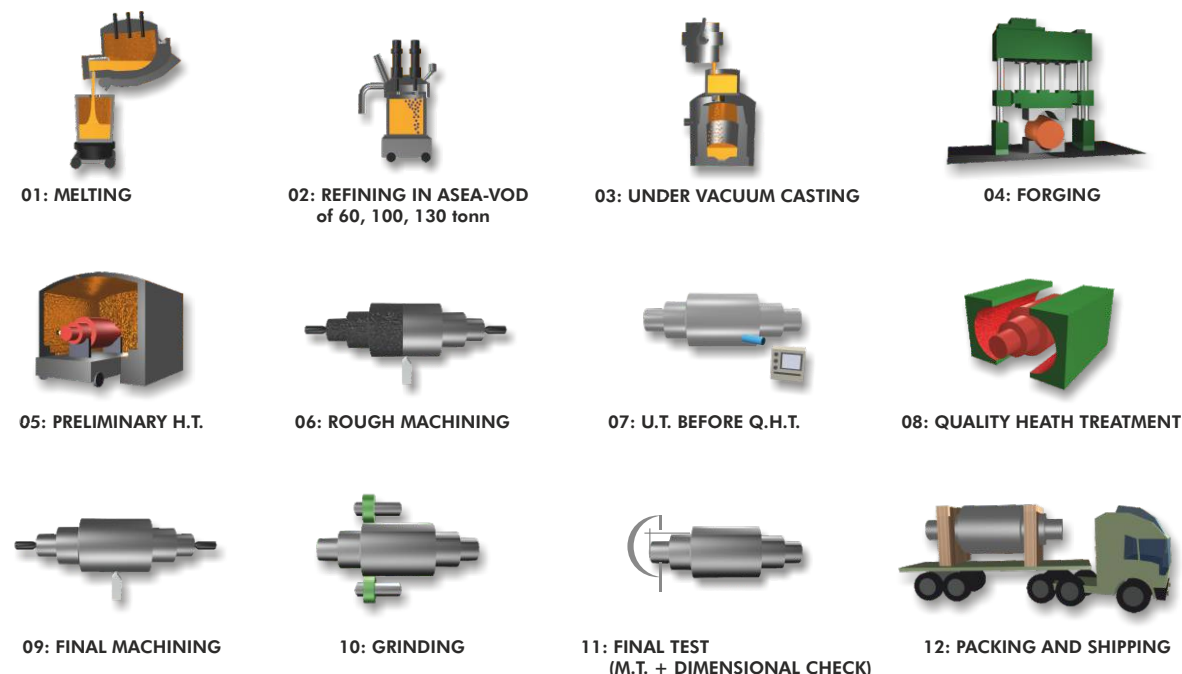
**Hardening process**

In order to obtain a good combination of necks toughness and high hardness on the working layer, the back up rolls are treated only on the barrel, with a special differential hardening equipment. The heat treatment is then performed by austenitizing the working layer in a high-power heating furnace and then by cooling with blown air and spray water. The uniformity of the treatment is guaranteed by keeping the roll in rotation during the process

**FORGED BACK UP ROLLS FOR STEEL AND ALUMINUM INDUSTRY FROM 20 TO 270 METRIC TONS DELIVERED WEIGHT**



**Roll Manufacturing Cycle (flow chart)**



**Typical properties of SDF forged BU Rolls**

In comparison with cast rolls, forged rolls with an equal chemical composition show a better combination of metallurgical and physical properties, such as: a compact porosity-free microstructure, good ductility and toughness values and high resistance to fatigue, wear and thermal cracking. In addition, the uninterrupted fibrosity between body and necks, resulting from metal flow during forging, improves the fatigue resistance of the rolls and prevents the failure of necks from arising. The most significant properties of back up rolls are the following:

Fatigue resistance of necks obtained with a minimum forging reduction of 3 on the cross-section, low hardness (35-45 HSC), high tempering temperature and low residual stresses.

High wear resistance of the working layer as a consequence both of the steel chemical composition, rich in carbide forming elements and of the quality heat treatment performed.

Optimized hardness for specific working conditions, with a wide-range variation, even with the same chemical composition. This is possible thanks to different heat treatment conditions, including differential heating, and blown-air cooling water spray.

High thermal cracking resistance by:

- specific alloy elements addition (Cr- Mo);
- fine and homogeneous microstructure typical of forged steel;
- absence of stress intensity factors, such as porosity, non metallic inclusions and other discontinuities.

High spalling resistance of the working layer (spalling is often obtained with work hardening) with a proper combination of some factors such as:

- good steel micro-cleanliness that prevents local fatigue and thermal cracking notches from taking place
- good material toughness to bear possible cracks caused by rolling accidents
- favourable compressive stresses on the working surface of rolls.