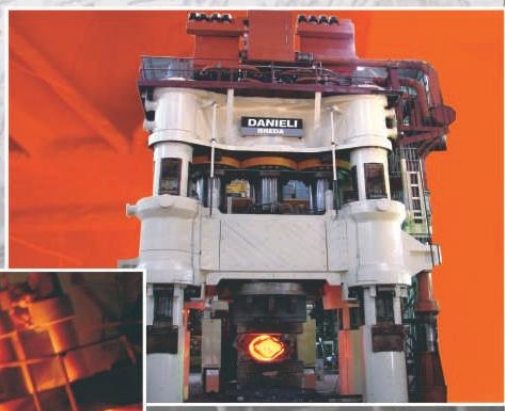
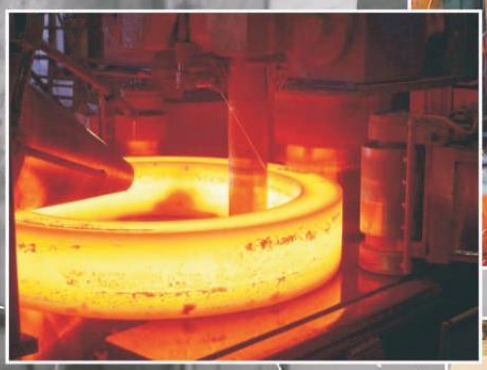
MIDHANI

STRATEGIC MATERIALS SUPPLIER TO THE NATION





मिश्र धातु निगम लिमिटेड

MISHRA DHATU NIGAM LIMITED

HYDERABAD

ABOUT MIDHANI

Mishra Dhatu Nigam Limited (MIDHANI), a Govt. of India Enterprises, was set up in 1973 at Hyderabad with the objective of providing the nation self reliance in strategic materials. For over four decades now, MIDHANI has been handling challenging tasks of developing alloys, taking a lead position in indigenization of critical technologies and products to render support to several programmes of National importance and hi-tech segments of Indian Industry. MIDHANI has now started offering its core competence of developing and manufacturing custom made alloys to suit the specific requirements of customers for their critical applications.

MIDHANI's Product range includes Superalloys, Titanium & Titanium Alloys, Special Purpose Steels and other Special Alloys. The products include a variety of mill forms ranging from forged rounds to wires and strips. MIDHANI, keeping up with the requirements, has moved from supply of semi finished products to supply of finished products like forged rings, near net shapes and titanium tubes. With its many years of engineering expertise, MIDHANI has diversified into the manufacture of Biomedical Implants, Armour products, Investment Castings and Speciality fasteners.

PRODUCTS

SUPERALLOYS

- Nickel-base
- Cobalt-base
- Iron-base

TITANIUM & TI ALLOYS

- Commercially pure Titanium
- Titanium Alloys

SPECIAL PURPOSE STEELS

- Maraging Steels
- Armament Steels
- Nuclear Grade Steels
- Special Stainless Steels

COMMERCIAL GRADES

- Superalloy for Oil & Gas Sector
- Tool & Die Steel for Auto Sector
- Helical Springs & Spring Rounds
- Alloy Steel for Mining Sector

SPECIAL PRODUCTS

- Titanium and Superalloy Investment Castings
- Speciality Fasteners
- Weld consumables
- Armour Products

UNIQUE MANUFACTURING FACILITIES

MIDHANI is equipped with highly integrated and flexible manufacturing facilities to produce a wide variety of special metals and alloys in various mill forms such as forged bars/ flats, Rings; near net shapes hot rolled bars/ sheets, cold rolled sheets, strips, foils, wires, castings, tubes and fasteners.

Melting

With the help of an impressive array of melting and refining furnaces such as Arc Furnace with VD & VOD, Air Induction Melting Furnace, Vacuum Induction Refining Furnace, Vacum Induction Melting Furnaces, Vacuum Arc Remelting Furnace, Electroslag Refining Furnaces. MIDHANI produces alloys with close compositional control, metallurgical cleanliness and homogeneity.

Forging

6000 T Forge Press:

6000 T Hydraulic Forge press with 20T manipulator, 4 Column push down type with 7000T upsetting force and 4500 X 1800 mm clearance.

1500 T Forge Press:

MIDHANI has a 1500 T capacity CNC hydraulic press operating with two rail bound manipulators for forging ingots to various shapes with close tolerances.

Ring Rolling Mill

Mill Type	:	Radial Axial Ring Rolling Mill
OD	:	320 - 3540mm
Height	:	50 - 635mm
Weight (max)	:	3500Kg

Titanium Melting

MIDHANI has Vacuum Arc Remelting furnace for the production of Titanium ingots upto 6.5 T. For electrode preparation, a 3000 T capacity Compacting press and a Plasma arc welding unit are available. A high vacuum furnace is used for annealing.

