

## High-Speed Steel Rolls for rolling mills: the cost-effective solution to improve rolls lifetime.



**DR-HSS**  
ROLLING MILL  
ROLL SERIES

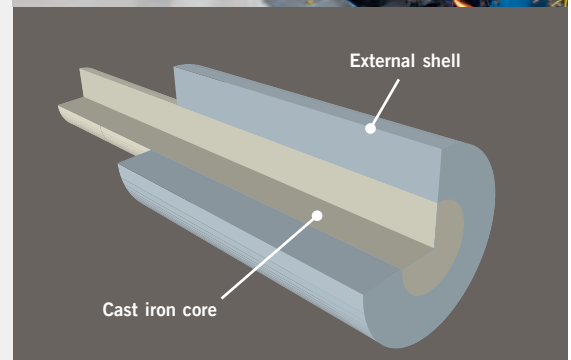
**Danieli offers a variety of High-Speed Steel Rolls to be used on rolling mills. Such rolls provide higher groove lifetime compared with cast iron rolls, as well as higher resistance to thermal or mechanical shocks compared with tungsten carbide rings.**

### Composition

The rolls are composed by an outer layer made of high-carbon and alloy high speed-steel and an inner core layer made of spheroidal graphite cast iron. The rolls are manufactured with the horizontal centrifugal casting technology which grants an homogeneous and fine microstructure. The external layer is characterized by the presence of MC-type primary carbides with high hardness and tempered martensile matrix with high temperature resistance.

### Main features:

- > high and uniform hardness;
- > high resistance to wear abrasion;
- > high resistance to adhesiveness by surface oxide layer;
- > high resistance to heat cracks and thermal stress;
- > fine and uniform structure over the external layer.



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### The utilization of Danieli High-Speed Steel Rolls offers:

- > An increase in roll lifetime compared with standard cast iron rolls (3-5 times bigger) thanks to longer groove lifetime (2-3 times) and reduced redressing thickness (-10 to -50%).
- > Reduction of heat cracks and mechanical impact cracks compared with tungsten carbide rings.
- > Increased rolling campaign time.
- > Better surface finishing.

Danieli High-Speed Steel Rolls can be used on all stands of bar and wire rod mills, in particular on the finishing mill, including dog-bone and slitting stands on slitting process.

Material	Features	Structure
<b>RAR-S</b>	Good wear resistance, good impact and heat crack resistance. This is the standard material suitable on all stands.	Tempered Martensite + Carbides (mainly MC + M7C3)
<b>RAR-H</b>	Improved impact and heat crack resistance, mainly used on slitting passes	Tempered Martensite + Carbides (mainly MC)
<b>RAR-W</b>	Improved wear resistance, mainly used to improve groove lifetime.	Tempered Martensite + Carbides (mainly MC + M7C3)

### Mechanical Properties

Material	Hardness shore C	Tensile strength (kg/mm <sup>2</sup> )	Bending strength (kg/mm <sup>2</sup> )	Elongation (%)
<b>RAR-S</b>	70-85	≈ 90	≈ 250	≈ 0.28
<b>RAR-H</b>	70-85	≈ 90	≈ 250	≈ 0.28
<b>RAR-W</b>	75-85	≈ 85	≈ 220	≈ 0.25

### Chemical composition

Material	C	Si	Mn	Ni	Cr	V+Ti+Nb	Mo+W
<b>RAR-S</b>	1.2-2.3	0.5-1	0.5-1.5	1.5	4-8	3-10	2-8
<b>RAR-H</b>	1-2.5	0.5-1	0.5-1.5	1.5	3-8	3-10	4-10
<b>RAR-W</b>	1.5-2.7	0.5-1	0.5-1.5	1.5	4-10	3-10	1-5

