

Tool Steel

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SēAH Changwon Integrated Special Steel

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Tool Steel

Major Ingredients and Uses								
Grade		Chemical composition (%)						Use
		C	Si	Mn	Cr	Mo	V	
STD61	-	0.4	1.0	0.4	5.1	1.3	0.9	Hot work tool steel
DC1	STD61 Modified	0.4	0.6	0.6	5.0	Add	Add	Premium hot work tool steel
STD11	-	1.5	0.3	0.3	12.0	0.9	0.3	Cold work tool steel
TD1	8Cr Steel	0.9	1.0	0.6	7.8	Add	Add +Al,Nb	Premium cold work tool steel for advanced high strength steel (HRC 55~60)
TD5	8Cr Steel	1.0	1.0	0.4	8.0	Add	Add +Al,Nb	Premium cold work tool steel for trimming dies (HRC 57~63)
TW27	8Cr Steel	1.0	1.0	0.4	7.5	Add	Add	Cold work tool steel for rolling dies (HRC 62~64)
KCW1	Matrix HSS	0.6	1.5	0.4	4.3	Add	Add	Cold/Hot forging tool steel (HRC 58~61)

Premium Hot Work Tool Steel

DC1

General features

- Improved STD61 applicable for wide variety of uses
- Improved toughness and heat check resistance
- Superior high-temperature strength and machinability

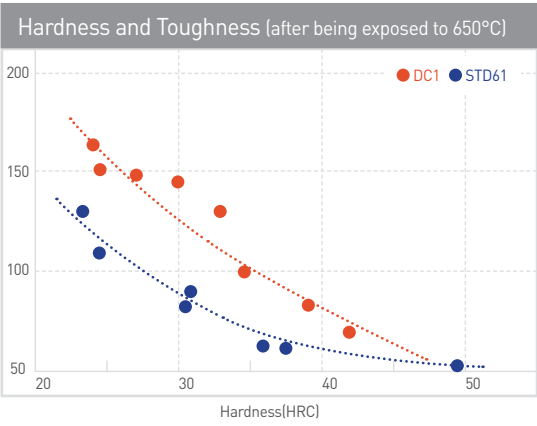
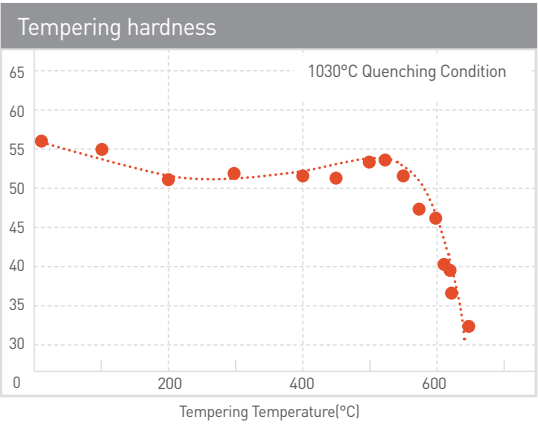
Applications

Die Casting, Hot Forging, Extrusion

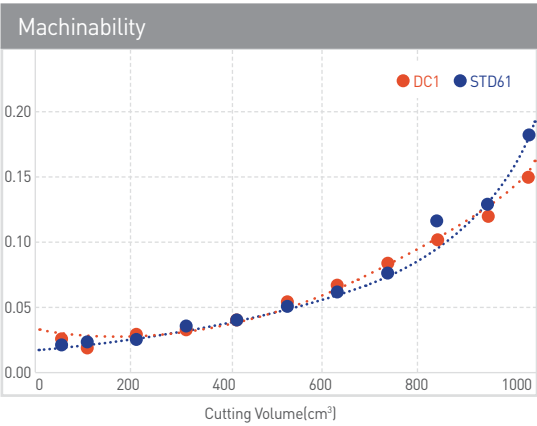
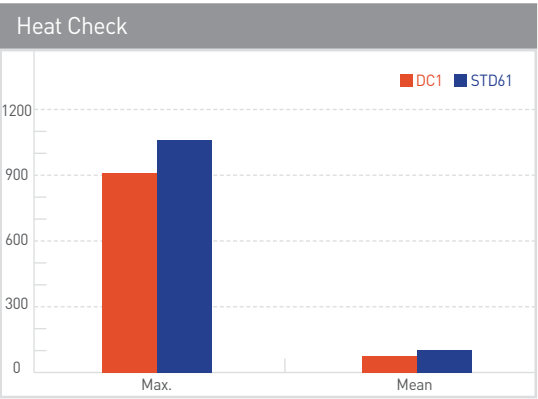
Chemical composition (wt%)

Grade	C	Si	Mn	Cr	Mo	V
STD61	0.4	1.0	0.4	5.1	1.3	0.9
DC1	0.4	0.6	0.6	5.0	Add	Add

Mechanical properties



The hardness and impact toughness have been improved by the steel-making process and hot work process optimization.



