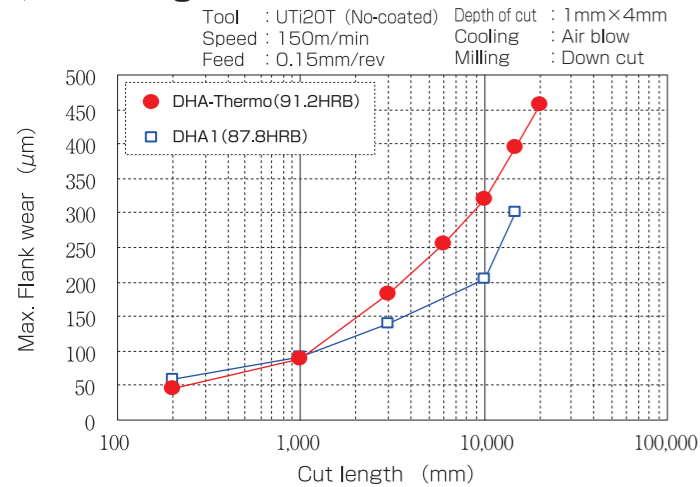
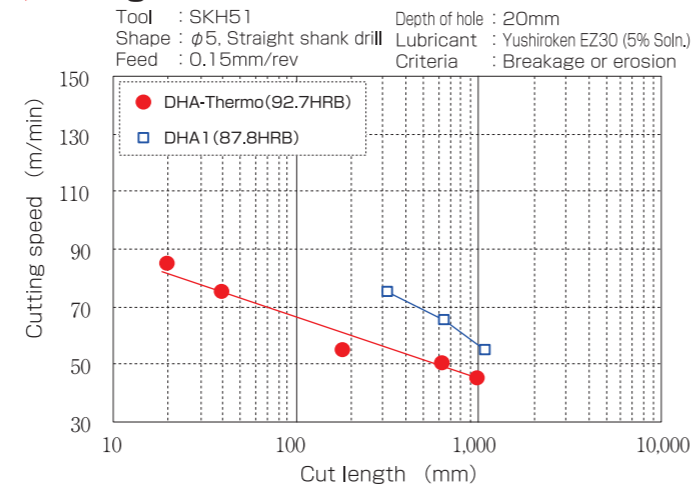


Machinability

◆ Endmilling

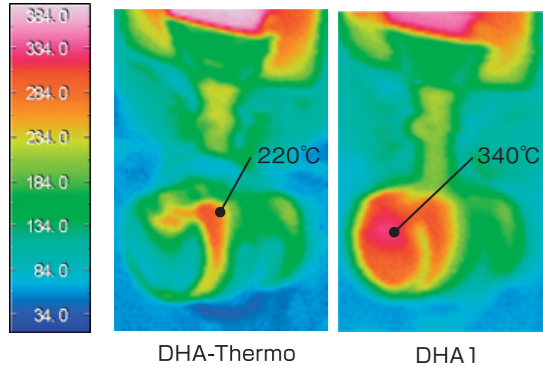


◆ Drilling

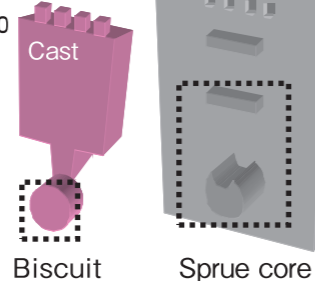
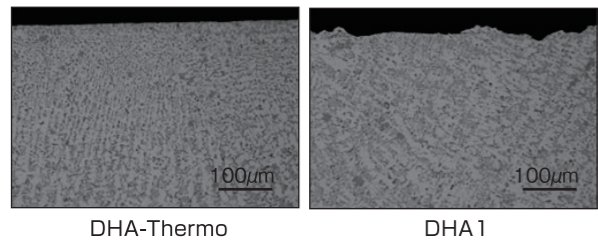


Application to sprue core

◆ Surface temperature of sprue core



◆ Cast structure of the biscuit contacted with DHA-Thermo



◆ 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)

