

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		4140

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

WELDING	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.
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MECHANICAL PROPERTIES (Comparisons)	Grade	Size	Tensile Strength MPa	Yield Strength MPa	Elong. %
	709M	63	1030	830	14
	4140 Cond. "U"	63	930	740	12
	4340 Cond. "V"	63	1000	835	12
	709M	100	960	760	14
	4140 Cond. "T"	100	850	665	13
	4340 Cond. "U"	100	930	740	12
	709M	150	930	720	14
	4140 Cond. "T"	150	770	570	15
	4340 Cond. "U"	150	850	665	13
	709M	250	900	900	14
	4140 Cond. "S"	250	770	770	13
	4340 Cond. "T"	250	850	850	13

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

SIZE RANGE	Standard stock condition "T" (Refer to mechanical properties)	
	Round	10 to 24 mm CD
		25 to 300mm PLD

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 Amsted Rd Bayswater	3153	Ph (03) 9739 8022	Fax (03) 9739 8033
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

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