The molds life can be improved as a result of the reduced heat check through improvement of high temperature strength and toughness. Also, machining costs can be reduced by improving machinability.

Application example

According to the evaluation of Company K, an automobile parts manufacturer, the mold life has been improved above present condition.

Application	Evaluation	Present Condition
Die Casting	123,000ea (▲20%)	~ 100,000ea
Hot Forging	4,900ea (▲40%)	~ 3,000ea



Die Casting Mold (timing Chain Cover)



Hot Forging Mold (Non Driven)



Premium Cold Work Tool Steel for Advanced High Strength Steel

TD1

General features

- Improved STD11 applicable for wide variety of uses
- Improved toughness and chipping resistance
- Improved machinability can reduce costs

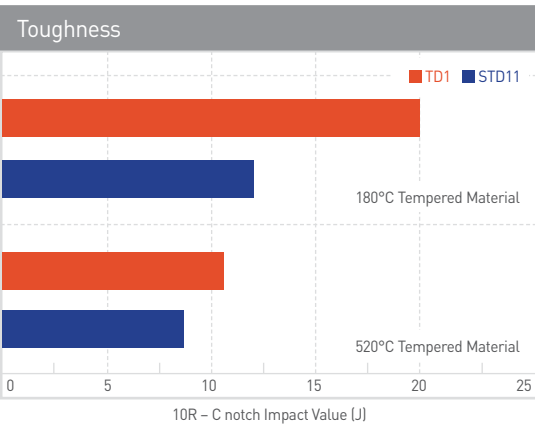
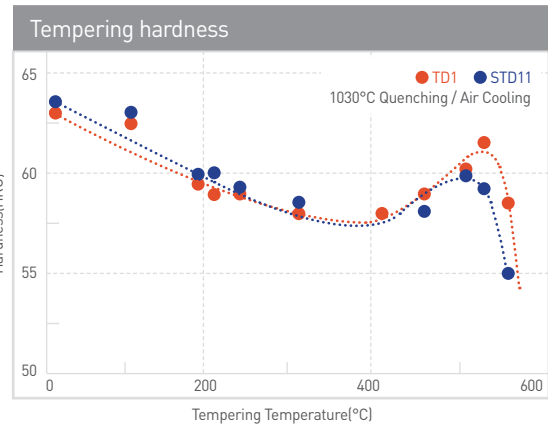
Applications

Cold Press, Blanking Die for automotive parts

Chemical composition (wt%)

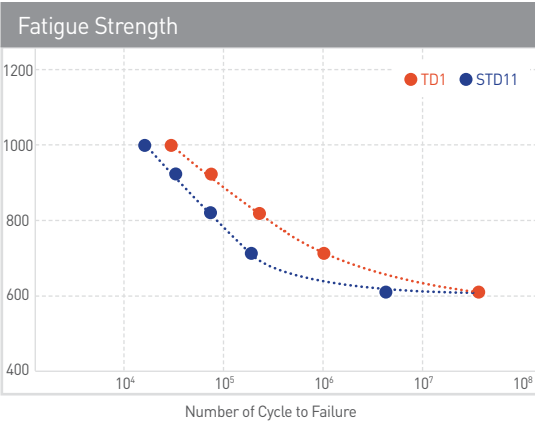
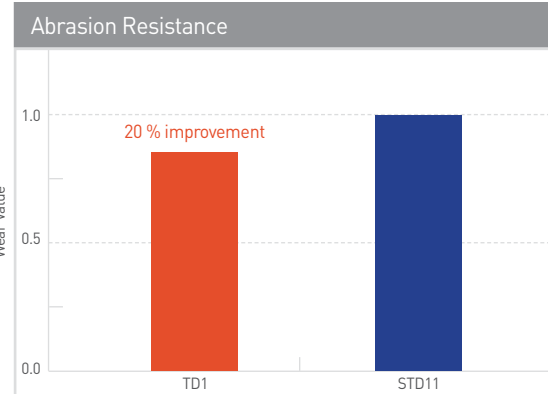
Grade	C	Si	Mn	Cr	Mo	V	Etc.
STD11	1.5	0.3	0.3	12.0	0.9	0.3	-
TD1	0.9	1.0	0.6	7.8	Add	Add	Al, Nb

Mechanical properties



High hardness is secured in the high temperature tempering conditions better than STD11.

