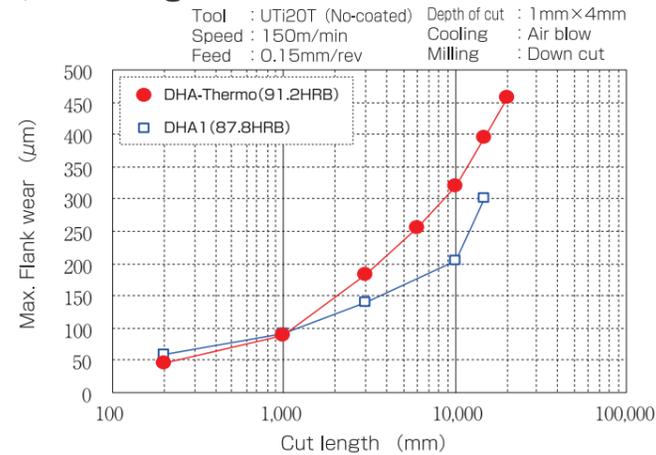
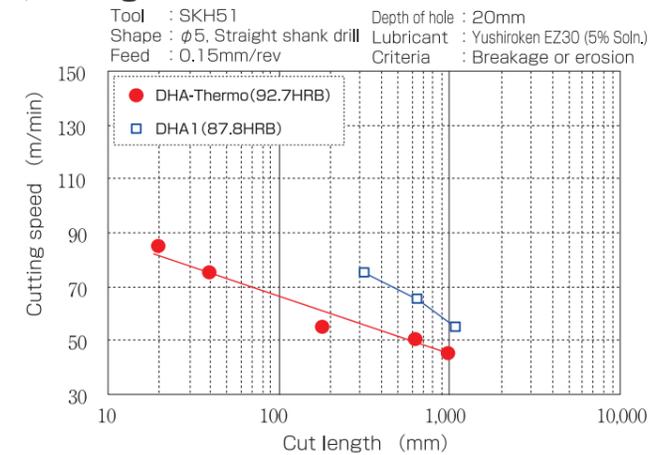


Machinability

◆ Endmilling

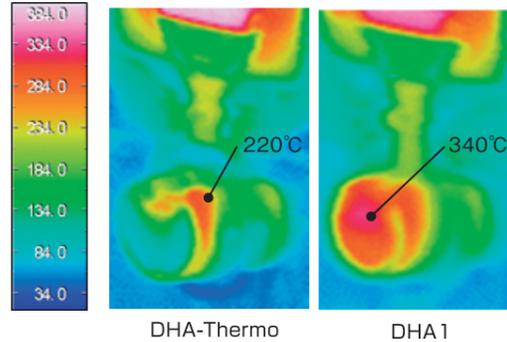


◆ Drilling

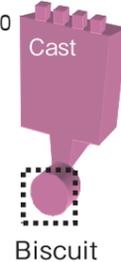
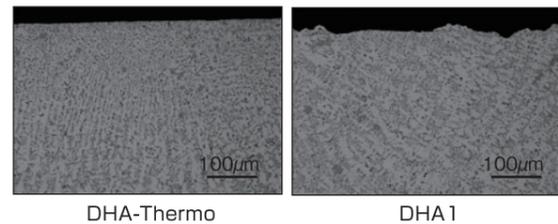


Application to sprue core

◆ Surface temperature of sprue core



◆ Cast structure of the biscuit contacted with DHA-Thermo



Physical properties

◆ Thermal expansion rate

Temp.	20~100°C	20~200°C	20~300°C	20~400°C	20~500°C	20~600°C
×10 ⁻⁶ /K	12.0	12.8	13.3	13.8	14.1	14.3

◆ Thermal conductivity

Temp.	25°C	100°C	200°C	300°C	400°C	500°C	600°C
W/m·K	37.1	37.3	37.6	37.2	35.9	34.1	32.9

*Accuracy of repeated measurements is about ±10%.

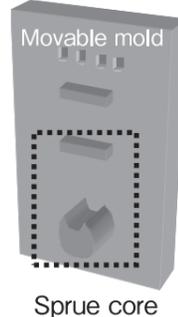
◆ Specific heat

Temp.	25°C	100°C	200°C	300°C	400°C	500°C	600°C
J/kg·K	443	471	506	550	601	660	728

◆ Young's modulus / Rigidity modulus / Poisson's ratio (25°C)

Young's modulus	Rigidity modulus	Poisson's ratio
209GPa	81GPa	0.30

Machine : 135t Die-casting machine
Molten Al : ADC12, 700°C
Cast product : 650±15g, 122×122×14mm
Cooling water : Sprue core, Plunger chip
2L/min (13~16°C)



