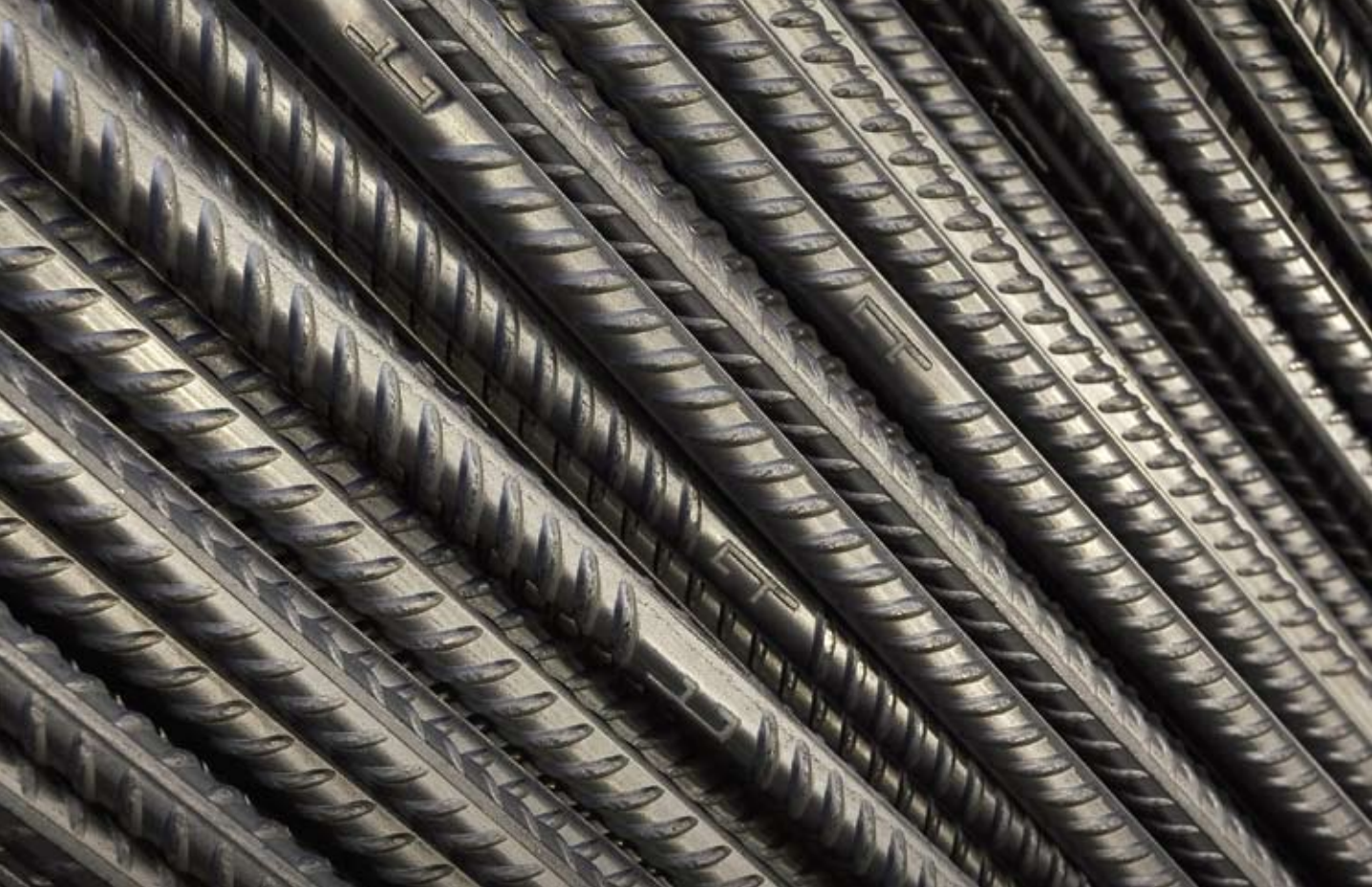
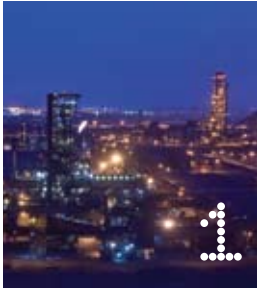


Metals SBU



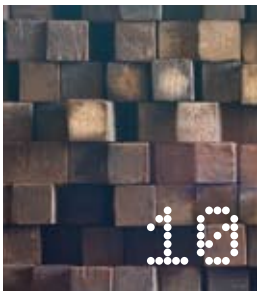
Long Products Catalog



Vision & Mission



Environment



Billet



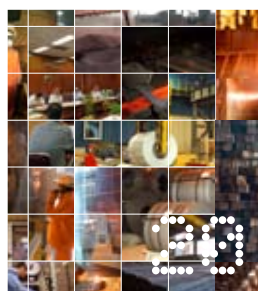
Rebars



Wire rod



Light sections



Story of steel



Rebar Discoloration and Strength	21
Rebar Corrosion in Concrete	25
Technnology & Innovation	30
Our Portfolio	31
Certificates	32
Packing	33
Where We Are	36

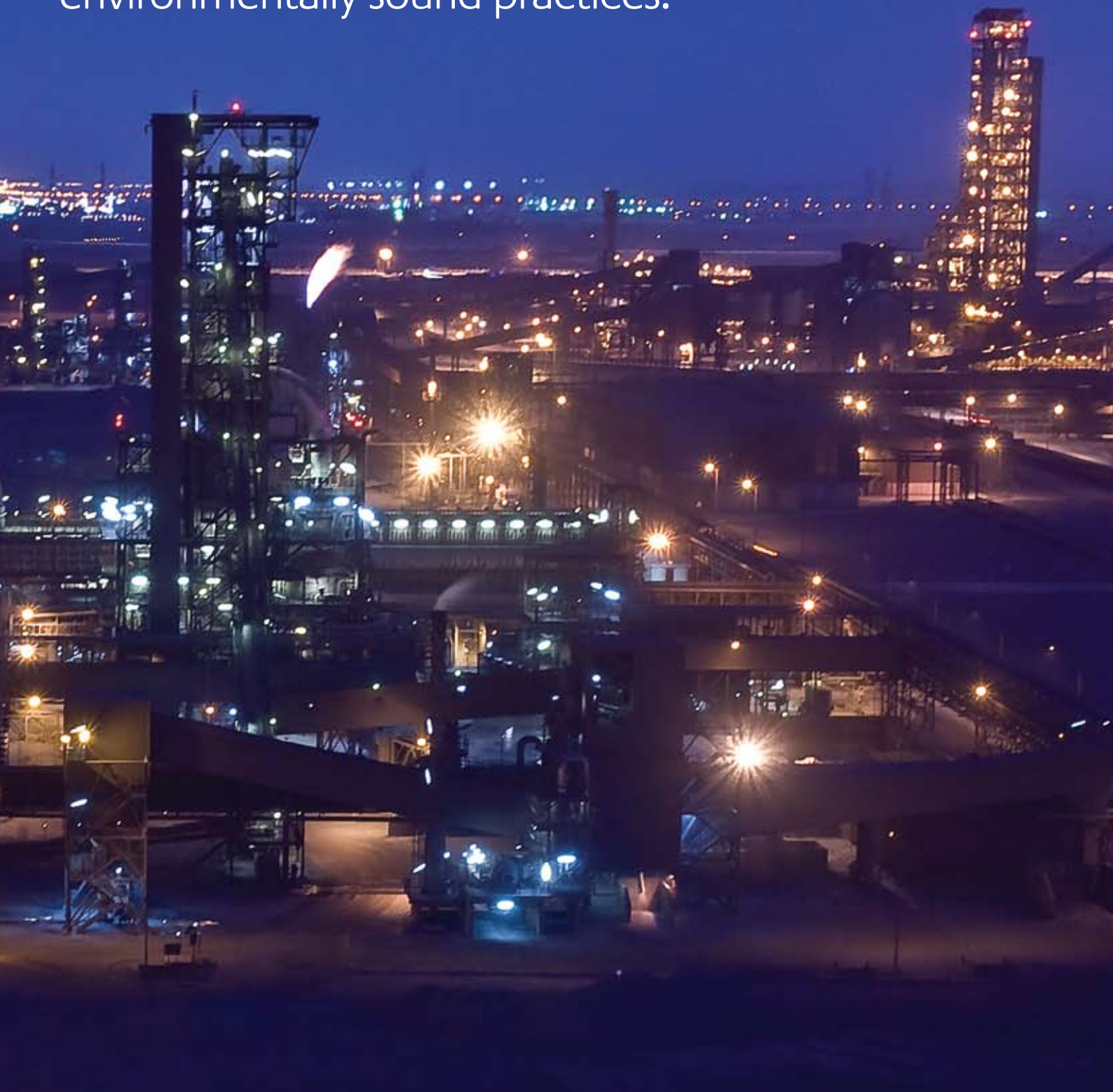
Vision

To be the leading producer and marketer of steel products in the Middle East and North Africa.