The impact toughness is improved by reduced carbides size, it is suitable for advanced high tensile steel sheets.



The mold life is expected to be extended through the improvement of abrasion resistance and fatigue strength. In particular, it can be used as a way to reduce mold breakages such as chipping.

Application example

According to the evaluation of Company S, an automobile parts manufacturer, the mold life has been improved above the present condition.

Application	Evaluation Result	Present Condition
B-Pillar mold	135,000ea (▲35%)	~ 100,000ea
Steel wheel mold	50,200ea (▲65%)	~ 30,000ea



Mold of Company "S" produced from TD1 (DP 980 forming)

Tool Steel

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Premium Cold Work Tool Steel for Advanced High Strength Steel (ESR Grade)

TD5

General features

- Specialized tool steel for cold trimming dies
- Superior abrasion resistance and impact toughness
- Superior nitriding and surface coating

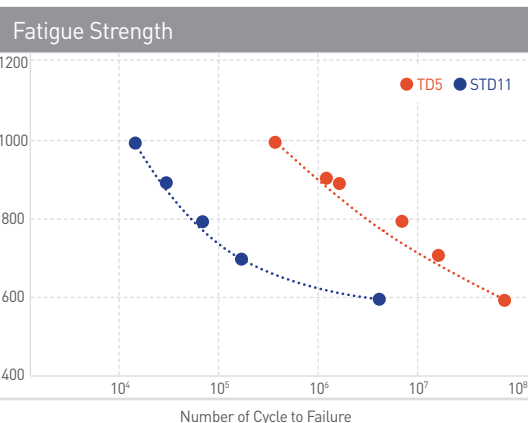
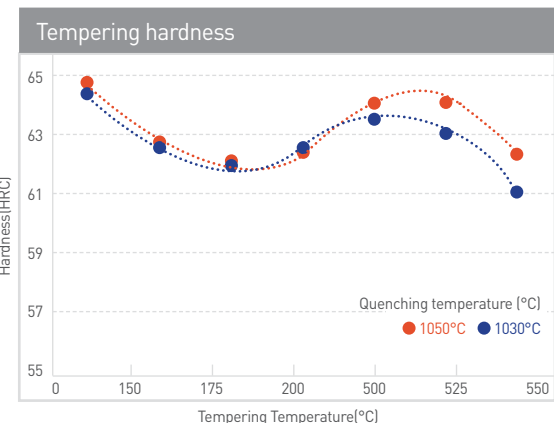
Applications

Trimming Dies, Cold Forming Dies, Knife

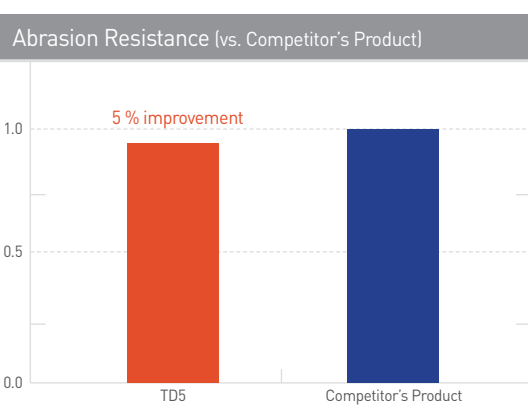
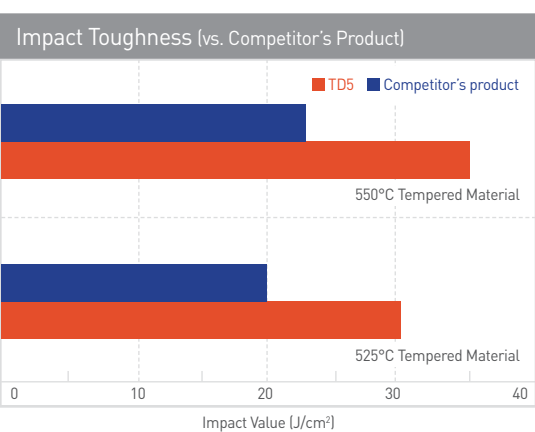
Chemical composition (wt%)

Grade	C	Si	Mn	Cr	Mo	V	Etc.
STD11	1.5	0.3	0.3	12.0	0.9	0.3	-
TD5	1.0	1.0	0.4	8.0	Add	Add	Al, Nb

Mechanical properties



Stable high hardness can be secured at high temperature tempering condition. Mold chipping and cracks can be reduced by improving fatigue strength.

