

Dogal LAD

High strength low alloy steels for cold forming

General

Dogal LAD grades are micro-alloyed cold-forming steels that derive their high strength from the addition of very small quantities of alloying elements. These steel grades are designated according to their lowest guaranteed yield strength. The difference between their yield strength and tensile strength is small. LAD grades have good formability and bendability in relation to their yield strengths.

The consistency of the mechanical properties of Dogal LAD steels is guaranteed within the specified minimum and maximum values. Dogal LAD grades conforms the provisions of EN 10292.

Dimensions

Dogal LAD steels are available in thicknesses between 0,4 mm and 2.5 mm and in widths up to 1500 mm. Limitations may occur depending on grade and thickness.

Applications

The steels are intended for general presswork, forming and bending operations. These grades can be bent, sheared and punched on standard workshop equipment. Slightly higher forces may be necessary but this does not generally cause problems.

Whenever steel sheet parts are pressed and then painted, the work-hardening and bakehardening properties of Dogal LAD steels can be put to good use. Work-hardening occurs during pressing, and bakehardening takes place when the paint is being cured, if the curing is done at elevated temperature.

Tolerances

Dogal LAD steels are supplied with tolerances in accordance with EN 10143.

Zink coating

The various coating thicknesses are classified into weight classes which specify the minimum zinc weight in g/m² on both sides, as determined by means of the triple-spot test in accordance with EN 10327.

Surface appearance

The Dogal LAD steels are provided with normal surface or improved surface (obtained by skinpassing).

Weight class	Coating thickness per side * µm	Weight determination g/m ² on two sides,	
		Triple spot test min	Singel test min
Z100	7	100	85
Z120	8	120	100
Z140	10	140	120
Z200	14	200	170
Z275	20	275	235

* The values are calculated on the basis of the minimum values for the triple-spot test (1 µm = 7,14 g/m²).

Surface treatment

LAD steels are provided with chemical and/or oiling passivation as surface protection. The chemical passivation are chromate free and fulfil the demands in the End-of-life Vehicles Directive (2000/53/EC) and the Directive on the restriction of the use of ceratin hazardous substances in electrical and electronic equipment (2002/95/EC).

Heat treatment

Heat treatment of Dogal LAD steels should be avoided. The heating can affect the zinc coating which can result in poor appearance and deterioration of the corrosion properties. If the material is eventually heated the temperatures should be limited to max temp. 200°C.

Mechanical properties

(transverse to rolling direction)

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Steel grade	Yield strength $R_{p0,2}$ or R_{eL} MPa min - max	Tensile strength R_m MPa min - max	Elongation A_{80} ** % min	Inside radius for 90° bend (t= thickness)
Dogal 300 LAD	300 - 380	380 - 480	23	0,75*t
Dogal 340 LAD	340 - 420	410 - 510	21	0,75*t
Dogal 380 LAD	380 - 480	440 - 560	19	1*t
Dogal 420 LAD	420 - 520	470 - 590	17	1*t
Dogal 460 LAD*	460 - 560	560 - 680	15	1*t
Dogal 500 LAD*	500 - 620	640 - 780	13	1*t

* not included in standard EN 10292.

** two units less for $t \leq 0,70$ mm and four units less for $t \leq 0,50$ mm

Chemical composition

Steel grade	% by mass							
	C max	Si max	Mn max	P max	S max	Al min	Ti max	Nb max
Dogal 300 LAD	0,07	0,03	0,60	0,020	0,020	0,020	0,010	0,010
Dogal 340 LAD	0,10	0,03	0,80	0,025	0,010	0,020	0,010	0,010
Dogal 380 LAD	0,08	0,35	0,70	0,020	0,010	0,020	0,010	0,030
Dogal 420 LAD	0,09	0,25	0,90	0,020	0,010	0,020	0,010	0,040
Dogal 460 LAD*	0,11	0,50	1,40	0,020	0,004	0,020	0,010	0,040
Dogal 500 LAD*	0,15	0,50	1,70	0,015	0,004	0,020	0,010	0,040

* not included in standard EN 10292.

Welding

Dogal LAD offer excellent welding characteristics. All the conventional fusion welding methods can be used. For spot welding it is recommended to use increased electrode force and weld time to optimise the weld quality.

Technical service and information

Knowledge Service Center will be pleased to assist with additional information concerning this product from SSAB Tunnpåt, +46-243-7 2929, or use SSAB Tunnpåt's own website www.ssabdirekt.com.

Specifications herein are for general reference only. They are valid at date of publication and are subjects to change without notice due to ongoing product development.

Specifications are binding only if confirmed in writing.

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