Data Sheet: A4.4

SUPRAFORM® S315–700 MC / EN10149-2 S315–700 MC

Hot Rolled High Strength Low Alloy Structural Steel Coil

General description

Suprafrom® MC is a range of high strength low alloy structural steels with improved formability. This is achieved by means of reduced perlite i.e. low carbon content, which also imparts excellent weldability and toughness to the steel. The high strength is derived from precipitation hardening by micro alloying elements (mainly niobium) and carefully controlling the processing parameters during hot rolling.

The Supraform® MC range supplied by ArcelorMittal South Africa consists of eight grades where the MC designations relate to the minimum respective yield strengths of each grade. The specifications for the Suprafrom® MC range are similar to those in EN 10149 specifications. The SUPRAFORM® TM range is replaced by the SUPRAFORM® MC range.

During steel making, the steel is calcium treated to reduce the sulphur content to very low values and also to effect inclusion shape control. The heat is processed to a high standard of steel cleanliness, which results in excellent notch toughness properties.

Supraform® MC grades can usually be welded using any of the standard arc and resistance welding processes without any special precautions.

Some typical applications for Supraform® MC grades are as follows:

- Body and chassis components for the automotive and truck industry, bumper brackets, engine mounting brackets and wheel centres.
- Crane jibs and booms
- A wide variety of uses for mining equipment, rolling stock, cold formed sections and other high strength applications.

Chemical composition

Table 1. Supraform MC/EN 10149 Chemical composition specification (ladle analysis, percent)

Grade	C max	Mn max	P max	S max	Si max	Al min	V max	Ti max	Nb max
S315 MC	0,12	1,30	0,025	0,020	0,50	0,015	0,200	0,150	0,090
S355 MC	0,12	1,50	0,025	0,020	0,50	0,015	0,200	0,150	0,090
S420 MC	0,12	1,60	0,025	0,015	0,50	0,015	0,200	0,150	0,090
S460 MC	0,12	1,60	0,025	0,015	0,50	0,015	0,200	0,150	0,090
S500 MC	0,12	2,00	0,025	0,015	0,50	0,015	0,200	0,015	0,090
S550 MC	0,12	1,80	0,025	0,015	0,50	0,015	0,200	0,150	0,090
S650 MC	0,12	2,00	0,025	0,015	0,60	0,015	0,200	0,220	0,090
S700 MC	0,12	2,10	0,025	0,015	0,60	0,015	0,200	0,220	0,090

For further information, contact:
ArcelorMittal South Africa Limited, PO Box 2, Vanderbijlpark 1900.
https://www.arcelormittalsa.com/Products.asp

Mechanical properties

The high strength of the Supraform® MC grades is achieved by grain refinement and precipitation hardening of the ferritic microstructure. In order to ensure that the mechanical properties are met, the ferritic grain size is carefully controlled and is finer than ASTM E112, plate No 1, grain size 8.

In order to maintain this microstructure, heating or hot forming above 450°C should be avoided during fabrication or repair operations as the yield and tensile properties may be impaired and cannot be restored by subsequent heat treatment.

Table 2. Mechanical properties; Supraform / EN 10149

Grade	Minimum Yield strength (MPa)	Tensile strength[1] (MPa)	Minimum elongation (%)		Mandrel diameter for 180° bend test[3], t = strip thickness
			<3mm Lo = 80mm	*A5 (%) Lo=5,56√So*	
S315 MC	315	390 - 510	20	24	0t
S355 MC	355	430 - 550	19	23	0,5t
S420 MC	420	480 - 620	16	19	0,5t
S460 MC	460	520 - 670	14	17	1,0t
S500 MC	500	550 - 700	12	14	1,0t
S550 MC	550	600 - 760	12	14	1,5t
S650 MC	650	700 - 880	10	12	2,0t
S700 MC	700	750 - 950	10	12	2,0t

Notes:

1. The test is performed in accordance with BS EN ISO 6892-1.
2. Tests are done longitudinal to the rolling direction.
3. The sample will be free of cracks on the outside of the bend when tested to EN ISO 7438.

Dimensions

Supraform® MC is available in the dimensions indicated in the applicable Price Lists.

Dimensional tolerances

The Supraform® MC range is produced with dimensional tolerances in accordance with EN10051

Flatness tolerances

For laser cutting and critical flatness requirements, the material must be levelled by equipment designed to adequately flatten high yield strength products in order to remove all internal stresses. Insufficient levelling may result in material not being adequately deformed and hence distortion during further processing such as laser cutting. Surface defects such as "Lüders Bands" is an aesthetic surface appearance and is dependent on the levelling process applied after rolling. Lüders bands are defined as: stretcher-strain marks which are localized bands of plastic deformation in metals during tensile stresses. AMSA will not be held accountable for claims arising from this aesthetic surface defect caused during the levelling process.

Certification

All material described in this data sheet is supplied with test and analysis certificates.

Supply conditions

All material described in this data sheet is supplied in terms of Price Lists 120 and 121 and ArcelorMittal South Africa's General Conditions of Sale.

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