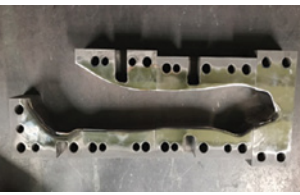


More advanced impact toughness and abrasion resistance than competitor's product can improve the mold life.

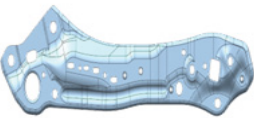
Application example

According to the evaluation of Company I, an automobile parts manufacturer, the mold life has been improved above present condition.

Application	Evaluation Result	Present Condition
Car seat mold	35,200ea (▲30%)	26,000ea
Crusher Blade	35 days	30 days



Company "I" mold produced from TD5



Product (Car seat mold)

Tool Steel

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TW27

for Rolling Dies

General features

- High hardness is secured after high temperature tempering (HRC 62 or higher)
- Superior abrasion resistance and impact toughness

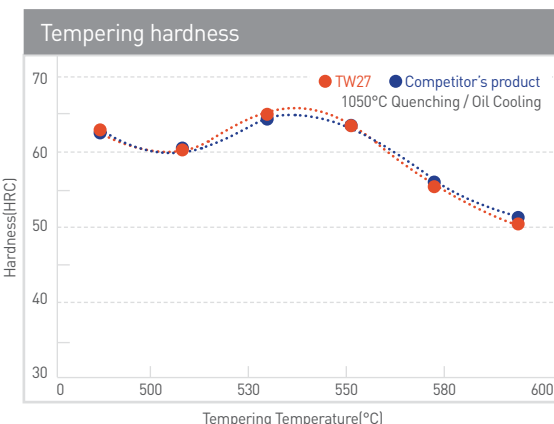
Applications

Rolling Dies, Fine Blanking Dies

Chemical composition (wt%)

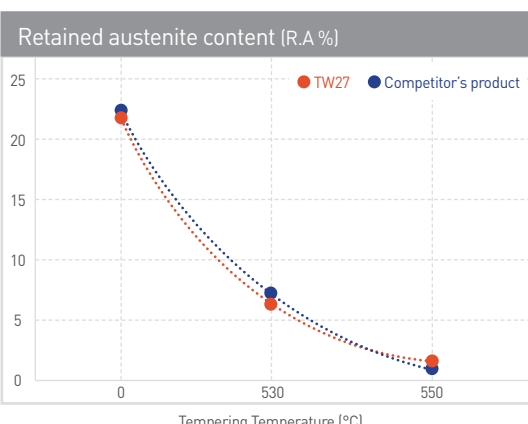
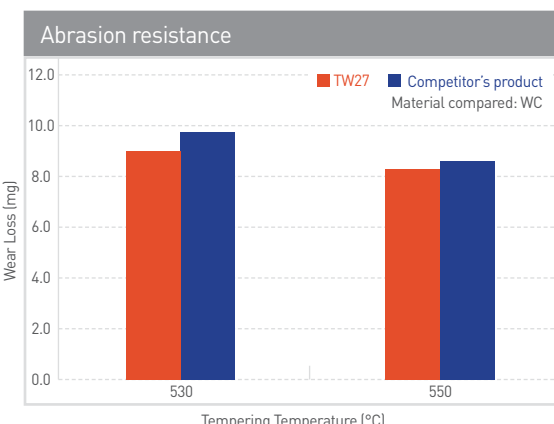
Grade	C	Si	Mn	Cr	Mo	V
STD11	1.5	0.3	0.3	12.0	0.9	0.3
TW27	1.0	1.0	0.4	7.5	Add	Add

Mechanical properties (vs. Competitor's product)



Hardness more than HRC 62 can be secured after high temperature tempering.

Impact toughness is equivalent to or better than that of competitors' products.



Dispersed carbide can improve abrasion resistance .

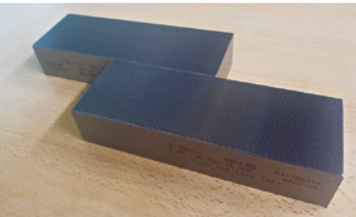
Deformation is suppressed by controlling retained austenite after high temperature tempering.

It can be used for stable rolling dies.

