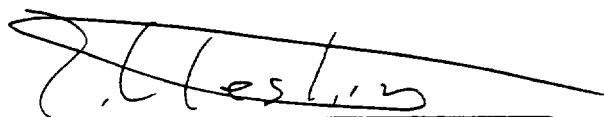


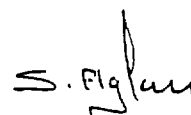
MINUTES OF MEETING  
CONCERNING  
THE SCOPE OF WORK  
FOR THE STUDY ON  
INDUSTRIAL WASTE WATER POLLUTION CONTROL  
IN  
THE ARAB REPUBLIC OF EGYPT

Cairo, June 2, 1999

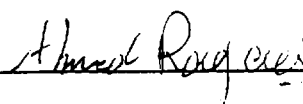


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Leader  
Preparatory Study Team  
Japan International Cooperation Agency  
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Dr. Sabry Aglan  
Advisor to the Minister of Public  
Enterprises,  
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Agency (EEAA)  
Egypt



Mr. Ahmed Ragaei  
First Undersecretary  
Ministry of International Cooperation  
(MOIC)  
Egypt

This minutes of meeting has been prepared to confirm the points agreed on between the authorities concerned of the Government of the Arab Republic of Egypt ("the Egyptian side") and the team organized by the Japan International Cooperation Agency ("the Team"), concerning the implementing framework of the Study on Industrial Waste Water Pollution Control in the Arab Republic of Egypt ("the Study"). Hence this minutes of meeting should be read in conjunction with the " Scope of Work " signed in Cairo on June 2, 1999 ("S/W") and in continuation to the previously signed Minutes of Meeting on March 18th, 1999.

A list of those who participated in the discussions is attached herewith (See Annex 1).

### 1. Conditions for Phase 2

With regard to the first sentence of the article III of the S/W, the Egyptian side and the Team (collectively referred to as "both sides") agreed that Phase 2 will be implemented and a Demonstration Plant will be introduced to one of the Representative Factories ("the Demonstration Factory") if following conditions are satisfied:

- (1) An appropriate waste water treatment system can be found which satisfies the following requirements as a result of the study in Phase 1:
  - The cost for Demonstration Plant will not exceed JICA's budgetary limitations;
  - The system doesn't produce sludge containing toxic substances which can not be treated properly.
- (2) The Egyptian side assures the followings:
  - The Demonstration Factory will prepare a sufficient and appropriate site for installation of the Demonstration Plant;
  - The Demonstration Factory, with support of its holding company, will bear the local costs necessary for the installation and operation of the Demonstration Plant.

(Note): The items of local costs, which will be discussed during Phase 1, are plant site preparation, piping between the plant and factory, transportation of equipment and materials from the port to the site, customs clearance and payment of import duties, operation and maintenance costs, etc.;

- Demonstration activities of the waste water treatment system by using the Demonstration Plant will be established in the Demonstration Factory;
- The setup for operation will be established in the Demonstration Factory;
- The Demonstration Plant will be utilized properly and effectively in line with anticipated purpose even after the completion of the Study.

S..a

## 2. Appropriate Industrial Waste Water Treatment Systems

With regard to article III.2 of the S/W, it was confirmed that the appropriate industrial waste water treatment systems ("the Systems") may include in-process systems and both sides agreed that the Systems will be prepared based on the following considerations:

- The Systems are of adequate technical level so that they will be able to be adopted and spread widely in the Arab Republic of Egypt ("Egypt");
- The waste water treatment plants, constructed on the basis of the Systems, will be easily maintained locally and be operated at a low cost;
- The Systems will not necessarily treat whole waste water discharged from the factories.

## 3. Candidate Factories

With regard to article III.2-1 of the S/W, both sides confirmed the candidate factories as follows:

- (1) Al Nasr Company for Granular Wood and Rating;
- (2) Egyptian Iron and Steel Company;
- (3) Egyptian Ferroalloys Company;
- (4) Delta Steel Mill Company;
- (5) Al Nasr for Steel Pipes and Fittings Company

## 4. Selection of the Representative Factories

With regard to article III.2-2 of the S/W, it was agreed that three (3) representative factories ("the Representative Factories") will be selected based on following criteria:

- factories that are in need of improvement in their anti-pollution measures;
- factories that are typical so that the recommended waste water treatment systems can be expected to be diffused to other factories in Egypt;
- factories that are interested in designing or upgrading their waste water management;
- factories that are financially able (either self-financing or from other financial resources) to adopt the recommendations on the appropriate waste water treatment system;
- factories in which similar projects by other donors are not under way.

The Egyptian side and JICA will jointly select the Representative Factories based on findings of the JICA study team.

## 5. Technology Transfer Seminar

It was agreed that a technology transfer seminar will be conducted in cooperation with Management Development Centre for Industry (MDCI), MOPE and EEAA at the end of Phase 1. The purpose of the seminar is to disseminate the results and findings of the Study as widely as possible to personnel in charge of industrial pollution control in governmental offices, public sector and private sector.

The seminar details will be discussed at a later stage by and between the Egyptian side and the JICA study team.