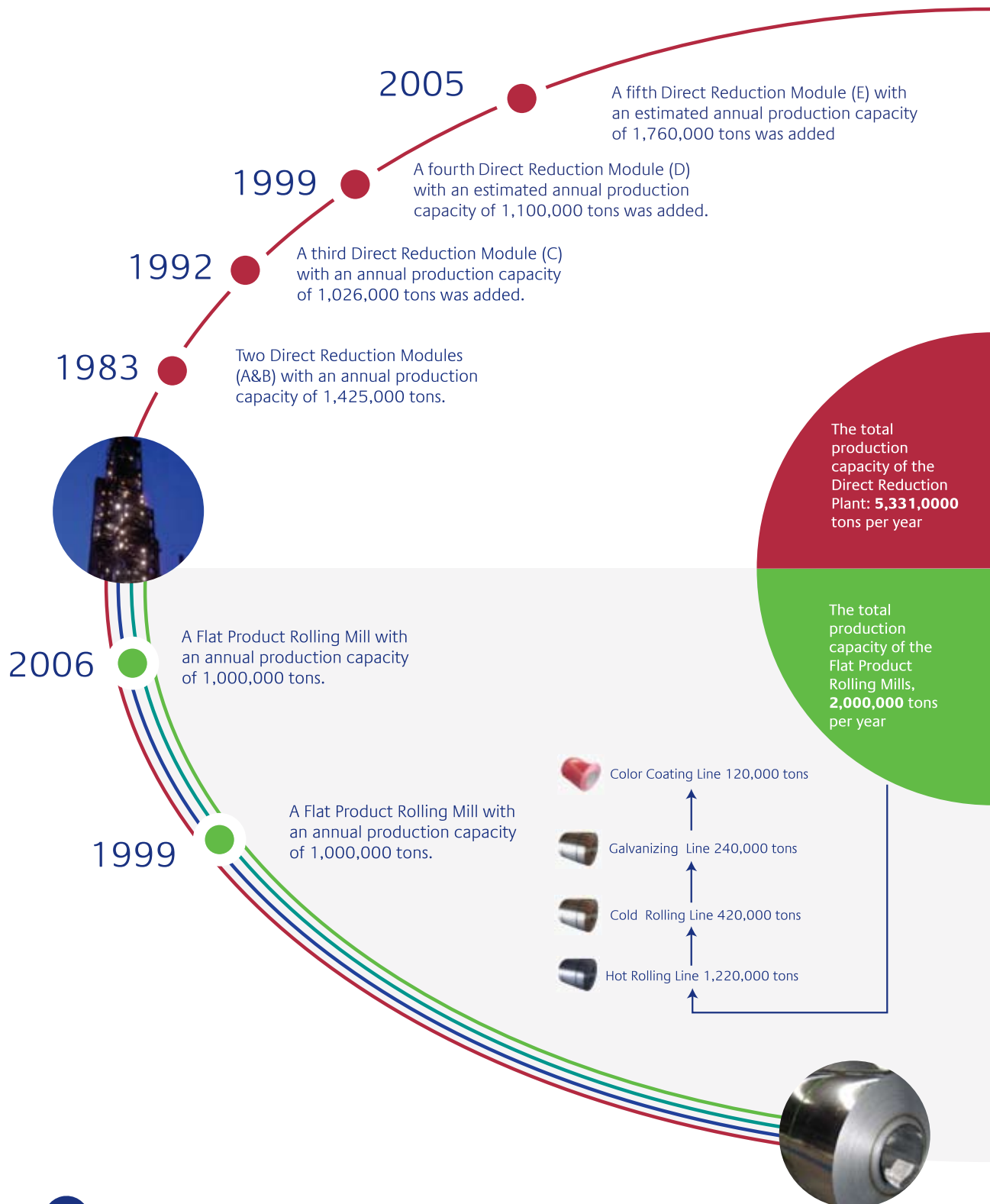


Mission

To be the provider of comprehensive and competitive steel products through employee empowerment with safe and environmentally sound practices.



1 The Direct Reduction Plant



4 The Flat Product Rolling Mills

2 The Steel Plant



1983

Three electric arc furnaces with an annual production capacity of 2,900,000 tons.

1998

An electric arc furnace for the flat products with an annual production capacity of 1,000,000 tons was added.

2007

Another electric arc furnace for the flat products with an annual production capacity of 1,200,000 tons was added.

2012

Another electric arc furnace for the Long products with an annual production capacity of 1,000,000 tons will be added.

The total production capacity of the Steel Plants: **6,100,000** tons per year

The total production capacity of the Long Product Rolling Mills: **3,900,000** tons per year



1983

- A Reinforcing Bar (Rebar) Rolling Mill with an annual production capacity of 850,000 tons.
- A Wire Rod Coil Rolling Mill with an annual production capacity of 500,000 tons was added.

1988

The production capacity of the Rebar Mill was increased to 1,200,000 tons per year; and the Wire Rod Mill to 650,000 tons per year.

1993

A Rebar Mill with an annual production capacity of 750,000 tons was added.

2005

A Rebar and Wire Rod Mill with an annual production capacity of 500,000 tons was added.

2012

A Wire Rod Mill with an annual production capacity of 800,000 tons will be added.

3 The Long Product Mills



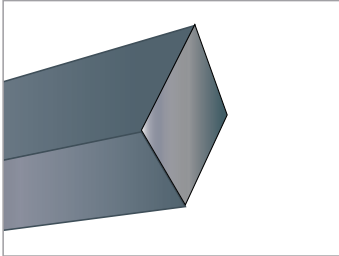
To SABIC

Environmental health is priority one.

SABIC, being environmentally conscious, is committed to ensure the minimum ecological impact of steel production operations. The high quality of our environment is as important to us as the high quality of our produced steel. Continuous monitoring of emissions and severe management program ensure that SABIC is not only complying with worldwide legislations, but also taking avant-garde steps to do more.







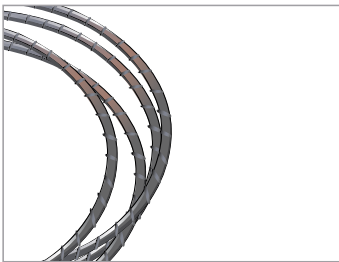
Billet

Billets are the raw material for producing long steel products. They are produced in various steel grades based on the finished products.



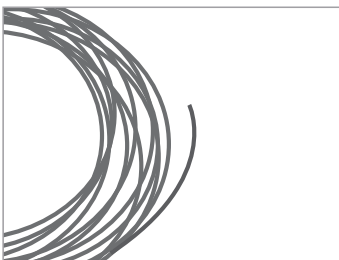
Rebar

Concrete reinforcing bars (rebars) represent 50% of SABIC'S total Steel production. They are made according to international standards and are also suitable for EPOXY coating.



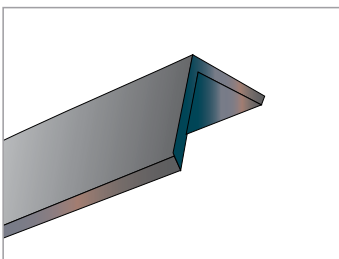
Rebar in coil

Rebar in coil is further processed by downstream cut and bend operations and straightening lines to produce shapes and straight bars for construction. Plain coils are used for reinforcing concrete pipes, and by cut and bend facilities.



Wire rod

Drawing grade wire rods are used by downstream industries to produce mesh, nails, hangers, screws, barbed wires, fencing mesh, binding wires, etc. Mesh grade wire rods are used for downstream cold indentation process to make cold deformed bars for constructions.



Light section

HADEED produces light sections from mild steel conforming to ASTM A36M, in various shapes such as flats, squares, equal angles and channels, and are used for metallic structures & machines.



SABIC Steel Billets

They are the source products.

SABIC manufactures steel billets in accordance with the best international quality standards, in order to supply our customers with solid and tough steel products that meet the international standards, and endure the most harsh circumstances.

Billet Specifications

Chemical Composition

Billet Size (mm)	%C	%Si	%Mn	%P	%S
130x130	0.40 Max.	0.45 Max.	1.50 Max.	0.05 Max.	0.05 Max.

Other chemical compositions are possible. Please contact Sales & Marketing Department.