Physical properties

◆ Thermal expansion rate

Quenching : 1030°C, Rapid cooling
Tempering : 640°C, Twice
Hardness : 45HRC

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

Daido's Hot Work Die Steel Series

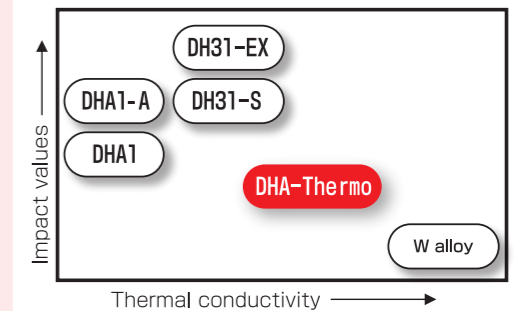
DHA-Thermo™

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)



Tokyo Head Office
(Tool Steel Overseas Marketing & Sales Dept.)

Bangkok Office

Daido Steel Group Europe GmbH

Daido Steel (America) Inc.

Daido Steel (Shanghai) Co., Ltd

**Daido Steel (Shanghai) Co., Ltd
Guangzhou Subsidiary Company**

Daido Shinagawa Building, 6-35, 1-Chome, Konan, Minato-ku, Tokyo, Japan
Phone: +81-3-5495-1270 Fax: +81-3-5495-6739

Unit2-1, 22nd Fl., Silom Complex Bldg., 191, Silom Road, Silom, Bangrak, Bangkok 10500, Thailand
Phone: +66-2-231-3214 Fax: +66-2-231-3216

Insterburger Strasse 16, 60487 Frankfurt am Main, Germany
Phone: +49-69-29802867-0 Fax: +49-69-29802867-40

1051 Perimeter Drive, Suite 1175, Schaumburg, Illinois 60173, U.S.A.
Phone: +1-847-517-7950 Fax: +1-847-517-7951

Room 1402, Ruijin Building, 205 Mao Ming Nan Road, Shanghai, 200020, China
Phone: +86-21-5466-2020 Fax: +86-21-5466-0279

Room 2601, No.8, Linhezhoug Road, Tianhe District, Guangzhou, 510610, China
Phone: +86-20-3877-1632 Fax: +86-20-8550-1126

www.daido.co.jp

DHA is a Registered trademark or Trademark of Daido Steel Co., Ltd.

■ Document Disclaimer

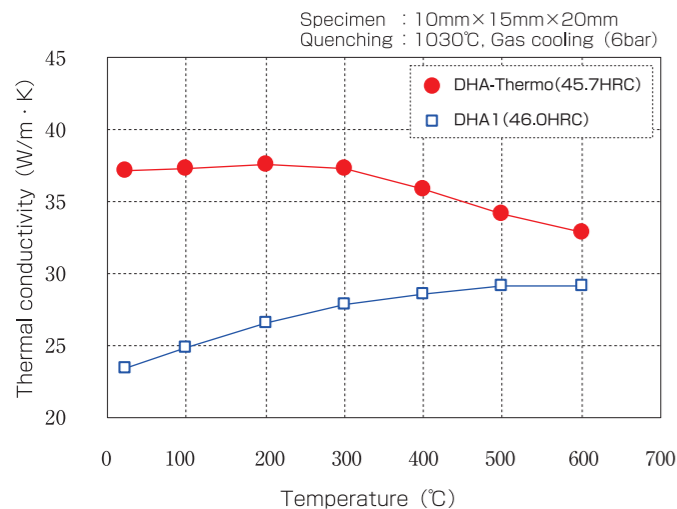
The product characteristics included in this brochure are the representative values based on the result of our measurements, and do not guarantee the performance in use of the products. Please inquire the latest information to our department in charge as the information of this brochure is updated without previous notice as needed.
Copyright ©2012 Daido Steel Co., Ltd. All rights reserved.