Daido's Hot Work Die Steel Series

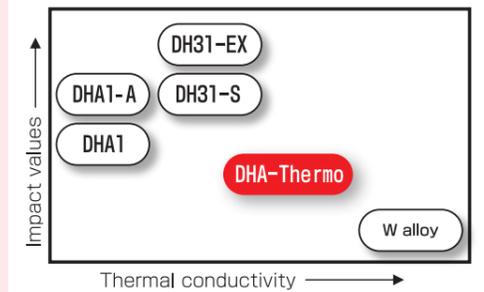
DHA-Thermo™

High Thermal Conductivity Hot Work Die Steel

Features

High functional Hot Work Die Steel with 1.6 times higher thermal conductivity than SKD61 contributing to rapid cooling of die casting and low pressure casting tools such as core pins and sprue cores.

- ◆ High thermal conductivity contributes to rapid solidification and results in refined and improved cast structure with less defects.
- ◆ Reduced thermal load leads to longer life by lessening galling, soldering and heat checking behavior.
- ◆ Applying to the tools around gate helps to shorten cycle time due to faster solidification of casts.



Main applications

Recommended positions or parts	Applied tools	Hardness
· Where cast quality is required to be improved	Insert	40~47HRC
· Where severely galled and heat checked	Core pins	42~47HRC
· Around gate such as biscuits when especially when shorter cycle time is aimed	Sprue bush, Sprue core Plunger chip	40~47HRC

◇ Notes · Sufficient inner cooling is required to exercise the characteristic of high thermal conductivity
· Available for small tools lighter than 40kg due to hardenability

Heat treatment

Re-forging Temp. (°C)	Heat treatment(°C)			Hardness		Transformation Temp.(°C)	
	Annealing	Quenching	Tempering	Annealed	Quenched & Tempered	Ac	Ms
900~1200	820~870 Slow cooling + 650~700 Air cooling	1000~1030 Vacuum (≥4bar)	550~670 Air cooling	≤229HBW	38~49 HRC	727~806	295 (Austenitized at 1030°C)



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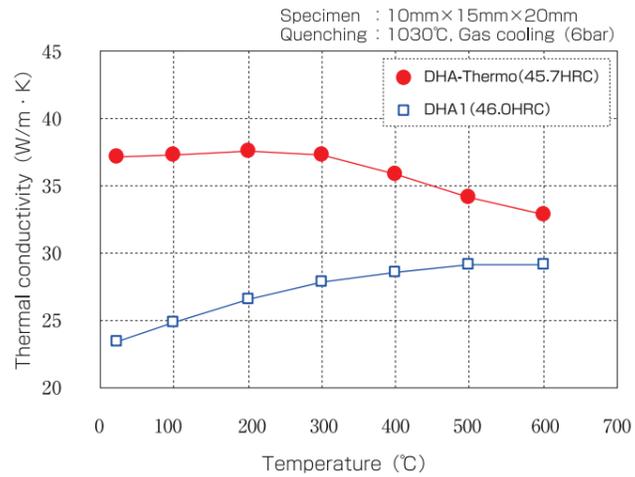
The product characteristics included in this brochure are the representative values based on the result of our measurements, and do not guarantee the performance in use of the products. Please inquire the latest information to our department in charge as the information of this brochure is updated without previous notice as needed.
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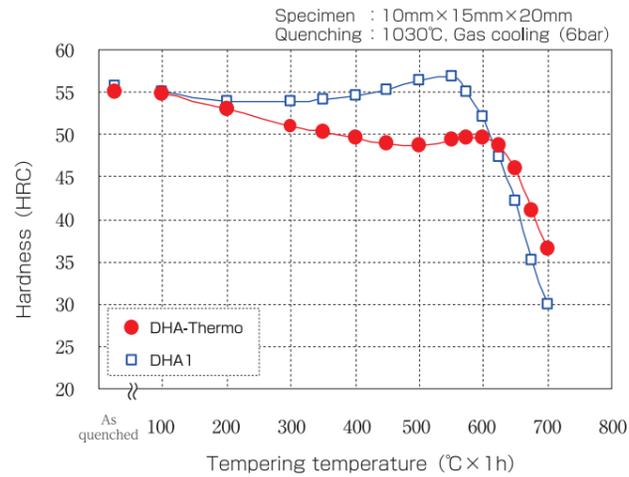
Properties