Dimension / Appearance

Billet Length		Billet Section		Corner radius (mm)	Rhomboidity Max (mm)	Twist Max degree/m	Straightness Max mm/m	Waviness
Size (m)	Tolerance \pm (mm)	Size (mm)	Tolerance (mm)					
12	\pm 50	130x130	\pm 3	4	10	0.5	5	No Waviness

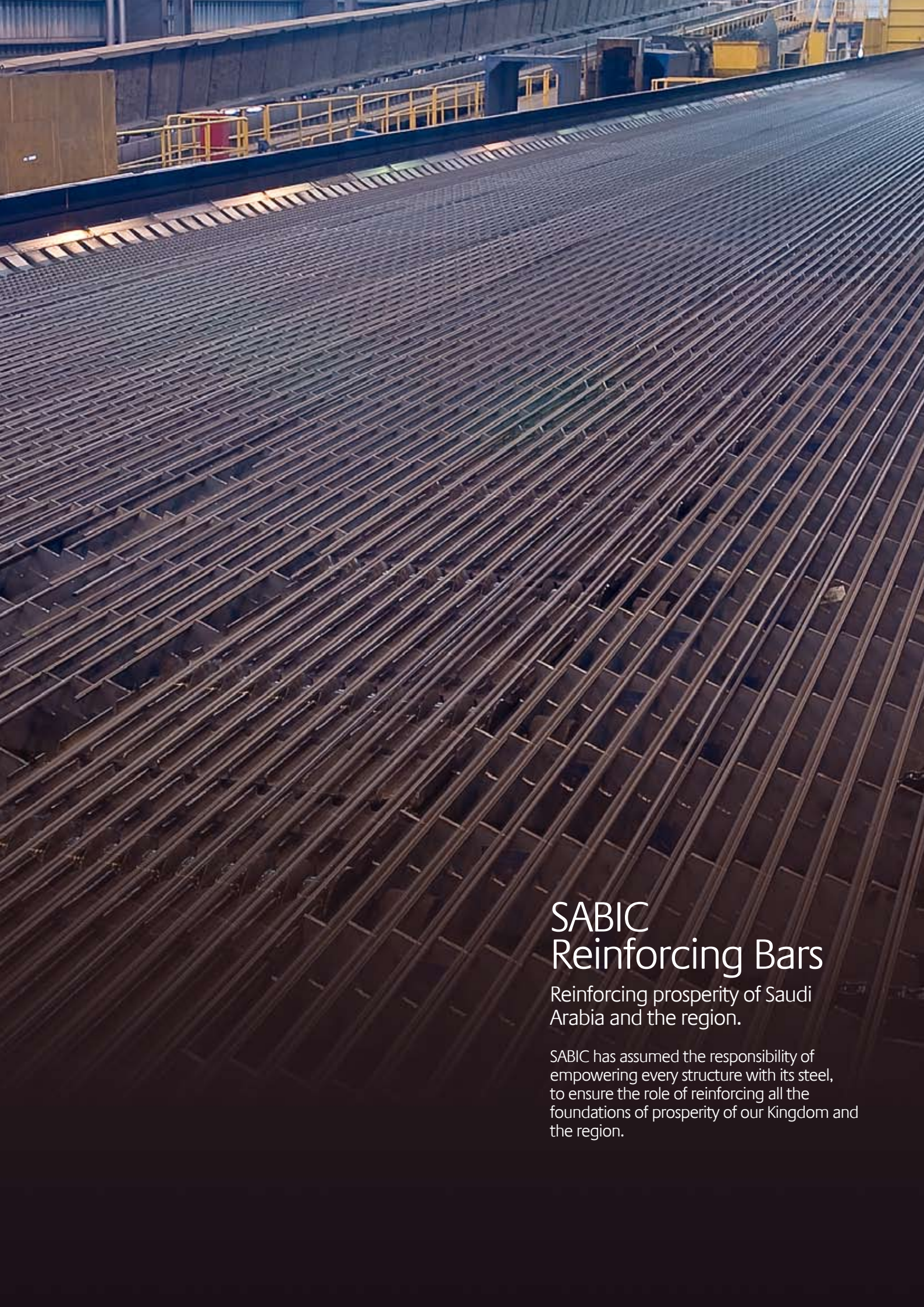
Other lengths are possible. Please contact Sales & Marketing Department.

Surface Quality

Free from harmful surface defects like surface cracks, slag patches, scabs, pinholes, etc

Internal Quality

Sound internal quality billets free from blowholes, central shrinkage, internal cracks, etc



SABIC Reinforcing Bars

Reinforcing prosperity of Saudi Arabia and the region.

SABIC has assumed the responsibility of empowering every structure with its steel, to ensure the role of reinforcing all the foundations of prosperity of our Kingdom and the region.

Mechanical Properties of SABIC Steel Rebars

Standard	Grade	Nominal Diameter mm	Yield Strength MPa (minimum)	Tensile Strength MPa (minimum)	Tensile to Yield Ratio (minimum)	Elongation in 200 mm % (minimum)	Elongation (A ₅) % (min)	Agt% (min)
ASTM A615	40	10	280	420	N/A	11	N/A	N/A
		14 - 18				12		
	60	10 - 19	420	620	N/A	9	N/A	N/A
		20 - 25				8		
> 25		7						
BS 4449: 1997	460 B	10 - 40	460	N/A	1.08	N/A	14	5
BS 4449: 2005	B500B	10 - 32	500	N/A	1.08	N/A	N/A	5
GCC Standard GS06/ISO	B400BR / B400BWR	10 - 40	400	N/A	1.08	N/A	14	5
	B500BR / B500BWR	10 - 32	500	N/A	1.08	N/A	14	5

Chemical Composition of SABIC Steel Rebars

Standard	Grade	Chemical Composition % (max)							
		C	Si	Mn	S	P	N	Cu	C.E.V
ASTM A615	60	...	...	...	...	0.060	...	...	...
BS 4449: 1997	460 B	0.250	...	...	0.050	0.050	0.012	...	0.510
BS 4449: 2005	B500B	0.220	...	...	0.050	0.050	...	0.800	0.500
GCC Standard GS06/ISO 6935-2/2007	B400BR / B500BR	...	...	...	0.060	0.060	...	...	...
	B400BWR / B500BWR	0.220	0.600	1.600	0.050	0.050	0.012	...	0.500

Note:

- 1 Other elements like, Ni Cr, Mo, V, Nb, Ti etc. may be added if required.
- 2 Higher nitrogen contents are permissible if sufficient quantities of nitrogen binding elements are present.
- 3 Product analysis may differ. Standard tolerances will apply.

SABIC Reinforcing Bars

Linear Mass and Number of Bars in Bundles

Diameter (mm)	Nominal Linear Mass Kg/m	Tolerance in linear Mass				Number of 12 meter long Bars in a bundle of nominal weight of 2 Tons.
		ASTM A615	BS 4449:1998	BS 4449:2005	GCC Standard GSO6/ISO 6935-2/2007	
10	0.617	- 6 %	± 6.5 %	± 4.5 %	± 6 %	270
12	0.888					± 4.5 %	188
14	1.210		± 5 %	138		
16	1.580			106		
18	2.000			84		
20	2.470			68		
22	2.980			± 4 %	56	
25	3.850				44	
28	4.830		34			
32	6.310		26			
36	7.990		21			
40	9.870		17			

Deformed rebar in coils are produced according to ASTM A615, Grade 40, Grade 60, BS 4449:1997, Grade 250, Grade 460B, GCC Standard GSO6/ISO6935-2/2007 Grade B400B-R, B500B-R, B400BWR, B500BWR. Other equivalent grades are also possible.

SABIC kindly asks its clientele to contact Sales & Marketing Department in order to place their orders, according to their needs and requirements.



Wire Rods and Rebar in Coils

To empower the foundations of development.

HADEED produces a range of low and medium carbon steel wire rods according to international standards related to wire rod production for various applications. Concrete reinforcing rebar in coils meeting ASTM 615, BS 4449:1997 and GCC standard GSO6 requirements are also available.

Wire Rod and Rebar in Coils

Drawing grades

These wire rods are used for wire drawing for various applications as shown below:

Chemical Composition and Mechanical Properties of Drawing Grade Wire Rods

Grade	Chemical Composition %					Mechanical Properties		
	C	Si	Mn	P	S	Yield Strength MPa	Tensile Strength MPa	Elongation %
AISI 1006	0.08 max.	0.07/0.10	0.25/0.40	0.040 max.	0.050 max.	210 - 270	350 - 400	28/38
AISI 1008	0.01 max.	0.08/0.13	0.30/0.50	0.040 max.	0.050 max.	220 - 280	360 - 420	28/35
AISI 1010	0.08/0.13	0.10/0.15	0.30/0.60	0.040 max.	0.050 max.	260 - 290	400 - 430	29/32
AISI 1012	0.10/0.15	0.10/0.15	0.30/0.60	0.040 max.	0.050 max.	260 - 300	400 - 440	25/30
AISI 1015	0.13/0.18	0.10/0.15	0.30/0.60	0.040 max.	0.050 max.	260 - 310	430 - 470	24/29
AISI 1018	0.15/0.20	0.18/0.30	0.60/0.90	0.040 max.	0.050 max.	300 - 350	470 - 520	22/28
AISI 1021	0.18/0.23	0.18/0.30	0.60/0.90	0.040 max.	0.050 max.	330 - 360	500 - 540	20/25
AISI 1030	0.28/0.34	0.18/0.30	0.60/0.90	0.040 max.	0.050 max.	360 - 390	580 - 640	18/23

Wire rod for welded mesh and cold indented rebar manufacture

Wire rods of Mesh Grade quality are used to manufacture cold drawn/cold deformed concrete reinforcement bars as well as reinforcement mesh. The wire rods are available in two tensile grades as shown below:

Mesh Grade Wire Rods

Grade	Chemical Composition %					Mechanical Properties
	C	Si	Mn	P	S	Tensile Strength MPa
Mesh - 1	N/A	N/A	N/A	0.05 max.	0.05 max.	360/450
Mesh - 2	N/A	N/A	N/A	0.05 max.	0.05 max.	440/500

N/A = Not Applicable

Wire rod for stick welding electrodes

Welding quality wire rods are used for making wires for stick welding electrodes. The chemical composition is as shown below:

Wire Rods for Welding Electrodes				
Chemical Composition %				
C	Si	Mn	P	S
0.10 max	0.05 max.	0.30-0.60	0.03 max.	0.03 max.

