شرکت فولاد اکسین خوزستان

KHOUZESTAN OXIN STEEL CO.

www.oxinsteel.ir 2016

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CVI
MANAGEMENT SYSTEM
CERTIFICATE
CONFORMANCE VERIFICATION INTERNATIONAL


IMQ
CONFORMITY DECLARATION


IMQ
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CSQ


Accreditation certificate


CSQ
IMQ


CVI
QUALITY SYSTEM
CERTIFICATE
CONFORMANCE VERIFICATION INTERNATIONAL


CERTIFICATE


ICS
Manufacturing Process Approval Certificate


IMQ
CONFORMITY DECLARATION

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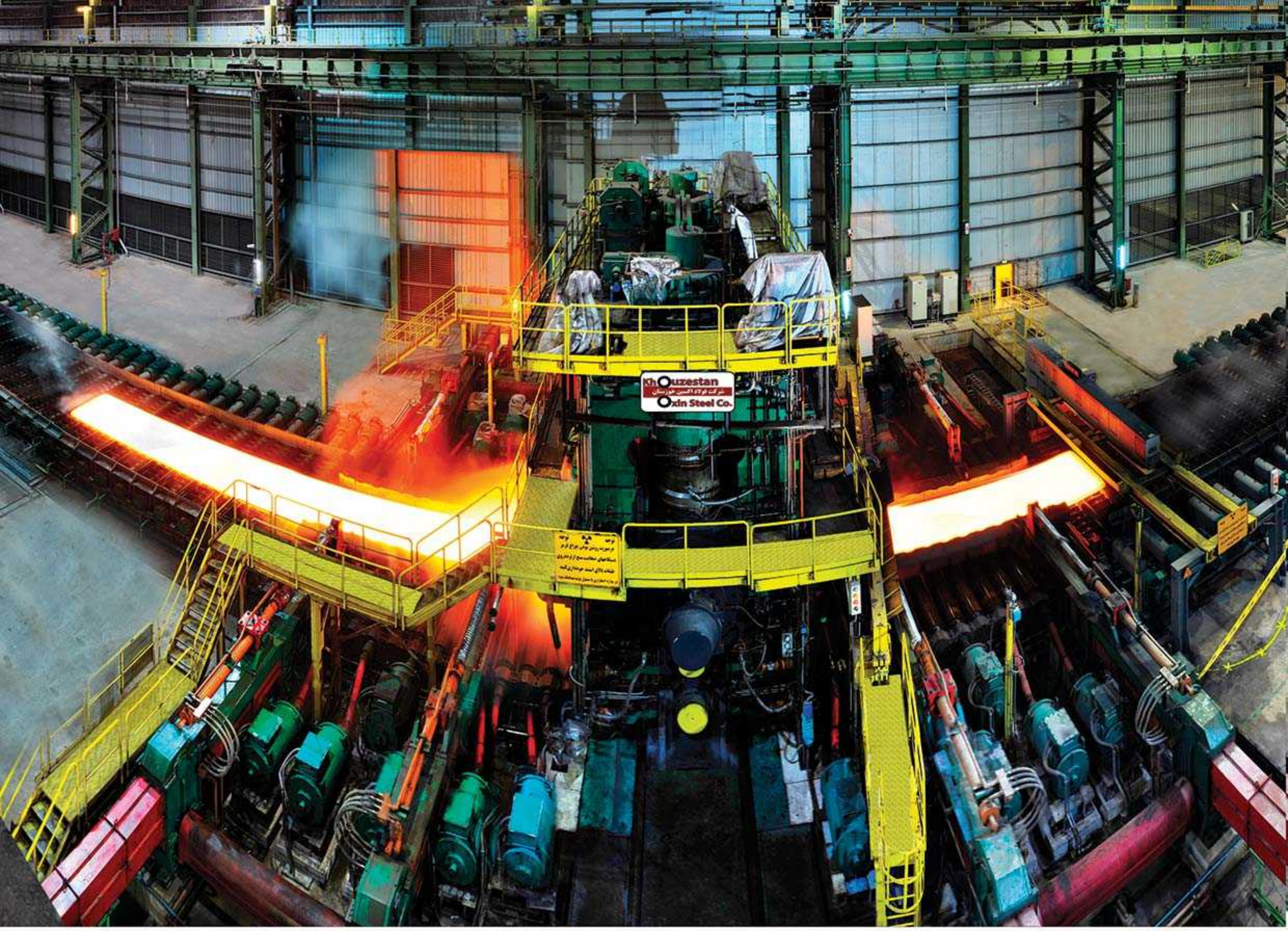

Introduction

Production and consumption of steel in today's world is considered one of the main indexes of development of countries and societies. Presence of steel industry in a region influences the process of development, culture, knowledge level, employment, research, training and commerce of that region. Humanity's daily life is intertwined with steel and steel industry plays a significant role in construction, rebuilding and development of a country. Steel products are used in industry fields such; oil, gas, petrochemicals, marine, manufacturing, steel structures and obviation of country's industrial strategic needs which indicates the immense influence of the steel industry on country's growth and prosperity.

Now is the season of country's steel industry prosperity and the Khouzestan Oxin Steel Company, this shining beacon in the national steel industry, is placed in the supply chain of the country's steel needs by producing its own special alloys plates for the realization of an independent economy.