## 6. Institutional Setup for Implementation of the Study

With regard to article VI of the S/W, both sides agreed on the following:

### (1) Steering Committee

The steering committee, of which the secretariat will be established within MOPE, is organized for ensuring smooth implementation of the Study. The committee members will be composed of, but not limited to, the representatives of the following organizations ;

- MOPE;
- EEAA;
- Holding companies;
- Tabbin Institute for Metallurgical Studies (TIMS);
- The Representative Factories ( sub-members ).

Responsibilities of each steering committee member are as follows;

- MOPE, as a responsible agency and leading counterpart, will perform overall coordination for the Study ;
- EEAA, as a responsible agency and supervising counterpart, will give necessary advice for smooth and effective implementation of the Study. Furthermore, it will take necessary measures to reflect the recommendations to be proposed in the Study in their policy issues to encourage factories to process industrial waste water properly;
- TIMS, as technical supporting agency, will provide necessary technical assistance and advice for the Study;
- Holding companies and the Representative Factories, as executing entities, will act as partners to the JICA study team.

### (2) Working Group

The Egyptian side will assign appropriate counterpart personnel who will form a working group to help the JICA study team to carry out the Study. Leader of the working group will be selected from relevant technical officials of MOPE and will perform necessary coordination for the Study at practical level as a

counterpart of the JICA study team. EEAA will also nominate focal points for coordinating purposes. The other members of the group will be composed of, but not limited to, the representatives of the following organizations:

- Holding Companies (deputy leader);
- The Candidate and the Representative Factories (as counterpart of JICA study team in each factory);
- Tabbin Institute for Metallurgical Studies (TIMS)

The Egyptian side will inform JICA of the members of the working group by the end of July, 1999.

### 7. Operational Flow of Phase 1

Both sides agreed to the operational flow of Phase 1 as illustrated in Annex 2.

### 8. Tentative Implementing Framework of Phase 2

Concerning the scope of Phase 2 of the Study, both sides agreed tentatively on the following:

#### (1) Outline of Work of Phase 2

Outline of Work of Phase 2, which will be discussed in detail later and stipulated by the Scope of Work of Phase 2, are as follows :

- Installation of the Demonstration Plant in the Demonstration Factory;
- Recommendations on setup for operation, management and maintenance of the Demonstration Plant;
- Transfer of practical skills to operate the Demonstration Plant;
- Demonstration activities of the waste water treatment system by using the Demonstration Plant for the purpose of ensuring diffusion to other factories in Egypt;
- Recommendations on policy measures and practical action plans to enhance public awareness on the importance of appropriate waste water treatment.

#### (2) Schedule of Phase 2

March	2000	Signing of the Scope of Work (Start of Phase 2)
May	2000	Start of implementation of the Demonstration Plant*
February	2001	Completion of implementation of the Demonstration Plant
May	2001	Starting the Demonstration of the System by the Demonstration Plant
October	2001	Submitting of the Final Report ( End of Phase2)

※(Note) Due to the single year budgetary system of the Government of

Japan, it should be noted that all works for implementing of the Demonstration Plant must be completed within one Japanese fiscal year (April 1 - March 31).

S.a

List of Members of the Egyptian and Japanese DelegationsEgyptian SideMinistry of Public Enterprises

Dr. Sabry Aglan	Advisor to the Minister of Public Enterprises
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Egyptian Environmental Affairs Agency

Eng. Dahlia Lotayef	Director, Technical Cooperation Office for the Environment (TCOE)
---------------------	---

Mr. Walid Wagieh Darwish	Program Officer, Industry Unit, TCOE
--------------------------	--------------------------------------

Holding Company for Metallurgical Industries

Eng. Abd El Lattif Ali Sohiman	General Director of Technical Affairs
--------------------------------	---------------------------------------

Eng. Sawsan Ahmed El Badawy	Chief of Planning & Production Follow Up Sector
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Ministry of International Cooperation

Mr. Ahmed Ragaei	First Undersecretary
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Japanese SideJICA Project Formulation Study Team

Mr. UESHIMA, Takumi	Director of Industrial Development Study Division, Mining and Industrial Development Study Department, JICA
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Mr. HANAWA, KOJI	Technical Cooperation Division, International Trade Policy Bureau, Ministry of International Trade and Industry
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Mr. OKUMURA, Munehiro	Water Environment Research Treatment Institute Co. Ltd.
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Staff, Industrial Development Study Division,  
Mining and Industrial Development Study  
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Mr. ISHIKAWA, Tsutomu

System Science Consultants Inc.