Rebar in coils

Deformed concrete reinforcement rebar in coils are made as per ASTM A615 Grade 40 and Grade 60, BS 4449:1997, Grade 250 and Grade 460B.

Sizes and Tolerances

Diameters

Wire rods are available in the size range of 5.5 mm to 16 mm diameter as shown below:

Available Sizes for Coiled Products										
Type	Size mm									
Plain	5.5	6.0	7.0	8.0	9.0	10.0	12.0	13.5	14.0	16.0
Deformed	-	6.0	-	8.0	-	10.0	12.0	-	14.0	16.0

Tolerances & Coil Dimensions

Size Tolerances on Coiled Product

Type	Size Range mm	Size Tolerance mm	Ovality mm max.
Plain Drawing Grades	5.5 and 6.0	±0.25	0.40
	7.0 to 16.0	±0.30	0.48
Plain Mesh Grade	5.5 and 6.0	±0.30	0.48
	7.0 to 16.0	±0.40	0.64
Deformed	6, 8, 10, 12, 14 and 16	Mass tolerance as per applicable standard.	

COIL DIMENSIONS (Approximate Value)

Outside Diameter	1250 mm
Inside Diameter	800 mm
Compacted Length	1650 mm
Mass (indicative)	1800 kg
Packing	Four equidistant straps with 6 mm diameter binding wire.

You Have Special Requirements.. HADEED is Ready

Wire rods conforming to individual customer specifications can also be made.

SABIC kindly asks its clientele to contact Sales & Marketing Department in order to place their orders, according to their needs and requirements.

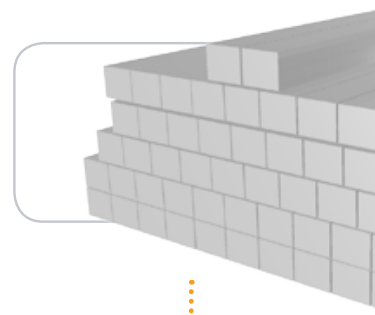
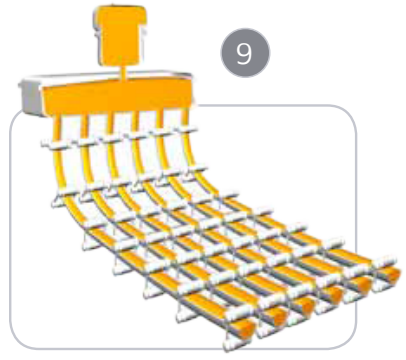
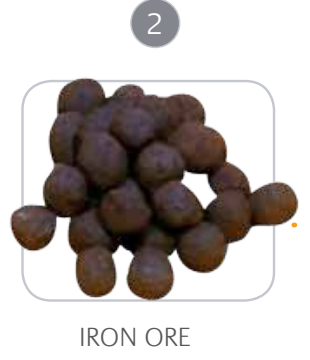
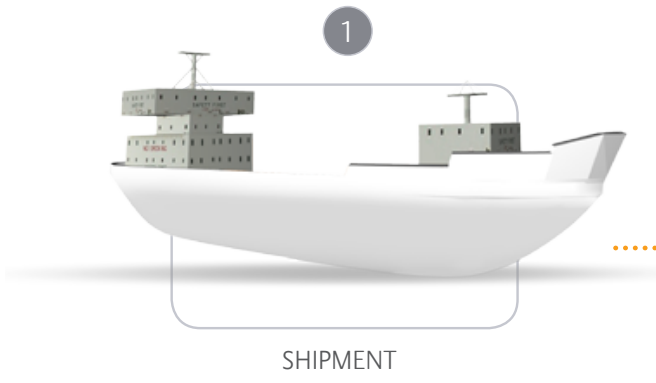


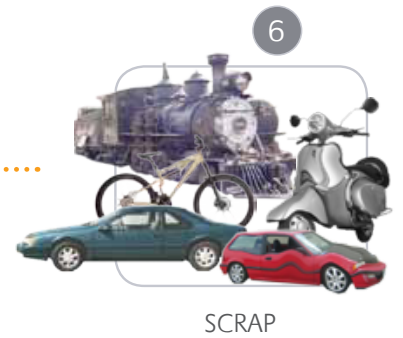
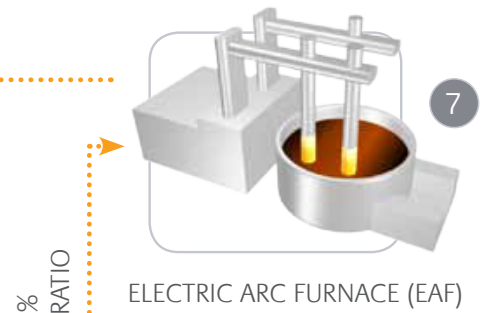
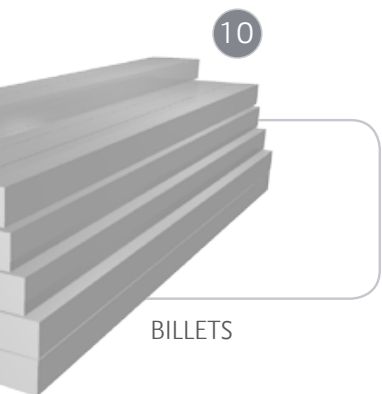
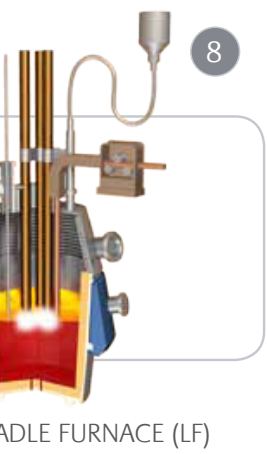
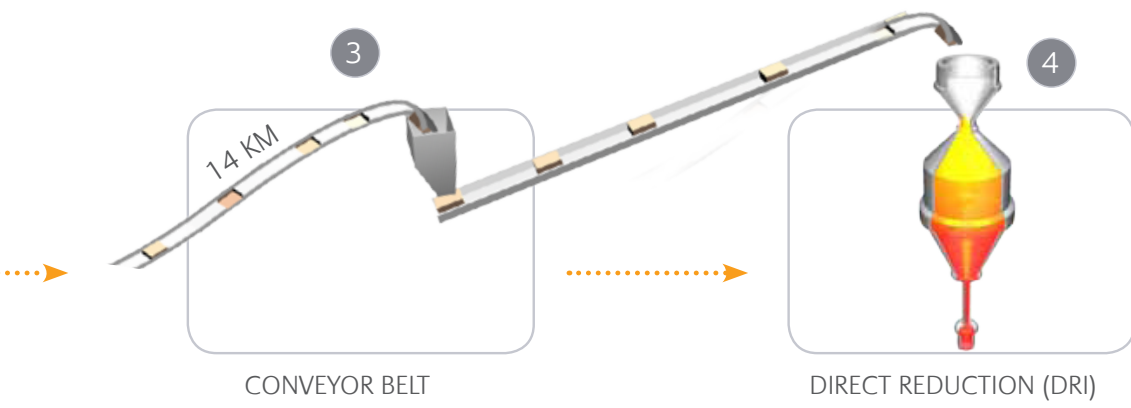
Light Sections

HADEED produces light sections from mild steel conforming to ASTM A36M in shapes such as flats, squares, equal angles and channels and they are cut to standard 6 meter length.









Light Sections

Equal Angles		
Dimensions mm	Nominal Weight kg/m	Number of pcs. (6M) per bundle 2T
30x3	1.363	245
40x3	1.844	181
40x4	2.416	138
40x5	2.974	112
40x6	3.516	95
45x4	2.742	122
45x5	3.378	99
45x6	3.998	84
50x4	3.056	109
50x5	3.770	88
50x6	4.469	75
50x7	5.152	65
60x5	4.568	73
60x6	5.423	62
65x6	5.909	56
70x6	6.380	52
70x7	7.377	45

Square Bars		
Dimensions mm	Nominal Weight kg/m	Number of pcs. (6M) per bundle 2T
10	0.785	425
12	1.130	295
14	1.540	217
16	2.010	166
18	2.543	131
20	3.140	106
22	3.800	88
24	4.520	74
25	4.910	68

The above mentioned specifications are related to our standard products. Customer's special requirements can be met.

