# SMALLER HEATS, FASTER DELIVERY Engineered for Efficiency





#### **MAGNA SPECIAL STEELS & MACHINE WORKS**

(A DIVISION OF MAGNA CASTING & MACHINE WORKS)

www.mssmw.in



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### Introduction

Magna Special Steels & Machine Works (MSSMW), (A Division of Magna Casting & Machine Works) is essentially an Alloy, Stainless Steel, Super Specialty Ingot Manufacturing Unit, established in the year 1999 at Pune, India. Magna Special Steels & Machine Works (A Division of Magna Casting & Machine Works) belongs to Worldwide Oilfield Machine (WOM) group of companies. WOM established in 1980 and has diversified business in Oil & Gas, Defense and Railway.

The principal objective is to manufacture highest quality Steel in Carbon, Alloy, Stainless Steel, Super Specialty Steel Like: Duplex / Super Duplex, precipitation Harding stainless steels conforming to customer's stringent requirements with emphasis on supreme quality, timely delivery and competitive pricing. Through our innovative technology, we have developed and supplied Steel to vital industries like Oilfield, Petrochemical, Railway, Defense and various other High Tech Industries.

Steel Melting Unit was started for ingot manufacturing in various grades like Alloy, Super speciality steels, Stainless Steel, Precipitation Harding stainless steels, Duplex / Super Duplex steels, with assurance of best material quality. Steel being the main product for the nation and industrial development, we at MSSMW endeavor to manufacture highly clean steel through our advanced melting process developed by industry experts and highly skilled workforce.



## **Advantages: MSSMW**



#### **Proven Track Record**

The company has over 25 years of experience in supplying the highest quality products to the Oil & Gas industry that operate successfully at upto 25000 psi.



#### **Heat Size**

MSSMW's dynamic setup enables production in heat sizes starting from 12 ton to 15 tons, which is quite rare in the industry. This allows the company to also accept customized orders and small-scale requirements.



#### **Quality Guaranteed**

Complete control over each process and adherence to strict quality standards, backed by ISO / IEC 17025-2017 accredited in-house laboratory assures supreme quality products that meet and exceed industry standards.



#### **Short Lead Time**

Total vertical integration eliminates third-party dependency of the company as well as eliminates delays associated to logistics, ensuring shorter lead time.



#### **All Under One Roof**

The company is vertically integrated with an in-house Steel Melting Shop, Casting, Heat Treatment, Forging and Machining, thus resulting in potential for economies of scale and increased market control.





We at MSSMW are focused on producing Highly clean steel with the finest steel refining processes at all stages of manufacturing like: Electric Arc Furnace, Ladle refining and Vacuum degassing. Bottom poured Ingot casting is carried out by Teeming car with controlled teeming rate with laser temperature monitoring system of liquid flow into ingot mold also auto recorded on SCADA.

IEC-17025/2017.

quality standards. Magna Special Steels & Machine Works (A Division Of Magna Casting & Machine Works) is having a full-fledged Metallurgical Laboratory certified as per requirements of ISO/

With the above state of the art manufacturing and testing facility MSSMW produces the best quality of steel. MSSMW strives to meet customers stringent requirements through innovative processes of steel melting and refining, bottom, poured ingot casting, hot forging, heat treatment and Proof machining.

## Steel Grades, Products Range & Supply Conditions

#### **Alloy Steels - Applications**

#### 1. AISI 4340-ASTM A29

Automotive components like axles, gears & shafts, Hydraulic cylinders, aircraft components, metal cutting tools, cold - forming tools, marine application, drill bits for oil wells, mining application, agriculture application.

#### 2. AISI 8630-ASTM A29

Automotive, Gear components, shafts, forgings requiring high tensile. strength, Defense, Oil & gas.

#### 3. F11-ASTM A182

Aerospace, Boiler tubes, pressure vessels, high-temperature applications.

#### 4. F22-ASTM A182

Oil and gas applications, pressure vessels, structural components.

#### 5. EN24-BS970

Automotive components like axles, gears & shafts, Hydraulic cylinders, aircraft components, oil and gas applications.

#### Tool, Die and Valve Steels - Applications

#### 6. AISI A2-ASTM A681 (DIN W.Nr. 1.2363 - X100CrMoV5)

Dies shapes, slitters, pressure injection tools, cutting tools, stamping.

