The KDA1 is a general-purpose hot-tool steel with a higher strength at high temperature and tenacity than the general-purpose hot-tool steel KDS (equivalent to SKD61).

Features of KDA1

1.Superior heat-check resistance

●Hard to crack in comparison with the SKD61, and has a finer structure. ●Has superior heat-check resistance equivalent to the KDA1S and offers longer service life.

2.Superior tenacity ●80% or more higher tenacity than the SKD61 (in the T direction). ●Good tenacity equivalent to the KDA1S.

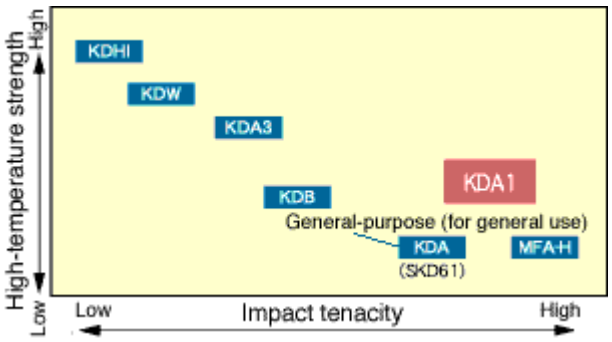
3.Superior heat-softening resistance ●Twice as high heat-softening resistance as the SKD61 maintains high hardness for a long time.

Applications

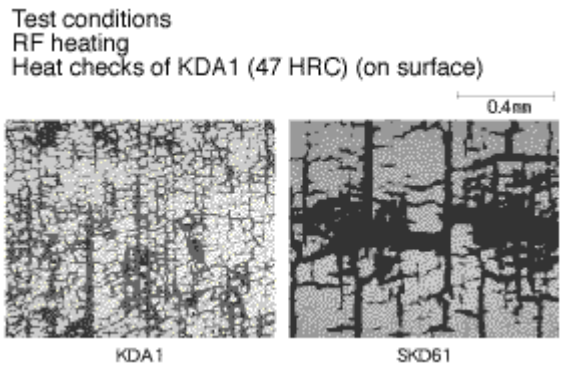
●Tools for hot projection

●Hot forging dies

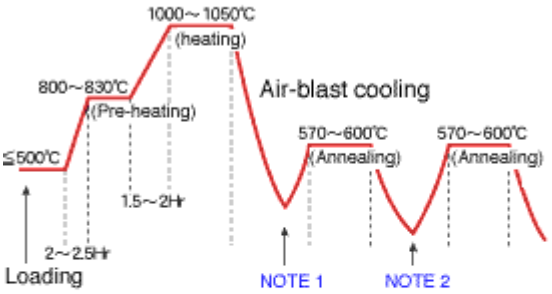
Position of KDA1



Heat-check resistance



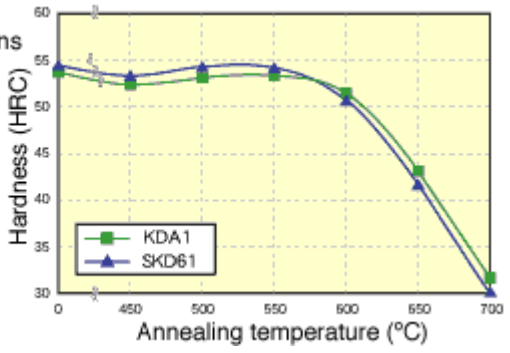
Thermal processing characteristics

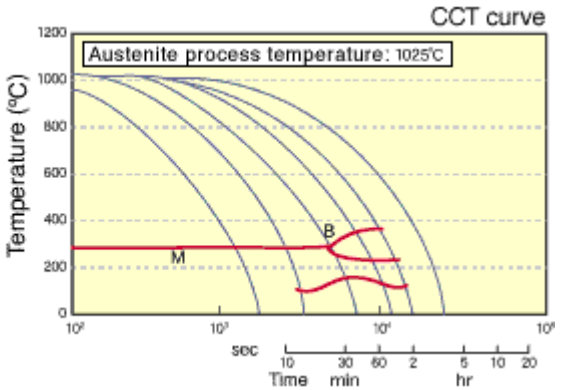


NOTE 1:Cool the anneal-heated products forcedly with N2 gas or air until the die temperature decreases down to between 100°C–150°C.
Load the products into the annealing furnace at the furnace temperature below 300°C. (Observe this procedure for the first annealing.)

