

**PRODUCTION OF
COLD ROLLED
STAINLESS STEEL
AT
SALEM STEEL PLANT
AND
APPLICATIONS**

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AGM I/C (MS-PAD)
SAIL, SALEM STEEL PLANT**

COLD ROLL STAINLESS STEELS – OPPORTUNITY IN INDIA

- ❖ **OVER ALL DEMAND IN EXCESS OF 1.3 MILLION TONNES**
- ❖ **KITCHEN WARE & UTENSILS 0.9 MILLION TONNES**
- ❖ **INDUSTRIAL SEGMENT 0.4 MILLION TONNES**
- ❖ **GROWTH**
 - **LOW END DEMAND TO DOUBLE IN NEXT 8 YEARS**
 - **HIGH END DEMAND TO GROW 4 TIMES IN NEXT 10 YEARS**

SOURCE : STEEL GURU

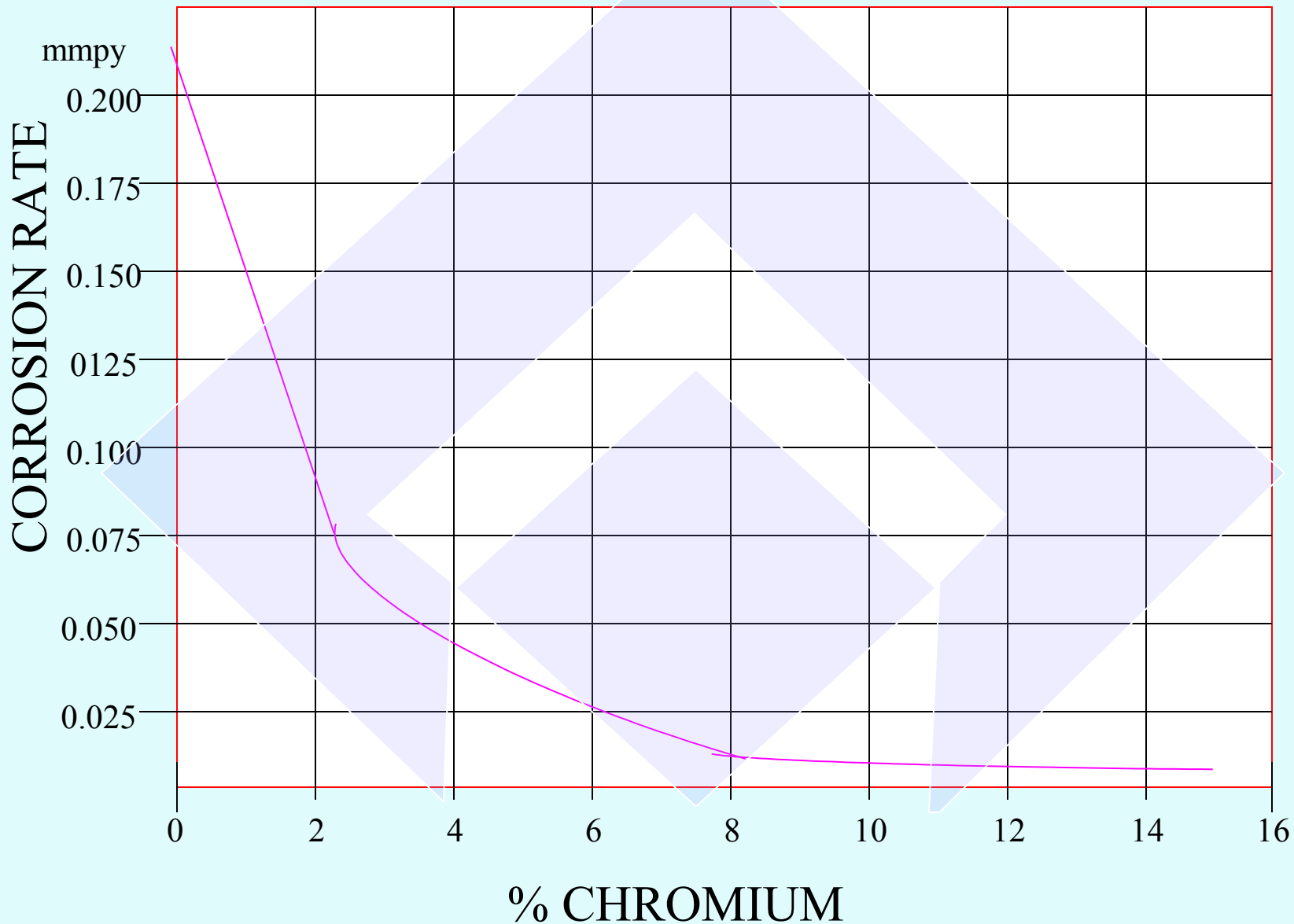
PRODUCTION OF COLD ROLLED STAINLESS STEEL & APPLICATIONS