#### 7. AISI 01-ASTM A681 (DIN W.Nr. 1.2510 - 95MnWCr5)

Additional Customer requirements will be incorporated after discussion with customer.

#### 8. AISI H11 (DIN W.Nr. 1.2343 - X38CrMoV5-1)

Forging Dies, Die Casting Dies, Hot Piercing Punches, Aluminum Extrusion Dies, Forming Punches..

#### 9. AISI H13 (DIN W.Nr. 1.2344 - X40CrMoV5-1)

Forging Dies, Die Casting Dies, Hot Piercing Punches, Aluminum Extrusion Dies. Forming Punches.

#### 10.L6-ASTM A681 (DIN W.Nr.1.2714 - 55NiCrMoV7) / DB6

Forging Dies, Die Casting Dies, Hot Piercing Punches, Aluminum Extrusion Dies, Forming Punches

#### 11. SAE: HNV-3 (DIN W.Nr. 1.4718 - X45CrSi9-3)

Engine valves, coupling, chemical processing, offshore platforms and marine applications

#### **Stainless Steels - Applications**

#### 12. AISI 304L-ASTM A182 / A276

Aerospace & automotive Structure, Chemical containers, Food processing equipments, Heat exchangers, Marine components, Fasteners.

#### 13. AISI 316L-ASTM A182 / A276

Marine applications such as Valves, boat fittings, pump trim, Construction, Chemical & Petrochemical in-dustry for containers, dyes, Food processing industry, Paper pulp handling equipments, equipments for textile bleaches.

#### 14. AISI 310-ASTM A 182 / A276

High-temperature parts, furnace construction, medical.

#### 15. F51 (UNS S31803 Duplex Stainless Steel)-ASTM A182

Marine applications such as Valves, boat fittings, pump trim, Construction, Chemical & Petrochemical industry, Oil & Gas, dyes, Food processing industry, Paper pulp handling equipments, equipments for textile bleaches.

#### 16. F53 (UNS S32750 Super Duplex Stainless Steel) -ASTM A182

Marine applications such as Valves, boat fittings, pump trim, Construction, Chemical & Petrochemical in-dustry, Oil & Gas, dyes, Food processing industry, Paper pulp handling equipments, equipments for textile bleaches.

#### 17. F55 (UNS S32760 Super Duplex Stainless Steel) -ASTM A182

Marine applications such as Valves, boat fittings, pump trim, Construction, Chemical & Petrochemical in-dustry, Oil & Gas, dyes, Food processing industry, Paper pulp handling equipments, equipments for textile bleaches etc.

#### 18. F60 (UNS S32205 Super Duplex Stainless Steel) -ASTM A182

Power, paper industries, Petrochemical, chemical processing, marine, Oil and gas

#### 19. All 400 Series Grades-ASTM A276 (AISI 410, AISI 416, AISI 420, AISI 430, AISI 431)

Structural applications, automotive parts, appliances, cutting tools, plastic moulds and dies, Machine industries, valve industries, Oil exploration industries, Defense, Furnace constructions.

#### 20. F6NM (UNS S41500)-ASTM A182

Offshore oil and gas, chemical processing, contruction, power.

#### Precipitation Hardenable Stainless Steels - Applications

#### 21.15-5 PH (UNS - S15500) ASTM A564

Aircraft door hinges, Service Drive Housing, Shock mounts, Propellers, Valves, Gears, Shafts, Nuclear Reactor components, Oil & gas industry components.

#### 22.17-4 PH (UNS - S17400) ASTM A564

Jet engines, Turbine blades, Chemical processing equipments & components, reactor parts, Surgical equipmentss, Marine, Petroleum refining equipments.