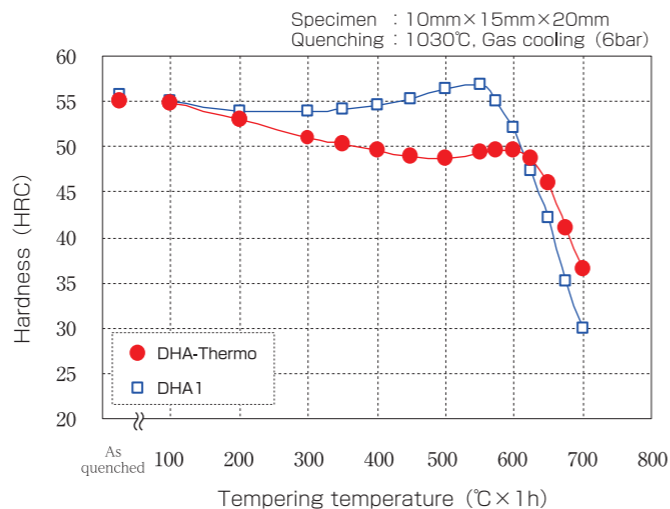
Properties

Material size : 65mm×65mm

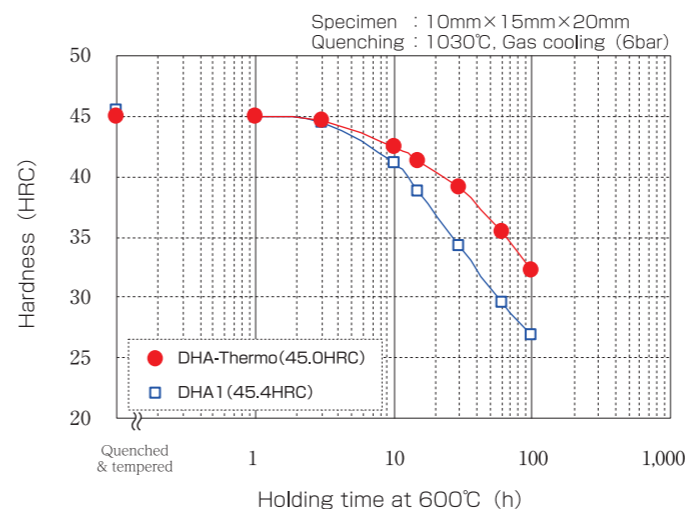
Thermal conductivity



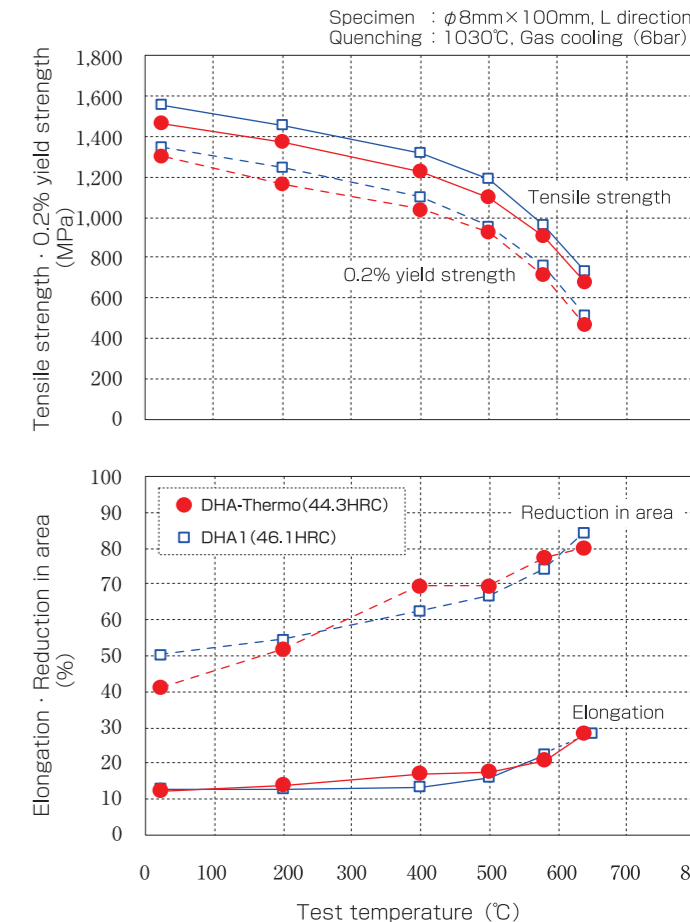
Tempered hardness



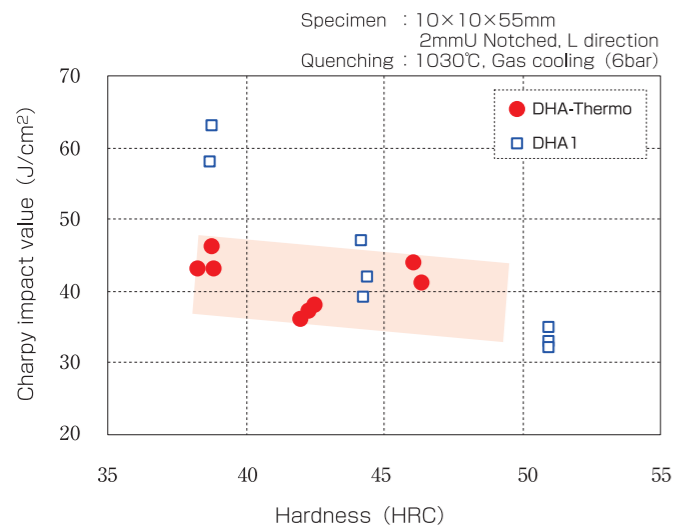
Softening resistance