Application example

According to the evaluation of Company K, rolling dies manufacturer, the target mold life has been secured.

Application	1st	2nd	Target
Company A	51,000ea	53,000ea	50,000ea ▲
Company B	129,500ea	147,400ea	120,000ea ▲



Company "A" Product Evaluation

Tool Steel

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KCW1

for Cold/Hot Forging

General features

- Superior crack and chipping resistance
- Improved impact toughness
- Hardness: HRC 58 ~ 61

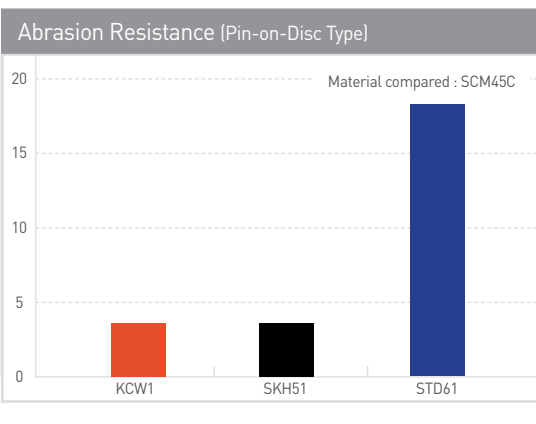
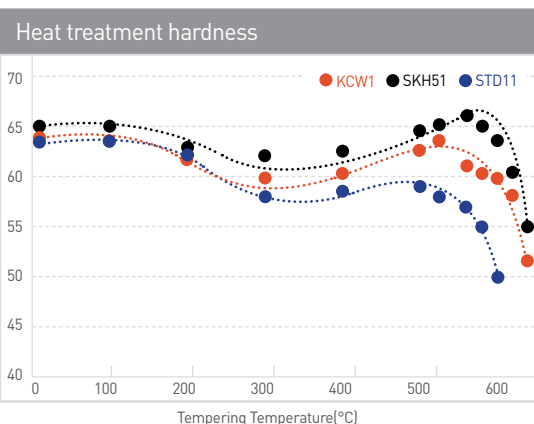
Applications

Cold forging dies, Warm forging dies

Chemical composition (wt%)

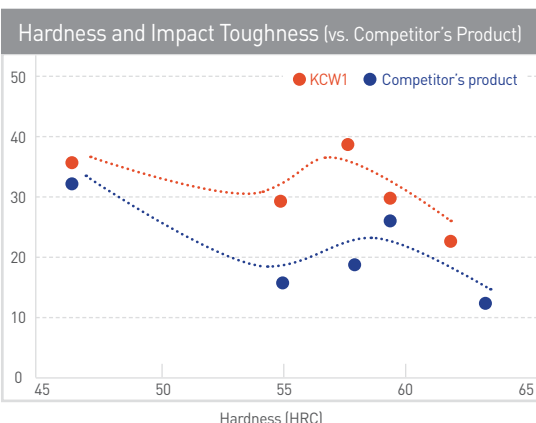
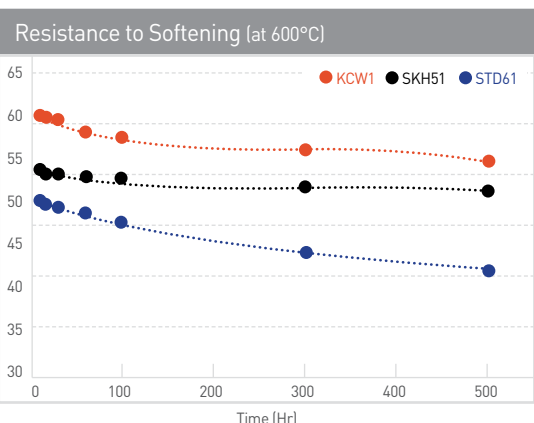
Grade	C	Si	Mn	Cr	Mo	V
KCW1	0.6	1.5	0.4	4.3	Add	Add

Mechanical properties



An improved high hardness is secured as compared to cold work tool steel (STD11)

Abrasion resistance is similar to that of high speed tool steel.



Hardness is stable under forging conditions.

The mold life can be improved through the improved hardness and toughness compared to competitors' products.

Application example

According to the evaluation of Company H and I, an automobile parts manufacturer, the target mold life has been secured.

Application	Evaluation Result	Target
Company H	20,526ea	20,000ea ▲
Company I	18,250ea	18,000ea ▲



Company "H" Outer Race mold



Company "I" T/P Housing mold