KHOUZESTAN OXIN STEEL COMPANY

Oxin Steel Company of Khouzestan

In line with the needs of the country's massive industries for high width steel plates, Khouzestan Oxin Steel Company (joint stock) was registered in 2005 with the Companies & Non-Commercial Institutions Registration Office under no. 248247 in Tehran with the aim of completing the missing link in the chain of supplying the needs of industry for high width heat treated steel plates for the oil, gas, petrochemicals, marine and car industries and strategic products of the country industries and in 2009, started mass production of 1050000 plates using the latest up to date world technology.

The main activity of the company is the production of various steel plates up to a width of 4.5m and various thickness, high strength and unique in the Middle East, which has turned this company into one of a rare manufacturers of this product worldwide and, today on the path of growth and excellence, we produce plates in particular dimensions and properties to meet the needs of our cliental.

The company's produced plates have a range of applications: oil and gas pipelines, pressure vessels and big storage tanks of chemical and petroleum fluids, ship building industry, industrial and power plant boilers, huge metal structures and bridge construction which are part of industrial products that use the Khouzestan Oxin Steel Company's steel plates.

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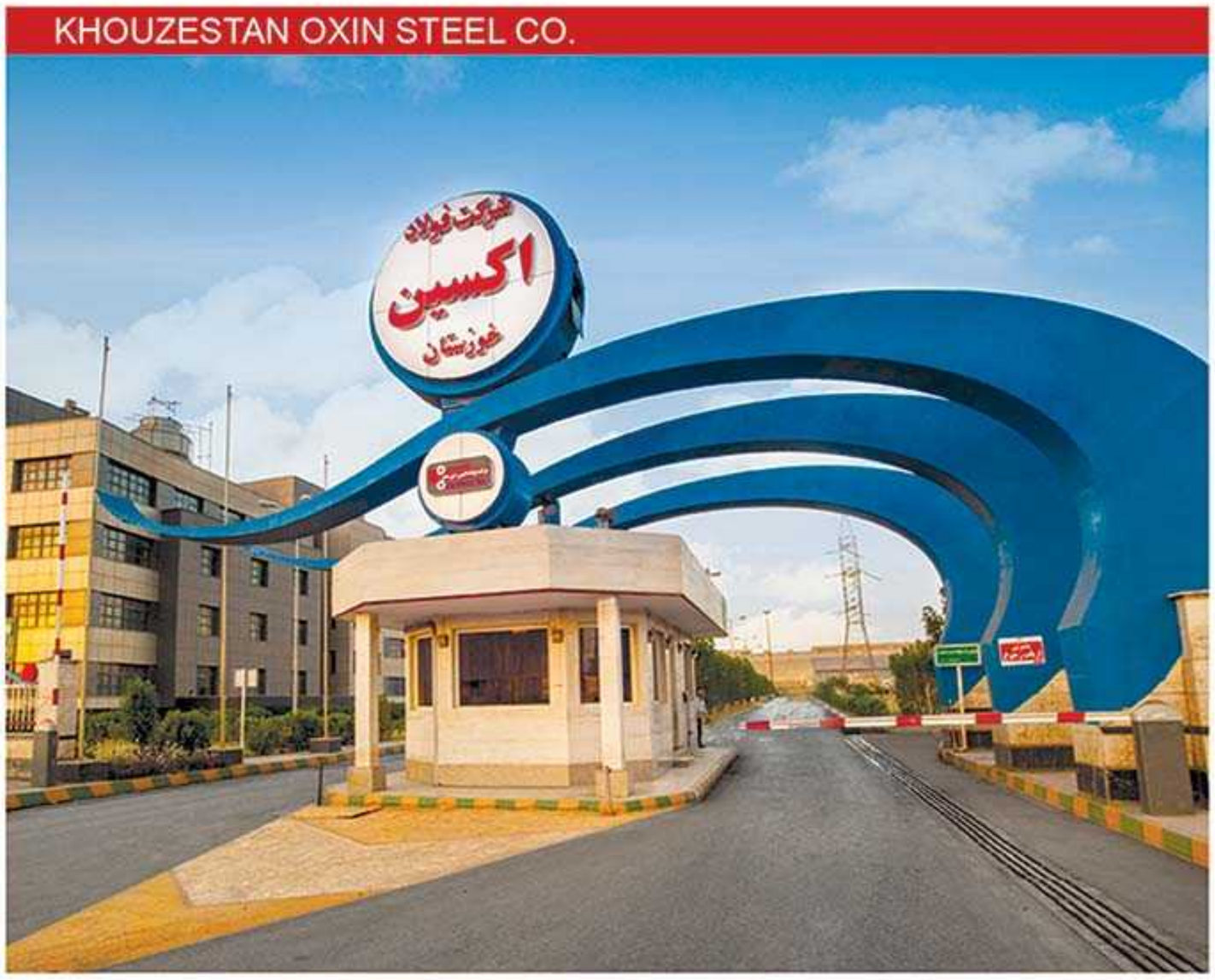
KHOUZESTAN OXIN STEEL CO.



General company profile

Khouzestan Oxin Steel covers an area of 160 hectares with 10 halls and an infrastructure (office space) of about 100000 square meters.

