

# Plastic Mold Steel Physical Properties

Thermal expansion rate / Thermal conductivity / Specific heat /  
Young's modulus / Rigidity modulus / Poisson's ratio

## ■ Document Disclaimer

- The data described in this document is the latest version as of June 1<sup>st</sup>, 2023. Values listed in the brochure may differ.
- The repeated measurement accuracy of the thermal conductivity measuring equipment that we use is about  $\pm 10\%$ .
- The product characteristics included in this brochure are the representative values based on the result of our measurements, and do not guarantee the performance in use of the products. Please inquire the latest information to our department in charge as the information of this brochure is updated without previous notice as needed.
- If you have any questions regarding this document, please contact us after selecting "Tool Steel" from the "Inquiry Form (Products)" on our website (<https://www.daido.co.jp>).

**PXA, PX4, PX5, PAC, NAK, G-STAR, S-STAR, D-STAR, PD613, MAS** is a registered trademark or trademark of Daido Steel Co., Ltd.

Brand name	Heat treatment*1			HRC	Thermal expansion rate ( $\times 10^{-6}/K$ )						Thermal conductivity (W/m · K)*2						
	Cond.	H (°C)	T (°C)		20~100°C	20~200°C	20~300°C	20~400°C	20~500°C	20~600°C	25°C	100°C	200°C	300°C	400°C	500°C	600°C
<b>PXA30, PX5, PX4</b>	PH	-	-	32	11.3	12.2	12.6	13.4	13.9	14.2	33.0	36.9	36.4	34.7	34.9	33.6	32.7
<b>PAC5000</b>	PH	-	-	39	11.2	12.0	12.6	13.1	13.6	14.0	32.5	33.6	33.7	35.1	34.5	33.9	33.6
<b>NAK55</b>	PH	-	-	40	11.4	12.3	12.9	13.5	13.9	14.4	27.2	30.5	30.2	31.8	32.4	32.5	31.1
<b>NAK80</b>	PH	-	-	41	11.5	12.4	13.0	13.5	14.0	14.5	26.9	31.3	32.5	31.8	32.9	31.7	30.3
<b>NAK101</b>	Solution treatment			37	10.2	10.8	11.2	11.7	12.0	12.1	12.0	13.8	14.7	17.0	19.1	22.1	23.4
	Aging : 500°C			44	10.1	10.8	11.3	11.7	12.2	12.4	13.5	15.7	17.5	18.2	20.6	22.5	23.2
<b>G-STAR</b>	PH	-	-	34	9.8	10.4	10.9	11.3	11.7	12.0	20.9	22.8	22.4	24.2	25.0	25.6	26.5
	HT	1030	200	51	9.6	10.4	10.5	10.7	11.2	11.8	17.4	19.9	21.2	21.9	22.6	24.7	26.6
			500	52	10.0	10.8	11.3	11.8	12.2	12.7	18.1	20.3	20.5	21.8	22.9	24.2	25.9
<b>S-STAR</b>	PH	-	-	33	9.9	10.7	11.2	11.6	12.0	12.3	19.1	22.1	23.1	23.1	24.7	25.1	25.7
	HT	1030	200	54	9.9	10.7	11.1	11.6	11.9	12.1	14.9	16.7	17.4	19.2	20.8	22.3	23.9
			500	54	10.3	11.1	11.6	12.1	12.5	12.9	16.7	17.7	19.2	19.5	21.3	22.0	23.5
<b>D-STAR</b>	PH	-	-	33	9.9	10.7	11.2	11.6	12.0	12.3	19.1	22.1	23.1	23.1	24.7	25.1	25.7
	HT	1030	200	54	9.9	10.7	11.1	11.6	11.9	12.1	14.9	16.7	17.4	19.2	20.8	22.3	23.9
			500	54	10.3	11.1	11.6	12.1	12.5	12.9	16.7	17.7	19.2	19.5	21.3	22.0	23.5
<b>PD613</b>	A	-	-	<20	10.6	11.3	11.9	12.4	12.8	13.1	28.4	32.5	32.9	31.7	32.5	31.2	31.1
	HT	1030	200	62	11.3	12.0	11.8	12.1	12.5	12.8	17.0	18.5	18.5	20.9	21.8	23.2	25.4
			500	60	10.9	11.5	12.2	12.8	13.3	13.5	19.0	20.8	20.7	22.0	23.4	23.7	25.8
<b>MAS1C</b>	Solution treatment			32	9.7	10.4	10.5	10.8	11.0	10.7	15.1	18.0	19.6	20.8	23.7	27.3	29.4
	Aging : 500°C			53	9.3	10.1	10.5	10.9	11.4	11.9	19.4	21.8	23.5	23.8	25.6	26.8	25.6
<b>NAK86K</b>	PH	-	-	36	9.8	10.6	11.0	-	-	-	27.5	29.2	29.3	29.6	-	-	-

(\*1) A : Annealing H : Quenching (Hardening) T : Tempering PH : Pre-hardened

(\*2) Accuracy of repeated measurements is about  $\pm 10\%$ .

Brand name	Heat treatment*1			HRC	Specific heat (J/kg · K)							Young's modulus (GPa)*3	Rigidity modulus (GPa)*3	Poisson's ratio *3
	Cond.	H (°C)	T (°C)		25°C	100°C	200°C	300°C	400°C	500°C	600°C			
<b>PXA30, PX5, PX4</b>	PH	-	-	32	449	504	535	558	622	678	785	212	82	0.30
<b>PAC5000</b>	PH	-	-	39	455	510	503	566	620	690	814	211	81	0.30
<b>NAK55</b>	PH	-	-	40	447	478	488	542	602	673	791	204	78	0.31
<b>NAK80</b>	PH	-	-	41	439	493	525	539	608	651	765	202	78	0.29
<b>NAK101</b>	Solution treatment			37	430	476	493	507	564	638	698	195	74	0.32
	Aging : 500°C			44	425	463	495	509	576	656	781	202	77	0.31
<b>G-STAR</b>	PH	-	-	34	440	479	491	551	609	680	807	221	85	0.30
	HT	1030	200	51	435	490	530	559	623	684	817	214	82	0.30
			500	52	435	474	488	537	595	671	801	215	83	0.30
<b>S-STAR</b>	PH	-	-	33	437	494	531	554	620	680	796	222	86	0.30
	HT	1030	200	54	415	450	467	522	581	645	756	214	82	0.30
			500	54	429	448	487	507	574	629	745	215	83	0.30
<b>D-STAR</b>	PH	-	-	33	437	494	531	554	620	680	796	222	86	0.30
	HT	1030	200	54	415	450	467	522	581	645	756	214	82	0.30
			500	54	429	448	487	507	574	629	745	215	83	0.30
<b>PD613</b>	A	-	-	<20	439	497	531	558	624	669	772	219	84	0.30
	HT	1030	200	62	424	450	445	498	537	589	672	207	79	0.31
			500	60	420	447	450	491	549	593	678	209	80	0.31
<b>MAS1C</b>	Solution treatment			32	430	476	493	507	564	638	698	172	65	0.33
	Aging : 500°C			53	400	430	454	467	514	568	606	190	72	0.33
<b>NAK86K</b>	PH	-	-	36	484	529	550	583	-	-	-	211	82	0.29

(\*1) A : Annealing H : Quenching (Hardening) T : Tempering PH : Pre-hardened

(\*3) Measured value at 25°C