Embassy of Japan

Mr. MIYAKE, Koichi

First Secretary

JICA Egypt Office

Mr. SAKATA, Shokichi

Assistant Resident Representative

Mr. Alfred Zoser

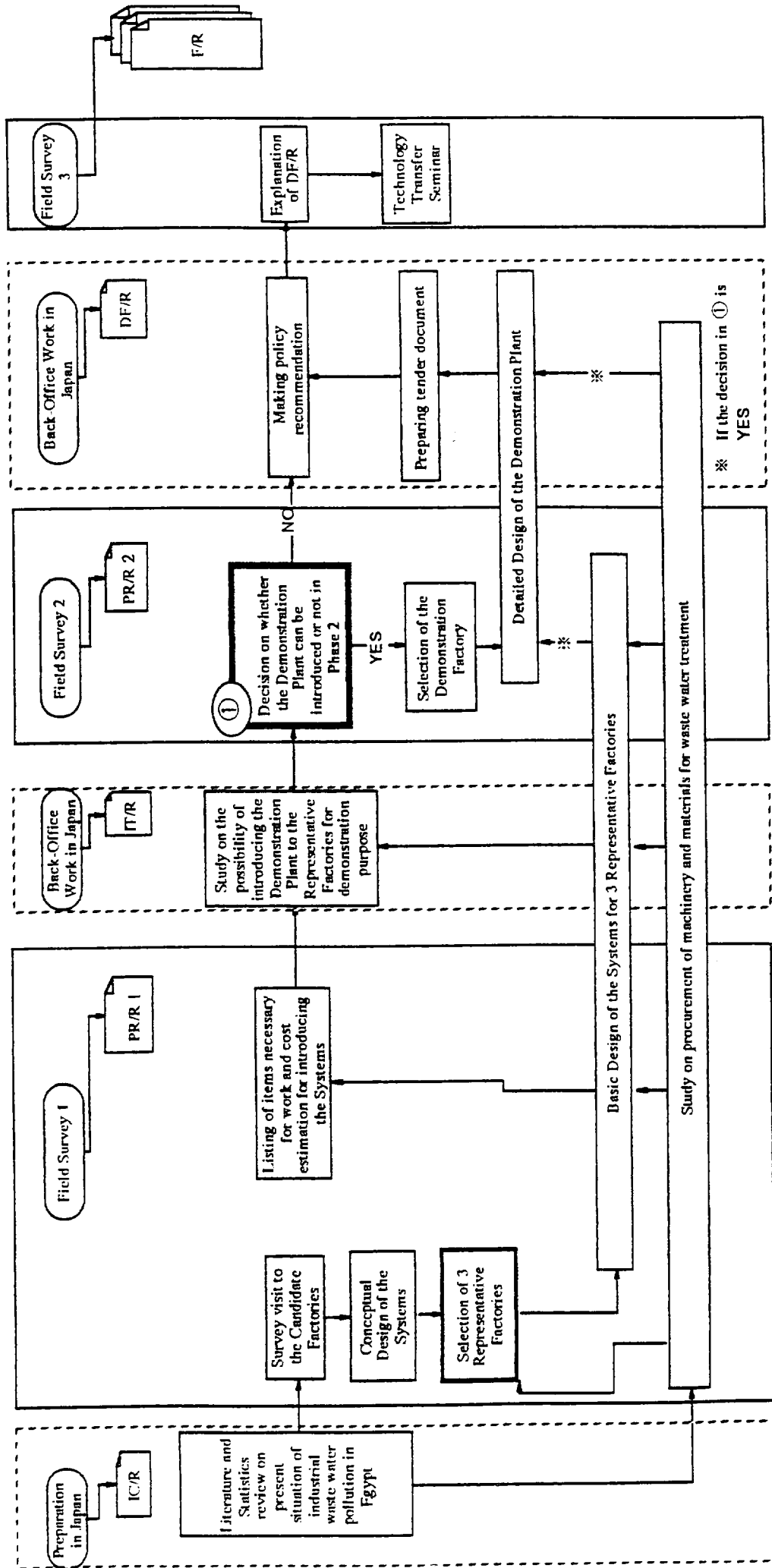
Project Coordinator

S. a



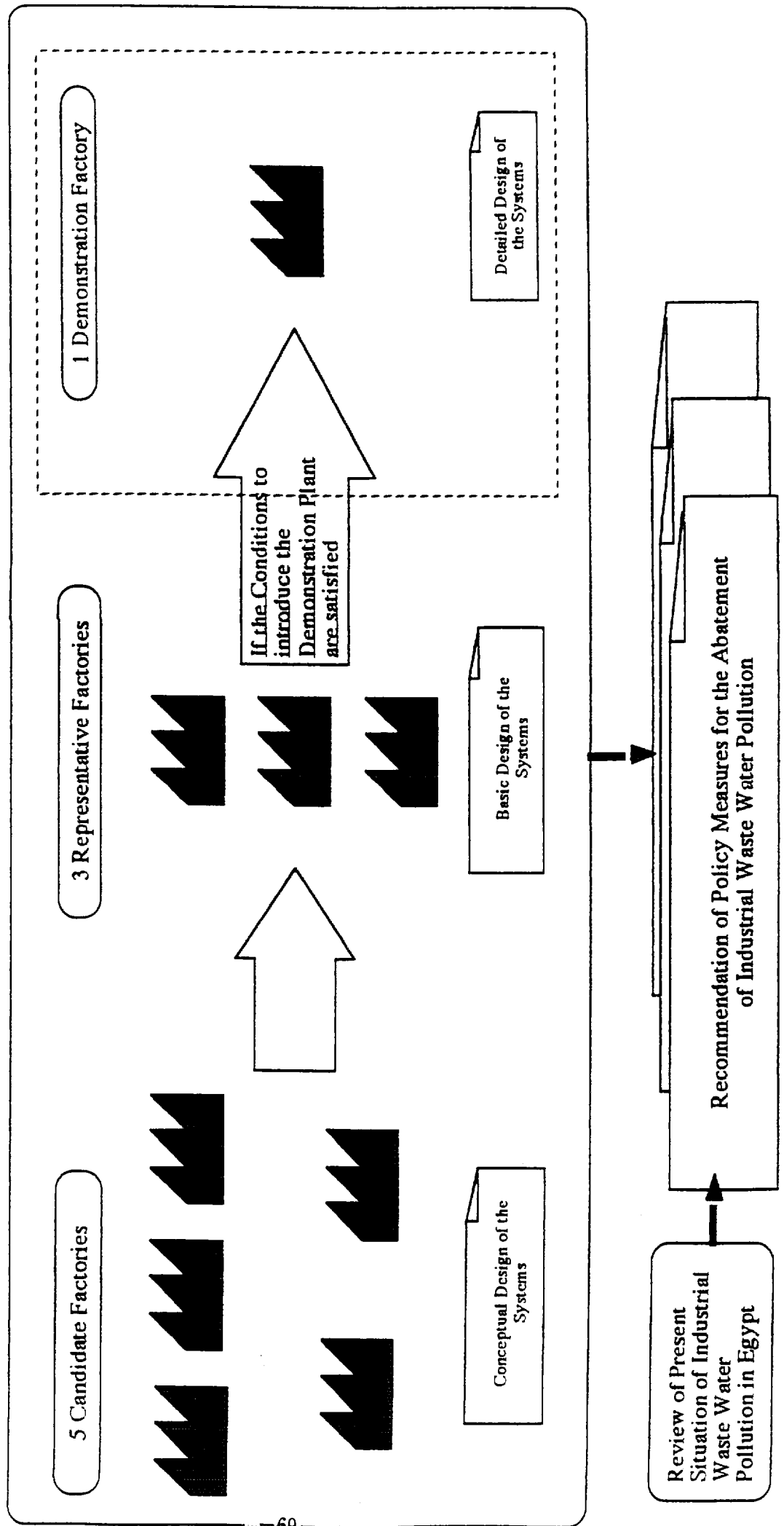
: report

Operational Flow of Phase 1



Concept of the Phase 1

Annex 3



2

## 収集資料

## I. 調査対象工場パンフレット（本報告書に添付）

- 4-1 Egyptian Iron and Steel Company
- 4-2 Delta Steel Mill Company
- 4-3 El Nasr Company for Steel Pipes
- 4-4 El Nasr Company for Granular Wood and Rating

※Egyptian Ferroalloys Companyについては未入手

## II. その他収集資料

## ● Egyptian Iron and Steel Company

- (a) Distributing Pipe Line for Waste Water (General Layout) : 図面
- (b) Distributing Pipe Line for Waste Water (Balance Scheme) : 図面
- (c) Standard Specifications of Products : 会社パンフレット
- (d) Outline of Steel Process Used at Hadisob : 一枚のプロセスフローシート

## ● Delta Steel Mill Company

- (a) Outline of Steelmaking Used at DSM : プロダクションプロセスフロー 1枚
- (b) 水質分析データ（水量を手書追記） 1枚
- (c) Industrial Waste Water Treatment Plant P & I Diagram (EGITALEC) : 図面
- (d) Schematic Water Diagram : 連続鑄造機用浄水場と思われる Cocastの図面
- (e) Consolidation Data Sheet 1枚
- (f) Cooling Water Circuit P & I - Diagram : 図面
- (g) Water Feeding Pipe Lines（アラビック） : 図面
- (h) General Layout（英語+アラビック） : 図面
