FORGING QUALITY STEELS

Certification

• Chemistry • Macro Quality • Inclusion • Grain Size • Hardness • Magnaflux
• Microstructure • Anti mixup test.
In addition to these standard tests, following additional tests are performed as per customer requirements.

- UST as per customer req.
- Step down test
- Blue fracture test
- Jominy hardenability test
- Mechanical tests like hardness, tensile test etc. (on heat treated samples)
- Impact test (on heat treated samples)
- Any other special test as per the end use

Typical forging quality steel grades.

Classification	IS	EN	DIN	AISI / SAE	JIS
Plain Carbon	15C8, 35C8 45C8	EN-8, EN-9 EN-32 B	CK-15, CK-30 CK-45, C35 Pb K C15 Pb K, CK-35 CK-60	1015, 1026 1030, 1135, 1040 1045, 1050 1055, 1060, 1080	S43C, S45C S48C, S55C, S35C, S53C
Carbon Manganese	47Mn6, 37Mn6, 37Mn2, 37C15, 20Mn2	EN-14A, EN-14B EN-15, EN-15B	40Mn4, 28Mn6, 27Mn2	1524, 1526, 1541, 1041F	SMn420H, SMn430H SMn433H, SMn435H SMn 443H
Plain Chrome	40Cr1, 50Cr4	EN-18 EN-207	34Cr4, 37Cr4 41Cr4	5120, 5140 5145, 5150 5160	SCr 420H, SCr415
Chrome Manganese	16Mn5Cr4 20Mn5Cr5	-	16MnCr5, 20MnCr5	-	-
Chrome Moly	40Cr1Mo28	EN-19	42CrMo4	4118, 4130, 4135, 4140, 4145, 4150 A182 F12 C1 II	SCM 415H, SCM 420H SCM 435H, SCM 440H
Chrome Nickel	40CrNi6 16Ni3Cr2	EN-36A EN-36B	15CrNi6, 16CrNi4 18CrNi8, 20CrNi4	- -	-
Chrome Nickel Moly	20NiCr2Mo2	EN-353, EN-354, EN-355, EN-36C EN-24, 815H17, 822H17	17CrNiMo6 30CrNiMo3 34CrNiMo6	4340, 8620 8640, 8627 8615, 8617	SNCM220H SNCM420H
Moly-Man	35Mn6Mo3 35 Mn6Mo4	EN-16 EN-17	-	4027H 4037H	-
Ball Bearing	103Cr2	EN-31	100Cr6	SAE52100	SUJ2
Micro Alloyed	38MnSiVS5	-	-	-	-

FORGING QUALITY STEELS

BIS Approved
NABL Accreditated Chem & Mech Labs.
ISO 9001 & IATF16949 Certified by UL DQS
ISO 14001 & OHSAS 18001 Certified by TUV Nord
AD 2000 Merkblatt WO /PED Certified by TUV Nord

SUNFLAG STEEL

FORGING QUALITY STEELS

Forging Quality Steel

Quality requirements for Forging quality steels

- Close control on chemistry.
- Freedom from harmful internal & surface defects.
- Fine & uniform grain size.
- Dimentional tolerance IS 3739 grade 1.
- High degree of cleanliness

These steels are widely used in automobile, defence, railways and various manufacturing industries.

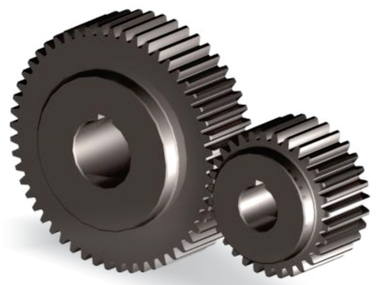
Some of the popular forging applications are as under

Gears, Axles, Crankshaft, Connecting rod, Pinions, Crown Wheels, Camshafts etc.
Automobile industry is the single largest user of forgings. Forging are generally used in the transmission systems of an automobile, where large forces get transferred between different parts, hence they are of vital importance.

SIZES AND CONDITION OF SUPPLY

Condition of Supply	Shapes	Sizes
1. As rolled	Round RCS	15mm to 350mm 50mm to 350mm
2. As rolled & annealed	Round RCS	15mm to 250mm 50mm to 350mm