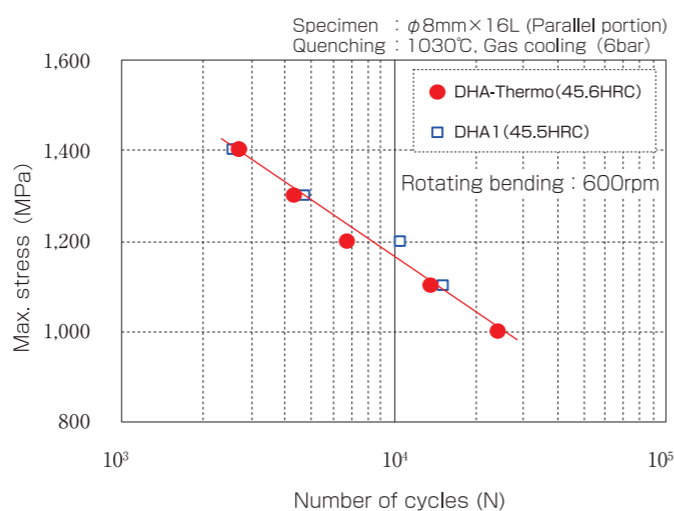
Mechanical properties



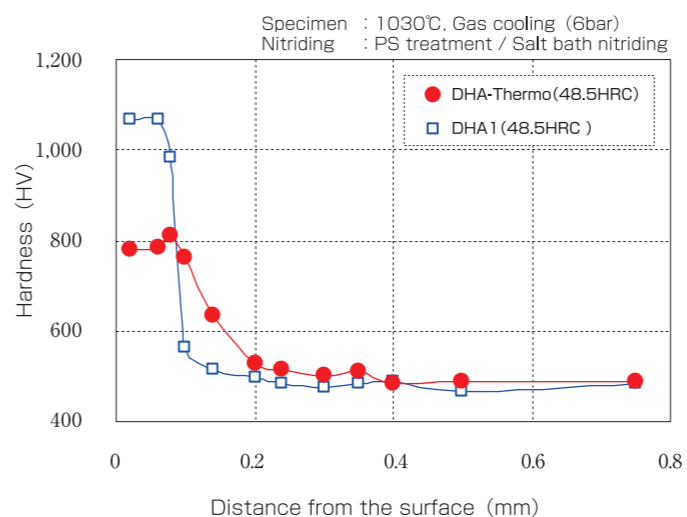
Toughness



Fatigue properties

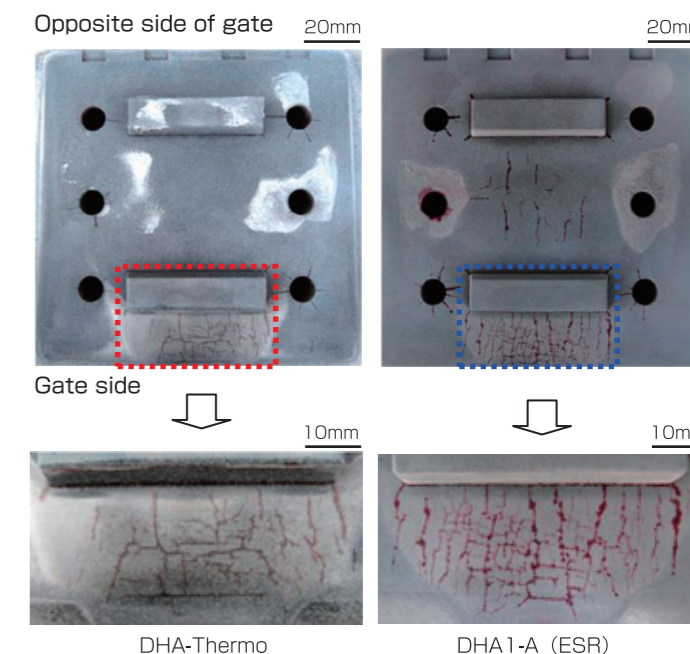


Nitriding characteristics

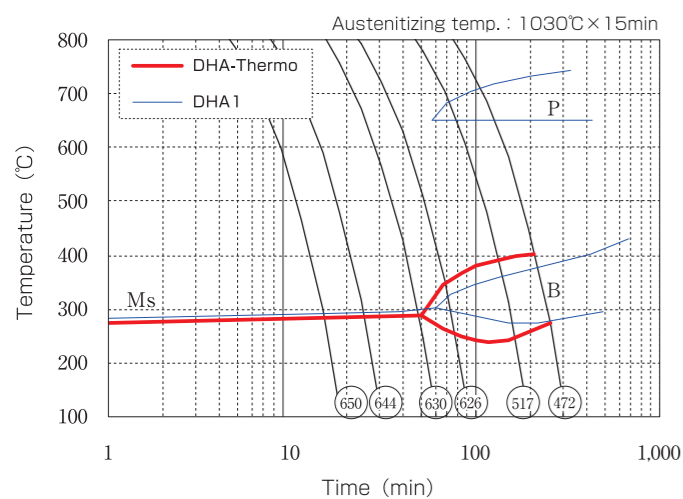


