

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 feature 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.
Hot-rolled micro-	alloyed steels									
HR300LA	VDA239-100	0.12	0.50	1.30	0.030	0.025	0.015	0.10	0.15	0.20
HR340LA	VDA239-100	0.12	0.50	1.50	0.030	0.025	0.015	0.10	0.15	0.20
HR380LA	VDA239-100	0.12	0.50	1.50	0.030	0.025	0.015	0.10	0.15	0.20
HR420LA	VDA239-100	0.12	0.50	1.60	0.030	0.025	0.015	0.10	0.15	0.20
HR460LA	VDA239-100	0.12	0.50	1.65	0.030	0.025	0.015	0.10	0.15	0.20
HR500LA	VDA239-100	0.12	0.50	1.70	0.030	0.025	0.015	0.10	0.15	0.20
HR550LA	VDA239-100	0.12	0.60	1.80	0.030	0.025	0.015	0.10	0.15	0.20
HR600LA ¹⁾	voestalpine	0.12	0.60	1.90	0.030	0.025	0.015	0.10	0.20	0.20
HR700LA	VDA239-100	0.12	0.60	2.10	0.030	0.025	0.015	0.10	0.20	0.20

¹⁾Steel grade being developed

Hot-rolled and micro-alloyed steels with improved formability of punched edges LAS stands for hot-rolled, micro-alloyed 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	0.030	0.010	0.015	0.10	0.15	0.20
HR340LAS	VDA239-100	0.12	0.50	1.50	0.030	0.010	0.015	0.10	0.15	0.20
HR380LAS	VDA239-100	0.12	0.50	1.50	0.030	0.010	0.015	0.10	0.15	0.20
HR420LAS	VDA239-100	0.12	0.50	1.60	0.030	0.010	0.015	0.10	0.15	0.20
HR460LAS	VDA239-100	0.12	0.50	1.65	0.030	0.008	0.015	0.10	0.15	0.20
HR500LAS	VDA239-100	0.12	0.50	1.70	0.030	0.005	0.015	0.10	0.15	0.20
HR550LAS	VDA239-100	0.12	0.60	1.80	0.030	0.005	0.015	0.10	0.15	0.20
HR700LAS	VDA239-100	0.12	0.60	2.10	0.030	0.005	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.
J											
Hot-rolled complex	x-phase steels										
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
Hot-rolled ferritic-l	painitic steels										
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
Hot-rolled dual-ph	ase steels										
DP600LCT	voestalpine	0.12	1.20	1.60	0.085	0.006	0.02 - 0.06	0.15	1.40	0.005	0.20
Hot-rolled martens	sitic steels										
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



