

MICROALLOYED STEELS FOR COMPLEX COMPONENT GEOMETRIES, VDA 239-100

High-strength steels for cold forming with minimum yield strengths up to 700 MPa

Thermomechanically rolled microalloyed steels cover a wide range of strength. They are characterized by best cold formability and good weldability. The individual strength classes are adjusted essentially by adding microalloying elements such as niobium, titanium and vanadium. These alloying elements can be added individually or in combination and lead to increased strength through grain refinement and precipitation hardening. Microalloyed steels offer the possibility of optimally selecting the materials to conform to component requirements and are thus very well suited to the manufacture of structural and chassis parts.

Convincing advantages

- » Very good cold formability for demanding component geometries
- » Very good suitability for cutting and punching
- » Excellent weldability resulting from low C equivalent
- » Selected grades also available as hot-dip galvanized strip

Chemical composition

Heat analysis in mass %

Steel grade	C max.	Si max.	Mn max.	P max.	S ¹⁾ max.	Al min.	Nb max.	Ti max.	Cu max.
HR300LA(S)	0.12	0.50	1.30	0.030	0.025	0.015	0.10	0.15	0.20
HR340LA(S)	0.12	0.50	1.50	0.030	0.025	0.015	0.10	0.15	0.20
HR380LA(S)	0.12	0.50	1.50	0.030	0.025	0.015	0.10	0.15	0.20
HR420LA(S)	0.12	0.50	1.60	0.030	0.025	0.015	0.10	0.15	0.20
HR460LA(S)	0.12	0.50	1.65	0.030	0.025	0.015	0.10	0.15	0.20
HR500LA(S)	0.12	0.50	1.70	0.030	0.025	0.015	0.10	0.15	0.20
HR550LA(S)	0.12	0.60	1.80	0.030	0.025	0.015	0.10	0.15	0.20
HR700LA(S)	0.12	0.60	2.10	0.030	0.025	0.015	0.10	0.20	0.20

¹⁾The LAS grades contain less sulfur as compared to the standard.

Mechanical properties: Tensile test

Test direction: Longitudinal

$A_{80\text{ mm}}$ for thicknesses < 3 mm

A_5 for thicknesses \geq 3 mm

Steel grade	0,2 % yield strength $R_{p0.2}$ [MPa]	Tensile strength R_m [MPa]	Total elongation [%] min.		n value min. n_{10-20/A_5}
			$A_{80\text{ mm}}$	A_5	
HR300LA(S)	300 – 380	380 – 500	24	28	0.14
HR340LA(S)	340 – 440	420 – 540	22	26	0.13
HR380LA(S)	380 – 480	450 – 570	20	24	-
HR420LA(S)	420 – 520	480 – 600	18	22	-
HR460LA(S)	460 – 560	520 – 640	16	20	-
HR500LA(S)	500 – 620	560 – 700	14	17	-
HR550LA(S)	550 – 670	610 – 750	12	16	-
HR700LA(S)	700 – 850	750 – 950	10	13	-

The hot-rolled, high-strength steels of the LAS series exhibit increased damage tolerance and thus optimum edge elongation by means of grain refinement based on the control of sulfide inclusions. This means that even the most complex component geometries can be produced using sophisticated forming processes.

Coatings and available dimensions

Available thicknesses [mm] based on coating

Steel grade	UC	GI
HR300LA	1.8 – 6.0 ¹⁾	-
HR340LA	1.8 – 6.0	-
HR380LA	1.8 – 6.0 ¹⁾	1.8 – 3.0
HR420LA	1.8 – 6.0	1.8 – 3.0
HR460LA	1.8 – 6.0 ¹⁾	1.8 – 3.0
HR500LA	1.8 – 6.0	1.8 – 3.0 ¹⁾
HR550LA	1.8 – 6.0	1.8 – 3.0 ¹⁾
HR700LA	2.0 – 6.0	2.0 – 3.0
HR300LAS	1.8 – 6.0 ¹⁾	-
HR340LAS	1.8 – 6.0 ¹⁾	-
HR380LAS	1.8 – 6.0 ¹⁾	1.8 – 3.0 ¹⁾
HR420LAS	1.8 – 6.0 ¹⁾	1.8 – 3.0 ¹⁾
HR460LAS	1.8 – 6.0 ¹⁾	1.8 – 3.0 ¹⁾
HR500LAS	1.8 – 6.0 ¹⁾	1.8 – 3.0 ¹⁾
HR550LAS	1.8 – 6.0 ¹⁾	1.8 – 3.0 ¹⁾
HR700LAS	2.0 – 6.0	2.0 – 3.0 ¹⁾

¹⁾After consultation with quality control

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