Hot Rolling

2-hi, 2-stand and 3-hi strip mills, 3-hi, 3 stand bar mill and 7 stand wire rod mill make up the hot rolling facilities along with heat treatment, levelling and straightening and shearing of sheets and strips

Precision cold rolling

For cold rolling, 4-hi strip mill, 6-hi sheet mill, 12-hi strip mill and 20-hi foil mill are available, besides facilities like continuous annealing line, bell annealing furnaces, along with finishing lines for slitting and strip grinding.

Bar and wire drawing

The shop is equipped with wire drawing machine, annealing lines, polishing, straightening and cutting machine etc., to draw wires upto a minimum of 0.02dia.

Investment casting facility

Vacuum investment casting facility enables MIDHANI to supply near-net-shape castings of Nickel, Iron & Cobalt base Superalloys and Titanium & Titanium alloys.

Length (mm)	:	350 max
Diameter (mm)	:	250 max.
Weight (kg)	:	20 max.

Biomedical Implants & Devices

- Knee Hinge Joint
- Hip Prosthesis
- Compression Hip Screw
- Implants
- Screws
- Clamps and Plates
- Intra medullary Nails & Rush Nails

MIDHANI also manufactures custom made implants biomedical products to suit the specific requirements e.g. Hinge Knee Joint, Acetabular Cup with attached IliacWing, Lumbar Puncture Needle Device.

MIDHANI conforms to ASTM, BS, ISO, IS, AMS, MIL, AFNOR, DIN & other standards for materials as well as biomedical products.

Fasteners Facilities

- Superni 80 A
- Superni 718
- Superfer 286
- Titan 31
- MDN 4130
- MDN 321
- MDN 431
- MDN 420
- MDN 15-5

Hexagonal bolts, Hexagonal socket, Head cap screws, Cheese Head screws, Countersunk screws, Locking washers, and Plates, Wire locking screws and Nuts, Studs, Specialised and Custom made fasteners, Lock nuts, Locking plates and Split bushes. etc.,

Seamless Tubes

Outer diameter	:	27 - 90 mm
Wall thickness	:	3 - 10 mm
Max. Length	:	12000 mm

Welded Tubes

Outer Diameter	:	12-60 mm
Wall thickness	:	0.5 - 2.5 mm
Length	:	2000 - 18000 mm

NEW FACILITIES

Wide Plate Mill

- 4-Hi Mill stack
- Hot/Cold Plate leveller
- Hot Dividing shear
- Roller Pressure quench
- Walking Hearth Furnace
- Roller Hearth Furnace
- Tempering Furnace

Size Range

- Wide plate mill : 4mm (min)
- Thickness : 4mm
- Width : 1000 - 3000 mm
- Length : 5000 - 15000 mm

Spring Manufacturing Facility

- Spring Coiling Machine
- Scragging Machine
- End tapering machine
- Furnaces: Walking Beam.
- End heating and Tempering furnace
- Quenching Facility
- End Grinding Machine

Size Range - I

- Wire rod dia : 15 - 18mm
- Outer Dia : 110 - 130mm
- Free Length : 150mm
- Weight range : 12 - 18kgs

Size Range - II

- Wire rod dia : 26 - 56mm
- Outer Dia : 220 - 450mm
- Free Length : 450 - 750mm
- Weight range : 113 - 150kgs

MIDHANI PRODUCT RANGE

Superalloys ▪ Iron base SUPERFER ▪ Nickel base SUPERNI ▪ Cobalt base SUPERCO

Superalloys find extensive application in aeronautics, space, nuclear, chemical, petrochemical, power generation and furnace industries, where extreme temperatures, mechanical stresses and corrosive environments are encountered.

GRADE	UNS NO.	CONFORMITY TO INTERNATIONAL SPECN.	KNOWN NEAR EQUIVALENT
Superfer MDS			ALLOY DS
Superfer 800/800H	N 08800/08810	ASTMB163, B407, B408, B 409	ALLOY 800/800H
Superni 600	N 06600	ASTMB166, B168,DTD 328A	ALLOY 600
Superni 76	N 06002	ASTMB 435 & B572	ALLOY X
Superni 80A	N 07080	ASTMB637, BSHR 201	ALLOY 80A
Superni 90	N 07090	BS2HR 2	ALLOY 90
Superni 718	N 07718	AMS5662, 5663, ASTM B637, B670	ALLOY 718
Superni 750	N 07750	ASTMA461	ALLOY X-750
Superni 825	N 08825	ASTMB 163, B 426, B424, B 425	ALLOY 825
Supper weld 82	N 06082	AWSERNiCr-3	ALLOY 82
Superni C276	N 10276	ASTMB574 & B575	ALLOY C276
Superni 690M	N 6690	ASTMB166, B167 & B168	ALLOY 690
Superni 617	N 06617	ASTMB 166 & B168	ALLOY 617
Superni 625	N00625	ASTMB 443, B446 & B564	ALLOY 625
Superni 706M	N09706		ALLOY 706