Investment costs

The wide rolled plate project of the Khouzestan Oxin Steel Company with a capital of $250m foreign currency and 1,611,404 Rials investment became operational.

Company utilities

Electricity demand required at 20MWh, water consumption of 150 cubic meters per hour and a gas consumption of 8000 normal cubic meters per hour which are provided by company's own installations and private plants.

Factory production capacity

The nominal capacity of the plate production at the Khouzestan Oxin Steel company is 1050000 tons, of which, about 210,000 tons is heat treatment capable.

Raw material

The raw material used in this company is steel slab which in the first stage are acquired from other steel manufacturers with constant foundry.

Steel slab dimensions

Thickness	From 110 to 300mm
Width	From 1200 to 2200mm
Length	From 3000 to 4500mm

KHOUZESTAN
OXIN STEEL COMPANY

Production process

Production process for wide Plate entails six basic stages:

1- Preheating of steel slab

The slab is heated to a temperature of (1200 °C) in the preheating furnace and after homogenization of metallurgical properties and dissolving of alloy elements it is taken out of furnace and placed at the start of rolling line.

2- Rolling operations

Hot rolling of wide plates entails three stages:

a) Descaling: descaling operation is conducted by spraying of water with a pressure of 225bar on the slab top and bottom surfaces .

b) Hot rolling process : the process of hot rolling is conducted by a 4Hi-Reversing Mill Stand . One of the characteristics of the Khouzestan Oxin Steel Co which makes it unique in the midle East is the determining of rolling operation according to mechanical properties desired by the clients and the international standards. The equipment for Khouzestan Oxin Steel Co rolling line is designed in a way which enables it to conduct three types of rolling including Conventional Rolling (CR), Temperature Control Rolling (TCR) and Thermo-Mechanical Rolling (TMR) or in the other word all of TMCP processes with or without accelated cooling.

c) Hot levelling: rolling operation is completed by passing the plate through a hot leveling machine to flatten the plate. The produced plate is then directed to the cooling beds hall to cool down.

3- Plate inspection

The manufactured plates with a thickness of less than 50mm is inspected in two stages using the below methods:

a) Visual inspection: in this stage, both ends of the plate are visually inspected and possible observed defects are reported and if possible, they are repaired.

b) Ultrasonic testing: in this method, by passing the plate under the ultrasonic testing machine, all internal defects are detected in size and exact location. Results of this inspection are very important for the cutting stages .plates with over 50mm thickness are sent to the conditioning bay for cutting by torch.

4- Cutting and leveling of the plate

4.1 cutting: three shearing machine are placed in the production line at the finishing line to cut the plates according to customers' specifications:

a) Double side trimming sheare: the edges of the plates are trimmed according to customers' specifications using the trimmer.

b) Slitting Machine: this slitter is placed after the triming machine and it can cut the mother plate longitudinally to reduce the width of the final plate if need be.

c) Dividing machine: this machine is responsible to cut cold steel plates to lenghs required, head and tail cropping , sampling and dividing operations are foreseen.

4.2- Cold plate leveller : plates with the thicknesses less than 25 mm enter the cold plate leveller befor passing through dividing shear. To level cold steel plates , is of symmetrical design so that the plates can be passed through in either direction.

5- Plate weighing and cold plat marking machine

6- Plate piler no.1 and no.2

7- Piles bunding machine and piles labling machine

8- Transfer to plate storage yard

6- Heat treatment plant

The Heat treatment Plant of Khouzestan Oxin Steel Company is able to conduct "Quench Tempering" and "Normalizing"treatment on the plates. plates that require Heat treatment operations to achieve the desirable mechanical properties are transferred to this Plant .

Equipment in this plant includes

- **Austenitizing and Normalizing furnace which is abbreviated as ANF.**
- **Tempering & Normalizing furnace, which is abbreviated as the TNF.**
- **Continuous quenching machine**
- **Warm Plate Leveller machine (working range between 200 to 600 °C).**
- **Cooling beds**
- **Machine for registering specifications and information of plate in semi-heat state.**
- **plate sample Cutting machine**
- **Plant Transport devices**
- **Ceiling cranes**

This plant is able to conduct Heat treatment of plates with below specifications:

- **Plates specification for quench Tempering**

Thickness from 10 to 60mm
Width from 1100 to 4500mm
Length from 2500 to 15000mm

- **plate dimensions for normalizing**

Thickness from 10 to 120mm
Width from 1100 to 4500mm
Length from 2500 to 15000mm

KHOUZESTAN OXIN STEEL COMPANY

ilac-MRA

Association of the Analytical Centers "Analitica"
Accreditation Body
Full Member and Signatory to ILAC and APLAC
Mutual Recognition Arrangements

Accreditation certificate

№ AAC.A.00234

Valid to
25 February 2018

Accreditation Body AAC "Analitica" certifies that
Laboratory of "Khouzestan Oxin Steel Co"
10 Km of Ahvaz. Bandar Imam Khomeini Road, Iran
was accredited in accordance with the requirements of International Standard ISO/IEC 17025:2005 (GOST ISO/IEC 17025 - 2009). This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer Joint ISO-ILAC-IAF Communiqué dated January 2009).

The scope of laboratory (center) accreditation is described in the Appendix, which is an integral part of the certificate.