Material size : 65mm×65mm

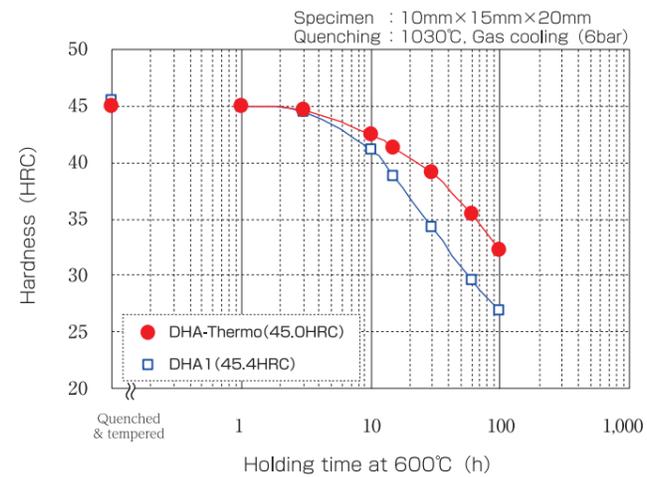
Thermal conductivity



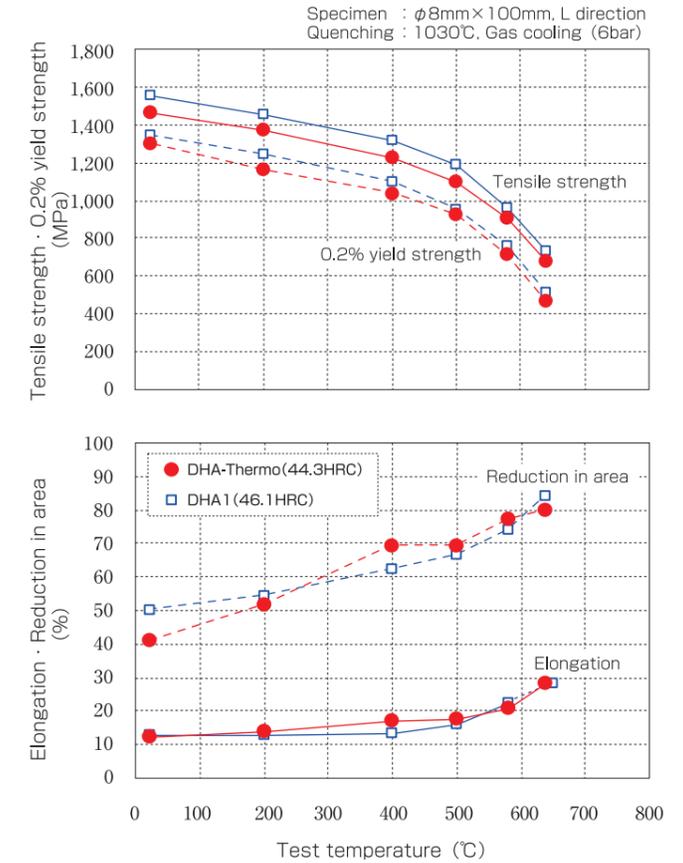
Tempered hardness



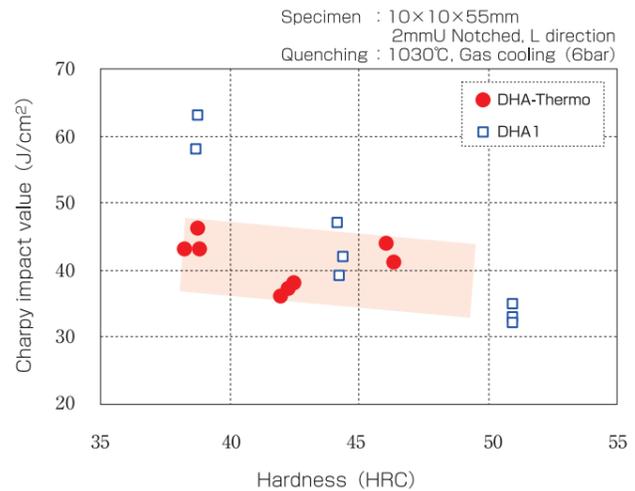
Softening resistance



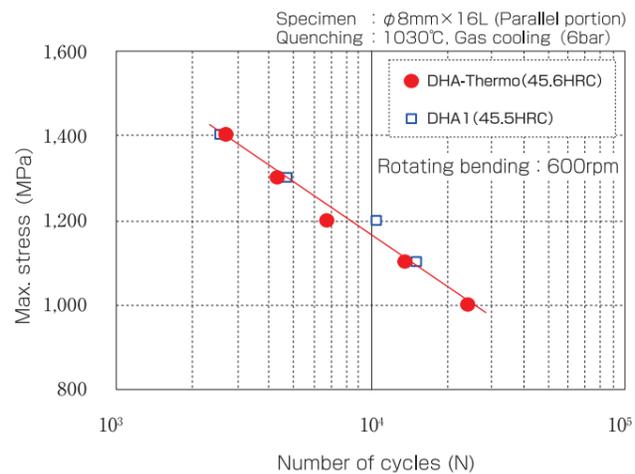
Mechanical properties



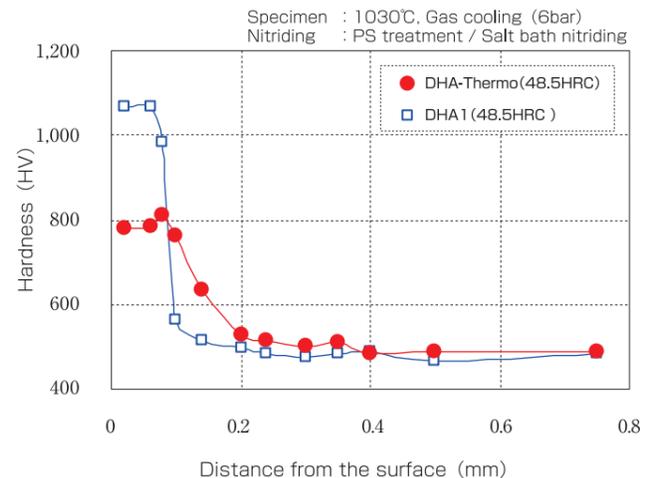
Toughness



Fatigue properties

