

# Properties of 14 MCP-Alloys:

Choose an MCP low melting point alloy from this popular range

	MCP - Designation	47	58	59	60	64	70	80	96	110	124	137	150	200	220
<b>MELTING BEHAVIOUR</b> The behaviour of alloy samples on melting has been observed by differential thermal analysis. Certain liquidus temperatures are poorly defined. (Shown as *)	Melting range (°C)	47	58	50-60	53-64	54-66	70	72-98 *	96	97-123	124	138	138-170	199	97-300 *
	Latent heat of fusion (J/kg)	36 800	28 900	33 500	36 000	37 700	39 800	34 300	34 700	37 700	20 900	44 800	44 400	71 200	13 800
<b>SPECIFIC HEATS</b> Differential scanning calorimetry techniques have been used to estimate the specific heat of solid samples (at 25°C) and liquid samples (at a superheat of approximately 25°C above the liquidus temperature).	Specific heat, solid (J/kg K)	163	167	167	159	159	146	151	151	151	126	167	180	239	151
	Specific heat, liquid (J/kg K)	197	201	201	188	209	184	180	167	201	155	201	213	272	272
<b>THERMAL AND ELECTRICAL PROPERTIES</b> The thermal conductivity of samples has been measured one day after casting, by a steady state, absolute method. A 'four-probe' method was used to obtain values of the electrical resistivity of bars 6 hours after casting.	Thermal conductivity (W/m K)	14,5	10,0	16,0	14,5	16,5	18,0	17,0	12,5	15,5	9,0	18,5	30,0	61,0	12,0
	Electrical resistivity (μOhm - cm)	55,0	78,8	51,1	47,8	48,9	48,0	46,7	71,4	59,5	98,7	59,0	34,0	11,2	76,4
<b>MECHANICAL PROPERTIES</b> Measurements were made on test pieces aged approximately (2 days/70 days) after casting. In each case stress data is reported in units of N/mm <sup>2</sup>	<b>Tensile Properties</b>														
	Proof stress, 0,2% set	18,5/22,5	25,1/25,1	10,7/15,5	10,8/10,8	9,3/10,5	6,8/11,3	9,6/16,4	8,6/19,0	14,1/21,0	18,3/26,4	32,0/42,1	31,5/37,4	48,4/42,6	26,0/36,8
	Tensile strength (N/mm <sup>2</sup> )	33,6/36,8	38,8/39,4	23,9/36,3	22,6/25,7	20,3/24,9	18,4/26,0	21,4/30,9	20,4/33,9	31,3/42,1	31,1/47,6	60,1/62,2	62,4/58,4	64,2/54,7	52,9/63,1
	% Elongation on 5.65 √A gauge length	23,5/37,5	13/20	140/100	105/77,5	95/70	205/120	145/135	165/100	75/110	80/37,5	80/55	105/35	30/32,5	16,5/7,5
	% Reduction of area	60/42	23/25	90/86	90/60	85/60	99,5/83	95/97	99,5/97	95/93,5	95/80	95/70	95/60	80/77,5	29/14
	<b>Compressive Properties</b>														
	Proof stress, 0,2% set	24,3/32,6	32,0/27,2	17,0/20,8	18,4/18,4	17,0/15,5	10,4/17,8	15,9/25,1	18,4/24,1	20,0/26,4	22,5/32,1	41,6/46,7	41,8/41,2	51,8/50,8	49,6/49,2
Proof stress, 1,0% set	28,0/40,4	34,5/33,5	18,4/29,0	20,0/21,5	18,4/18,8	14,3/22,9	18,6/30,4	20,8/29,8	24,9/36,5	28,4/38,4	49,4/58,2	52,5/52,7	62,4/58,0	58,4/60,0	
Proof stress, 10,0% set	12,1/29,0	19,8/25,7	11,3/21,5	11,9/17,4	11,5/16,2	14,3/23,5	17,8/30,0	17,6/26,4	21,3/34,3	27,8/38,0	45,9/63,1	47,6/60,8	66,9/63,0	42,0/48,8	
<b>Brinell Hardness</b>															
2mm ball, 4kg load	14,5/16,5	14/16,5	13,5/18	13/14	12,5/13	13/14,5	12/15	13,5/15,5	15,5/18,5	14/15	23/23	24/23,5	24,5/21,5	23,5/25,5	
<b>GROWTH AND SHRINKAGE</b> After casting into a mould, releasing and cooling to room temperature, alloy bars characteristically show progressive dimensional changes. In the present case, alloys were cast with minimum superheat into prewarmed steel moulds, and quenched to 20°C. The tables shows, as a function of time after solidification, the growth in the bar length L relative to the mould length L <sub>m</sub> (both measured in a 20°C ambient). This is expressed in thousandths parts:  that is $1.000 \times \frac{L - L_m}{L_m}$	2 minutes	-0,20	-0,10		-1,50	-1,60	-0,15	-1,60	-1,60	+5,80	-1,25	-0,30	-0,20		-1,15
	6 minutes	-0,25	-0,05	-1,40	-1,45	-1,40	+4,90	+0,45	+6,05	+7,80	-1,15	-0,10	+0,30		+0,50
	20 minutes	-0,30	-0,05	-1,55	-1,50	-1,40	+5,65	+2,55	+6,90	+7,90	-1,00	0,00	+0,35	-2,20	+4,10
	1 hour	-0,25	-0,05	-1,60	-1,55	-1,25	+5,70	+2,85	+7,05	+8,10	-0,45	+0,15	+0,60	-2,20	+4,25
	3 hours	-0,20	-0,05	-1,70	-1,50	-0,45	+5,90	+2,95	+7,25	+8,25	+0,45	+0,30	+0,80	-2,20	+4,40
	8 hours	-0,20	-0,05	-1,65	-1,30	+1,25	+6,00	+3,05	+7,45	+8,40	+1,05	+0,45	+0,95	-2,20	+4,55
	1 day	-0,15	+0,05	-1,50	-0,25	+2,75	+6,15	+3,10	+7,60	+8,55	+1,65	+0,60	+1,05	-2,25	+4,75
	3 days	-0,05	+0,65	-1,25	+2,25	+3,50	+6,30	+3,25	+7,75	+8,60	+2,25	+0,70	+1,10	-2,25	+4,90
	10 days	+0,20	+0,75	-0,45	+3,15	+3,70	+6,35	+3,35	+7,80	+8,70	+2,85	+0,80	+1,15	-2,25	+5,10
	1 month	+0,25	+0,80	+0,50	+3,30	+3,70	+6,35	+3,45	+7,85	+8,75	+3,40	+0,90	+1,20	-2,30	+5,25
	3 months	+0,05	+0,80	+1,00	+4,20	+4,50	+6,40	+3,55	+8,00	+8,80	+3,75	+0,95	+1,25	-2,30	+5,30
	12 months	-0,10	+0,90	+1,75	+3,30	+4,40	+6,40	+3,70	+7,90	+8,75	+4,00	+1,00	+1,30	-2,30	+5,30
	<b>SPECIFIC GRAVITY</b> Samples were measured one day after casting.	(g/cm <sup>3</sup> )	9,36	9,23	9,64	9,67	9,64	9,67	9,98	9,85	9,45	10,73	8,58	8,21	7,27