Typical properties

GRADE	NOMINAL COMPOSITION (in%)	MECHANICAL PROPERTIES 0.2%P.S (kg/mn^2)	UTS (kg/mn^2)	%El
Superfer MDS	Fe Bal, Ni 37, Cr 18, Cu 0.5, Ti 0.2, Si 2.1, C 0.1	36.0	68.0	37
Super800/800H	Fe Bal, Ni 32, Cr 21, Al 0.3, Mn 1.5max, Ti 0.3, Si 1max, C 0.1max	32.6	70.0	40
Superni 600	Fe 10max, Ni Bal, Cr 15.5, Mn 0.5,	24.6	56.0	30
Superni 76	Fe 18.5, Ni Bal, Cr 21.0, Co 2.5max, Cu 0.2, Mo 9.0, Mn1.0, C 0.1 Others W-0.5	27.5	80.0	30
Superni 80A	Fe 1max, Ni Bal, Cr 19, Co 2.0max, Al 1.5 Ti 2.5, C 0.07	70.5	105.0	20
Superni 90	Fe 1max, Ni Bal, Cr 19, Co 19, Al 1.5, Ti 2.5, C 0.08	68.0	108.0	20
Superni 718	Fe 18.5, Ni Bal, Cr19.0, Cu 0.15, Al 0.50, Mo 3.05, Mn 0.18, Ti 0.90, Si 0.18, C 0.04, Others Cb+Ta-5.13	83.0	103.0	12
Superni 750	Fe 7.0, Ni Bal, Cr 15.5, Cu 0.25, Al 0.70, Mn 0.50, Ti 2.50, Si 0.25, C 0.04, Others Cb+Ta-0.95	63.0	98.0	8
Superni 825	Fe 30.0, Ni 42.0, Cr 21.5, Cu 2.25, Al 0.10, Mo 3.0, Mn 0.50, Ti 0.90, Si 0.25, C 0.03,			
Superweld 82	Fe 3.0, Ni Bal, Cr 20.0, Mn 3.0, Ti 0.55, Others Nb-2.5	95.0	42.0	
Superni C276	Fe 6.0 Ni Bal, Cr 15.0, Mo 16.0, Mn 1.0, Si 0.08, C 0.02, Others W-3.5			
Superni 690M	Ni 58 min, Cr 27-31, Fe 7 to 11, C 0.05 , S 0.015 , Mn 0.5, Si 0.5, Cu 0.5, Ti 0.6, B 0.006	24.0	58.5	30
Superni 617	Ni 44.5min, Cr 20-24, Co 10-15, Mo 8-10, Al 0.8-1.5, B 0.006 C 0.05-0.15, Fe 3.0, Mn 1.0, Si 1.0, S 0.015, Ti 0.6, Cu 0.5.	32.0	73.0	62
Superni 625	Ni 58, Cr 20-23, Fe 5, Mo 8- 10, Nb + Ta 3.15-4.15, Co 1.00	27.0	60.0	30
Superni 706M	Ni + Co 39.0-44.0, Cr 14.5-17.5, Nb+Ta 2.5-3.3,Ti 1.5-2.0, Al 0.40, C 0.06, Cu 0.30,Mn 0.35, Si 0.35, S 0.015, P 0.020, B 0.006, Co 1.00	99.0	128.2	18

GRADE	PRODUCT CHARACTERISTICS	APPLICATIONS
Superfer MDS	- Good heat resisting property - Resistant to green rot which occurs when atmosphere varies between oxidizing and reducing. - Resistant to corrosion process.	- Furnace parts and heat treatment jigs in carburising and nitriding furnaces.
Superfer 800	- Resistant to oxidation and carburisation - Resists stress-corrosion cracking and a variety of industrial atmospheres.	- Furnace equipment, steam boilers, heat exchangers and piping in chemical /petro chemical and nuclear industries, reformer baffle plates / tubes in fertilizer plants.
Superni 600	- Nickel-Chromium-Iron alloy having high temperature corrosion and oxidation resistance upto 1050^{0} C - Good to excellent resistance to various corrosive media both organic and inorganic. - Excellent mechanical properties with workability.	- Furnace muffles in oxidizing atmosphere - High temperature springs. - Heat exchanger tubings - Chemical and food processing equipment - Nuclear parts viz. feed valves, combustion chambers etc.