- ❖ **MORE THAN 100 GRADES OF STAINLESS STEEL IN THE MAJOR FAMILY OF AUSTENITIC, FERRITIC & MARTENSITIC ARE PRODUCED IN THE WORLD.**
- ❖ **SALEM STEEL PLANT MANUFACTURES ABOUT 15 GRADE OF STAINLESS STEEL IN COLD ROLLED SHEETS AND COILS.**
- ❖ **HOT ROLLING AND COLD ROLLING PROCESS.**
- ❖ **PRODUCT MIX**
- ❖ **APPLICATIONS OF STAINLESS STEEL.**
- ❖ **EXPANSION**

STAINLESS STEEL

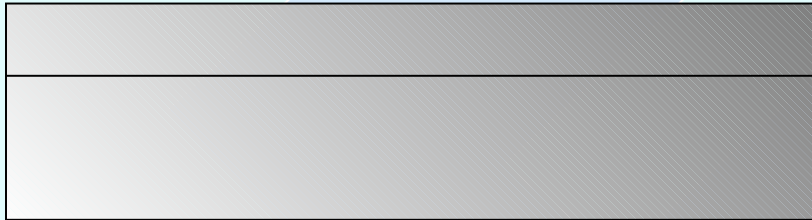
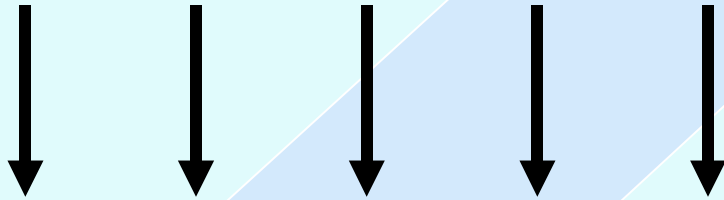
**STEEL CONTAINING
MINIMUM 10.5%
CHROMIUM.**

EFFECT OF CHROMIUM CONTENT ON CORROSION RATE



CONTACT WITH ATMOSPHERE

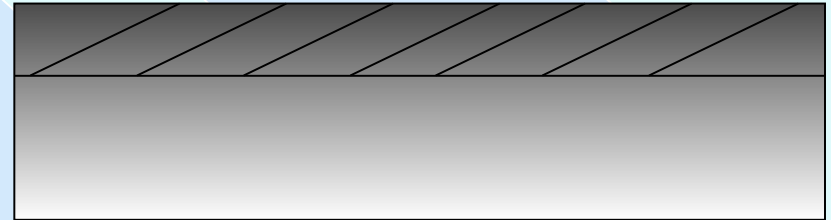
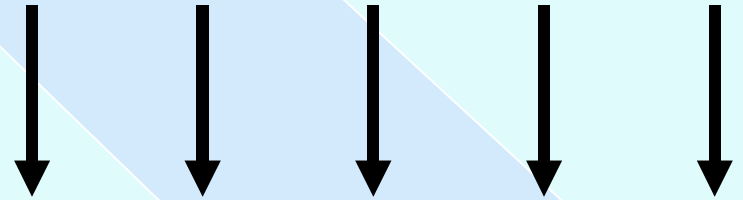
CHROMIUM FORMS
PASSIVE “CHROMIUM
OXIDE”



STAINLESS STEEL

RESISTS CORROSION
BY FORMING TENACIOUS
IMPERVIOUS OXIDE LAYER
ON SURFACE

IRON FORMS RUST
“IRON OXIDE”



CARBON STEEL

RUSTS & CORRODES
BY FORMING POROUS IRON
OXIDE LAYER ON SURFACE

CLASSIFICATION OF COMMON GRADES OF STAINLESS STEELS

CHROMIUM-NICKEL (300 SERIES)