Flat Bars		
Dimensions mm	Nominal Weight kg/m	Number of pcs. (6M) per bundle 2T
25x5	0.981	340
25x10	1.963	170
30x5	1.178	283
30x10	2.355	142
32x8	2.010	166
35x5	1.374	243
38x6	1.790	186
40x5	1.570	212
50x3	1.178	283
50x8	3.140	106
50x12	4.710	71
65x6	3.062	109
75x6	3.533	94
80x10	6.280	53
100x6	4.710	71

Channels		
Dimensions mm	Nominal Weight kg/m	Number of pcs. (6M) per bundle 2T
30x15x4	1.740	192
40x20x5	2.870	116
50x25x5	3.860	86
60x30x6	5.070	66
75x40x4	6.920	48

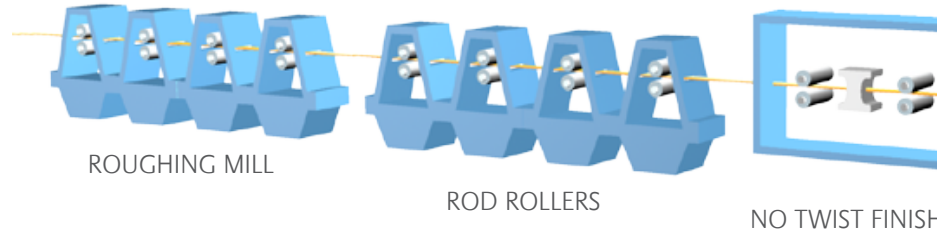
Package	
Standard Length	6 meters, Tolerance according to specifications
Bundle Standard Weight	Approximately 2,000 kgs.
Binding	Uniform piece count for each size per bundle according to the schedule with 3 equidistant straps with 6mm wire.

11 ROLLING MILL

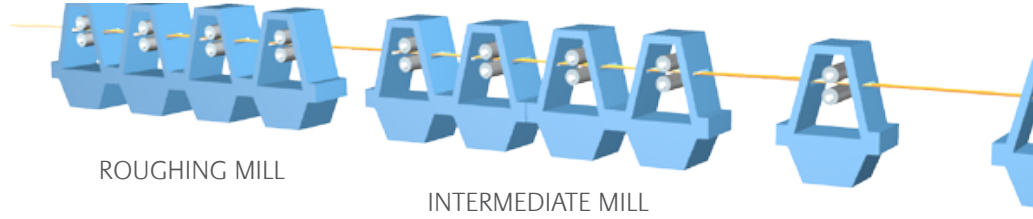
REBAR MILL



REBAR IN COIL / WIRE ROD MILL



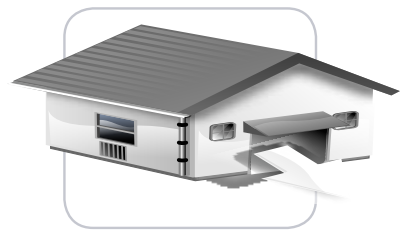
SECTION MILL

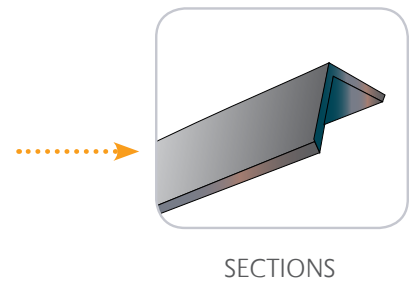
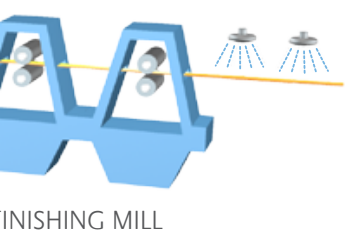
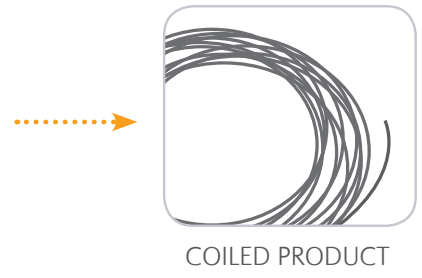
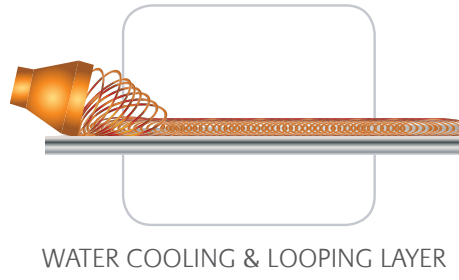
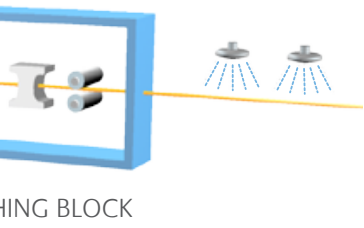
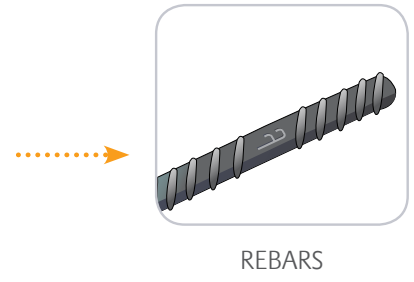
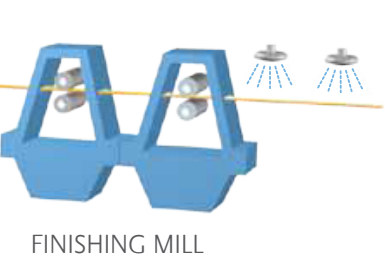


14



13





12





SABIC steel part
of the long story

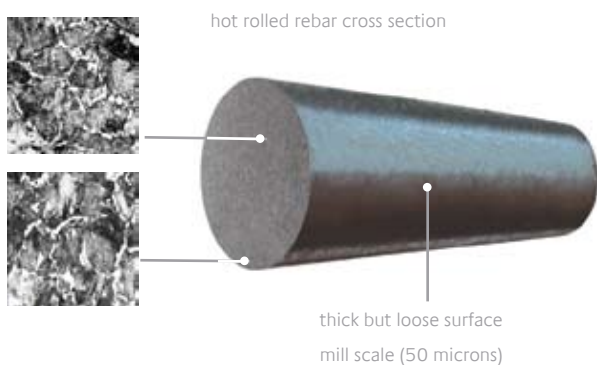
SABIC True Commitment to the World.

HADEED quality control system is in compliance with the international Quality Standard ISO 9001-2008. HADEED has well equipped laboratories and inspection facilities where sampling, testing and analysis are done repeatedly as per standard procedures for iron ore lumps and pellets, direct reduced iron, scrap, ferro alloys, additives, intermediate and finished products. All of this is to ensure total conformity with required specifications. These laboratories are highly equipped with state of the art spectrometers, wet chemical,

Rebar Manufacturing Processes

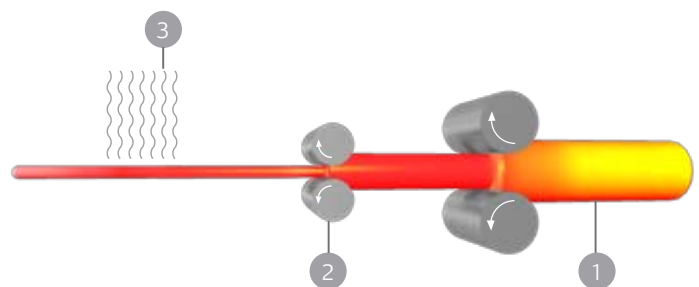
The steel rebars are produced through hot rolling process where the properties are achieved by regulating the chemical composition, or by bar quenching process where the properties are achieved by regulating the microstructure of steel.

Conventional process



In the conventional hot rolling process, the mechanical properties are achieved by regulating the chemical composition. The use of higher levels of carbon and manganese increase the strength of the steel, but may impair ductility and the weldability.