#### **Products - Sizes**

#### **Ingots**

- 1. Round: 16" (400 mm), 24" (600mm), 32" (800 mm)
- 2. Square: Up to 4 Faces from 1 ton 14 tons
- 3. Polygonal: up to 12 Faces from 2 tons 14 tons

#### **Forged Products**

- 1. Round: 8" to 28" (200 to 750mm)
- 2. Square: 8" to 28" (200 to 750mm)
- 3. Rectangular: 8" to 28" (200 to 750mm)
- 4. Engineering Components: 2 tons to 10 tons

#### **Process - Types**

#### **Heat treatments**

- 1. Normalizing
- 2. Annealing
- 3. Spherodized / Globular Annealing
- 4. Quenching and tempering
- 5. Solution Annealing
- 6. Ageing

#### Surface finish

- 1. Hot Forged
- 2. Hot Forged and turned
- 3. Hot forged and ground
- 4. Hot forged and proof machined



## **Quality Assessment through Inclusion Test**

Dia.220 1.5/1.0 1.5/1.0 0.0/0.0 1.0/1.0

# Ingot casting process with highest level of cleanliness measured though Inclusion test as per ASTM E45 AISI410 (Stainless Steel) European Mills AISI410 (Stainless Steel) MSSMW

#### Inclusion Rating (Thin/Thick) **Melt Route Initial Size** Grade Tubing 1 AISI410 EAL-LF-VD 0.5/0.0 0.5/0.5 0.0/0.0 0.5/0.0 Head 2 AISI410 EAL-LF-VD Dia.400 0.5/0.0 0.5/0.5 0.0/0.0 0.5/0.0 3 AISI410 EAL-LF-VD Dia.665 0.5/0.0 0.5/0.5 0.0/0.0 0.5/0.0 4 AISI410 EF-AOD Dia.220 1.5/1.0 2.0/1.5 0.0/0.0 1.0/1.0 AISI410 EF-AOD Dia.250 1.5/1.0 1.5/1.0 0.0/0.0 1.0/1.0

# Sr. No. Grade Melt Route Initial Size Inclusion Rating (Thin/Thick) 1 AISI410 EAF-AOD-LRF-VD M1 Ingot 0.5/0.0 0.5/0.5 0.5/0.0 1.0/1.0 2 AISI410 EAF-AOD-LRF-VD M1 Ingot 0.5/0.0 1.0/1.0 0.5/0.0 1.0/0.5 3 AISI410 EAF-AOD-LRF-VD M1 Ingot 0.5/0.0 0.5/0.5 0.0/0.5 1.0/0.5 4 AISI410 EAF-AOD-LRF-VD M1 Ingot 0.5/0.0 1.5/0.0 0.5/0.0 1.0/0.5

AISI410 EAF-AOD-LRF-VD M1 Ingot 0.5/0.5 0.0/0.0 0.5/0.0 0.5/0.5

6 AISI410 EAF-AOD-LRF-VD M2 Ingot 1.0/0.5 0.0/0.0 1.0/0.0 0.5/0.5

# 17-4 PH (UNS Designation - S17400) & Duplex Stainless Steel European Mills

EF-AOD

AISI410

Sr. No.	Grade	Melt Route	Initial	Inclu	clusion Rating (Thin/Thick)			
		Meit noute	Size	A	В	С	D	
1	S31803-F51/ S32205-F60 Duplex SS	E+AOD+LRF	DIA 65	1.5/0.5	0.5/0.0	1.5/1.5	1.5/0.5	
2		E+AOD+LRF	Dia 70	1.5/0.5	0.5/0.0	1.0/1.5	1.5/0.5	
3	·	E+AOD+LRF	Dia 50	1.5/1.0	0.5/0.0	1.0/1.5	1.5/0.5	
4	17-4 PH (UNS- S17400)	EAF+LF+VD	Ingot	0.5/0.5	0.5/0.5	0.5/0.0	0.5/0.0	

# 17-4 PH (UNS Designation - S17400) & Duplex Stainless Steel MSSMW

Sr. No.	Grade	Melt Route	Initial	Inclusion Rating (Thin/Thick)				
		Meit noute	Size	A	В	С	D	
1	17-4 PH (UNS-S17400)	EAF-AOD- LRF-VD	M1 Ingot	1.0/0.5	0.5/0.0	1.0/1.5	1.5/0.5	
2	S31803-F51	EAF-AOD	M1 Ingot	1.5/0.5	0.5/0.0	1.0/1.5	1.5/0.5	