301/304/304L/321

**DUCTILE,
GOOD
CORROSION
RESISTANCE**

NON-MAGNETIC

316/316L

**DUCTILE,
EXCELLENT
CORROSION
RESISTANCE**

NON-MAGNETIC

310S

**HIGH ALLOY
CONTENT.
GOOD HIGH
TEMPERATURE
PROPERTIES.
NON-MAGNETIC**

CLASSIFICATION OF COMMON GRADES OF STAINLESS STEELS

STRAIGHT CHROMIUM (400 SERIES)

410S/ 430/ 409/409M

**NON-HARDENABLE
GOOD GENERAL
CORROSION
RESISTANCE
MAGNETIC**

420

**HARDENABLE
HEAT TREAT
FOR HIGH
HARDNESS
MAGNETIC**

CLASSIFICATION OF COMMON GRADES OF STAINLESS STEELS

LOW NICKEL-HIGH MANGANESE(200 SERIES)

SSLN1

1% NICKEL

NON-MAGNETIC

DUCTILE

ADEQUATE

CORROSION

RESISTANCE

SSLN4

4% NICKEL

DUCTILE

NON-MAGNETIC

GOOD GENERAL

CORROSION

RESISTANCE

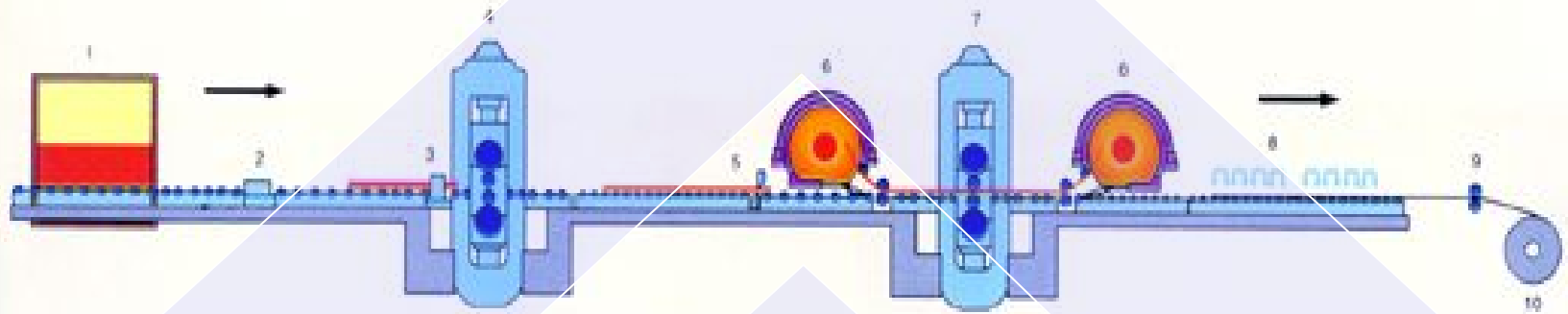
BROAD RANGE OF CHEMICAL COMPOSITION

CLASSIFICATION

ELEMENTS

	% C	% Cr	% Ni	% Cu
AUSTENITIC 300 SERIES	0.15 max.	16-28	6-33	2 max.
FERRITIC 400 SERIES	0.20 max.	14-30	Present in some	Nil
MARTENSITIC 400 SERIES	1.00 max.	11-27	2.5	Nil
SSLN 200 SERIES	0.12 max.	14-16	0.7-4.2	1.8 Max