Head of
Accreditation body

I. Boldyrev
25 February 2015

"АНАЛИТИКА"

119049, Moscow, Leninskiy prospekt, 1/ 2, korp.1, apt.1320
+7 (495) 959-93-43, 959-93-33, 959-93-17

QC Laboratory

- **QC laboratory includes of five different sectors as below:**

1- Laboratory sample preparation workshop

- **Band saw**
- **machinery**
- **Horizontal magnetic polish machine**
- **CNC milling**

2- Mechanical properties laboratory

- **Tensile testing machines with the capacity of 60 and 120 tons**
- **Impact test machine with capacity of 500 Joules**
- **Bending test machine**
- **Universal hardness machine**
- **Drop weight tear tester (DWTT)**

3- Quantometric laboratory

- Ferrous base metals
- Low alloy steel
- Stainless steel

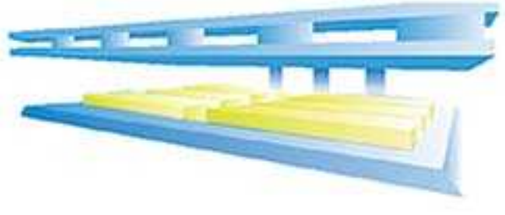
4- Metallography laboratory

- Sample cutting machine
- Warm mounting
- Polish machine
- Electrochemical etching machine
- Optical microscope equipped with image analysis software
- Micro-hardness machine

5- Fluids laboratory

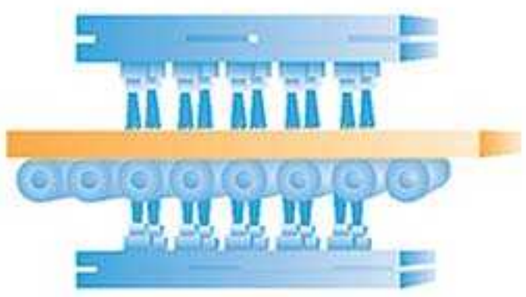
- Optical spectroscopy device
- PH meter device
- Biological oxygen demand (BOD meter)
- Chemical oxygen demand (COD meter)
- Induction furnace

Manufacturing Process

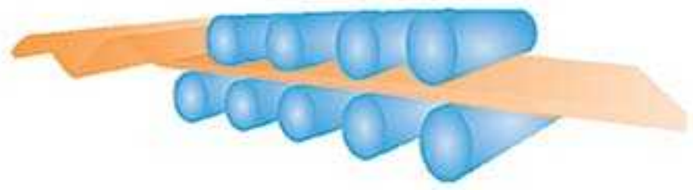


1 Walking beam reheating furnace

2 Primary descaler



5 Accelerated cooling



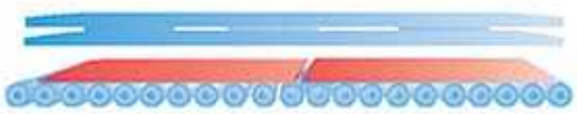
6 Hot plate leveler

9 Side trimming machine

10 Cold plate leveler

Normalizing process flow

1 Entry roller table of ANF



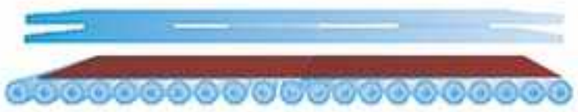
2 Austentizing & Normalizing Furnace (ANF)

Quenching and Tempering process flow

1 Entry roller table of ANF

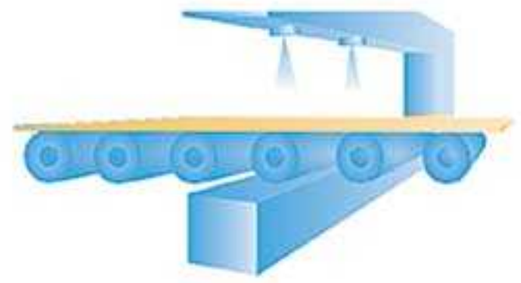
2 Austenitining & Normalizing Furnace (ANF)