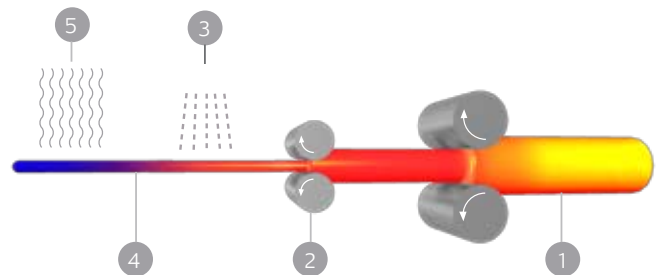
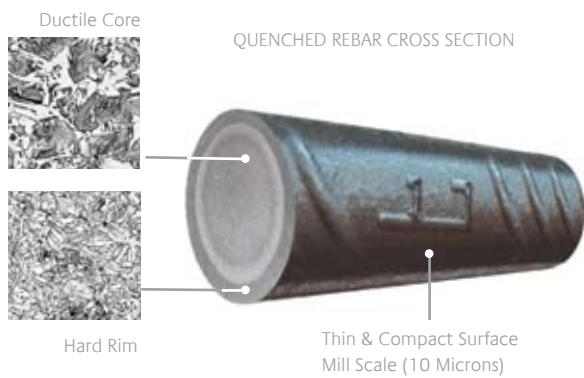
metallographic and mechanical test facilities. These are the most accurate and reliable apparatus to conclude, without any doubts, the high quality of SABIC steel products. Throughout the production process, The quality related parameters are monitored and compared with standard set points. Visual inspection is carried out to ensure surface quality of intermediate & finished products. Macro-evaluation of billet cross section is done to assess internal quality to ensure good quality product. These tests are of utmost importance to HADEED, and to its signature... the benchmark of high quality standard that never can be challenged.



- 1. Hot Billet with high C and Mn content
- 2. Hot Rolling
- 3. Normal Air-cooling

SABIC steel rebars are produced through bar quenching process where the properties are attained by regulating the microstructure of the steel giving better rebar ductility and good weldability.

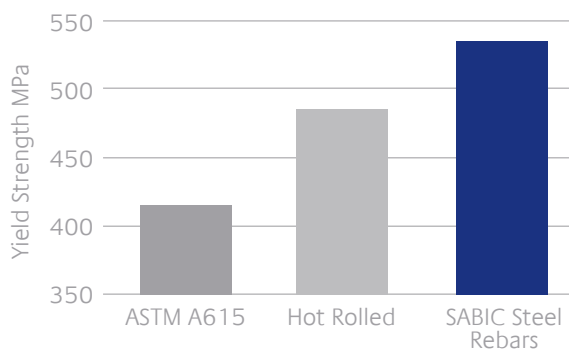
Bar Quenching Process



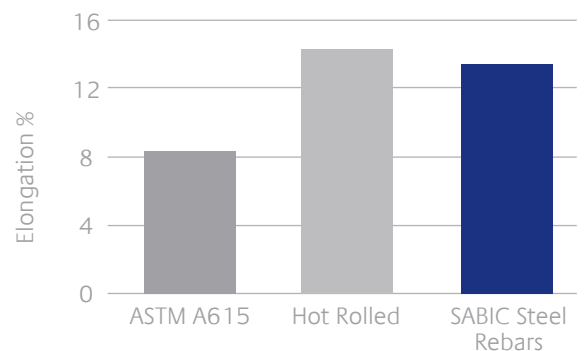
- Hot Billet with low C and Mn content
- Hot Rolling
- Quenching
- Self tempering
- Air-cooling

SABIC steel properties

The precise process control adopted at HADEED results in a clean steel with very low content of harmful residual elements, higher yield strength, good ductility and better bending properties of the steel bar. The lower carbon equivalent values used in SABIC Quenched Steel Rebars also make them ready to be welded, particularly for the applications requiring low heat input like tack welding. This combination of properties is very rare to find in conventional rolled material.



Comparison of Yield Strength

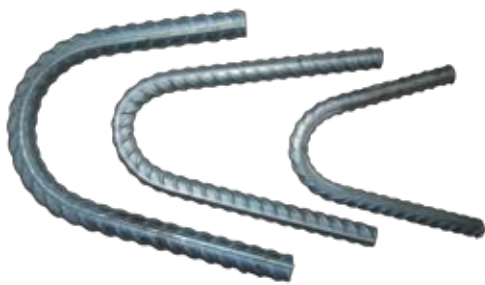


Comparison of Uniform Elongation

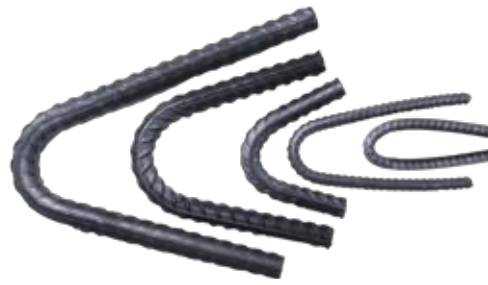
SABIC Steel Properties

Combined with higher yield strength, SABIC Quenched Steel rebars also have guaranteed tensile to yield strength ratio and percent elongation values; besides, they can be bent to a much smaller radius than standard specification.

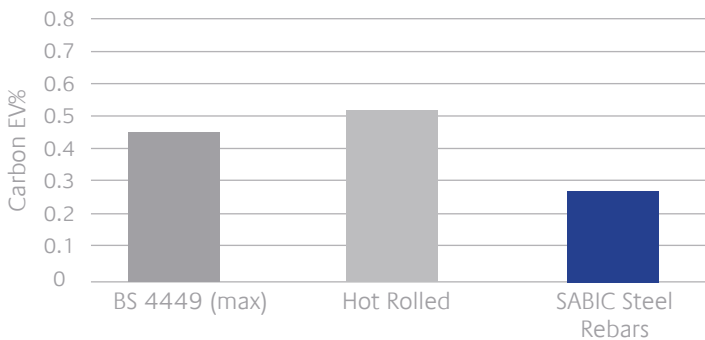
Bending Characteristics of HADEED Steel Rebar



International Standard Requirement



SABIC Steel Rebar Standard



Comparison of Carbon Equivalent Values

SABIC Quenched Steel Rebars are able to absorb sufficient plastic strain during accidental overloading. So if you ask for extra safety margin to the reinforced concrete structures, the use of high strength SABIC Quenched Steel Rebar is the right answer.



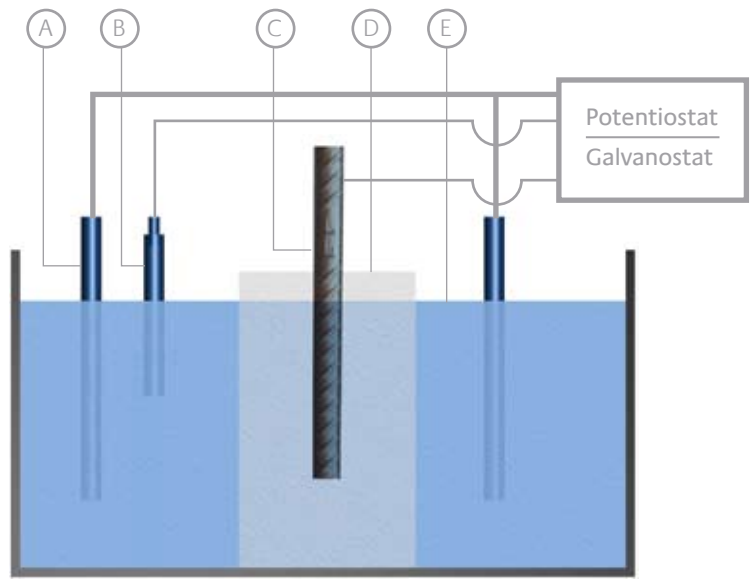
Rebar Corrosion in Concrete

The lab scale corrosion studies are carried out in an aggressive environment to have quick and comparative results. Well-established standard procedures and practices are used to carry out these studies and the results are well accepted.

Rebar Corrosion in Concrete

1 Test set up

Rebar samples were cast in concrete cylinders. The concrete was of similar in quality to that used in normal construction. After curing, these samples were exposed to natural seawater's corrosion activity, and the half-cell potential and corrosion rates were periodically measured.



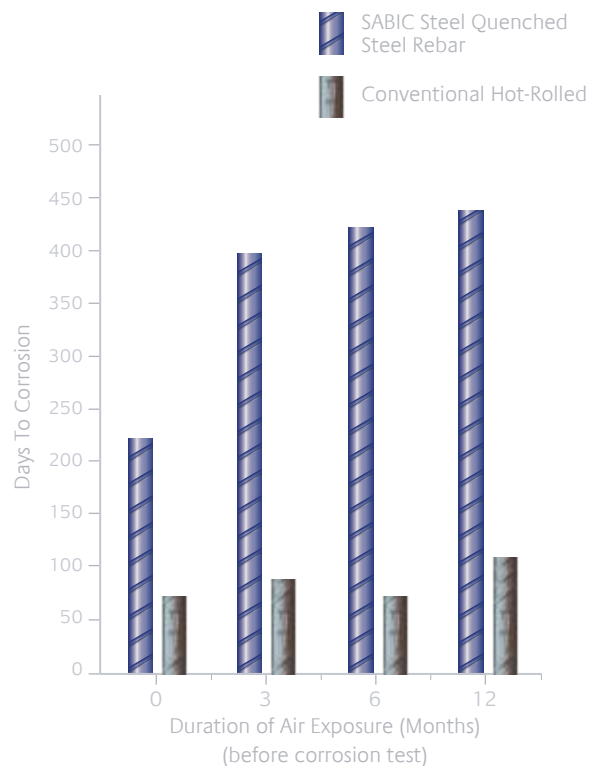
A Counter Electrode
B Reference Electrode
C Rebar Sample
D Concrete Cylinder
E Seawater