HOT ROLLING PROCESS



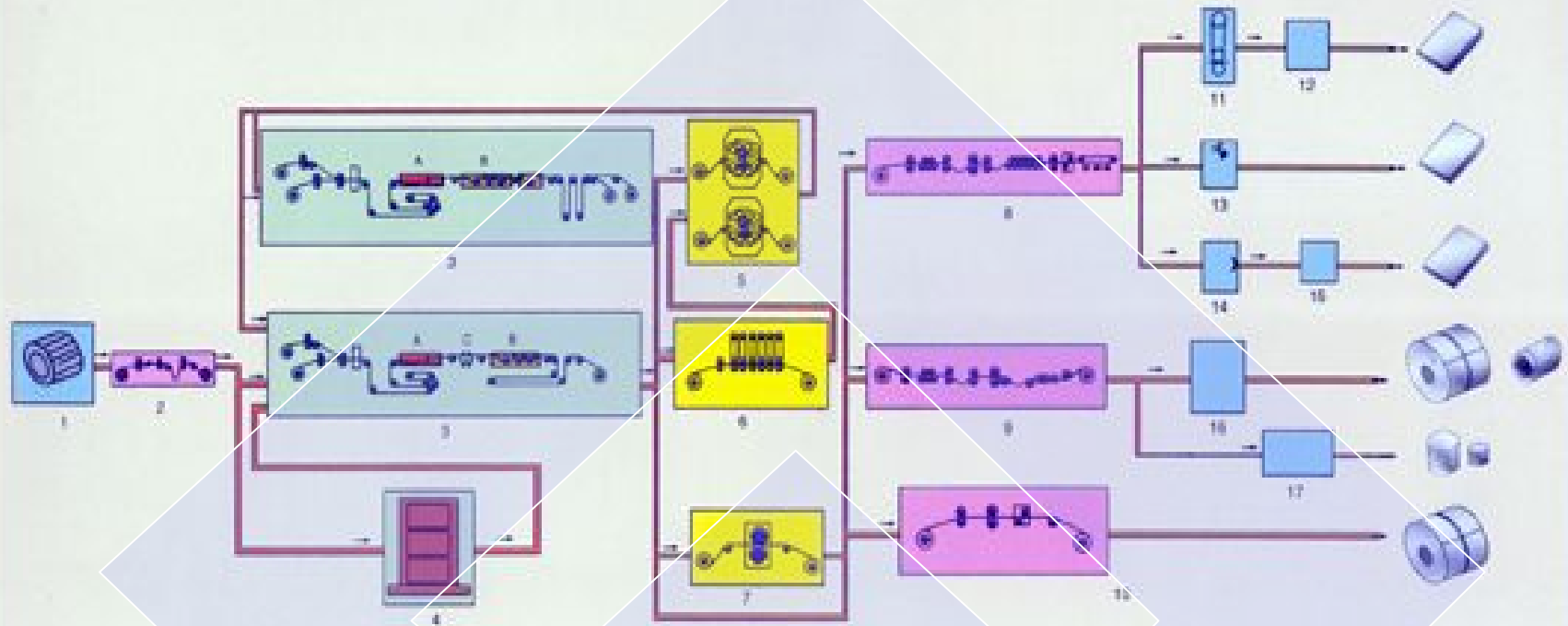
1. Reheating Furnace
2. Descaler
3. Edger

4. Roughing Mill
5. Crop Shear
6. Coiler Furnace

7. Steckel Mill
8. Laminar Cooling
9. Pinch Roll

10. Down Coiler

COLD ROLLING PROCESS



1. Hot Rolled Coil
2. Coil Buildup Line
3. Annealing & Pickling Line
 - A - Annealing
 - B - Pickling
 - C - Shot Blasting
4. Bell Annealing Furnace

5. Sendzimir Mills
6. Strip Grinding Line
7. Skinpass Mill
8. Shearing Line
9. Slitting Line
10. Coil Inspection & Dividing Line
11. Sheet Grinding & Polishing Line

12. PVC Coating Unit
13. Sheet Packing Line
14. Stretcher Leveller
15. Resquaring Shear
16. Coil Packing Line
17. Blanking Line

PRODUCT RANGE

HOT ROLLED ANNEALED & PICKLED

COIL/SHEET/PLATE

THICKNESS	-	3.00 TO 8.00 mm
WIDTH	-	1025/1275 mm
LENGTH	-	4000 mm (Max)

HOT ROLLED (AS ROLLED)

COIL/SHEET/PLATE

THICKNESS	-	3.00 TO 10.00 mm
WIDTH	-	1025/1275 mm
LENGTH	-	BY DISCUSSION

PRODUCT RANGE

STAINLESS STEEL

COLD ROLLED ANNEALED & PICKLED

COIL

THICKNESS - 0.13 TO 6.0 mm
WIDTH - 1000-1250 mm

SHEET/PLATE

THICKNESS - 0.5 TO 6.0 mm
WIDTH - 1250 mm(Max)
LENGTH - 4000 mm(Max)

SPECIAL FINISHES PRODUCED BY SALEM STEEL PLANT

- **AQUALINE**
- **CHEQUERED**
- **DULL FINISH**
- **EPIDERMA**
- **FABRIQUE**
- **FRONDZ**
- **HAMMERTONE**
- **HONEY KOM**
- **MACRO MATT**
- **MIRROR FINISH**
- **MOON ROCK**
- **MYSTIQUE**
- **PEARLPLUS**
- **STRIPE**
- **ZEBRA**
- **NO.3/NO.4**