GRADE	PRODUCT CHARACTERISTICS	APPLICATIONS
Superni 76	- Good strength and oxidation resistance - Good forming and welding properties.	- Gas turbine parts.
Superni 80A	- Heat treatable 80^0-20^0 Ni-Cr alloy with outstanding creep resistant properties. - High strength upto 800^0C - High oxidation resistance. - High fatigue properties under arduous conditions.	- Gas turbine components such as rotor and stator blades, combustion chamber and other parts. - Exhaust valves in diesel engines. - HTfasteners operating under continuous stressed condition.
Superni 90	- Nickel based Superalloy containing chromium and cobalt with aluminum as hardening agents. - High strength upto 850^0 C - Excellent creep resistance upto 800^0 C - High resistance to oxidation, scaling and corrosion in various atmospheric conditions	- Die inserts and mandrels for forging bolts, fasteners, hot shear blades.
Superni 718	- Precipitation hardenable nickel base alloys. - High yield strength upto 650^0 C - Excellent cryogenic properties upto - 217^0 C - Good weldability even in aged condition. - Excellent oxidation resistance upto 980^0 C - Ease of formability.	- Jet engines, pump bodies and parts
Superni 750	- Age hardenable alloy used for its corrosion and oxidation resistance and high creep strength at temperature upto 800^0 C	- Gas turbine parts, aviation and indl. Springs, bolts, bellows.
Superni 825	- Used aggressive & corrosive environments. - Resistant to chloride-ion stress-corrosion cracking. - Resistant to reducing acids and oxidizing chemicals.	- Phosphoric acid evaporators, chemical process equipment.
Superweld 82	- Used for gas shielding arc welding of Superni's etc., to steel or other dissimilar combination of nickel-base and iron-base alloys.	- Welding electrodes.
Superni C276	- Resistant to various acids like hydrochloric etc.	- Tanks, vessels, handling wet chlorine acids. Gas, hypochlorite, ferric &cupric chlorides, etc.,
Superni 690M	- Excellent resistance to stress corrosion cracking	- Coal gasification furnaces, petrochemical industries
Superni 617	- High temperature strength and oxidation resistance	- Combustion cans, air craft and land based gas turbines, nuclear power plants.
Superni 625	- High temperature resistance and good corrosion resistance	- Chemical processing industries, aero space, gas turbine components
Superni 706M	- High strength combined with ease of fabrication, Excellent resistance to post weld strain age cracking.	- Aero space industry, industrial gas turbines

Titanium And its Alloys

- Commercially pure Titanium
- Titanium Alloys

Titanium by virtue of its excellent corrosion resistance and high strength-to-weight ratio finds application in the aerospace, chemical, petrochemical, marine, paper pulp, textile, food and dairy industries. Titanium alloy is also used for bio-medical implants.

MIDHANI GRADE	CONFORMITY TO INTERNATIONAL SPECIFICATION	TYPICAL APPLICATION
BT 3-1	OCT1-90173-75	Sleeves, casings, flanges, brackets, fasteners, shank, compressor blades
BT 5-1	OCT1-90266-78	Engine cooling rings, fasteners, tank linings, rings, tail cones
BT 9	OCT1-90006-77	VI, VII, VIII stage rotor blades, wing nose boxes
Titan 22A	LA 114, TA8DV, AMS 4972E	Compressor blade feed stock
Titan 23A	GTM Ti OT 4-1, OCT 1-91173-75, OCT 1-90218-76	Lugs, Exhaust shrouds, brackets, tail cone covers, stiffening sheets
Titan 35A	GTM 900/FS-2, OCT 1-90006-77	Compressor blade feed stock
Titan 33A (BT20)	GOST 23755-79	Structural application of Aircraft
TITAN 44A	Titanium Beta 21 S	Structural application of Aircraft

GRADE	UNS. NO.	CONFORMITY TO INTERNATIONAL SPECN.	KNOWN NEAR EQUIVALENT
Titan 12	R 50250	ASTM B 265/B 348 GRADE 1	ALLOY 115
Titan 15	R 50400	ASTM B 265/B 348 GRADE 2	ALLOY 125
Titan 31	R 56400	ASTM B 265/B 348 GRADE 5	ALLOY 318
Titan 26	-	TA6ZD	ALLOY 685
Titan 32	R 56320	ASTM B 265/B 348 GRADE 9	-