5 Entry roller table of TNF

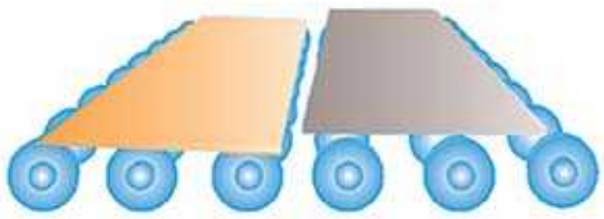


6 Tempering & Normalizing Furnace (TNF)

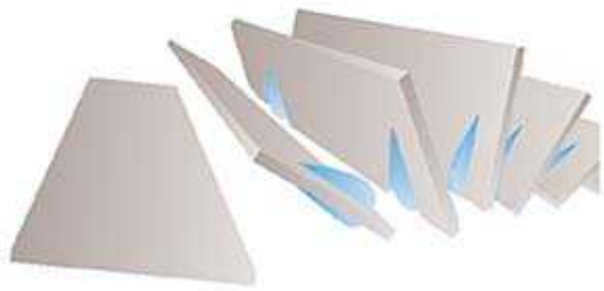
3 4-Hi Reversing mill



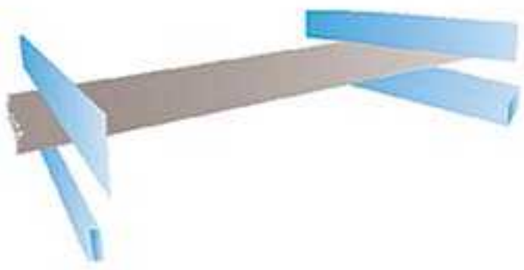
4 Thickness gauging machine



7 Cooling beds

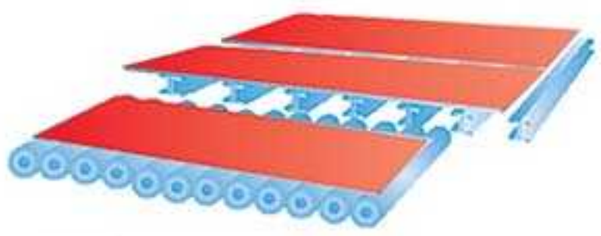


8 Ultrasonic test/inspection bed

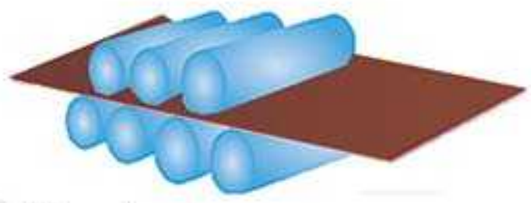


11 Dividing shear machine

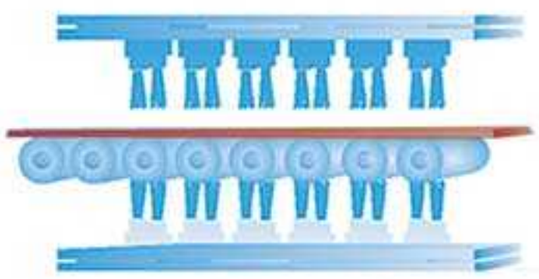
12 Plate piling



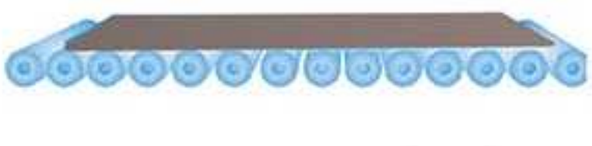
3 Plate cooling bed & transfer device



4 Warm leveler

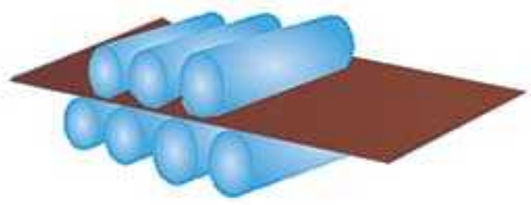


3 Quenching machine

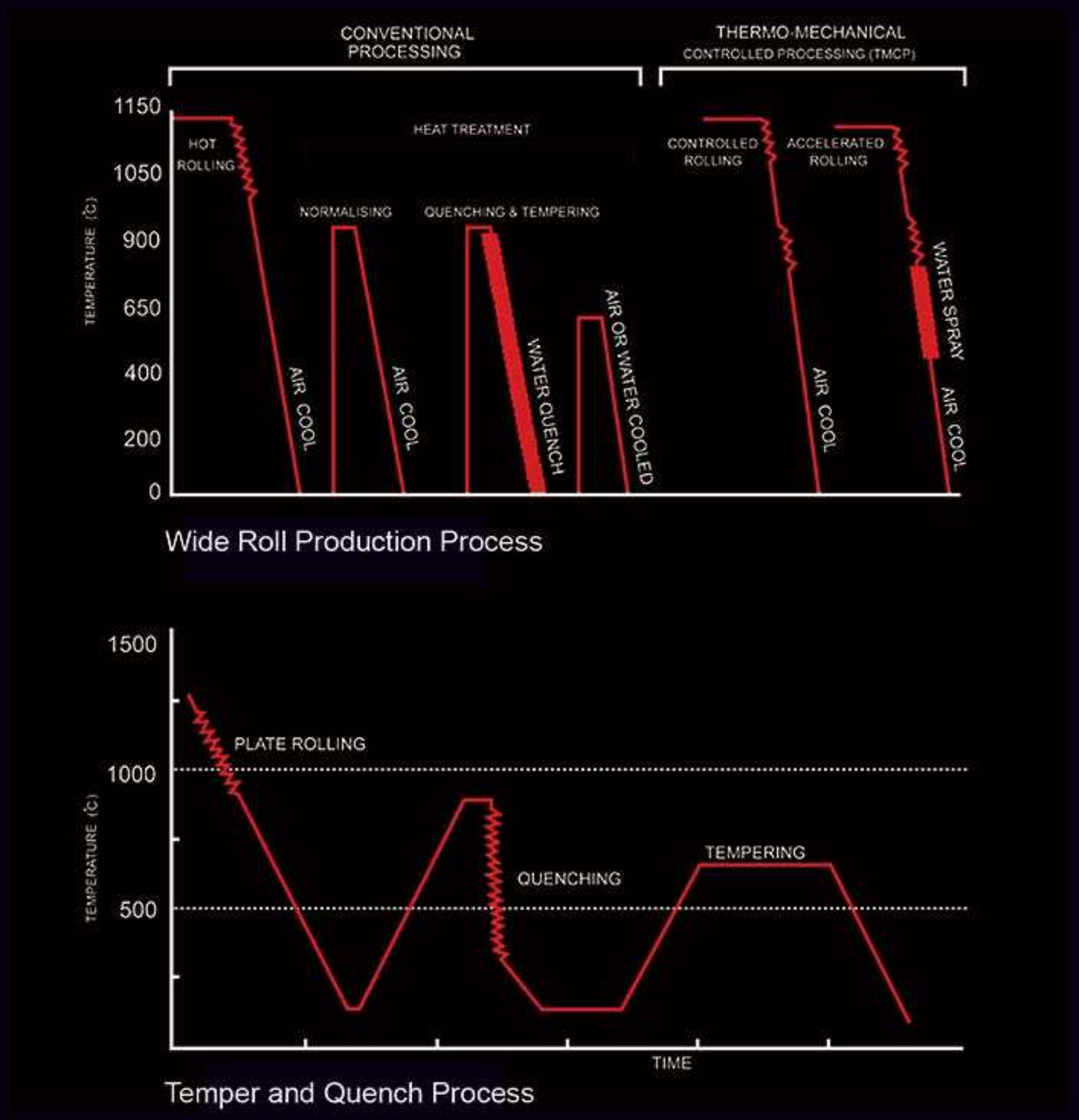


4 Plate transfer divice 1

7 Plate cooling bed & transfer device



8 Warm leveler



Wide Roll Production Process

Temper and Quench Process

Production processes

- Thermo mechanically controlled processing (TMCP)

Microstructure obtained from thermo mechanical rolling is highly uniformed and fine grained which means we can manufacture steel with high strength and suitable ductility.