STANDARDS FOLLOWED BY SALEM STEEL PLANT

IS

6911

ASTM

A240

DIN

EN10088

JIS

G4305

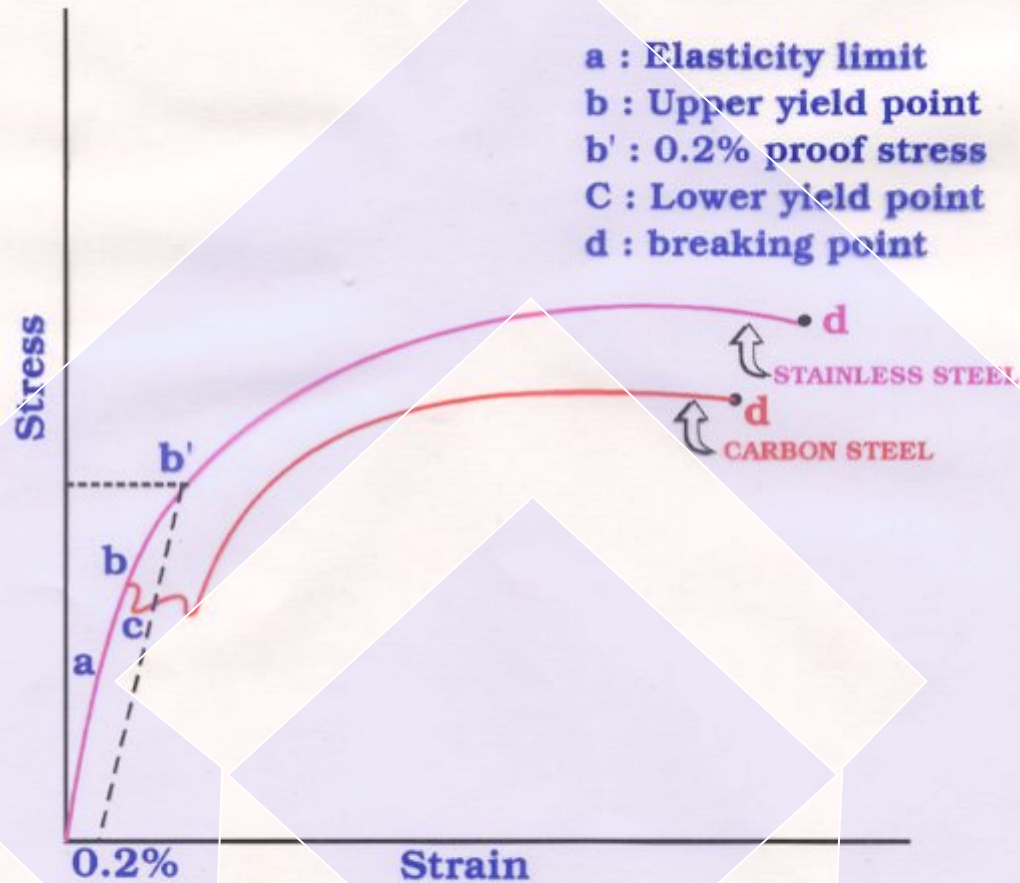
ATTRIBUTES OF STAINLESS STEEL

- **EXCELLENT CORROSION RESISTANCE**
- **EXCELLENT MECHANICAL PROPERTIES**
- **EXCELLENT ELEVATED TEMPERATURE PROPERTIES**
- **HIGH STRENGTH TO WEIGHT RATIO**
- **EASE OF FABRICABILITY**
- **MINIMUM MAINTENANCE**
- **BETTER EQUIPMENT LIFE**
- **APPEALING AESTHETICS**

ATMOSPHERIC GENERAL CORROSION RESISTANCE - COMPARISON

MATERIAL	RURAL (MICRON/YEAR)	INDUSTRIAL/ MARINE (MICRON/YEAR)
CARBON STEEL	6	34
CORTEN STEEL	4	14
COPPER	0.8	0.9
ZINC	0.3	3
ALUMINIUM	0.06	0.4
STAINLESS STEEL	0.002	0.1

