

## 709M Improved machinability high tensile steel

Typical Analysis (Ave. values %)	C	Si	Mn	Cr	Mo	S	P
	0.4	0.2	0.8	1.0	0.2	0.025	0.025
NEAREST STANDARD	AS		DIN		BS		AISI
	4140		1.7225 41CrMo4		~En19A ~708 M 40		4140

<b>DESCRIPTION</b>	<p><b>709M</b> compared to other 4140 steels <b>709M</b> has guaranteed superior machinability characteristics in all sizes up to 320 mm Dia, effectively reducing costs. By using <b>709M</b> machinability will be increased by up to 30% or tool life extended by up to 3 times. <b>709M</b> has superior, guaranteed minimum mechanical properties in all dimensions to ensure higher safety margins with longer component life.</p>
--------------------	--

<b>APPLICATIONS</b>	<p><b>709M</b> is the most commonly used of the high tensile steels with a wide range of applications in automotive, Gear and Engine construction, Crankshafts, Steering knuckles, Connecting rods, Spindles, Intermediate gears, Pump and Gear shafts. Axles, Nuts and Bolts.</p>
---------------------	--

<b>HEAT TREATMENT</b>	Forge	850-1050°C. Cool in furnace.
	Normalize	840-880°C. Air cool.
	Anneal	680-720°C. Cool slowly in controlled furnace.
	Stress relieve	In the quenched and tempered condition, about 30-50°C below the tempering temperature. Air cool. In the annealed condition, 600-650°C. Air cool.
	Harden	830-860°C Oil quench.
	Temper	540-680°C hold for 1 hour min. at temperature, air cool. (see tempering chart)
	Nitride	Suitable for both liquid and gas nitriding.

<b>WELDING</b>	<p>Parts should be welded in the hardened and tempered condition. Strength properties of the joint will not be the same as the base metal. Preheat 300-400°C. Temper after welding to about 35-50°C below the recommended tempering temperature. Filler metal: - FOX CM2-KB electrodes or CM2-IGwire. For advice in connection with difficult welding, please consult our engineers.</p>
----------------	--

<b>MECHANICAL PROPERTIES</b>		<= 63.0 mm dia	<= 100 mm dia	<= 150 mm dia	<= 250 mm dia
	Yield strength (Rp 0.2)	Min 830 N/mm <sup>2</sup>	Min 760 N/mm <sup>2</sup>	Min 720 N/mm <sup>2</sup>	Min 690 N/mm <sup>2</sup>
	Tensile (Rm)	Min 1030 N/mm <sup>2</sup>	Min 960 N/mm <sup>2</sup>	Min 930 M/mm <sup>2</sup>	Min 900 M/mm <sup>2</sup>
	Elongation (A5) %	Min 12	Min 13	Min 14	Min 14
	Charpy Impact J	To be recorded	To be recorded	To be recorded	To be recorded
	Hardness	To be recorded	To be recorded	To be recorded	To be recorded
	Z% RA	To be recorded	To be recorded	To be recorded	To be recorded

<b>PHYSICAL PROPERTIES</b>	Density (kg/dm <sup>3</sup> )	7.85
	Modulus of elasticity 10 <sup>3</sup> N/mm <sup>2</sup>	210
	Thermal conductivity W/(m.K)	42
	Electric resistivity Ohm.mm <sup>2</sup> /m	0.19
	Specific heat capacity J/(kg.K)	460
	Modulus of elasticity 10 <sup>3</sup> N/mm <sup>2</sup>	205
	Thermal expansion 10 <sup>6</sup> m/(m.K)	11.1

Standard stock condition "T" (Refer to mechanical properties)

<b>SIZE RANGE</b>	16	38	50	65	87	116	143	173	210
	25	40	55	70	92	120	152	183	220
	30	42	60	75	102	123	160	193	250
	36	45	65	82	106	130	163	203	

Sizes normally stocked in Australia. Some branches may not hold the entire range.

Other sizes available on request.

**LOCATIONS**

**Bohler Uddeholm Australia Pty Ltd ABN 15000013052**

Sydney	129-135 McCredie Rd Guildford	2161	Ph (02) 8724 5554	Fax (02) 8724 5555
Newcastle	3 Pavilion Pl Cardiff	2285	Ph (02) 4954 6611	Fax (02) 4956 5773
Albury	1 Eames St Albury	2640	Ph (02) 6041 3399	Fax (02) 6041 1820
Wollongong	40 Doyle Ave Unanderra	2526	Ph (02) 4272 6544	Fax (02) 4272 7563
Marayong	1/21 Binney Rd Marayong	2148	Ph (02) 9831 4431	Fax (02) 9671 1682
Melbourne	282-290 Greens Rd Dandenong	3175	Ph (03) 9767 5554	Fax (03) 9767 5555
Bayswater	4 Ramage St Bayswater	3153	Ph (03) 9729 7356	Fax (03) 9738 0850
Adelaide	1 Williams Cir Pooraka	5095	Ph (08) 8368 4554	Fax (08) 8368 4555
Brisbane	12-18 Limestone St Darra	4076	Ph (07) 3712 9554	Fax (07) 3712 9555
Townsville	9-11 Caldwell St Garbutt	4814	Ph (07) 4479 4800	Fax (07) 4725 1316
Perth	29-33 Gauge Cir Canningvale	6155	Ph (08) 9455 8672	Fax (08) 9455 8673
Kewdale	5 Beete St Welshpool	6106	Ph (08) 9350 9582	Fax (08) 9350 9683
Launceston	20 Murphy St Invermay	7248	Ph (03) 6334 3542	Fax (03) 6331 4001

[www.buau.com.au](http://www.buau.com.au)

Every care has been taken in listing this information, particularly specifications. Bohler Uddeholm Australia Pty Ltd will not accept responsibility for any loss or other damage caused to any person or Company as a result of the use of information contained herein

Notes