



# Hot Working Tool Steel

## PREMIUM GRADE TGE23



Smelting method : EAF+LF+VD+ESR+VMR

Main characteristics : High ductility, high thermal fatigue resistance, high thermal erosion resistance, high isotropic property, high purity and small heat treatment distortion.

Major applications : ● Mainly used for processing of light alloy - metal pipes, rods, extruded carrier rods, molds, and extruded molds, etc. ● Pressure casting equipment, molded trimming die, compression moulding inserts, etc. ● Hot shearing blades, plastic molds, etc.

Equivalent Grade from UDDEHOLM / DIEVAR

Chemical constituent (%):

C	Si	Mn	Cr	Mo	V	P	S
0.37	0.3	0.4	5.0	2.2	0.45	≤0.015	≤0.001

Physical Property :

Room temperature density (Kg/m <sup>3</sup> )	Specific heat of room temperature (J/Kg.K)	200°C thermal conductivity (W/m.K)	Elastic modulus (N/mm <sup>2</sup> )	Linear expansivity (x10 <sup>-6</sup> /K)	
				20 ~ 200°C	20 ~ 400°C
7.85	460	29.7	215,000	12	12.5

Ultrasonic flaw detection: As per GB/T4162 Class AA flaw detection, i.e., flat bottom hole ≤φ 1mm, no flaw detection noise wave shall appear or please comply with customer regulation.

Purity :

Class A		Class B		Class C		Class D	
Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse
1.0	0.5	1.5	1.0	1.0	1.0	1.5	1.0

Delivery state : (1) Delivery hardness: delivery under annealing state, delivery hardness ≤ 229HB; (2) Organization state and impact power requirement: the organization and segregation shall comply with North American Die Casting Association No. 207 criterion; (3) Impact power sample: please sample according to the central part of steel. The samples shall be treated according to criterions in North American Die Casting Association, making sure that hardness of samples at 45±2HRC. Dimension of sample: 7\*10\*55. Gapless.

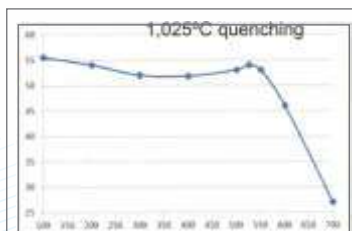
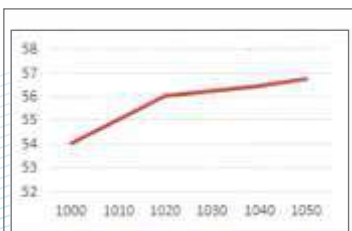
Specification (diameter, thickness mm)	Average impact power at the center part not less than (J)	Minimum impact power per sample not less than (J)
≥60-200	380	350
≥201-300	350	300
≥ 01	300	250

Supply specification

Product Name	Specification/mm	Material
Forged round bar	φ 71-810	TGE23
Forged module	(120-400) x (300-800)	TGE23
Rolled round bar	φ 14.5-70	TGE23
Rolled flat bar	(12-120) x (200-810)	TGE23

Thermal treatment

Softening annealing	Quenching	Tempering
Heating to 850°C for heat insulation; cooling to 600°C at 10°C/h air cooling	1020-1040°C quenching; high-speed gas quenching or hot oil cooling	Selecting tempering temperature according to hardness requirements; please conduct tempering for 3 times; prevent tempering under 450-550°C



Austenite temperature: 1025°C, heat insulation for 30min