Typical properties

GRADE	NOMINAL COMPOSITION (in%)	MECHANICAL PROPERTIES		
		0.2%P.S (kg/mn^2)	UTS (kg/mn^2)	% EL
Titan 12	Fe 0.20, O 0.15, N 0.05, C 0.08, H 0.013, Ti Bal,	18	32	25
Titan 15	Fe 0.25, O 0.25, N 0.06, C 0.08, H 0.013, Ti Bal	25	47	20
Titan 31	Fe 0.30, O 0.20, N 0.07, C 0.08, H 0.013, Ti Bal, Al 6, V 4	85	92	10
Titan 26	AL 6.0, Zr 5.0, Mo 0.5, Si 0.25, Ti bal	850	990	6
Titan 32	3.0 Al , 2.5 V, Ti-bal	700	900	15

GRADE	PRINCIPAL CHARACTERISTICS	APPLICATIONS
Titan 12/15	- Excellent resistance to corrosion by a wide range of natural and artificial environment. to weight ratio in view low density and high strength.	Airframes, aircraft engine parts, gas compression, chemical desalination, marine components, plate heat of exchangers, platinized anodes, surgicals implants, anodes for chlor-alkali cells, jigs, fixtures and baskets for electro plating.
Titan 31	- High strength to weight ratio. - High specific strength at elevated temperatures. - Excellent resistance at temperatures upto 520^0 C - High fatigue strength and toughness.	Rocket motor, structural forgings and fasteners, pressure vessels, gas and chemical pumps, cryogenic parts, ordnance equipment, marine components, steam turbine blades.
Titan 26	- Excellent High Temp. Strength & Creep Resistance, Good Weldability & Formability, Good Corrosion Resistance	Blades and other Aero engine Components
Titan 32	- High strength to weight ratio, excellent corrosion resistance	Marine applications, Bio implants, chemical processing industries

Special Purpose Steels

- Martensitic Steel
- Maraging Steels
- Austenitic Steel
- Precipitation hardening steels

These special steels have improved mechanical properties and better work ability which are essential for special applications in aerospace, power generation, nuclear, defence, cryogenic and other general engineering industries. These include precipitation hardening steels, nonmagnetic austenitic and martensitic stainless steels and above all maraging steels.

GRADE	UNS. NO.	CONFORMITY TO INTERNATIONAL SPECN.	KNOWN NEAR EQUIVALENT	MAX SERVICE TEMP°C
MDN 174	S 17400	ASTM A 564-TYPE 630	Alloy 17-4 PH	315
MDN 250	K 92890	ASTM A 538/A 579	Maraging 250	400
MDN 904L	N 08904	ASTM B 625, B 649	Alloy 904 L	-
MDN 15-5PH	S 15500	ASTM A 567	Alloy 15-5 PH	350
MDN 11-10PH	-	-	Alloy 11-10 PH	400

Typical properties

GRADE	NOMINAL COMPOSITION (in%)	MECHANICAL PROPERTIES 0.2%P.S (kg/mn^2)	UTS (kg/mn^2)	% EL
MDN 174	C 0.07, Ni 4.0, Cu 4.00, Cr 16.5, Fe Bal, Others Nb-0.3 Condition H1 100.	72	93	16
MDN 250	C 0.01, Ni 18.5, Co 8.5, Fe Bal, Condition 480^{0}C Others Mo-4.8, Ti -0.4, Al-4.17 Condition Aged	178	185	6
MDN 904L	C 0.02, Ni 25.0, Cu 1.5, Cr 19.5, Fe Bal, Others Mo-4.5	22	50	36
MDN 15-5PH	C 0.07, Mn 1.0,P 0.040,S 0.030, Si 1.0,Cr 14.0-15.0, Ni 3.50-5.50, Cu 2.50-4.50, Cb + ta 0.15-0.45,Ti 0.6-1.0, Al 0.2, Nb 0.15,Cu 0.3 Fe-bal	795	965	14
MDN 11-10PH	C 0.03, Si 0.15, Mn 0.1, P 0.01, S 0.01, Cr 10.0-11.0, Ni 9.0-10.3, Mo 1.8-2.3	1270	1370	8

GRADE	PRINCIPAL CHARACTERISTICS	APPLICATIONS
MDN 174	- A precipitation hardening steel offering good corrosion resistance with high strength and hardness - Used in application demanding high corrosion resistance upto 300^0 C	Nuclear power plants, nozzles for nylon fiber compressor parts
MDN 250	- High strength and toughness for service at cryogenic and ambient temperatures	Components for rockets, missiles and aircrafts, hot forging, dies, extrusion tooling etc.
MDN 904 L	- Used under severe corrosive conditions	Distillation columns, reaction vessels, pipes and tanks
MDN 11- 10PH	- High Strength, Toughness & Stress Corrosion Cracking resistance	Structural application in Aerospace industry
MDN 15 - 5PH	- High strength, good corrosion resistance, good mechanical properties up to 600^0 F (316^0 C),good toughness	Aerospace, chemical, petro chemical, food processing, paper and general metal working industries,

Heating Element Alloys

- Electrical resistance alloys (SUPERHEAT SERIES)

MIDHANI offers Nickel-Chromium and Iron-Nickel chromium alloys for heating elements in electric furnaces in various atmospheres. These alloys also find usage in iron heaters, dryers and other heating appliances.