NOTE 2: Be sure to execute annealing two or more times.
Execute additional annealing if the hardness is too high after the second annealing.

Test conditions
●Test-piece dimensions
30×30×30mm
●Hardening: 1030°C
Cooling with N2 gas
(Vacuum furnace)
●Annealing
Keeping for 1 hour
(performed once)

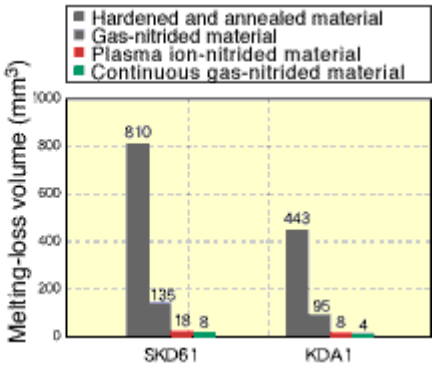




Melting-loss resistance

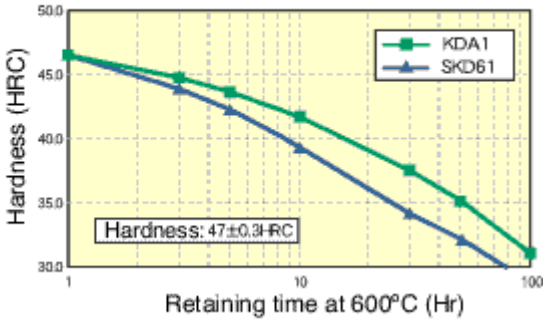
The KDA1 features superior melting-loss resistance to the SKD61, which is remarkably improved by surface treatment.

Test conditions
- Test piece: 47±0.5HRC
- Al alloy: ADC12
- Melting temperature: 700°C
- Revolution: 500rpm
- Test time: 20min



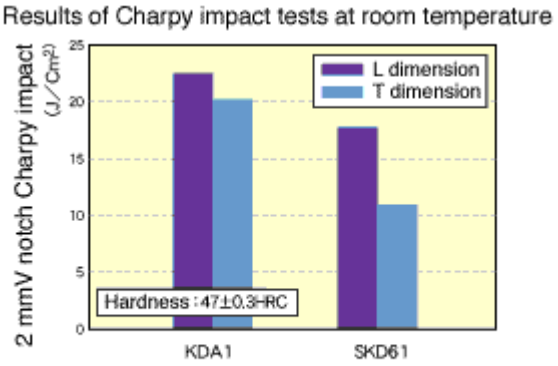
Heat-softening resistance

The KDA1 features superior heat-softening resistance to the SKD61.

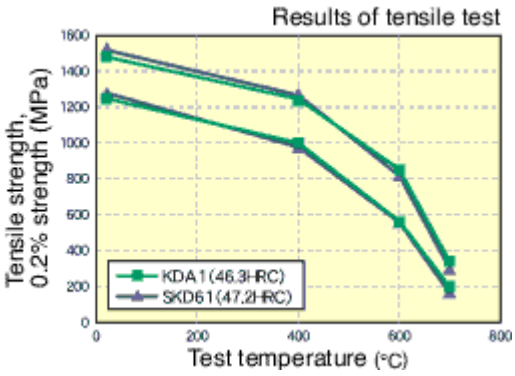


Strength and tenacity

The KDA1 features superior tenacity to the SKD61.



Test condition
Material dimensions: 120 x 250 x L, center



Physical properties

The KDA1 has smaller thermal expansion than the SKD61.

Lower thermal conductivity than the SKD61 yields less temperature gradient.

■ Thermal expansion factor (×10⁻⁶/°C)

Temperature /°C	KDA1	SKD61
100	9.01	9.67
200	10.35	11.11
300	11.12	11.92
400	11.78	12.54
500	12.35	13.10
600	12.85	13.61
700	13.11	13.91

■ Thermal conductivity (cal/cm·sec·°C)

Temperature /°C	KDA1	SKD61
30	0.069	0.059
200	0.078	0.069
400	0.079	0.068
600	0.076	0.068
700	(0.075)	(0.067)
800	0.074	0.066