STRESS STRAIN CURVE



FOR GOOD WORKABILITY, PROOF STRESS TO UTS RATIO SHALL BE LOW (40-55%) WITH REASONABLY GOOD ELONGATION VALUE (20% MIN)

LIFE CYCLE COSTING

$$LCC = AC + IC + \sum_{n=1}^N \frac{OC}{(1+i)^n} + \sum_{n=1}^N \frac{LP}{(1+i)^n} + \sum_{n=1}^N \frac{RC}{(1+i)^n}$$

WHERE:

LCC = TOTAL LIFE CYCLE COST

AC = INITIAL MATERIAL ACQUISITION COSTS

**IC = INITIAL MATERIAL INSTALLATION/
FABRICATION COSTS**

OC = OPERATING MAINTENANCE COSTS

LP = PRODUCTION LOSS COSTS DURING DOWNTIME

RC = MATERIAL REPLACEMENT COSTS

N = LIFE TIME

i = ACTUAL INTEREST RATE

n = YEAR OF THE EVENT

ALL THE COST REFERRED TO THE PRESENT VALUE

PRODUCTS DEVELOPED FOR VARIOUS APPLICATIONS AND TECHNICAL SUPPORT RENDERED

APPLICATION	PRODUCT	GRADE
RAILWAYS	RAIL COACHES	301LN/409M
	TROUGH FLOOR	301/304
	FLOORING	430 SPL FINISH
	RAIL COACH INTERIOR WAGON	304 SPL FINISH 409M
AUTOMOBILE/ TRANSPORT	AUTO EXHAUST SYSTEM	409L
	GUARD MUFFLER	430/304
	INTERIOR & EXTERIOR PANELLING	430/SSLN(\$PL FINISH)
APPLIANCES	WASHING MACHINE	430
	MIRCOWAVE OVENS	430
	VACCUM FLASKS	304
	PRESSURE COOKER	304/SSLN4
	GEYSERS	304
	GAS STOVES	304
ARCHITECTURE, BUILDING & CONSTRUCTION	SOLAR WATER HEATERS	304/430
	ROOFING	304/316
	FAÇADE CLADDING	430/304
	WALL CLADDING	430/304

PRODUCTS DEVELOPED FOR VARIOUS APPLICATIONS AND TECHNICAL SUPPORT RENDERED

APPLICATION	PRODUCT	GRADE
ARCHITECTURE, BUILDING & CONSTRUCTION	FALSE CEILING	430/304
	RAILINGS	304/316
	DOOR FRAMES	430
	DOOR SHUTTER	304/430
COINAGE	SS COINS	430
INDUSTRIAL APPLICATIONS	FURNACE PARTS	310S
	FLEXIBLE HOSES	304/321/304L/316
	OPTICAL FIBRE CABLE- SHEATHING	304
	HEAT EXCHANGER- PLATES	304
	TOWER PACKING	304/316/304L
	METALLIC BELLOWS	304/321/310S
	CAPACITOR BOXES	409
	SUBMERSIBLE PUMPS	304
POWER PLANT	COAL BUNKER LINERS	409M
	COAL BUNKERS	409M

EXPANSION AT A GLANCE

PROPOSED EXPANSION AT A COST OF RS.1500 CRORES.

STEEL MAKING THROUGH AOD ROUTE & CONTINUOUS CASTING.

ADDITION OF A & P LINE, Z-MILL, BALANCING FACILITIES IN HRM & CRM.

ROTARY POLISHING UNIT.



INTERNATIONAL

CERTIFICATIONS

CERTIFICATE

Management system as per
DIN EN ISO 9001 : 2000

In accordance with TÜV NORD CERT procedures, it is hereby certified that

STEEL AUTHORITY OF INDIA LIMITED
SALEM STEEL PLANT
Salem – 636 103, Tamil Nadu,
India

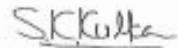


applies a management system in line with the above standard for the following scope

Manufacture & Supply of Cold Rolled Stainless Steel Coils, Strips, Sheets, Plates, Blanks & Hot Rolled Stainless Steel / Carbon Steel Coils, Plates Providing Human Resources Functional Services

Certificate Registration No. 44 100 930033-E3
Audit Report No. 2.5-1358/1999

Valid until 14.11.2010
(Until 29.11.2011 in case of transition to ISO 9001:2008)
Initial Certification 01.06.1993

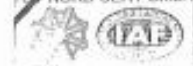


Certification Body
at TÜV NORD CERT GmbH

Mumbai, 27.01.2009

This certification was conducted in accordance with the TÜV NORD CERT auditing and certification procedures and is subject to regular surveillance audits.