- (i) レイアウト（アラビック） : 図面
- (j) Consolidation Data Sheet 1枚

## ● El Nasr Company for Steel Pipes

- (a) Environmental Status資料
- (b) Annex : Site Plan and Location Map ・ Production Process Flow Sheet ・ Industrial Waste Water Treatment of Galvanizing（中和処理設備フローシート）等を含む
- (c) Industrial Effluent Characteristics Sheet水質分析データ 7枚

## ● El Nasr Company for Granular Wood and Rating

- (a) レイアウト図 1枚
- (b) 水質分析データ 2枚

## ● Egyptian Ferroalloys Company

- (a) Environment Profile Egyptian Ferroalloys Co. (Egyptian Environmental Affairs Agency, FINNIDA, Egyptian Pollution Abatement Project) 45頁
- (b) Waste Water Samples of Fellosilicon Factory at Edfu 7枚
- (c) Water Flow Diagram : 図面
- (d) Water Quantities for One Furnace : 図面

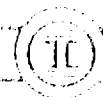
EGYPTIAN IRON & STEEL CO.

**STANDARD SPECIFICATIONS  
OF PRODUCTS**

**QUALITY CONTROL SECTOR**

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## BRIEF HISTORY & SPOT LIGHTS ON HADISOLB

**E**gyptian Iron and Steel Co. (HADISOLB) founded in 1954 is the first integrated steel plant in Egypt.

The plant lies 30 km south to Cairo near Helwan. The plant was originally delivered by DEMAG, the west German firm. The works were put into operation through their technical assistance in 1958.