2 Time to initiation of corrosion

The time taken by the samples to show a half-cell potential of -350 mV is used as an indication of corrosion initiation. (ref. ASTM C876)

Observations:

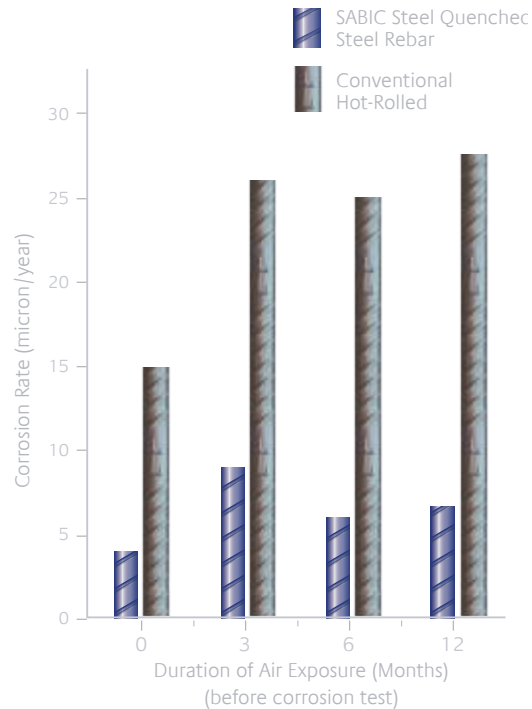
- SABIC Steel quenched steel rebar delay corrosion initiation in concrete.
- The discoloration layer present on the quenched steel rebar further delays the corrosion activity.



3 Corrosion rate measurement

Observation:

Corrosion rates for SABIC Steel quenched steel rebar are lower than that of conventional hot-rolled bars with similar duration of air exposure, in both rolled and pre-exposed conditions.



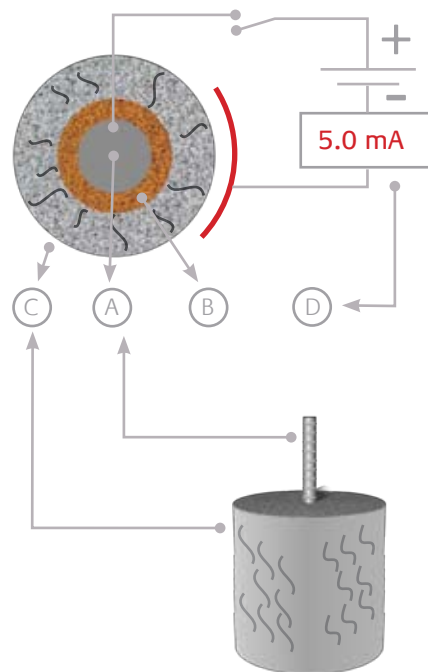
- 1 Test set up
- 2 Time to initiation of corrosion
- 3 Corrosion rate measurement
- 4 Concrete cracking
- 5 CONCRETE CRACKING DURATION
- 6 Rebar Discoloration Facts and Effects

4 Concrete cracking

In the concrete cracking test, the rebar samples are subjected to constant anodic potential. The current flowing through the circuit, depends upon the resistance of the system.

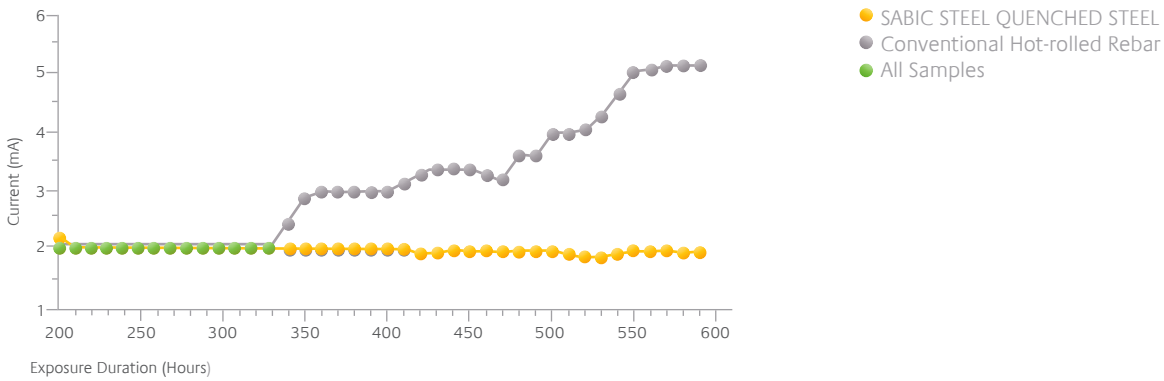
The growing volume of corrosion products at the rebar concrete interface initiates concrete cracking that reduces the electrical resistance of the system and results in flow of larger current.

Rapid increase in current flow is taken as an indication of concrete cracking.



- A Rebar Sample
- B Corrosion Product
- C Concrete
- D Ammeter

5 CONCRETE CRACKING DURATION



Observations:

- Conventional hot-rolled rebar samples show an early indication of concrete cracking. SABIC Steel sample of Quenched Steel Rebar does not show any sign of cracking.
- This test indicates also the superior corrosion resistance of SABIC Steel Quenched Steel Rebar in concrete.

6 Rebar Discoloration Facts and Effects

The quenched steel rebars inherently change their surface color during open air storage in humid environments. This discoloration is superficial and is associated with the thin mill

scale present on the rebar surface and does not extend to the base metal or affect the mechanical properties of the rebars. Rust on the other hand involves the corrosion of the base metal and adversely affects the material properties..

Discoloration

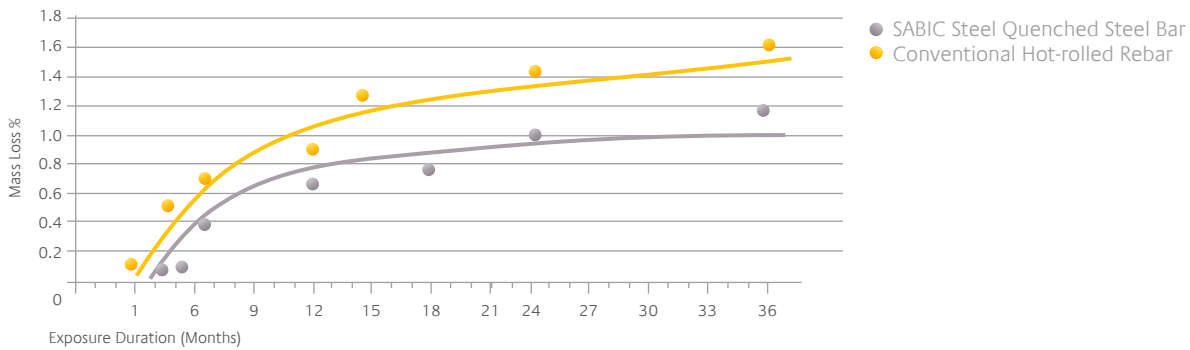


Rust



Long terms studies conducted at SABIC Technology Center and other universities have concluded:

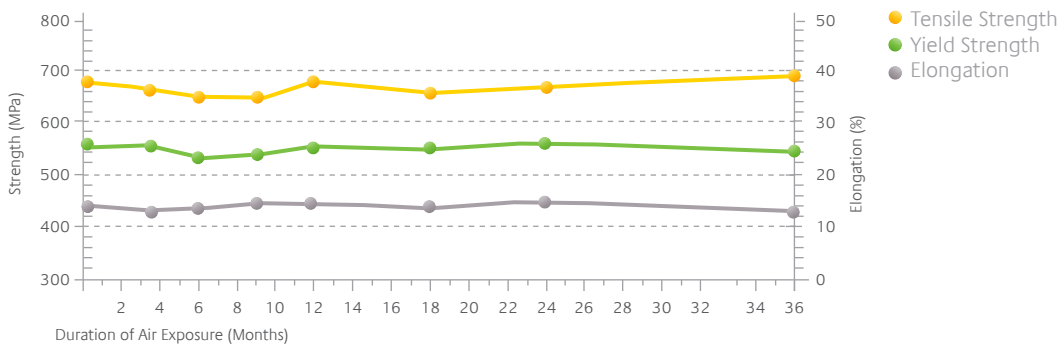
- Rebar discoloration is a surface phenomenon and does not affect the rebar strength, ductility, bending or bond with the concrete.
- Rebar discoloration enhances the corrosion resistance of the rebars by delaying the initiation of rebar corrosion and hence concrete cracking.



The mass loss during air exposure for the quenched steel rebars is always less than that of conventional rolled rebars for the corresponding air duration.