Advantages:

- Appropriate formability
- Fine weldability due to low carbon equivalent
- Excellent mechanical properties
- Achieving similar properties with normalized steel (without heat treatment and with a shorter process)

Normalizing

-This process includes heat treatment of steel to austenite zone and slowly cooling in the air.

Advantages:

- Homogeneous and fine-grain microstructure
- Reducing the rolling residual stresses
- Reducing the banding formation

Quenching and tempering

-This process includes normal roll of steel and then heating it to austenitic temperature and quick cooling to environment temperature . After that, quenched steel is tempered in temperature of about 600 °C to prevent formation of brittle and fragile martenzites.

-Advantages:

- Enhancement of steel hardness.
- Increased wear resistance
- Improvement of toughness
- Increased impact resistance
- reduces cracking

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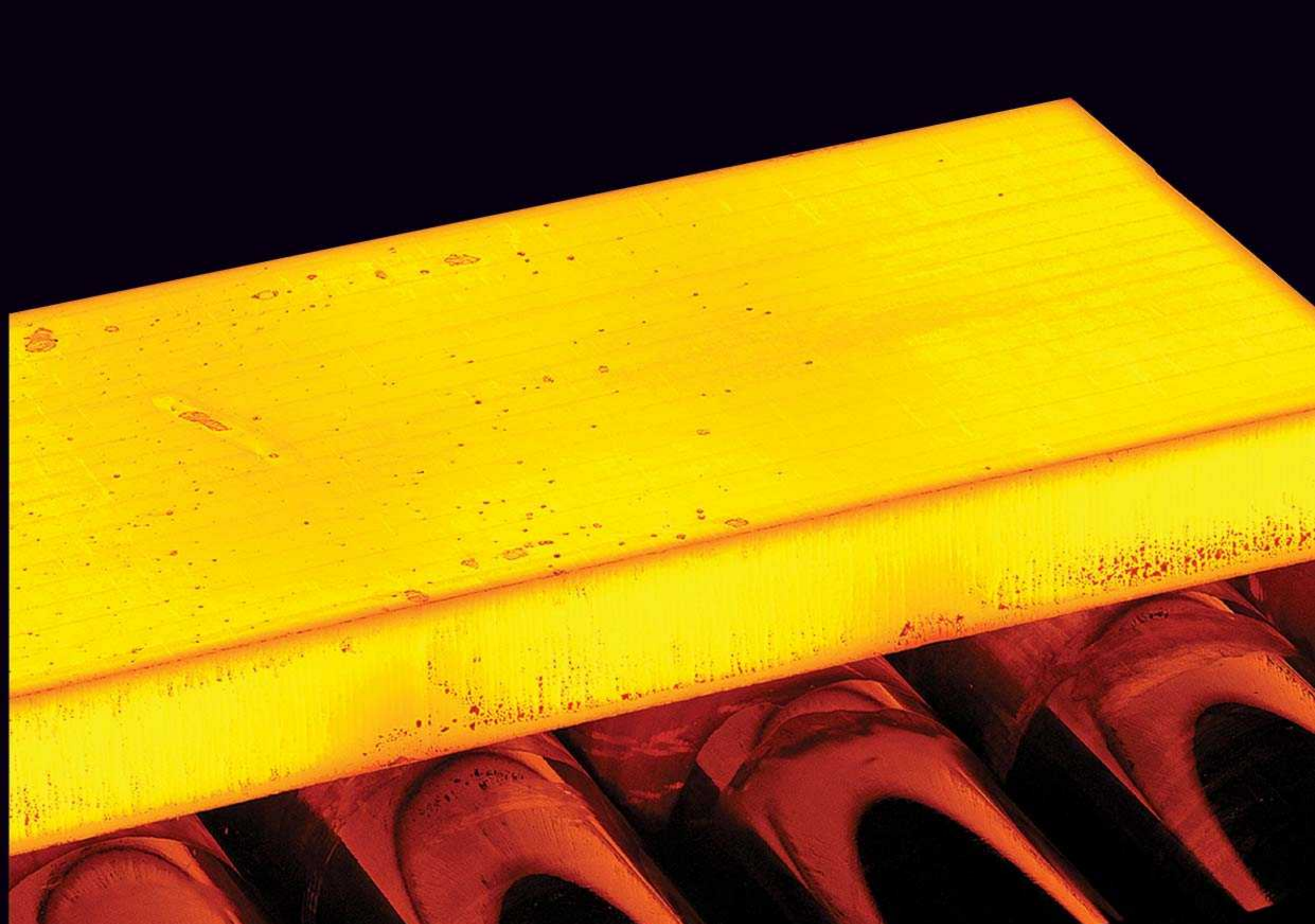