Mechanical properties: Tensile test

Test direction: longitudinal

 $A_{80 \text{ mm}}$ for thicknesses < 3 mm A_5 for thicknesses \geq 3 mm

		0.2 %-yield strength	Tensile strength	Total elong	gation min.	n value min.	
Steel grade	Standard	R _{p0.2} [MPa]	R _m [MPa]	A _{80 mm} [%]	A₅ [%]	n _{10 - 20/Ag}	
Hot-rolled micro-	alloyed steels						
HR300LA	VDA239-100 300 - 380		380 - 500	24	28	0.14	
HR340LA	VDA239-100	340 - 440	420 - 540	22	26	0.13	
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 ¹⁾	voestalpine	600 - 750	650 - 820	11	15	-	
HR700LA	VDA239-100	700 - 850	750 – 950	10	13	-	
The hot-rolled mi	croalloyed steels o	s with improved formability of f the LAS series are characte o the formability of punched 300 – 380	rized by enhanced	24	28	0.14	
The hot-rolled mid formability, espec	croalloyed steels o cially with respect t	f the LAS series are characte o the formability of punched	rized by enhanced edges.	24	28	0.14	
The hot-rolled mid formability, espec HR300LAS	croalloyed steels of cially with respect to VDA239-100	f the LAS series are characte o the formability of punched 300 – 380	rized by enhanced edges. 380 - 500				
The hot-rolled mio formability, espec HR300LAS HR340LAS	croalloyed steels of cially with respect to VDA239-100 VDA239-100	f the LAS series are characte o the formability of punched 300 – 380 340 – 440	rized by enhanced edges. 380 - 500 420 - 540	22	26	0.13	
The hot-rolled mir formability, espec HR300LAS HR340LAS HR380LAS	croalloyed steels of cially with respect to VDA239-100 VDA239-100 VDA239-100	f the LAS series are characte o the formability of punched 300 – 380 340 – 440 380 – 480	rized by enhanced edges. 380 - 500 420 - 540 450 - 570	22 20	26 24		
The hot-rolled mir formability, espec HR300LAS HR340LAS HR380LAS HR420LAS	vDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100	f the LAS series are characte o the formability of punched 300 – 380 340 – 440 380 – 480 420 – 520	rized by enhanced edges. 380 – 500 420 – 540 450 – 570 480 – 600	22 20 18	26 24 22	0.13	
The hot-rolled min formability, espec HR300LAS HR340LAS HR380LAS HR420LAS HR440LAS	roalloyed steels of cially with respect to VDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100	f the LAS series are characte o the formability of punched 300 – 380 340 – 440 380 – 480 420 – 520 460 – 560	rized by enhanced edges. 380 – 500 420 – 540 450 – 570 480 – 600 520 – 640	22 20 18 16	26 24 22 20	0.13	
The hot-rolled minor formability, especial HR300LAS HR340LAS HR380LAS HR420LAS HR420LAS HR460LAS	roalloyed steels of cially with respect to VDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100	f the LAS series are characte o the formability of punched 300 – 380 340 – 440 380 – 480 420 – 520 460 – 560 500 – 620	rized by enhanced edges. 380 - 500 420 - 540 450 - 570 480 - 600 520 - 640 560 - 700	22 20 18 16 14	26 24 22 20 17	0.13 - - -	
The hot-rolled mir formability, espec HR300LAS HR340LAS HR380LAS HR420LAS HR460LAS HR500LAS	roalloyed steels of cially with respect to VDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100	f the LAS series are characte o the formability of punched 300 – 380 340 – 440 380 – 480 420 – 520 460 – 560 500 – 620 550 – 670	rized by enhanced edges. 380 - 500 420 - 540 450 - 570 480 - 600 520 - 640 560 - 700 610 - 750	22 20 18 16 14	26 24 22 20 17 16	0.13	
The hot-rolled min formability, espec HR300LAS HR340LAS HR380LAS HR420LAS HR440LAS	roalloyed steels of cially with respect to VDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100	f the LAS series are characte o the formability of punched 300 – 380 340 – 440 380 – 480 420 – 520 460 – 560 500 – 620	rized by enhanced edges. 380 - 500 420 - 540 450 - 570 480 - 600 520 - 640 560 - 700	22 20 18 16 14	26 24 22 20 17	0.13	
The hot-rolled minor formability, especial HR300LAS HR340LAS HR380LAS HR420LAS HR460LAS HR500LAS HR550LAS HR550LAS	roalloyed steels of cially with respect to VDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100	f the LAS series are characte o the formability of punched 300 – 380 340 – 440 380 – 480 420 – 520 460 – 560 500 – 620 550 – 670	rized by enhanced edges. 380 - 500 420 - 540 450 - 570 480 - 600 520 - 640 560 - 700 610 - 750 750 - 950 Tensile strength	22 20 18 16 14 12	26 24 22 20 17 16	0.13	
The hot-rolled minor formability, especial HR300LAS HR340LAS HR420LAS HR460LAS HR460LAS HR500LAS HR500LAS HR700LAS	vDA239-100	f the LAS series are characte o the formability of punched 300 - 380 340 - 440 380 - 480 420 - 520 460 - 560 500 - 620 550 - 670 700 - 850 0.2 %-yield strength R _{p0.2}	rized by enhanced edges. 380 - 500 420 - 540 450 - 570 480 - 600 520 - 640 560 - 700 610 - 750 750 - 950 Tensile strength R _m	22 20 18 16 14 12 10 Total elong	26 24 22 20 17 16 13 gation min.	0.13	
The hot-rolled minor formability, especial HR300LAS HR340LAS HR420LAS HR460LAS HR460LAS HR500LAS HR500LAS HR700LAS	roalloyed steels of cially with respect to VDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100 VDA239-100	f the LAS series are characte o the formability of punched 300 - 380 340 - 440 380 - 480 420 - 520 460 - 560 500 - 620 550 - 670 700 - 850 0.2 %-yield strength	rized by enhanced edges. 380 - 500 420 - 540 450 - 570 480 - 600 520 - 640 560 - 700 610 - 750 750 - 950 Tensile strength	22 20 18 16 14 12 10	26 24 22 20 17 16 13	0.13 - - - - - -	
The hot-rolled minor formability, especial HR300LAS HR340LAS HR420LAS HR460LAS HR500LAS HR500LAS HR500LAS HR700LAS HR700LAS	vDA239-100	f the LAS series are characte o the formability of punched 300 - 380 340 - 440 380 - 480 420 - 520 460 - 560 500 - 620 550 - 670 700 - 850 0.2 %-yield strength R _{p0.2}	rized by enhanced edges. 380 - 500 420 - 540 450 - 570 480 - 600 520 - 640 560 - 700 610 - 750 750 - 950 Tensile strength R _m	22 20 18 16 14 12 10 Total elong	26 24 22 20 17 16 13 gation min.	0.13	
The hot-rolled minor formability, especial HR300LAS HR340LAS HR380LAS HR420LAS HR460LAS HR500LAS HR550LAS HR550LAS	vDA239-100	f the LAS series are characte o the formability of punched 300 - 380 340 - 440 380 - 480 420 - 520 460 - 560 500 - 620 550 - 670 700 - 850 0.2 %-yield strength R _{p0.2}	rized by enhanced edges. 380 - 500 420 - 540 450 - 570 480 - 600 520 - 640 560 - 700 610 - 750 750 - 950 Tensile strength R _m	22 20 18 16 14 12 10 Total elong	26 24 22 20 17 16 13 gation min.	0.13	
The hot-rolled minformability, especial HR300LAS HR340LAS HR420LAS HR460LAS HR500LAS HR500LAS HR500LAS HR700LAS HR700LAS HR700LAS	vDA239-100	f the LAS series are characte o the formability of punched 300 - 380 340 - 440 380 - 480 420 - 520 460 - 560 500 - 620 550 - 670 700 - 850 0.2 %-yield strength R _{po2} [MPa]	rized by enhanced edges. 380 - 500 420 - 540 450 - 570 480 - 600 520 - 640 560 - 700 610 - 750 750 - 950 Tensile strength R _m [MPa]	22 20 18 16 14 12 10 Total elong A _{80 mm} [%]	26 24 22 20 17 16 13 gation min. A _s	0.13	
The hot-rolled minformability, especial HR300LAS HR340LAS HR420LAS HR460LAS HR500LAS HR500LAS HR500LAS HR700LAS HR700LAS HR700LAS	roalloyed steels of cially with respect to VDA239-100	f the LAS series are characte o the formability of punched 300 - 380 340 - 440 380 - 480 420 - 520 460 - 560 500 - 620 550 - 670 700 - 850 0.2 %-yield strength R _{po2} [MPa]	rized by enhanced edges. 380 - 500 420 - 540 450 - 570 480 - 600 520 - 640 560 - 700 610 - 750 750 - 950 Tensile strength R _m [MPa]	22 20 18 16 14 12 10 Total elong A _{80 mm} [%]	26 24 22 20 17 16 13 gation min. A _s	0.13	