Later through the Russian experience and loans, an expansion of 1.2 million tons/year ingot steel capacity has been planned. This was based on the use of low phosphorous Baharya Iron ore.

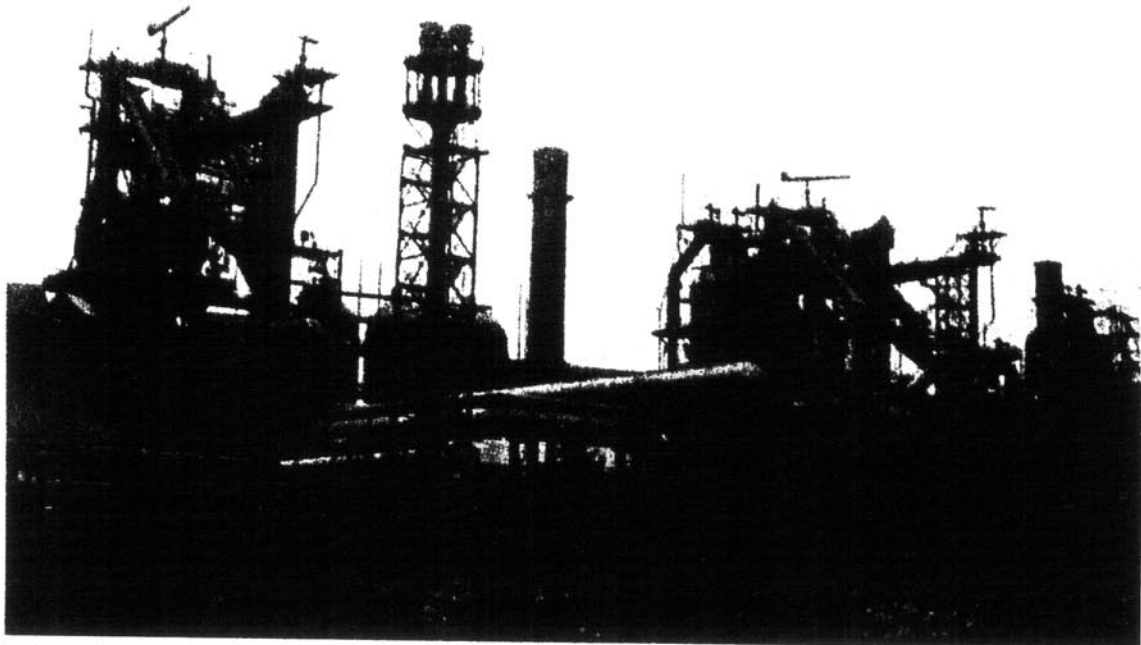
The full expansion was attained in two stages and for the time being the main production sectors and facilities in HADISOLB. are :

### \* Mines and Quarries :

- El Gedida iron ore mines.
- Beni-Khalid limestone quarry.
- Adabia dolomite quarry.

### \* The Iron Making Shops :

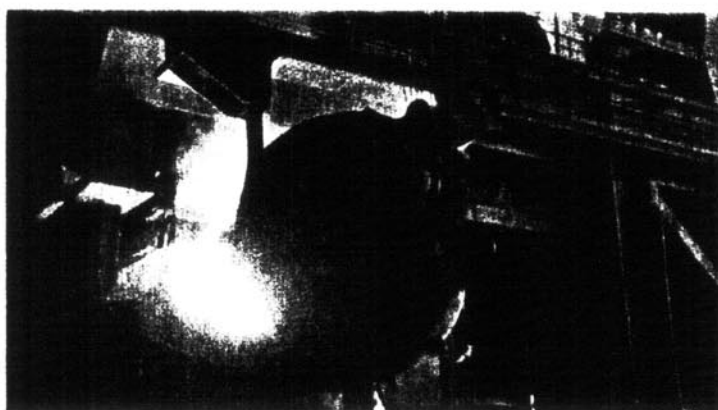
- Sintering shop containing two sinter units one has two sinter machines each of 50 m<sup>2</sup> area and the other has 5 sinter machines of 75 m<sup>2</sup> area each.
- Blast furnace plant containing 4 blast furnaces, two of them are 575 m<sup>3</sup> volume and were supplied by DEMAG. The other two are of 1033 m<sup>3</sup> volume and of Russian design.
- Slag processing shop where granulated slag, slag pumice and slag wool are produced.



