



## HOT-ROLLED STEEL STRIP FOR THE AUTOMOTIVE INDUSTRY

### A wide range of high-strength hot-rolled steels developed for complex component geometries with demanding forming operations

Hot-rolled steel grades developed for applications in the automotive industry have been combined in the “hot-rolled drive” steel product family. In order to meet the requirements of lightweight automotive design, “hot-rolled drive” grades feature above-average processing properties in addition to the properties specified in VDA 239-100. Microalloyed steels are characterized by a very fine-grained and largely single-phase microstructure. The steels of the LAS series are particularly suitable for the most demanding forming operations along punched edges.

Complex-phase steels, ferritic-bainitic steels and dual-phase steels feature a more pronounced transformation-hardened microstructure with a higher proportion of secondary phases. This leads to a customized balance between total elongation and hole expansion in order to implement complex forming operations.

The hardened microstructure of martensitic steels features maximum tensile strength while maintaining good formability, especially for bending applications.

#### Convincing advantages

- » Excellent suitability for bending and deep drawing
- » Best cutting and punching properties
- » Excellent formability of punched edges and high resistance to edge cracking
- » Excellent weldability



Premium quality  
with reduced carbon footprint

hot-rolled drive  
greentec steel

## Chemical composition

Heat analysis in % by mass

Steel grade	Standard	C max.	Si max.	Mn max.	P max.	S max.	Al min.	Nb max.	Ti max.	Cu max.
<b>Hot-rolled microalloyed steels</b>										
HR300LA	VDA239-100	0.12	0.50	1.30	0.03	0.025	0.015	0.10	0.15	0.20
HR340LA	VDA239-100	0.12	0.50	1.50	0.03	0.025	0.015	0.10	0.15	0.20
HR380LA	VDA239-100	0.12	0.50	1.50	0.03	0.025	0.015	0.10	0.15	0.20
HR420LA	VDA239-100	0.12	0.50	1.60	0.03	0.025	0.015	0.10	0.15	0.20
HR460LA	VDA239-100	0.12	0.50	1.65	0.03	0.025	0.015	0.10	0.15	0.20
HR500LA	VDA239-100	0.12	0.50	1.70	0.03	0.025	0.015	0.10	0.15	0.20
HR550LA	VDA239-100	0.12	0.60	1.80	0.03	0.025	0.015	0.10	0.15	0.20
HR600LA	VDA239-100	0.12	0.60	2.00	0.03	0.025	0.015	0.10	0.20	0.20
HR700LA	VDA239-100	0.12	0.60	2.10	0.03	0.025	0.015	0.10	0.20	0.20

### Hot-rolled and microalloyed steels with improved formability of punched edges

LAS stands for hot-rolled, microalloyed steels with adapted hot-rolling parameters and a significantly reduced sulfur content as compared to standard grades.

HR300LAS	VDA239-100	0.12	0.50	1.30	0.03	<b>0.010</b>	0.015	0.10	0.15	0.20
HR340LAS	VDA239-100	0.12	0.50	1.50	0.03	<b>0.010</b>	0.015	0.10	0.15	0.20
HR380LAS	VDA239-100	0.12	0.50	1.50	0.03	<b>0.010</b>	0.015	0.10	0.15	0.20
HR420LAS	VDA239-100	0.12	0.50	1.60	0.03	<b>0.010</b>	0.015	0.10	0.15	0.20
HR460LAS	VDA239-100	0.12	0.50	1.65	0.03	<b>0.008</b>	0.015	0.10	0.15	0.20
HR500LAS	VDA239-100	0.12	0.50	1.70	0.03	<b>0.005</b>	0.015	0.10	0.15	0.20
HR550LAS	VDA239-100	0.12	0.60	1.80	0.03	<b>0.005</b>	0.015	0.10	0.15	0.20
HR600LAS <sup>1)</sup>	voestalpine	0.12	0.60	2.00	0.03	<b>0.005</b>	0.015	0.10	0.20	0.20
HR700LAS	VDA239-100	0.12	0.60	2.10	0.03	<b>0.005</b>	0.015	0.10	0.20	0.20

