

Mechanical and Physical Properties

Mechanical Properties

	Hardness (HRC)	
	32	53
Tensile strength (N/mm ²)	1,100	1,940
0.2% Proof stress (N/mm ²)	890	1,540
Elongation (%)	15	9
Reduction in area (%)	55	28
Charpy impact value 2uE20°C (J/cm ²)	60	25

Thermal Expansion Coefficient

Thermal expansion (x 10 ⁻⁶ / °C)			
20~100°C	20~200°C	20~300°C	20~400°C
10.8	11.1	11.3	11.5

Thermal Conductivity

Thermal conductivity (W/m • K)				
20°C	100°C	200°C	300°C	400°C
23.0	23.4	23.9	24.7	25.1

Longitudinal Elastic Modulus

Longitudinal elastic modulus (N/mm ²)				
20°C	100°C	200°C	300°C	400°C
214,500	212,500	209,500	200,000	190,000

Density

Density (kg/m ³)				
20°C	100°C	200°C	300°C	400°C
7.80	7.78	7.75	7.73	7.70

Specific Heat

Specific heat (J/kg • K)
20°C
460

Welding Properties

Build-up Welding Procedures

Heat treatment	Welding rod	Pre and post-heating	
		Pre-heating	Post-heating
Pre-hardened (32HRC)	AWS: ER420 (JIS SUS420J2)	200~250°C	650°C
Quench-tempered (52HRC)		200~250°C	250°C Twice or 510°C Twice (Below tempering temperature)



DAIDO STEEL CO., LTD.

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

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

Daido Steel (America) Inc.

1111 Plaza Drive, Suit 740, Schaumburg, Illinois60173 U.S.A.
Phone: +1-847-517-7950 Fax: +1-847-517-7951

Bangkok Office

Unit2-1, 22nd Fl., Silom Complex Bldg., 191, Silom Road,
Silom, Bangrak, Bangkok10500, Thailand
Phone: +66-02-231-3214 Fax: +66-2-231-3216

Daido Steel (Shanghai) Co., Ltd.

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

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

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

S-STAR

32HRC Pre-Hardened or 53HRC Quench-Hardened Type
Ultra-Hard, Mirror-Finish, Corrosion-Resistance
Plastic Mold Steel

Features

- 1 Excellent corrosion resistance
- 2 High hardness, maximum 53HRC, is obtained
- 3 Super mirror-finished surface
- 4 Minimal distortion, less than ±0.03%, after heat treatment
- 5 Excellent internal soundness by special melting
- 6 Uniform texture surface by process etching and excellent electric discharge-machining
- 7 It is available to provide pre-hardened materials with the hardness 32HRC

Applications

- 1 Ultra mirror finish plastic molds
 - Lens
- 2 Ultra-hard, Corrosion-resistance plastic molds
 - Medical instruments, Cosmetic container, Food container
- 3 Resin
 - PMMA, PC, PP, PS, PVC, PE, PF, Flame resisting compound added resin

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 © 2018 Daido Steel Co., Ltd. All rights reserved.

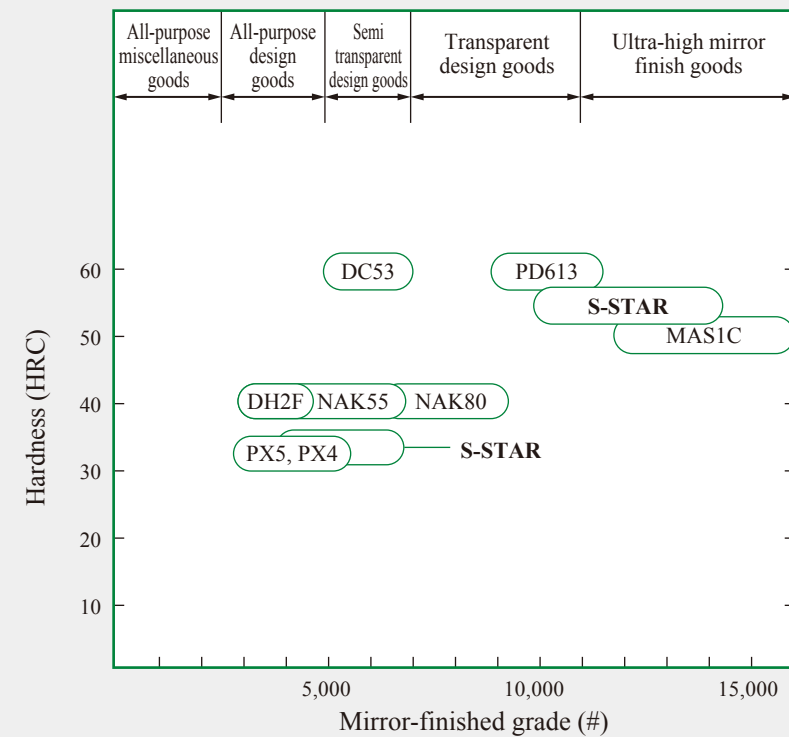


Chemical Composition

Daido Brand (JIS)	Supply Condition (hardness)	Chemical Composition (%)				
		C	Si	Cr	Mo	V
S-STAR (SUS420J2 mod.)	Annealing (HBW ≤ 229)	0.38	0.9	13.5	0.1	0.3
	Pre-hardened (31-34HRC)					