Dimensional Tolerences as per IS 3739 specification



SUNFLAG STEEL

FORGING QUALITY STEELS

PROCESS	EQUIPMENT	KEY PROCESS CHARACTERISTICS	EFFECT ON PRODUCT QUALITY
PRIMARY MELTING	EAF WITH EBT AND LOAD CELL ELECTRIC ARE FERVOCE WITH ELECTRIC BOTTOM TAPPING AND LOAD CELL	• GOOD CARBON BOIL • SLAG FREE TAPPING • LM WEIGHT MONITORING • LIQUID METAL	• FREE FROM UNDESIRABLE TRAMP ELEMENTS • LOW TRAMP ELEMENTS DUE TO USE OF OWN VIRGIN • RAW MATERIAL, SUCH AS DRI, PIG IRON. LOW PHOSPHORUS LEVEL TO IMPROVE COLD FORGEABILITY. • LOW N2 LEVEL AT TAPPING STAGE, • CONTROLLED FEO IN SLAG TO ENSURE LOW O2 FOR SUBSEQUENT STEEL REFINING
SECONDARY REFINING	LADLE REFINING FURNACE WITH COMPUTRISED FERROALLY FEEDING SYSTEM	• ARGON PURGING • MICROPROCESSOR BASED FERROALLOY ADDITION SYSTEM • CONTROLLED POWER INPUT	• ACHIEVEING FINAL PRODUCT CHEMISTRY WITH HIGH REPETABILITY. • PREDICTABLE ALLOY RECOVERY AND LESS FORMATION OF DEOXIDATION OF PRODUCTS. HIGH BASICITY FOR DEEP DESUL PHURISATION AND INCLUSION REMOVAL. FACILITY FOR TRIM ADDITION TO ACHIEVE CLOSE RANGE OF TARGET CHEMISTRY.
DEGASSING	STATIC TANK TYPE VACUUM DEGASSING	• HIGH SUCTION CAPACITABILITY TO • ACHIEVE VACUUM <1 m bar • ARGON PURGING/RINSING	• REDUCTION IN DISSOLVE GAS LEVELS O2,N2,H2 • SIGNIFICANT REDUCTION IN SULPHUR LEVEL • COMPLETE HOMOGENISATION OF CHEMISTRY AND TEMPERATURE FOR SMOOTH CASTING.
WIRE INJECTION	3 STRAND WIRE INJECTION EQUIPMENT FOR CARBENSULPHOR AND ALLUMINIUM	FINE ADJUSTMENT OF C & S & ALLUMINIUM	PRECISE CONTROL OF C ,S AND ALUMINIUM.
CASTING	CONTINOUS CASTER 3 STRANDS WITH AMLC/EMS, SUBMERGED NOZZLE CASTING AND LEVEL 2 AUTOMATION	• BASIC REFRACTORIES. • CONTROL ON SUPER HEAT, • CASTING SPEED, • UNIFORM SECONDARY COOLING, • STABLE CASTING	• IMPROVED SURFACE QUALITY OF BLOOMS • NO MACROINCLUSIONS DUE TO CLOSED STREAM CASTING THROUGH AMLC • CAST BLOOM FREE FROM HARMFUL SURFACE AND SUB SURFACES DEFECTS
BILLET INSPECTION	• OPTICAL EMMISSION SPECTROMETER • GAS ANALYSERS • MACRO TEST • AUTO GRINDING OF SURFACE • MAGNA FLUX ON ROLLED BILLET	• CHEMISTRY, • GAS LEVELS , • INTERNAL AND SURFACE QUALITY AS PER CUSTOMER SPEC	CONFORMANCE TO CUSTOMER SPECIFICATION.
BAR AND SECTION ROLLING MILL	• WALKING HEARTH REHEATING FURNACE, • AIR:FUEL RATIO CONTROL, • 24 STDS FIXED PASS LAY OUT WITH 10 STD FINISHING BLOCK OF TUNGSTON CARBIDE ROLL GROOVE, • VARIABLE REDUCTION MILL (VRM) WITH HOUSINGLESS STANDS AND HIGH STIFFNESS	• ROLLING TEMPERATURE, CONTROL FURNACE RESIDENCE TIME, • PRIMARY SCALE REMOVAL, • OVAL-ROUND PASS SEQUENCE AND INTERSTAND TENSION CONTROL WITH LOOPERS. • INPUT OUTPUT TEMERATURE CONTROL, • PLANNED PASS SCHEDULING • HORIZONTAL VERTICAL HORIZONTAL STAND CONFIGURATION IN VRM	• UNIFORM SURFACE APPEARANCE, • CLOSE DIMENSIONAL TOLERENCE, • FREEDOM FROM HARMFUL SURFACE DEFECTS , • COMPACT LAYING OF TURNS LEADING TO COMPACT COILS, • CONTROL ON SURFACE DECARBURISATION. • CAPABILITY TO ROLL ROUND 15-56 MM, COIL 5.5-38MM , HEX 13.3-38 MM AND FLAT IN DIFFERENT SIZES. • DIMENSIONAL TOLERENCES OF 1/4 TH OF STANDARD "DIN 1013" WITH MINIMUM SIZE VARIATION ALONG THE LENGTH OF BAR
BLOOMING MILL	• WALKING HEARTH REHEATING FURNACE, • THERMAL IMAGING CAMERA, • AIR:FUEL RATIO CONTROL, • HYDRAULIC SCALE BREAKER , • 2 HIGH REVERSABLE MILL WITH MECHANISED FEEDING • AUTOSCREWDOWN MECHANISM WITH HOT SAW CONTROLLED COOLING FACILITY	• ROLLING TEMPERATURE, • FURNACE RESIDENCE TIME	• FLEXIBILITY TO ROLL SQUARES AND ROUNDS • FREE FROM HARMFUL SURFACE DEFECTS • DIMENSIONAL CONTROL AS PER TOLERENCE, • PROPER END CUTTING, • GOOD STRAIGHTNESS IN AS ROLLED CONDITION
ALLOY STEEL MILL	• PLC CONTROLLED PUSHER TYPE FURNACE, • THREE HIGH ROUGHING STAND, • TWO THREE HI INTERMEDICATE STAND AND • TWO HIGH FINISHING STAND, • HOT SAW FACILITY AND RAKETYPE COOLING BED	• GOOD TEMPERATURE CONTROL, GOOD FINISH QUALITY	• DEFINE ROLL PASS DESIGN, BOX PASSES, • DI & SQ FOLLOWED BY OVAL ROUND SEQUENCE IN INTERMEDIATE AND FINISHING.