Heat checking resistance

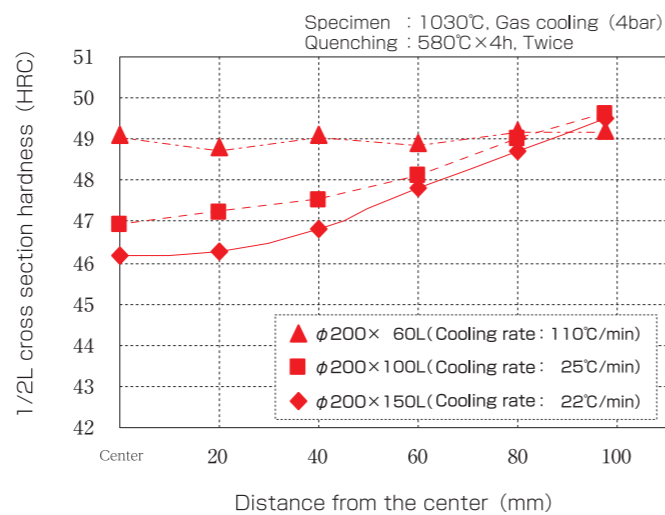
Mold size : 62mm×200mm×205mm (42HRC)
Quenching : 1030°C, Gas cooling (6bar)
Die casting : 135t machine ADC12 (700°C)
Observed at 10,000 runs



CCT diagram



Hardness distribution



Al erosion resistance