TÜV NORD CERT GmbH Langenarcksstrasse 20 45141 Essen www.tuev-nord-cert.com



CERTIFICATE

Management system as per
ISO 14001 : 2004

In accordance with TÜV NORD CERT procedures, it is hereby certified that

STEEL AUTHORITY OF INDIA LIMITED
SALEM STEEL PLANT TOWNSHIP
Salem – 636 030, Tamilnadu,
India

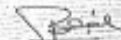


applies a management system in line with the above standard for the following scope

Provision & Maintenance of Water Supply, Solid Waste & Sewage Management, Lighting & other Social Services

Certificate Registration No. 44 104 094020-E3
Audit Report No. 2.5-4096/2008

Valid until 22.01.2012



Certification Body
at TÜV NORD CERT GmbH

Mumbai, 23.01.2009

This certification was conducted in accordance with the TÜV NORD CERT auditing and certification procedures and is subject to regular surveillance audits.

TÜV NORD CERT GmbH Langenarcksstrasse 20 45141 Essen www.tuev-nord-cert.com



TGA-ZM 07-00-00

SINCE 1993....

SINCE 1999....

SALEM STEEL PLANT

CERTIFICATE



Management system as per
OHSAS 18001 : 1999

In accordance with TÜV CERT procedures, it is hereby certified that

STEEL AUTHORITY OF INDIA LIMITED
Salem Steel Plant
Salem - 636 013,
Tamilnadu,
India



applies a management system in line with the above standard for the following scope

Manufacture of Stainless Steel / Carbon Steel Flat Products and Stainless
Steel Coil / Utility Blanks

Certificate Registration No. 44 116 071415
Audit Report No. 2501 8558

Valid until 29-09-08

B. Menon
TUV CERT Certification Body
at TÜV NORD CERT GmbH

Class, 2067-00-07

This certification was conducted in accordance with the TÜV CERT auditing and certification procedures and is subject to
regular surveillance audits.

TÜV NORD CERT GmbH Langenwardenstraße 20 45141 Essen www.tuv-nord-cert.com



TUV NORD

SINCE 2007....

TUV NORD

CERTIFICATE

The Certification Body of TÜV Asia Pacific Ltd.

certifies in accordance with
its certification procedure that



M/S. STEEL AUTHORITY OF INDIA LTD
Salem Steel Plant, Salem - 636 013, Tamil Nadu, India

has established and applies a social accountability system for

**Manufacture of Stainless Steel / Carbon Steel Flat Products and
Stainless Steel Coils / Utility Blanks**

Proof has been furnished that the requirements according to

SA 8000 : 2001

are fulfilled. The certificate is valid until 2009-12-31

Full details of format of standards SA 8000: 2001

Certificate Registration No. 0093

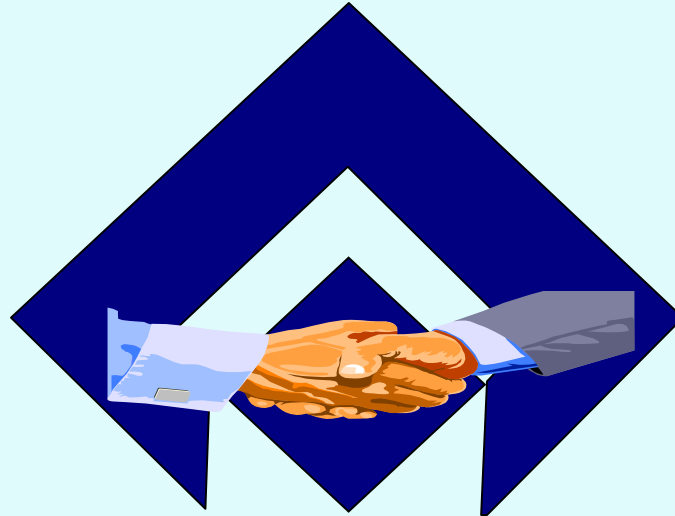


R. S. Srinivasan
Head of Certification Body

SINCE MARCH 2009....

SALEM STEEL PLANT

THANK YOU



FOR YOUR KIND

ATTENTION