580 - 670

1180 - 1400

> 300

900 - 1150

DP600LCT

Hot-rolled martensitic steels
HR900Y1180T-MS VDA 239-100

voestalpine



30

30

22

8

18

5

Coatings and available dimensions

Available thicknesses [mm] based on surface finish

Steel grade	UC (uncoated)	GI (hot-dip galvanized)
Hot-rolled micro-alloyed steels		
HR300LA	2.0 - 6.02)	-
HR340LA	2.0 - 6.0	-
HR380LA	2.0 - 6.02)	2.0 - 4.0
HR420LA	2.0 - 6.0	2.0 - 4.0
HR460LA	2.0 - 6.02)	2.0 - 3.5
HR500LA	2.0 - 6.0	2.0 - 3.02)
HR550LA	2.0 - 6.0	2.0 - 3.02)
HR600LA ¹⁾	-	-
HR700LA	2.0 - 6.0	2.0 - 3.5
Thermomechanically rolled and r	nicro-alloyed steels with improved formability	
HR300LAS	2.0 - 6.02)	-
HR340LAS	2.0 - 6.02)	-
HR380LAS	2.0 - 6.02)	-
HR420LAS	2.0 - 6.02)	-
HR460LAS	2.0 - 6.02)	-
HR500LAS	2.0 - 6.02)	2.0 - 3.02)
HR550LAS	2.0 - 6.02)	-
HR700LAS	2.0 - 4.03)	-
Hot-rolled complex-phase steels		
HR660Y760T-CP	2.0 - 5.0 ²⁾	2.0 - 3.5
Hot-rolled ferritic-bainitic steels		
HR440Y580T-FB	2.0 - 5.0	2.0 - 3.5 ²⁾
Hot-rolled dual-phase steels		
DP600LCT	2.8 - 6.5 ³⁾	-
Hot-rolled martensitic steels		
not-rolled martensitic steels		

 $Please find further information \ at \ www.voestalpine.com/Produktinformations portal \ or \ contact \ us \ directly.$



¹⁾Steel grade being developed ²⁾After consultation with quality department

³⁾The production possibilities for other thicknesses can be determined upon request

OUR PATH TO A GREENER FUTURE

Premium products in the greentec steel Edition

With greentec steel, voestalpine is pursuing an ambitious step-by-step plan in the long-term decarbonization of steel production. The declared objective is to achieve carbon-neutral production by 2050, and the initial steps have already been taken. Process-optimized production operations already prevent up to 10% of the direct CO_2 emissions at the Linz site. The material and processing properties of the steel are not affected in any way in this production route. Each voestalpine steel strip product is available in premium quality in the greentec steel Edition with a reduced carbon footprint and unique benefits.



Premium quality with reduced carbon footprint

hot-rolled drive

greentec steel

Hot-rolled steel strip – greentec steel Edition

Max. carbon footprint 2.10 kg CO₂e per kg of steel ¹⁾

Hot-dip galvanized steel strip – greentec steel Edition

Max. carbon footprint 2.30 kg CO₂e per kg of steel ¹⁾

1) 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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