#### 1.2714 (Die Steel) European Mills

Sr.	Grade	Melt Route	Inclusion Rating (Thin/Thick)					
No.			A	В	С	D		
1	1.2714	EAF-VD	2.0/1.5	0.5/0.0	0.0/0.0	1.0/1.0		
2	1.2714	EAF-VD	2.0/1.5	1.5/1.0	0.0/0.0	1.0/1.0		
3	1.2714	EAF-VD	2.0/1.5	0.5/0.0	0.0/0.0	1.0/0.5		
4	1.2714	EAF-VD	2.0/1.5	1.0/0.5	0.0/0.0	1.0/1.0		
5	1.2714	EAF-LF-VD	1.0/0.0	1.0/0.0	0.0/0.0	1.0/0.5		
6	1.2714	EAF-LF-VD	1.0/0.5	1.0/0.0	0.0/0.0	1.0/0.5		
7	1.2714	EAF-LF-VD	1.0/1.5	0.0/0.0	1.5/3.0	1.0/1.0		

#### 1.2714 (Die Steel) MSSMW

Sr.	Grade	Melt Route	Inclusion Rating (Thin/Thick)				
No.			Α	В	С	D	
1	1.2714	EAF-LRF-VD	0.0/0.0	0.0/0.0	0.5/0.5	0.5/0.5	
2	1.2714	EAF-LRF-VD	0.0/0.0	0.0/0.0	1.0/0.5	0.5/0.5	
3	1.2714	EAF-LRF-VD	0.5/0.0	0.0/0.0.0	0.5/0.0	1.5/1.0	
4	1.2714	EAF-LRF-VD	0.5/0.0	0.0/0.0	0.5/0.0	0.5/0.5	
5	1.2714	EAF-LRF-VD	0.5/0.0	0.5/0.5	1.0/0.5	1.0/0.5	
6	1.2714	EAF-LRF-VD	0.0/0.0	0.5/0.0	0.5/0.5	0.5/0.5	
7	1.2714	EAF-LRF-VD	0.0/0.0	0.0/0.5	1.0/1.0	1.0/0.5	



#### **Ladle Refining unit 15 MT**

This is to ensure precise control on the chemical composition of the steel grades being manufactured, continuous purging of Argon from bottom through porous plug for temperature and chemical homogeneity of liquid steel, maintaining accurate liquid metal temperatures in the ladles to have control on the super heat for processing steel in the next working station - It is also equipped with cored wire feeding system and entire Online data capturing in SCADA..



# LRF Melting Area

#### **Argon Oxygen Decarburization Unit 15 MT**

It is used for manufacturing all types of Stainless steel Including ultra low carbon grades. This enables us to use high carbon Ferro alloys to manufacture very low carbon stainless steel varieties. In AOD we are using the auto gas mixing station for mixing and choosing Oxygen, Nitrogen and Argon gases to the required ratio and in final stage only Argon is blown through bottom tuyeres for refining of liquid steel. Reduction process in AOD helps to reduce sulphur and controlled inclusion in stainless steel and entire Online data capturing in SCADA.





Vacuum Degassing 15 MT

All Our 100% Carbon, Alloy, 400 series stainless steel heats routed through Vacuum Degassing System based on mechanical pumps to create vacuum of less than 1 M bar (usually we go to less than 0.6 M bar vacuum), with continuous Argon purging from bottom for temperature and chemical homogeneity, floatation of the inclusions into slag and to remove dissolved gases like hydrogen, oxygen and nitrogen. It is also equipped for CaSi, Aluminum and Sulphur wire injection system for good deoxidizing and modification of the morphology of inclusion and entire Online data capturing in SCADA.

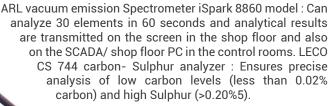
#### **Teeming Car for Ingot Casting**

Refined Liquid steel finally comes to the ingot casting area, which is facilitated with our own designed and manufactured ingot teeming car to carry 15 MT liquid metal to cast bottom poured ingots ranging from 1MT to 14 MT. Ingot Teeming car is equipped with continuous monitoring of liquid metal weight, teeming rate (Discharge rate of liquid metal) with laser temprature monitoring system of liquid flow into ingot mold, Argon Shrouding to control Re-oxidation of liquid steel, liquid stream temperature monitoring system. Entire bottom pouring system is closed casting, so that no liquid metal comes in contact with atmospheric air. After stripping ingots are hot transfered for forging or annealing. We have also the facility of controlled cooling of ingots in the slow cooling pit.