GRADE	UNS NO.	KNOWN NEAR EQUIVALENT
SUPERHEAT 80	N0 6003	ALLOY V
SUPERHEAT 60	N0 6004	ALLOY 3
SUPERHEAT 45	-	ALLOY 45
SUPERHEAT 30	-	ALLOY 1

Typical properties

GRADE	NOMINAL COMPOSITION (in%)	PHYSICAL PROPERTIES	
		Resistivity at 20°C micro-ohm-cm	Max working temp in air 1200°C
Superheat 80	Ni 80, Cr 20, R	109	1200
Superheat 60	Fe Bal, Ni 60, Cr 15,	112	1150
Superheat 45	Fe Bal, Ni 45, Cr 25	112	1150
Superheat 30	Fe Bal, Ni 30, Cr 20	104	1100

GRADE	PRINCIPAL CHARACTERISTICS	APPLICATIONS
SUPERHEAT 80	Suitable for electrical resistance and electrical heating applications	Electric furnace in oxidizing or neutral atmosphere domestic heaters, wire wound resistors and potentiometers
SUPERHEAT 60	- do -	Iron heaters, dryers
SUPERHEAT 45	- do -	Electric furnace in reducing, carburizing or slightly sulphurising atmosphere
SUPERHEAT 30	- do -	Medium temperature furnace, heaters, Rheostats, Shunts.

High Reliability Electrical & Electronic Alloys

- Soft magnetic alloys (Softmag series)
- Controlled expansion alloys (Ferni series)

MIDHANI manufactures a wide range of materials for electrical, electronic and telecommunications applications. They are soft magnetic alloys, soft iron high purity nickel and nickel-manganese alloys and controlled expansion alloys.

Typical properties

GRADE	NOMINAL COMPOSITION	TYPICAL MAGNETIC PROPERTIES				
		Strip Thick (mm)	Bs Tesia	μmax	μ2max	Coercive force
Softmag 36B	Fe Bal, Ni 36,	0.3	1.3	20000	17000	0.15
Softmag 48B	Fe Bal, Ni 48	0.3	1.3	55000	35000	0.08
Softmag 78B	Fe Bal, NI 78, Cr 0.05, Cu 5, Mo 4	0.1	0.7	160000	140000	0.012
Softmag 78D	Cr -do	0.1	0.7	390000	250000	0.006
Softmag 78E	Cr -do-	0.1	0.7	560000	280000	-0.004

GRADE	PRINCIPAL CHARACTERISTICS	APPLICATIONS
Softmag 36B	Very high electrical resistivity, good permeability and low electrical loss	Relays and pulse transformers
Softmag 48B	High initial permeability	Relays, transformers, solenoids, current transformers
Softmag 78	These alloys show very high initial and maximum permeability at low magnetic forces	Relay cores, current transformers, filters, inductances, magnetic amplifiers

Controlled expansion alloys

GRADE	UNS NO.	KNOWN NEAR EQUIVALENT
Ferni 36	K93600	INVAR
Ferni 42	K94200	N42

Typical properties

GRADE	NOMINAL COMPOSITION (in%)	MEAN COEFFICIENT OF THERMAL EXPANSION (10^{-7})	
		0-100 ^{0}C	0-200^{0}C
Ferni 36	Fe Bal, Ni 36	12	23
Ferni 42	Fe Bal, Ni 42	47	45

GRADE	PRINCIPAL CHARACTERISTICS	APPLICATIONS
Ferni 36	These alloys have controlled expansion co-efficients	Thermostats for geysers
Ferni 42	These alloys are tough and ductile and can be strain hardened	Glass to Metal sealing
Ferconi	These alloys are having specific expansion property	Glass to Metal sealing

ARMOUR PRODUCTS

A. Vehicle Armouring

Mi-17 Helicopter

Helicopter	:	Mi-17
Weight of armour panel	:	225Kg against steel armour of 370Kg
Reduction in weight	:	39%
Protection Level	:	7.62mm API at a range of 400m

Full Armouring of 52 Seater Bus

- Body and roof gives the protection against 7.62 x 39mm HSC upto glass level & 7.62 x 39 mm MSC above glass level
- Kevlar floor gives the protection against 2 x HE36
- BR glass gives the protection against 7.62 x 39 mm MSC

MIDHANI PRODUCT RANGE

Superalloys ▪ Iron base SUPERFER ▪ Nickel base SUPERNI ▪ Cobalt base SUPERCO

Superalloys find extensive application in aeronautics, space, nuclear, chemical, petrochemical, power generation and furnace industries, where extreme temperatures, mechanical stresses and corrosive environments are encountered.