Steel grade	Standard	C max.	Si max.	Mn max.	P max.	S max.	Al	Ti + Nb max.	Cr + Mo max.	B max.	Cu max.
<b>Hot-rolled complex-phase steels</b>											
HR660Y760T-CP	VDA239-100	0.18	1.00	2.20	0.050	0.010	0.015 – 1.2	0.25	1.00	0.005	0.20
HR750Y950T-CP <sup>1)</sup>	VDA239-100	0.23	1.00	2.70	0.050	0.010	0.015 – 1.2	0.25	1.20	0.005	0.20
<b>Hot-rolled ferritic-bainitic steels</b>											
HR440Y580T-FB	VDA239-100	0.18	0.50	2.00	0.050	0.010	0.015 – 2.0	0.15	1.00	0.010	0.20
<b>Hot-rolled dual-phase steels</b>											
DP600LCT	voestalpine	0.12	1.20	1.60	0.085	0.006	0.020 – 0.06	0.15	1.40	0.005	0.20
<b>Hot-rolled martensitic steels</b>											
HR900Y1180T-MS	VDA239-100	0.25	0.80	2.50	0.050	0.010	0.015 – 2.0	0.25	1.20	0.005	0.20

<sup>1)</sup> After consultation with quality department

## Mechanical properties: Tensile test

Test direction: longitudinal

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

$A_5$  for thicknesses  $\geq$  3 mm

Steel grade	Standard	0.2 %-yield strength $R_{p0.2}$ [MPa]	Tensile strength $R_m$ [MPa]	Total elongation min.		n value min. $n_{10-2/Ag}$	typical HER-values*	
				$A_{80\text{ mm}}$ [%]	$A_5$ [%]		UC	GI
<b>Hot-rolled microalloyed steels</b>								
HR300LA	VDA239-100	300 – 400	380 – 500	24	28	0.12	-	-
HR340LA	VDA239-100	340 – 440	420 – 540	22	26	0.10	-	-
HR380LA	VDA239-100	380 – 480	450 – 570	20	24	-	-	-
HR420LA	VDA239-100	420 – 520	480 – 600	18	22	-	-	-
HR460LA	VDA239-100	460 – 560	520 – 640	16	20	-	-	-
HR500LA	VDA239-100	500 – 620	560 – 700	14	17	-	-	-
HR550LA	VDA239-100	550 – 670	610 – 750	12	16	-	-	-
HR600LA	VDA239-100	600 – 730	650 – 800	11	15	-	-	-
HR700LA	VDA239-100	700 – 850	750 – 950	10	13	-	-	-

### Hot-rolled and microalloyed steels with improved formability of punched edges

The hot-rolled microalloyed steels of the LAS series are characterized by enhanced formability, especially with respect to the formability of punched edges.

HR300LAS	VDA239-100	300 – 400	380 – 500	24	28	0.12	120	-
HR340LAS	VDA239-100	340 – 440	420 – 540	22	26	0.10	110	-
HR380LAS	VDA239-100	380 – 480	450 – 570	20	24	-	100	-
HR420LAS	VDA239-100	420 – 520	480 – 600	18	22	-	90	-
HR460LAS	VDA239-100	460 – 560	520 – 640	16	20	-	85	-
HR500LAS	VDA239-100	500 – 620	560 – 700	14	17	-	80	-
HR550LAS	VDA239-100	550 – 670	610 – 750	12	16	-	75	-
HR600LAS <sup>1)</sup>	voestalpine	600 – 730	650 – 800	10	14	-	70	-
HR700LAS	VDA239-100	700 – 850	750 – 950	10	13	-	70	-