KHOUZESTAN OXIN STEEL COMPANY

Final product

The final product of the Khouzestan Oxin Steel Company includes various steel plates with high strengh for a selection of applications such as large diameter oil and gas pipes, pressure vessels and oil liquid storage, petrochemical gas, industrial and power stations boilers, ship building industries and steel plates of specific building structures with various mechanical properties. The tensile strength of these plates can increase up to 1200 Newton on millimeter square and their yield strengh can increase up to 1000 Newton on millimeter square.

Dimensions of the final product

Thickness	from 5 to 150mm
Width	from 1100 to 4500mm
Length	from 2500 to 24000mm

Products

- Steel plates for boilers and pressure vessels
- Steel plates for oil & gas pipelines
- Steel plates with suitable toughness
- Steel plates for shipbuilding
- Steel plates for general structural purposes
- Plates for Normalized structural steels
- Plates for thermomechanically rolled structural steels
- Structural steel plates with improved corrosion resistance
- Wear resistance steel plates with high yield strength (quenched & tempered)

Pipe Line Steels

Steel grades	Qualitystandard
X42M, X46M, X52M, X56M, X60M,X65M X70M, X80M	API 5L

Applications:

Oil, gas & water pipelines
casing pipes

Features:

Low carbon, sulfur and phosphor contents
Suitable strength and toughness
Clean steel
Microalloy steel such as Nb, Ti & V
Resistant to corrosion and SSCC/HIC tests
Suitable amount of DWTT
Thermo mechanical rolling

Mechanical properties:

High strength
Suitable toughness in low temperatures
Good weldability
Resistant to corrosion and SSCC/HIC tests

Delivery conditions:

As rolled
Thermo mechanically controlled

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Steel plates for shipbuilding

Steel grades	Quality standard
A to E, AH 32 to 40, DH 32 to 40, EH 32 to 40, FH 32 to 40, RSP 42 to 49, RPV 24 to 50, RL 235 to 360, AH 43 to 70, DH 43 to 70, EH 43 to 70, FH 43 to 70	KR

Application:
Ships
Marine structures
Tankers
Barges

Features:
Clean steel with low sulfur and carbon content
Addition of Cu and Cr
Environmental corrosion resistant
Microalloy steel such as Nb, Ti & V
High strength and toughness
Normalized in heat-treatment furnace

Mechanical properties:
High strength
Suitable toughness in low temperatures
Corrosion resistant
Fatigue resistant
Suitable weldability

Delivery conditions:
As rolled
Thermo mechanical rolling
Normalizing rolling
Normalized in heat-treatment furnace

Pressure vessels steel plates

Quality standard	Steel grades
P265, P275, P285, P345, P355, P400, P420, P440, P460, A285, A299, A515, A516, A537	EN10028-3, AFNOR-NF-A36-215, EN10028-5, ASTM A516-285-299-537-515
ASTM A573	ASTM A573

Application:
Boilers
Pressure vessels
Refineries
Heat exchangers
Power plants

Features:
Clean steel with low phosphor and sulfur content
Microalloy steel such as Nb, Ti & V
High strength and toughness
Thermo mechanical Rolling
Normalized in heat-treatment furnace

Mechanical properties:
High strength
Suitable toughness in low temperatures
Creep resistant
Corrosion Resistant and SSCC/HIC tests

Delivery conditions:
As rolled
Thermo mechanical rolling
Normalizing rolling
Normalized in heat-treatment furnace
Quenched and tempered

KHOUZESTAN OXIN STEEL COMPANY

structural steels

Plates for general structural purposes	Quality standard
St37-3, St44-3, St52-3, St50-2, St60-2, St70-2, S235, S355, S450J0, A283, KR A-E	DIN17100, EN10025-2, ASTM A283, KR
Plates for normalized structural steel	**Quality standard**
S275N, S275NL, S355N, S355NL, S420N, S420NL, S460N, S460NL	EN10025-3
Plates for thermo mechanically rolled structural steels	**Quality standard**
S275M, S275ML, S355M, S355ML, S420M, S420ML, S460M, S460ML	EN10025-4
Structural steel plates with improved corrosion resistance	**Quality standard**
S235J0W, S235J2W, S355J0WP, S355J2WP, S355J0W, S355J2W, S355K2W, A588	EN 10025-5, ASTM A588