**\* The Steel Making Shop :**

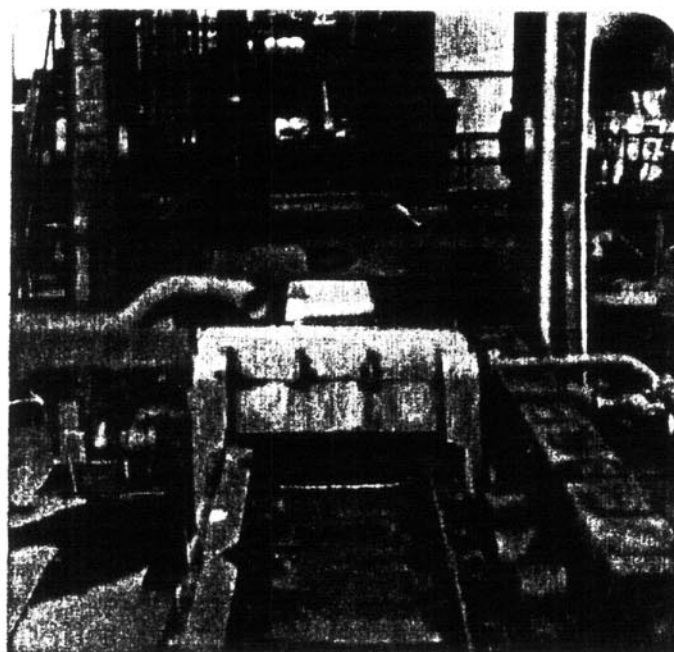
In the present time steel is produced mainly in the Oxygen converter shop. It has :

- 3 converters, each of 80 tons/heat with designed capacity 1.2 million tons/year.
- Continuous casting shop consisting of 3 two-strand slab casting machines and 3 six strand billet casting machines.
- One radial one strand slab casting machine.
- Two Electric arc furnaces each of 12 ton capacity.



**\* Hot Strip Mill :**

- A hot 1200 semicontinuous strip mill that produces hot rolled strips of 2 - 8 mm thickness, 500-1050 mm width and the coil weight is up to 7 tons. It is fed with 150-200 mm thick slabs of weight up to 7 tons.



**\* Cold Strip Mill :**

Designed for manufacture of cold rolled products from hot rolled coils supplied by the 1200 mill and also for slitting / shearing the hot rolled coils.

It consists of two reversible mills, a pickling line, annealing furnaces and a temper mill.

**\* Cold Formed Sections Shop :**

With 1 - 7 x 75 - 500 piece by piece section forming line designed for production of thin walled compound cold formed sections from cold and hot rolled coil band.

**\* 900 - blooming Mill :**

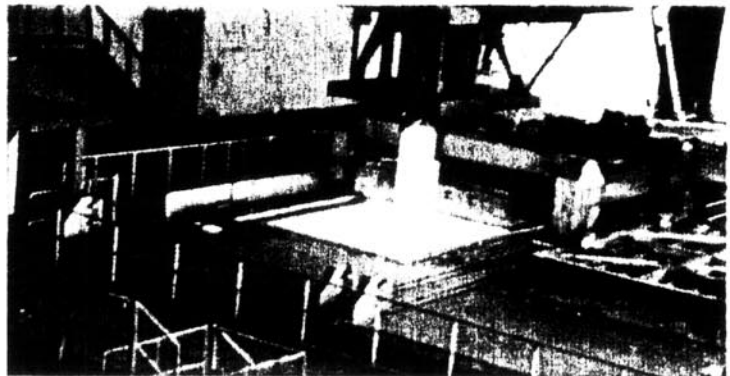
It comprises a soaking pit section which is fed by 3 - 4 tons steel ingots. The mill is also fed with cast slabs from the converter shop. It produces blooms of 140 x 140 mm and up to 225 x 225 mm for the heavy section mill, and also produces thick slabs 80 - 170 mm thick and of up to 500 mm wide for the 1800 plate mill.

**\* Heavy Section and Beam Mill :**

It produces structural sections mainly including universal beams.

It is fed with blooms from the 900 blooming mill and also with cast billets from the converter shop.

The rolling line is fed through a pusher reheating furnace (40t / hr), it has a finishing line with hot and cold saws, walking seam cooling bed and a roller straightener.



**\* Medium Section Mill :**

It produces steel bars, structural sections and light bars.

It is an eight stands semicontinuous mill. It comprises a pusher reheating (50 t/hr) and it is equipped with a finishing line with the same facilities of the heavy section mill.

**\* Light Section Mill :**

It is a nine stands semicontinuous mill. It has a pusher reheating furnace (25t/hr) capacity. The finishing line has the same facilities of the heavy section mill and off-line straighteners.