Steel grade	Standard	0.2 %-yield strength $R_{p0.2}$ [MPa]	Tensile strength $R_m$ [MPa]	Total elongation min.		BH2 value min. [MPa]	typical HER-values*	
				$A_{80\text{ mm}}$ [%]	$A_5$ [%]		UC	GI
<b>Hot-rolled complex-phase steels</b>								
HR660Y760T-CP	VDA239-100	660 – 820	760 – 960	10	13	30	65	75
HR750Y950T-CP <sup>1)</sup>	VDA239-100	750 – 950	950 – 1150	7	9	-	30	-
<b>Hot-rolled ferritic-bainitic steels</b>								
HR440Y580T-FB	VDA239-100	440 – 600	580 – 700	15	16	30	95	-
<b>Hot-rolled dual-phase steels</b>								
DP600LCT <sup>1)</sup>	voestalpine	$\geq$ 300	580 – 670	18	22	30	-	-
<b>Hot-rolled martensitic steels</b>								
HR900Y1180T-MS	VDA239-100	900 – 1150	1180 – 1400	5	8	-	-	-

<sup>1)</sup> After consultation with quality department

\* Typical HER is valid for a thickness range of 2.0 – 4.0 mm  
There is a dependency of the typical HER on the thickness of the sheet  
Typical values are not binding

## Coatings and available dimensions

Available thicknesses [mm] based on surface finish

Steel grade	UC (uncoated)	GI (hot-dip galvanized)
<b>Hot-rolled microalloyed steels</b>		
HR300LA	2.0 – 6.5	2.0 – 4.0
HR340LA	2.0 – 6.5	2.0 – 4.0 <sup>1)</sup>
HR380LA	2.0 – 6.5	2.0 – 4.0
HR420LA	2.0 – 6.5	2.0 – 4.0
HR460LA	2.0 – 6.5	2.0 – 3.5
HR500LA	2.0 – 6.5	2.0 – 3.0 <sup>1)</sup>
HR550LA	2.0 – 6.5	2.0 – 3.0
HR600LA	2.0 – 6.5	-
HR700LA	2.0 – 6.5	2.1 – 3.5
<b>Thermomechanically rolled and microalloyed steels with improved formability</b>		
HR300LAS	2.0 – 6.0	-
HR340LAS	2.0 – 6.0	-
HR380LAS	2.0 – 6.0	-
HR420LAS	2.0 – 6.0 <sup>1)</sup>	-
HR460LAS	2.0 – 6.0	-
HR500LAS	2.0 – 6.0 <sup>1)</sup>	2.0 – 3.0 <sup>1)</sup>
HR550LAS	2.0 – 6.0	-
HR600LAS	2.0 – 6.0 <sup>1)</sup>	-
HR700LAS	2.0 – 4.0 <sup>2)</sup>	-
<b>Hot-rolled complex-phase steels</b>		
HR660Y760T-CP	2.0 – 5.0	2.1 – 3.5
HR750Y950T-CP <sup>1)</sup>	-	-
<b>Hot-rolled ferritic-bainitic steels</b>		
HR440Y580T-FB	2.0 – 5.0	2.0 – 3.5
<b>Hot-rolled dual-phase steels</b>		
DP600LCT	2.8 – 6.5 <sup>2)</sup>	-
<b>Hot-rolled martensitic steels</b>		
HR900Y1180T-MS	3.0 – 4.1 <sup>2)</sup>	-

<sup>1)</sup> After consultation with quality department

<sup>2)</sup> The production possibilities for other thicknesses can be determined upon request

Please find further information at [eva-steel.voestalpine.com/app/va-pds/home](http://eva-steel.voestalpine.com/app/va-pds/home) or contact us directly.



Premium quality with reduced carbon footprint

## hot-rolled drive

greentec steel

Hot-rolled steel strip – greentec steel Edition

Max. carbon footprint 1.95 kg CO<sub>2</sub>e per kg of steel<sup>1)</sup>

Hot-dip galvanized steel strip – greentec steel Edition

Max. carbon footprint 2.13 kg CO<sub>2</sub>e per kg of steel<sup>1)</sup>

<sup>1)</sup> per EN 15804+A2 (EPD methodology) cradle to gate

All products, dimensions and steel grades listed in each voestalpine supply range are available as greentec steel Edition.

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# voestalpine

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