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Superfer 800/800H	N 08800/08810	ASTMB163, B407, B408, B 409	ALLOY 800/800H
Superni 600	N 06600	ASTMB166, B168,DTD 328A	ALLOY 600
Superni 76	N 06002	ASTMB 435 & B572	ALLOY X
Superni 80A	N 07080	ASTMB637, BSHR 201	ALLOY 80A
Superni 90	N 07090	BS2HR 2	ALLOY 90
Superni 718	N 07718	AMS5662, 5663, ASTM B637, B670	ALLOY 718
Superni 750	N 07750	ASTMA461	ALLOY X-750
Superni 825	N 08825	ASTMB 163, B 426, B424, B 425	ALLOY 825
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Superni 617	N 06617	ASTMB 166 & B168	ALLOY 617
Superni 625	N00625	ASTMB 443, B446 & B564	ALLOY 625
Superni 706M	N09706		ALLOY 706

Typical properties

GRADE	NOMINAL COMPOSITION (in%)	MECHANICAL PROPERTIES 0.2%P.S (kg/mn^2)	UTS (kg/mn^2)	%El
Superfer MDS	Fe Bal, Ni 37, Cr 18, Cu 0.5, Ti 0.2, Si 2.1, C 0.1	36.0	68.0	37
Super800/800H	Fe Bal, Ni 32, Cr 21, Al 0.3, Mn 1.5max, Ti 0.3, Si 1max, C 0.1max	32.6	70.0	40
Superni 600	Fe 10max, Ni Bal, Cr 15.5, Mn 0.5,	24.6	56.0	30
Superni 76	Fe 18.5, Ni Bal, Cr 21.0, Co 2.5max, Cu 0.2, Mo 9.0, Mn1.0, C 0.1 Others W-0.5	27.5	80.0	30
Superni 80A	Fe 1max, Ni Bal, Cr 19, Co 2.0max, Al 1.5 Ti 2.5, C 0.07	70.5	105.0	20
Superni 90	Fe 1max, Ni Bal, Cr 19, Co 19, Al 1.5, Ti 2.5, C 0.08	68.0	108.0	20
Superni 718	Fe 18.5, Ni Bal, Cr19.0, Cu 0.15, Al 0.50, Mo 3.05, Mn 0.18, Ti 0.90, Si 0.18, C 0.04, Others Cb+Ta-5.13	83.0	103.0	12
Superni 750	Fe 7.0, Ni Bal, Cr 15.5, Cu 0.25, Al 0.70, Mn 0.50, Ti 2.50, Si 0.25, C 0.04, Others Cb+Ta-0.95	63.0	98.0	8
Superni 825	Fe 30.0, Ni 42.0, Cr 21.5, Cu 2.25, Al 0.10, Mo 3.0, Mn 0.50, Ti 0.90, Si 0.25, C 0.03,			
Superweld 82	Fe 3.0, Ni Bal, Cr 20.0, Mn 3.0, Ti 0.55, Others Nb-2.5	95.0	42.0	
Superni C276	Fe 6.0 Ni Bal, Cr 15.0, Mo 16.0, Mn 1.0, Si 0.08, C 0.02, Others W-3.5			
Superni 690M	Ni 58 min, Cr 27-31, Fe 7 to 11, C 0.05 , S 0.015 , Mn 0.5, Si 0.5, Cu 0.5, Ti 0.6, B 0.006	24.0	58.5	30
Superni 617	Ni 44.5min, Cr 20-24, Co 10-15, Mo 8-10, Al 0.8-1.5, B 0.006 C 0.05-0.15, Fe 3.0, Mn 1.0, Si 1.0, S 0.015, Ti 0.6, Cu 0.5.	32.0	73.0	62
Superni 625	Ni 58, Cr 20-23, Fe 5, Mo 8- 10, Nb + Ta 3.15-4.15, Co 1.00	27.0	60.0	30
Superni 706M	Ni + Co 39.0-44.0, Cr 14.5-17.5, Nb+Ta 2.5-3.3,Ti 1.5-2.0, Al 0.40, C 0.06, Cu 0.30,Mn 0.35, Si 0.35, S 0.015, P 0.020, B 0.006, Co 1.00	99.0	128.2	18

QUALITY & PROCESS CONTROL

Diverse types of metals and alloys required by avionics, space, nuclear power, communication & chemical sectors must meet their exact specifications.