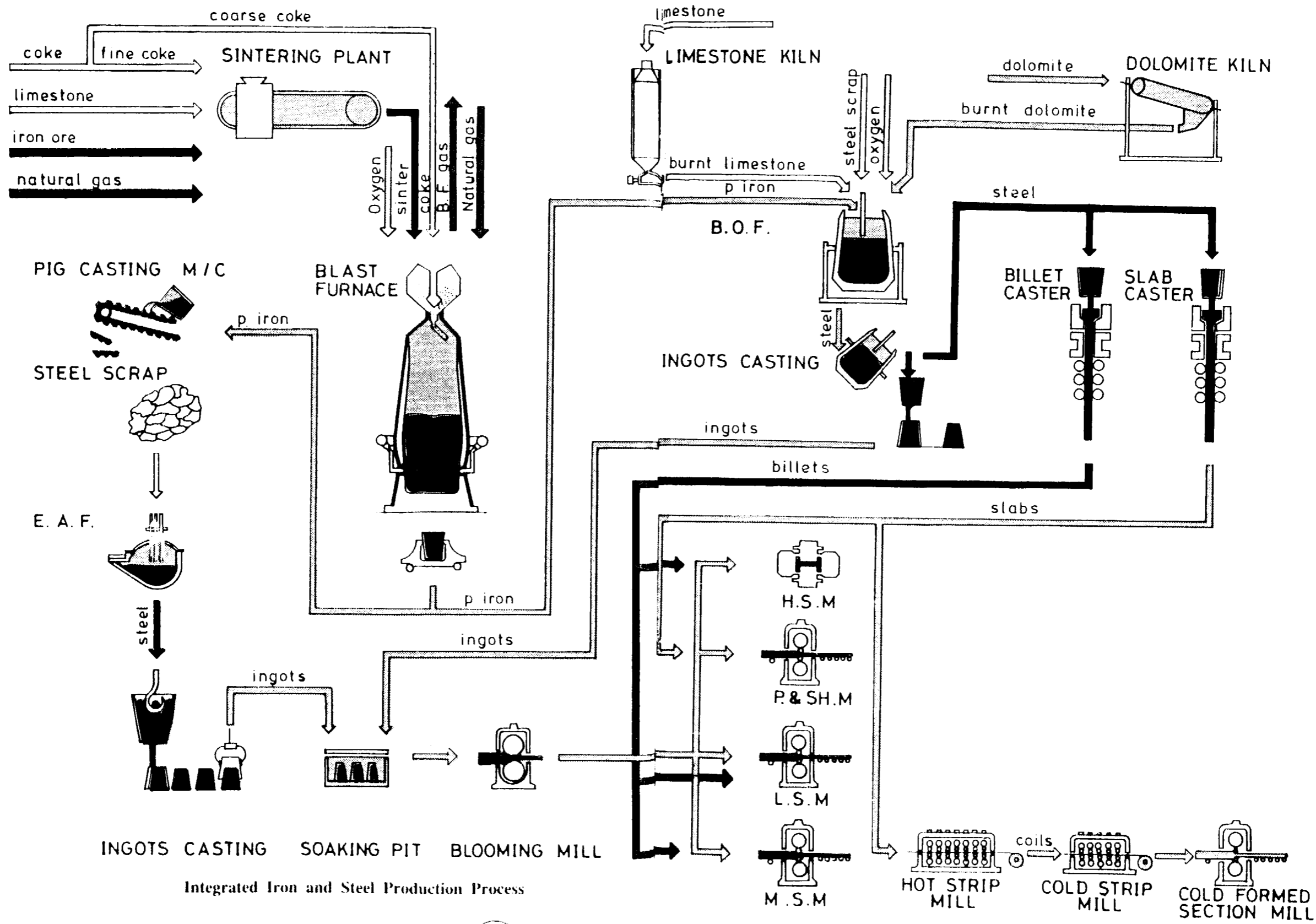
**\* The Light Section and Wire Rod Mill :**

It produces light sections and wire rod from cast billets of the converter shop and also billets supplied by the 750 heavy section mill.

**\* 1800 Plate Mill :**

It produces 8 to 100 mm thick plates of up to 1500 mm width from cast slabs of the converter shop





Integrated Iron and Steel Production Process



# SALEABLE PRODUCTS

## A - MAIN BYPRODUCTS

- \* Iron Ore.
- \* Barite.
- \* Clay.
- \* B.F. Slag.
  - Air Cooled Slag.
  - Water Cooled Slag.
  - Foamed Slag.
  - Granulated Slag .
  - Slag Wool.
- \* B.O.F. Slag.
- \* Foundry Pig Iron.
- \* Limestone Fines.
- \* Burnt Lime.
- \* B.F. Dust.
- \* Burnt Dolomite.
- \* Hydrated Ferrous Sulphate.
- \* Ferrous Scrap.
- \* Non Ferrous Scrap (Flux).
- \* Industrial Gases .



## B - NON PRIME MATERIALS

### \* Cobbles :

Soft commercial quality with tensile strength max 50 kg/mm<sup>2</sup> stock rusty  
Width 1000 mm.  
Length 4 - 12 mm.  
Thickness 18 - 50 mm.  
As available.

### \* Hot Rolled Plates Second Grade :

Standard and nonstandard sizes

### \* Hot Rolled Coils and Strips :

Prime and secondary grade material as well as overrolled material

## C. SEMI FINISHED STEEL PRODUCTS

Materials suitable for rerolling and can also be supplied in second choice/ off grade.

\* **Ingot** : up to 4 tons, killed & Rimmed steels,

\* **Blooms**.

\* **Billets** : Hot rolled or Continuously cast .

\* **Squares**

\* **Slabs** : Continuously cast with the dimensions:

Thickness 150,170,200 and 250 mm.

Width up to 1500 mm.

Length up to 6 meters.

\* **Billets** : Continuously cast with the dimensions.

Side 130,140,150,160 and 180 mm.

Length up to 6 meters.

## D. PRODUCTS OF HOT STRIP MILL

### \* Hot Rolled Coils :

Thickness ..... : 2 - 8 mm.

Width ..... : 1020 mm.

