

# ENGINE VALVE STEEL

FOR INTAKE AND EXHAUST VALVES OF  
INTERNAL COMBUSTION ENGINES

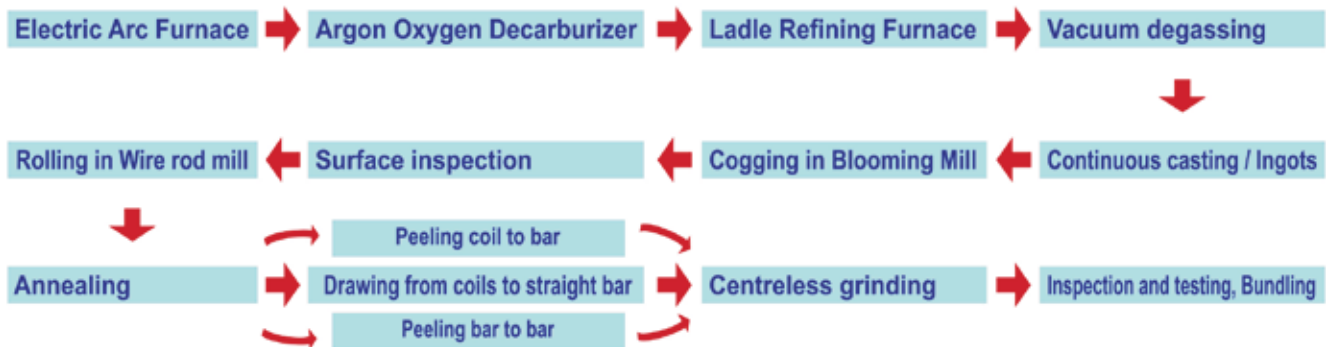


*BIS Approved*  
NABL Accredited Chem & Mech Labs.  
ISO 9001 & IATF 16949 Certified by UL DQS  
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# Engine Valve Steel

Sunflag Steel is a leader in production of heat resistant steel used for manufacture of Intake and Exhaust valves for Internal Combustion Engines.

## Process route for Manufacturing of Valve Steel



## Inspection and Testing at Sophisticated Lab

- Inspection and Testing for Surface Quality i,e MPI /ECT/Zygo
- Internal Soundness Ultrasonic Test
- Dimension, Length
- Hardness, Microstructure, Inclusion, Grain Size



### Grades / Standards

EN 10090	SAE	DIN ( W No.)	BS	JIS	IS
X45CrSi93	HNV3	1.4718	EN 52	SUH1	X45Cr9Si3
X40CrSiMo10-2	HNV1	1.4731		SUH3	X40Cr11Si2Mo10
X50CrSi 82				SUH-11	X50Cr8Si2
X53CrMnNiN21-9	EV8	1.4871	21-4N	SUH35	X53CrMnNiN219
X55CrMnNiN20-8	EV12	1.4875	21-2N		X55CrMnNiN208
X50CrMnNiNbN219	VA63	1.4882	21-43		X50CrMnNiNbN219
	HEV3		Inconel 751		NiCr15Fe7TiAl

### Chemical Composition

Elements	Grades		
	X45CrSi 9-3 (EN 52)	21-4 N	Inconel 751
%C	0.40-0.50	0.48-0.58	0.10 max
%Mn	0.6 max	8.0-10.0	1.0 max
%P	0.04 max	0.05 max	
%S	0.030 max	0.03 max	0.015 max
%Si	2.7-3.3	0.25 max	0.50 max
%Cu	--	--	0.50 max
%Cr	8.0-10.0	20.0-22.0	14.0-17.0
%Ni	0.50 max	3.25-4.50	Balance
%Mo	--	--	--
%V	--	--	--
%N	--	0.35-0.50	--
%Ti	--	--	2.0-2.6
%Al	--	--	0.9-1.5
Fe	--	--	5.0-9.0
%Cb & Ta	--	--	0.70-1.20

## Mechanical Properties

Grade	Test Condition	Yield Strength N/mm <sup>2</sup> (Min)	Tensile Strength N/mm <sup>2</sup> (Min)	Elongation %(min)	Hardness HRC
EN 52	Annealed				35 Max
EN 52	Hardened & tempered	700	900	14	As per customer specifications
21-4N	Solution Annealed, Ageing	660	882	8	30-40

## Supply Conditions

Dimensional Tolerance				
	As Rolled	As Drawn	As Peeled	Centreless Ground
Size Range	Coils - 5.5mm to 15mm Rounds - 15mm to 30mm RCS - 75mm, 80mm & 100mm	5mm to 30mm	5mm to 30mm	5mm to 30mm
Dimension Tolerance	As per IS 3739	5mm to 10mm h11, 10 to 30mm h10,	h11	h9, h11, +0.05/ -0, ± 0.05, +0.20/ -0 or as per requirement
Out of Roundness	As per IS 3739	0.05mm	1/2 dia tol	1/2 dia tol
Straightness	3.00 mm / mtr.	1mm / mtr	1 mm/mtr	1 mm / mtr
Length	4.0 mtrs (Length below 4 mtr can be supplied by offline cutting)	3 to 4 mtr	3 to 4 mtr	3 to 4mtr

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