Application:
Construction structure
Bridges
Dams
Power plants
Towers

Features:
Clean steel with low phosphor and sulfur content
Microalloy steel such as Nb, Ti & V
High strength and toughness
Thermo mechanical Rolling
Normalized in heat-treatment furnace

Mechanical properties:
High strength
Corrosion resistant
Suitable weldability

Delivery conditions:
As rolled
Thermo mechanical rolling
Normalizing rolling
Normalized in heat-treatment furnace

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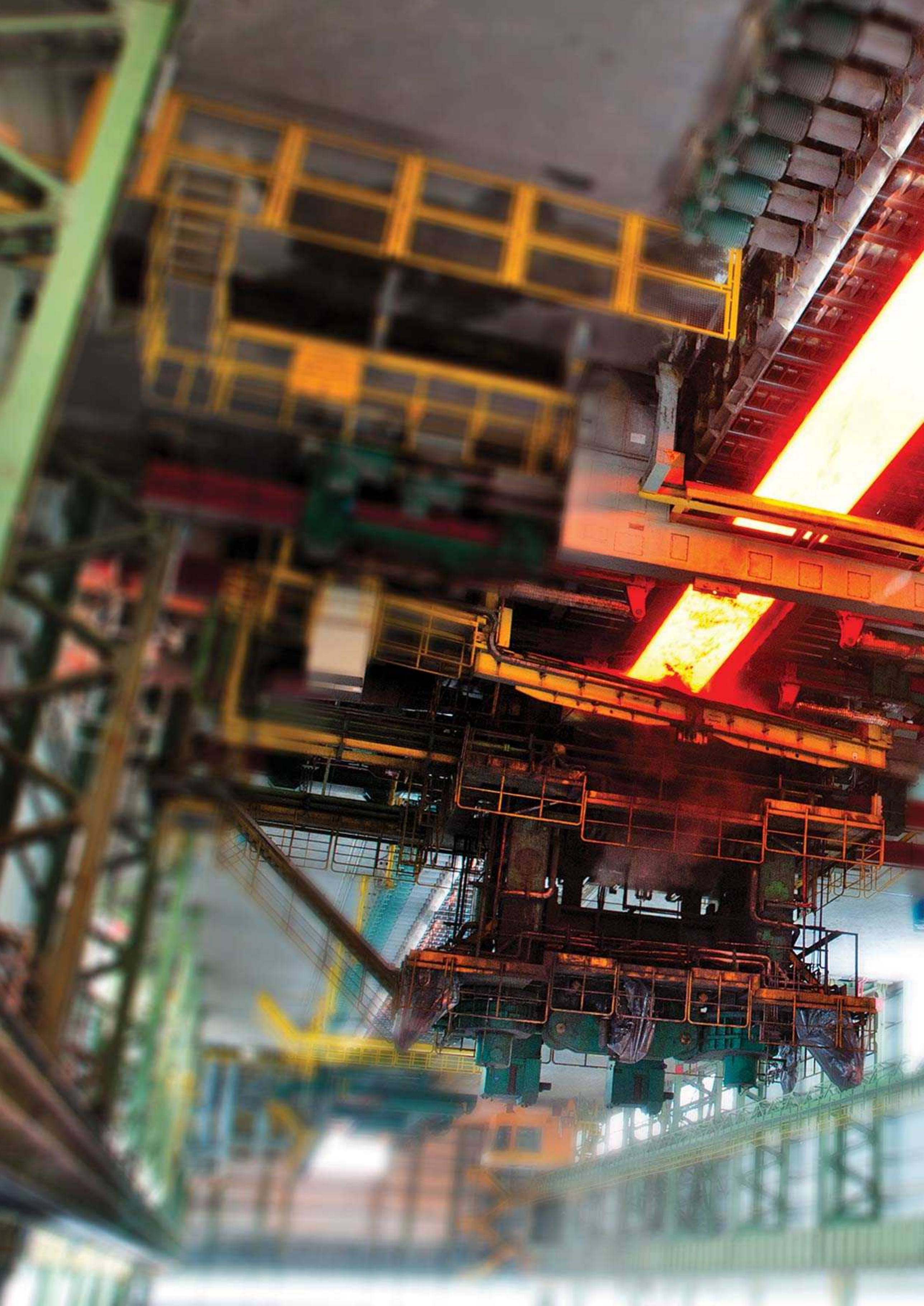

Wear-resistance steel plates with high yield strength (quenched and tempered)

Steel plates with high yield strength (quenched & tempered)	Quality standard
S460Q, S500Q, S550Q, S620Q, S690Q, S890Q, S960Q, A517, 34CrMo4	EN10025-6 ASTM A517 EN10083-3

Applications:

Mines
Machinery
Cement industry
Front Loaders

Features:

Clean steel with low sulfur and phosphor content
Alloy steel such as Cr, Mo & Ni
Suitable wear resistance
High strength and toughness
Quenched and tempered steel

Mechanical properties:

High strength
High toughness
Wear resistant
Good weldability

Delivery conditions:

Thermo mechanical rolling
Normalized in heat-treatment furnace
Quenched and tempered