Quality is measured and controlled at all stages at MSSMW. Raw materials including scrap, ferroalloys, refractories, and all incoming materials and checked and then only accepted and issued for production. Steel samples are checked at all stages of melting refining and casting.

State of the art facilities and latest available equipment's have been selected and employed in the quality assurance lab and team of process control monitors the same round the clock.



LECO ONH Mode: For Oxygen Nitrogen and Hydrogen Gas analysis: Analyses dissolved and total oxygen, Hydrogen and Nitrogen in the steel samples during refining so as to ensure good gas level control in the steel.

WD XRF model ARL PERFORMX: This facilitates to analyze raw materials like ferroalloys, refractories and alike used for steel making unit as well as slag samples drawn at various stages, like EAF, LRF, VD and AOD to have better control on quality of steel being produced as per SOPs



#### **Mechanical Testing Facility**

MSSMW Lab is well equipped with Mechanical Testing facility such as: Tensile testing, Impact Testing (At room Temperature and Sub Zero Testing Facility up to - 195 Deg F), Hardness Testing and required machining facility for sample preparation. These are equipped with Software for Data storage and compilation of Graphs during testing. Macro etching, Grain flow, in the forged samples are conducted for continues improvement. Metallography laboratory has sample preparation facility, Inverted Microscope, with photographic attachment and Soft ware for measurement of inclusion (Cleanliness level) and grain size and Stereo Microscope. All These facility enables us to monitor quality on regular basis for ensuring delivery of excellent products to the end users. These facilities are supported by conventional wet analysis for cross checking and specific results.



# To T Hammer

#### **Forge Shop**

We have a state of art Forging Facility which has a installed capacity of 40,000 MT/PA with capacity ranging from a few Kgs to 14 MT single piece open die forging. We forge close die intricate forgings up to 7 MT single piece. The plant is ISO 9001-2015 and PED -2014/68/EU certified.

Our skilled, trained and devoted craftsmen in the shop can handle complicated forgings in a variety of shapes in the closed die and open die forging. Round up to 1000 mm dia and squares up to 900mm square in pre forging and then in the required shapes is a routine now. Reheating furnaces, with temperature controls with SCADA system, rail bound Mobile forging manipulators, enable us to deliver difficult jobs in time.

#### **Heat Treatment Facility**

Heat treatment shop:Our advanced heat treatment facility includes 15 furnaces (electric, gas-fired, and oil-fired) capable of hardening, tempering, annealing, stress relieving, and controlled slow cooling. Cooling systems feature water and polymer quenching baths with mechanical agitation and capacities ranging from 10 KL to 100 KL, ensuring uniform cooling. Temperature precision is achieved with contact and dual thermocouples, infrared sensors, and SCADA-based monitoring, providing real-time graphs for accurate process control.



#### **Machine Shop**

We can handle variety of jobs for precise dimension control on surface and intricate jobs. We have number of HBM, lathes, drilling machines, milling machines, 5 Axis Machines and lots of SPM machines for finish machining of variety of valves and parts required for our own Oil Field Machine requirements. We also have dedicated CNC shop with nearly 150 CNC machines. With the advantage of this infrastructure and capability, we have started manufacturing variety of Alloy, Stainless and Tool Steels for captive use as well as for Outside Market.



#### 2500 Ton Press

We have under installation a 25 MN push-down press and a 20-ton rail-bound manipulator made by DANIELI BREDA.

The press and manipulator are fully automatic and can perform operations with programming (SCADA SYSTEM).

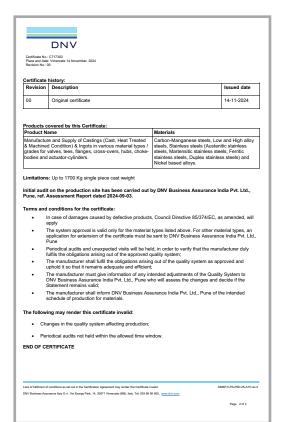
Machine Shop

### Certification









# PRECISION, SPEED AND SCALE Redefined for Your Business





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