

Data Sheet: A4.3

SUPRAFORM[®] TM 340 - 600

Hot Rolled High Strength Low Alloy Structural Steel Coil

General description

SUPRAFORM[®] TM is a range of high strength low alloy structural steels with improved formability. This is achieved by means of reduced pearlite 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[®] TM range consists of six grades where the TM designations relate to the minimum respective yield strengths of each grade. The specifications for the SUPRAFORM[®] TM range are similar to those in EN 10149 and the equivalent Domex steels.

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

Some typical applications for SUPRAFORM[®] TM 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.
- Steel pipes for high-pressure applications.
- A wide variety of uses for mining equipment, rolling stock, cold formed sections, etc.

Chemical composition

Table 1. Chemical composition specification (ladle analysis, percent)

Grade	Thickness (mm)	C max	Mn max	P max	S max
TM 340	2,0 - 10,0	0,10	1,20	0,020	0,020
TM 380	2,0 - 10,0	0,10	1,20	0,020	0,020
TM 420	2,5 - 10,0	0,12	1,40	0,020	0,020
TM 460	2,5 - 10,0	0,12	1,60	0,020	0,020
TM 500	3,0 - 4,5	0,15	1,60	0,020	0,020
TM 600	3,0 - 8,0	0,12	2,00	0,020	0,010

In order to assist end-users in determining fabrication parameters, the typical chemical compositions used to achieve the desired mechanical properties are given in table 2:

For further information, contact:

Mittal Steel South Africa Limited, PO Box 2, Vanderbijlpark 1900. Toll free number 0800 005043, Fax (016) 889-0070
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Table 2. Typical chemical composition (ladle analysis, percent)

Grade	C	Mn	Si	P	S	Al	Nb	Ti	Mo
TM 340	0,05	0,50	0,03	0,015	0,005	0,04	0,015	-	
TM 380	0,06	0,65	0,03	0,015	0,005	0,04	0,025	-	
TM 420	0,08	0,85	0,03	0,015	0,005	0,04	0,030	-	
TM 460	0,10	1,25	0,04	0,015	0,005	0,04	0,030	-	
TM 500	0,06	1,50	0,25	0,015	0,005	0,04	0,040	0,015	
TM 600	0,06	1,80	0,25	0,015	0,005	0,04	0,080	0,015	0,25

Mechanical properties

The high strength of the SUPRAFORM[®] TM 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 3. Mechanical properties

Grade	Yield strength (MPa)	Minimum tensile strength ¹ (MPa)	Minimum elongation ² (%) for thickness <i>t</i>		Mandrel diameter for 180 ° bend test ³ for strip thickness <i>t</i>
			<i>t</i> ≤ 3,0 mm	<i>t</i> > 3,0 mm	
TM 340	340 - 420	400	22	24	0,5 <i>t</i>
TM 380	380 - 460	450	20	22	0,5 <i>t</i>
TM 420	420 - 500	490	19	21	0,5 <i>t</i>
TM 460	460 - 560	530	18	20	1,0 <i>t</i>
TM 600	600	650	12	12	1,0 <i>t</i>

Notes:

1. The test is performed in accordance with EN 10002: Part 1 (1990).
2. Tests are done transverse to the rolling direction.
3. Gauge length 50mm.
4. The sample will be free of cracks on the outside of the bend when tested to BS 1639.

Dimensions

SUPRAFORM[®] TM is available in the dimensions indicated in the data sheet: Hot Strip Mill Product Dimensions (file reference A1.1).

Dimensional tolerances

The SUPRAFORM[®] TM range is produced with dimensional tolerances in accordance with ASTM A568M/A635M.

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 Mittal Steel South Africa's General Conditions of Sale.

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