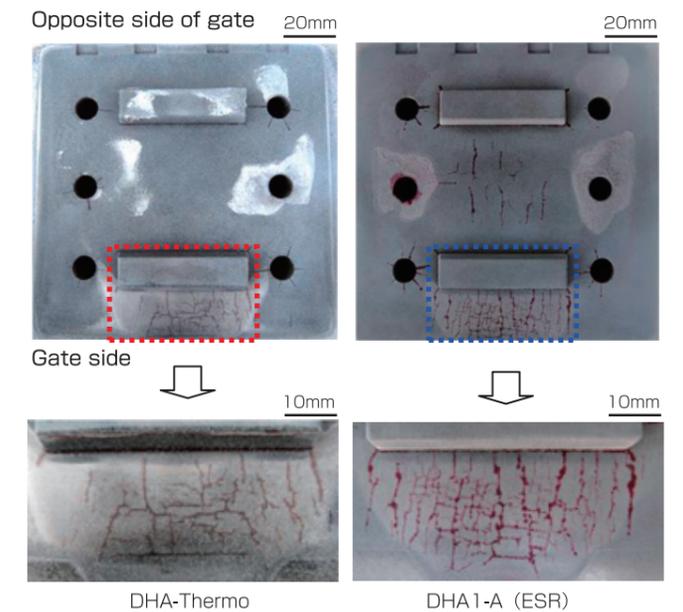


Nitriding characteristics

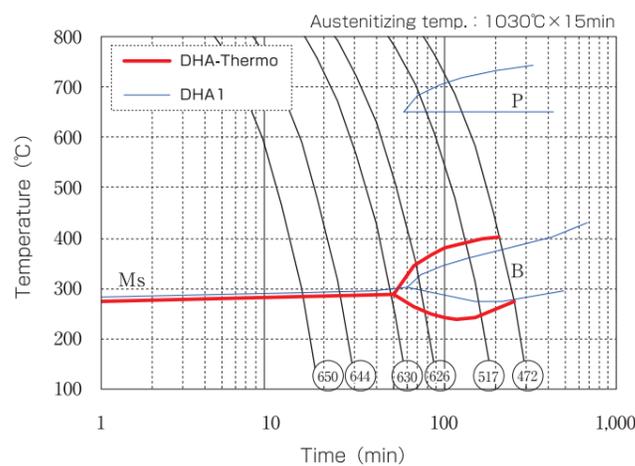


Heat checking resistance

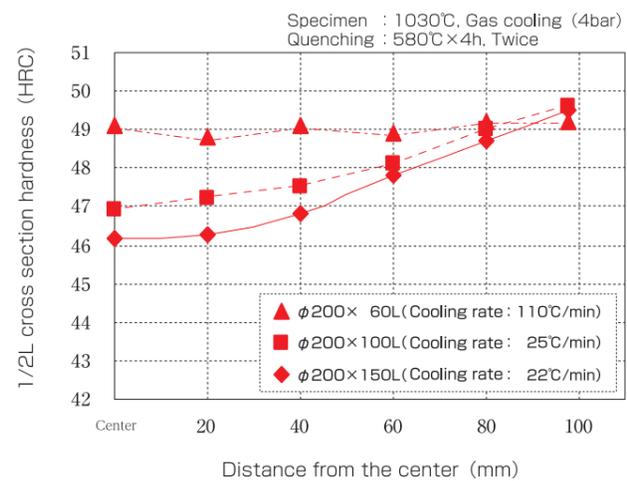
Mold size : 62mm×200mm×205mm (42HRC)
Quenching : 1030°C, Gas cooling (6bar)
Die casting : 135t machine ADC12 (700°C)
Observed at 10,000 runs



CCT diagram



Hardness distribution



Al erosion resistance