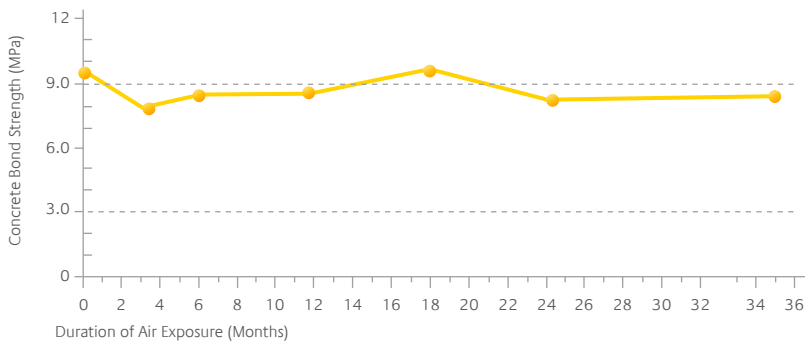
The extent of corrosion is determined by the quantity of mass lost after the elimination of the corrosion effect.

The characteristic of SABIC Quenched Steel Rebar: The mass lost remains less than that given by the conventional hot-rolled bars, with comparable duration of air exposure.



The studies indicate that the discoloration on HADEED's Quenched Steel Rebar does not

affect their strength even after three years of open-air exposure.



Similarly, the discoloration does not affect the concrete pullout bond strength. It is worth mentioning that the international building

codes consider very low bond strength in the structural design.



Technology & Innovation

A must to stay first

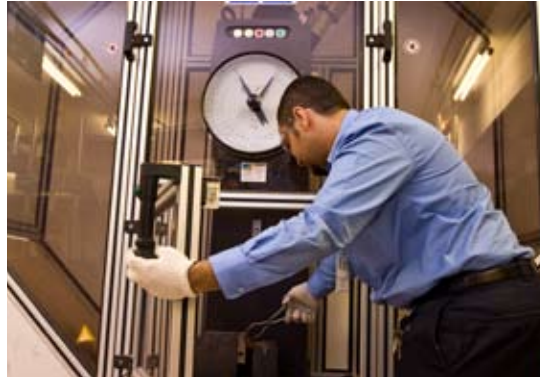
HADEED maintains a market leading point by constantly applying global advances in technology. To keep up with the responsibility cast on us, we carry out independent studies on a habitual basis to inspect the excellence of our products, and to evaluate the process and the product development in the whole industry.

Amongst other subjects, recent research has examined the consequences of seams on rebar properties, the effect of discoloration on rebar characteristics, reducibility of dissimilar raw materials and use of by-products.

Technology & Innovation

SABIC Technology Center in Al Jubail has dedicated research facilities for SABIC Metals Business in steel product development, process optimization, product quality improvement, energy conservation, sustainability and by – product utilization.

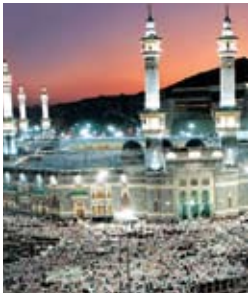
Using latest physical and computer based simulation tools, it carries out studies for metallurgical process mapping, developing microstructure – property relationships and process improvement.



SABIC... Designs Lifting Up Our Portfolio

With the ability to produce a remarkably diverse range of steel products in large volume to order, SABIC has supplied for some of the

most significant construction projects around the world, with the trusted materials needed to go up sky high.



Holy Mosque, Makkah

More than two million pilgrims journey to the ancient city of Makkah every year. SABIC was the heart and soul of this multi-billion dollar construction and modernization program, which has been the most

important expansion of the Holy Mosque in recent times, providing new buildings and facilities for visitors, and a spectacular new 90-meter minaret.



Chep Lap Kok Airport, Hong Kong

SABIC Steel was essential to the \$20 billion construction program, to build an airport capable of accommodating the dramatic increase in passenger numbers expected to flow through the gate way to the Far East over the next ten years.



The Kingdom Tower, Riyadh

The Kingdom Tower is the most momentous landmark of modern Saudi Arabia. Built with 37,000 tones of SABIC Steel, the tower

stands 367 meters high and forms part of a \$510 million complex that includes a five-star hotel, luxury apartments and a shopping mall.



Burj Al-Arab, DUBAI

The Burj Al-Arab, or Arab Tower, is one of the Middle East's most readily recognized landmarks and Dubai's highest profile resort hotel project. Built on a man-made island lying a quarter of a kilometer offshore, its stunning sail-shaped structure soars 321 meters above the Arabian Gulf.



SABIC Packing...

More than a mark. A trademark. A benchmark.



حديد
hadeed

Saudi Iron & Steel Co. [Hadeed]

Batch: **L35963 -- 001**

Material: **22003280**

Quality: 2322

Product: Debar 12mm 12m ASTM A615 GR60

Cast: L35963

Length: 12m

Size: 12.REB

Pcs: 188

Weight: 2 Tonnes

Comp: C Si Mn V N CEV



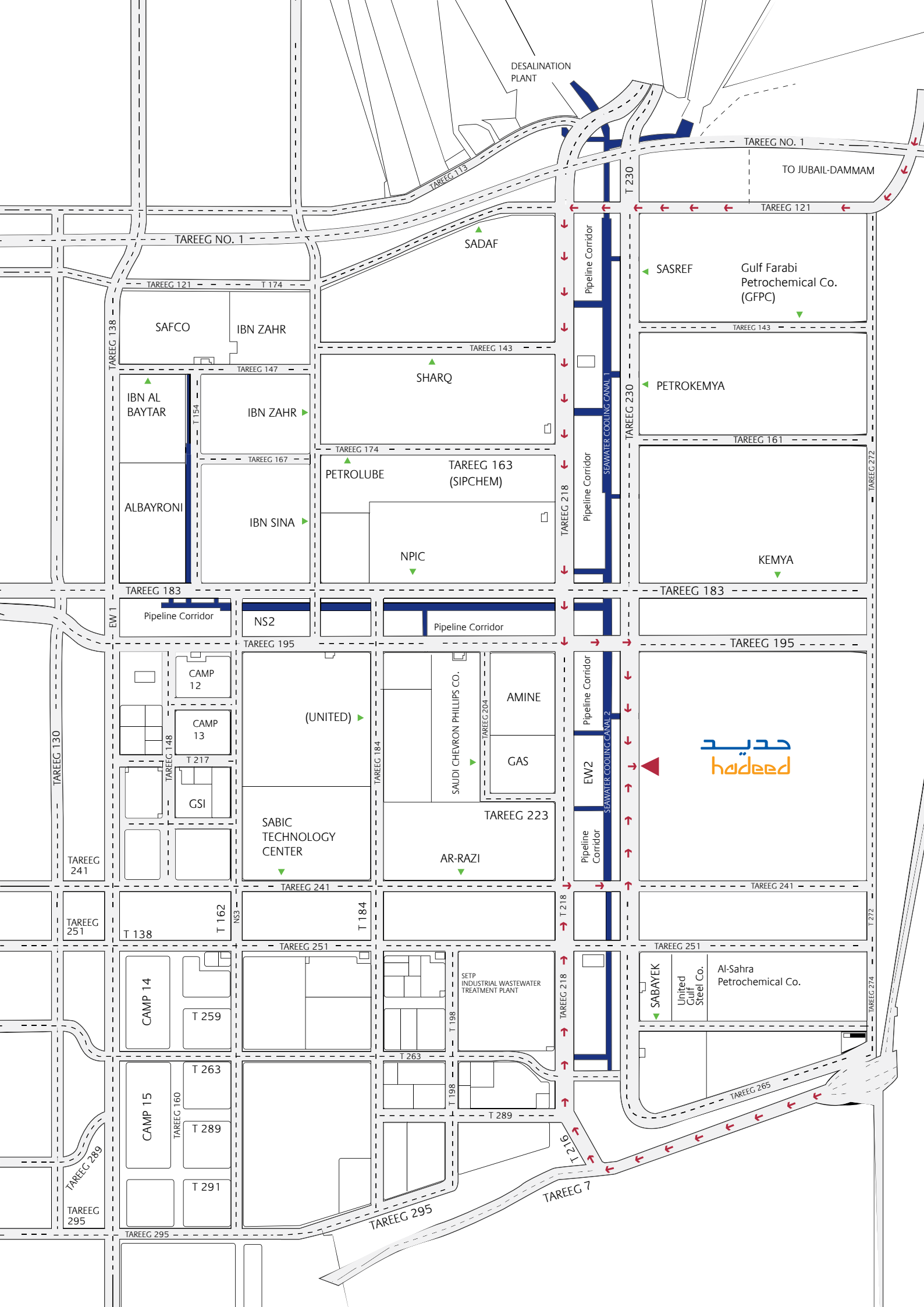
Made in Saudi Arabia



SABIC Label

A Document of Trust Made of Steel





Contact us

Al - Jubail Industrial City, Saudi Arabia

SABIC Steel Sales & Marketing

P.O. Box 10053

Al - Jubail Industrial City 31961

Saudi Arabia

T +966 (0) 3 357 1115

F +966 (0) 3 358 1096