Mirror Finish Properties

- Excellent corrosion resistance and mirror-finish surface are obtained with the high hardness: 53HRC



《Normal polishing procedures》

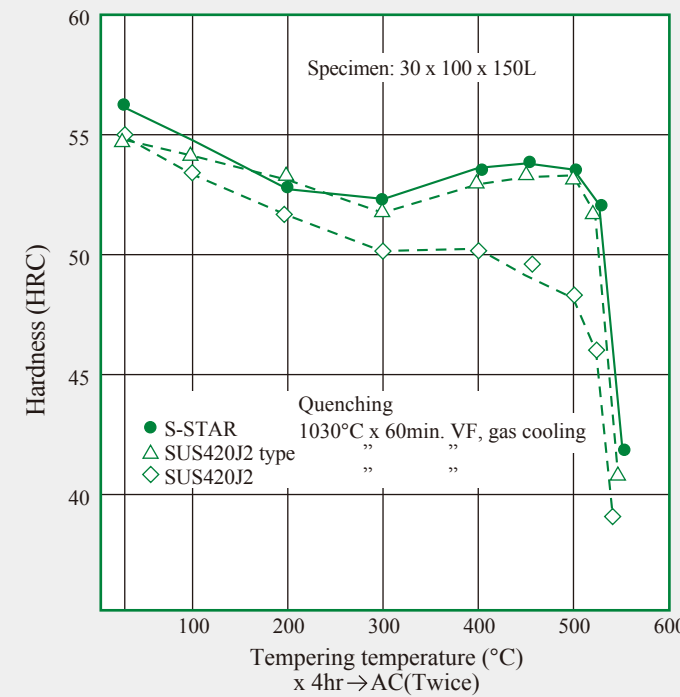
- Turning } → Grinding (~#220 → #320 → #400)
- Milling } → Emery paper polishing (#320 → #400 → #600 → #800 → #1000 → #1200 → #1500) → Diamond paste finishing (#1200 → #1800 → #3000 → #8000 → #14000)

With NAK55, surface might be roughed to aventurine finish surface when the method of polishing of #5000 or finer polishing is attempted.

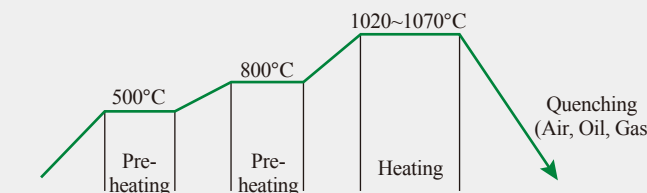
Heat Treatment

Hardened-Tempered Hardness

Maximum hardness of 53HRC is obtained.

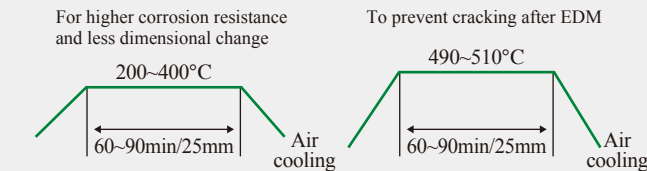


Quenching



Tempering

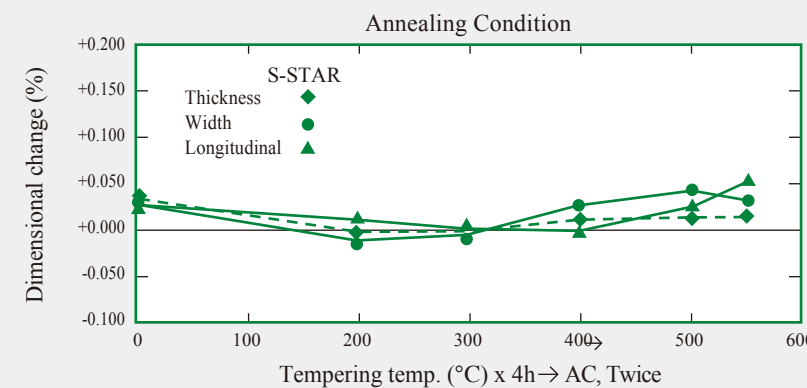
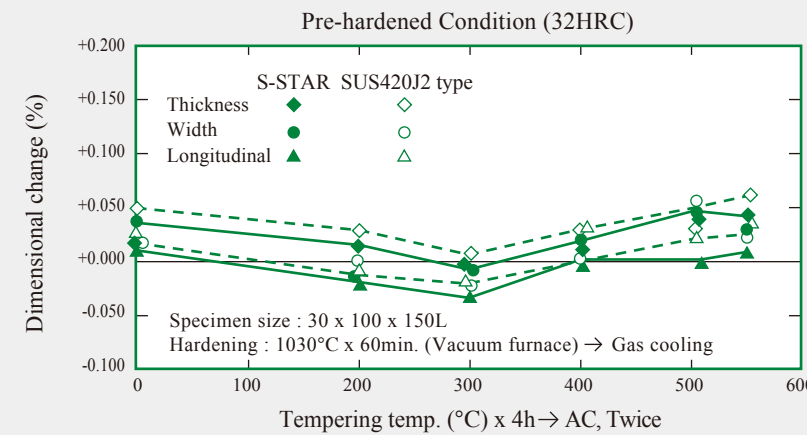
Double tempering is recommended for both low and high temperature tempering.