Rigorous quality charts are done at each stage of manufacture to achieve quality, reliability and consistency of properties in all products. Centralized storage of technical information and data logging is also a part of the process.

TESTING & MATERIAL EVALUATION

A comprehensive range of testing and evaluation services covering chemical analysis, mechanical, non-destructive and magnetic testing are rendered by MIDHANI.

These include X-Ray, Atomic Absorption, Optical Emission & Ultra-voilet visible Spectrometry and gas analysis Flux analyser. Tensile, Creep & Fatigue testing, Fracture toughness evaluation, Ultrasonic, Eddy Current, Magnetic, Particle inspection, Dye-Penetrant, Radiography Hysteresis graph, Core Loss testing, Scanning electron microsclope with EDAX etc are also carried out.

Sophisticated services dedicated to testing and evaluation of aeronautical materials and components are also offered by MIDHANI. Mechanical testing services include Tensile & Compressive Testing at ambient, elevated and cryogenic temperatures, low cycle fatigue.

TECHNICAL SERVICES

Job Works

Forging, Rolling, Heat treatment, investment castings, and other conversion jobs are carried out by MIDHANI for its customers.

AERONAUTICAL MATERIALS TESTING LABORATORY

MIDHANI had set up and manages a state-of-art Aeronautical Materials Testing Laboratory (AMTL) for comprehensive testing and evaluation of aeroengine materials and components.

MIDHANI has been closely involved with development and supply of advanced superalloys, titanium alloys and special steels to the Gas Turbine Research Establishment (GTRE) for the Kaveri Engine to power the indigenously designed Light Combat Aircraft.

Testing upto 1000^0 C, Stress Rupture Testing and Creep Strain Determination upto 1050^0 C, Rotating Bending Fatigue Test at ambient and elevated temperatures, Plain Strain Fracture Toughness (KIC) and JIC Testing, measurement of Fatigue Crack Prop gation Rates, Impact and Hardness Testing. Metallography services include specimen preparation, Optical Microscopy, Scanning Electron Microscopy In-situ Metallography, Phase analysis by Microhardness testing. Chemical compositional analysis is carried out using X-ray, Fluorescence Spectrometry, semi-quantitative analysis using Mobile Optical Emission Spectrometry. Other services include Electro discharge machining for sample blank extraction, Chevron Notch making, CNC machining.

METALLURGICAL CONSULTANCY SERVICES

MIDHANI offers failure analysis, selection and alloy design services on a consultancy basis to customers.

QUALITY ASSURANCE

MIDHANI is an ISO 9001:2015 and AS 9100D, certified NABL Accreditation as per IS-17025 for Chemical Testing Laboratory.

MIDHANI's quality systems are approved by more stringent standards of Director General of Aeronautical Quality Assurance, Director General of Civil Aviation, Director General of Quality Assurance, Department of Space, Department of Atomic Energy. "Source Approval" has been accorded by Boeing Aircraft Company, USA for titanium and Titanium alloys of MIDHANI for their C-17 transport and MD series of jet aircraft.

Apart from close control over chemistry and maintaining processing conditions, the intermediate as well as final products are subjected to various destructive and non-destructive tests to establish their suitability for high temperature, corrosion, vibration or stress conditions.

The central laboratory in MIDHANI, fully equipped with chemical, metallurgical, mechanical, non-destructive, magnetic and physical testing ensuring excellent quality of finished products.


CERTIFICATE

Mishra Dhatu Nigam Limited

AS9100:2016


CERTIFICATE

Mishra Dhatu Nigam Limited

ISO 9001 : 2015


National Accreditation Board for Testing and Calibration Laboratories

Forms of supply

(All dimensions are in mm)

Bar	Forged	Dia	75 - 300
	Hot Rolled	Dia	10 - 75
Wire	Cold	Dia	0.1 and above
Sheet / Plate	Hot Rolled	Thickness (min)	4.0 and above
		Width (max)	1000
		Length	1500 - 2000
	Cold Rolled	Thickness (min)	0.5
		Width (max)	1000
		Length	2000 - 2500
Strip	Cold Rolled	Thickness (min)	0.1
		Width (max)	250
Rings	Rolled	OD	3540
		Wall Thickness (Min.)	40
		Height (Max/Min)	620/50

we are everywhere,
from deep sea to space

MIDHANI

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