- Note ● For higher corrosion resistance, tempering should be carried out at temperatures of 400°C or lower.
- To prevent from cracking in EDM tempering is recommended at 490 to 510°C.
- When aging dimensional stability is deemed important, carry out low temperature tempering at 200 to 400°C or sub-zero processing.

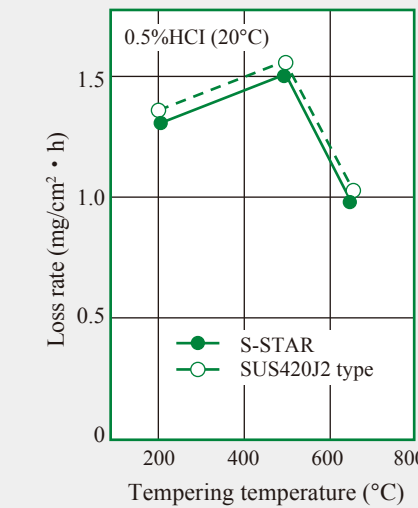
Dimensional Change

Dimensional change is the smallest by tempering about 300°C.

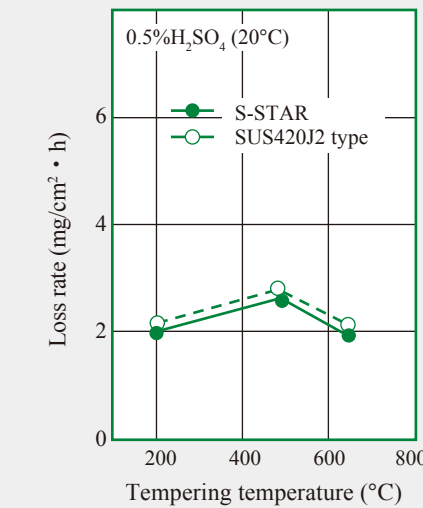


Corrosion Resistance

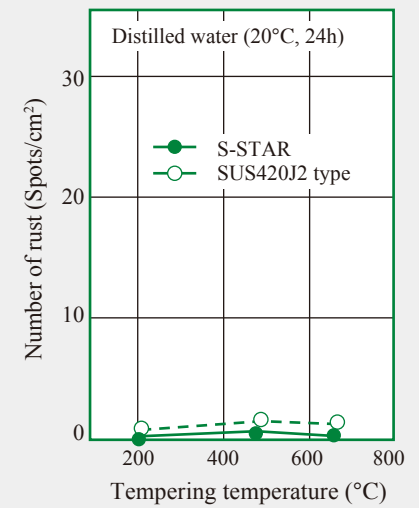
Hydrochloric Acid



Sulphuric Acid



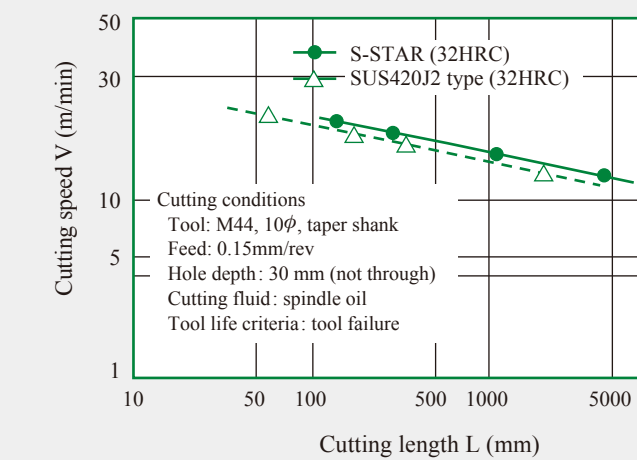
Distilled Water



Machinability

Good machinability under supply conditions (P.H).

Drill Tool Life (Pre-hardened)



Endmill Tool Life (Pre-hardened)