Inner diameter : 750 mm.

### \* Hot Rolled Strips :

Thickness.... : 2.0 up to 6.35 mm.

Width..... : 72 up to 100 mm.

Inner diameter : 750 mm.



**\* Plates :**

Thickness.... : 3.0 up to 8.0 mm.  
Width..... : 1020 mm.  
Length..... : up to 6000 mm.  
Cut edges : up to 6.00 mm.

**\* Checker Plates :**

Thickness.... : 4.0 mm up to 7.0 mm.  
Width..... : 1020 mm.  
Length..... : up to 6000 mm.

## **E. PRODUCTS OF COLD STRIP MILL**

**\* Cold Rolled Coils & Strips :**

Thickness.... : 0.5 mm up to 2.5 mm.  
Width..... : 30 mm up to 1000 mm.  
Inner diameter : 500 mm.

**\* Cold Rolled Sheets :**

Thickness.... : 0.5 mm up to 2.5 mm.  
Width..... : 1000 mm.  
Length..... : up to 4000 mm.

**\* Galvanized Sheets :**

Thickness.... : 0.55 Up to 1.5 mm.  
Width..... : 1000 mm.  
Length..... : 2000 mm.

**\* Corrugated Galvanized Sheets :**

Thickness.... : 0.55 up to 1.5 mm.  
Width..... : 800 mm - 850 mm.  
Length..... : 2000 mm.

## **F. COLD FORMED SECTIONS**

- \* Equal Angles**
- \* Cold formed channels**
- \* C Section**
- \* Open box section**
- \* Hat type section**
- \* Cold formed sleepers**
- \* Z Shape section**
- \* Road Crush barriers**

Production of other forms is possible.



## **G. PRODUCTS OF SECTION MILLS**

### **Light Section Mill :**

- \* Equal angles.
- \* Re bars.
- \* Squares.

### **Medium Section Mill :**

- \* Equal angles.
- \* Channels.
- \* Bars.
- \* Rails.
- \* Squares.
- \* Clips.

### **Heavy Section Mill :**

- \* Equal angles.
- \* Bars.
- \* Rounds.
- \* Channels.
- \* I - Beams.
- \* IPE Sections.
- \* HE Sections.
- \* Sleepers.
- \* Flats.

### **Plate Mill :**

- \* Sheets and Plates.
- \*\* Dimensions and tolerances are issued in special tables.

## **H. PRODUCTS FOR RAIL WAY AUTHORITY**

- \* Rails
- \* Sleepers.
- \* Fish-Plates
- \* Clips.

# SPECIFICATIONS FOR STEELS PRODUCED AT HADISOLB

## STEELS FOR GENERAL STRUCTURAL PURPOSES

-----

### A- Grade Classification & Chemical Composition.

Steel grade	Type of deoxidation	Chemical Composition of Final Product					
		Carbon % (Max.)			P % (Max.)	S % (Max.)	N % (Max.)
		Thickness "mm"					
		up to 16 mm	over 16 mm up to 40 mm	over 100 mm			
37/2	Optional	0.21	0.25	According to the desire of the Client	0.065	0.065	0.010
37/2	Rimmed	0.21	0.25		0.065	0.065	0.009
37/2	Killed	0.19	0.19		0.060	0.060	0.010
37/3	Specialy Killed	0.19	0.19		0.050	0.050	
44/2	Killed	0.24	0.24		0.060	0.060	0.010
44/3	Specialy Killed	0.23	0.23		0.050	0.050	
52/3	Specialy Killed	0.22	0.22		0.050	0.050	
50/2	Killed	(-)	(-)		0.060	0.060	0.010
60/2	Killed	(-)	(-)		0.060	0.060	0.010
70/2	Killed	(-)	(-)		0.060	0.060	0.010

Ref : DIN 17100

EURONORM : 25

EGYPTIAN IRON & STEEL Co.



**B- Mechanical & Technological Properties.**

Steel grade	Tensile strength	Yield strength	Elongation %		Bending Test (180°)	
	"kg/mm <sup>2</sup> "	"kg/mm <sup>2</sup> " min.	L = 5d <sub>0</sub> min.	Position of specimen	Thickness of specimen	Position of specimen
33	30	19	18 16	Longitudinal Transverse	3.0 a 3.5 a	Longitudinal Transverse
U 37/2	35 - 48	24	26	Longitudinal	1 a	Longitudinal
R 37/2			24	Transverse	2 a	Transverse
37/3						1 a 1.5 a
R 44/2	42 - 55	28	22	Longitudinal	2.5 a	Longitudinal
44/3			20	Transverse	3 a	Transverse
52/3	50 - 64	36	22 20	Longitudinal Transverse	2.5 a 3 a	Longitudinal Transverse
59/2			30	20 18	Longitudinal Transverse	— —
60/2	58 - 72	34	16 14	Longitudinal Transverse	— —	— —
70/2			37	11 10	Longitudinal Transverse	— —

Ref : DIN 17100/1980

EURONORM : 25/72



## STEELS FOR HOT ROLLED COILS FOR COLD REDUCTION

Steel grade	Type of oxidation	C (Max.)	Mn (Max.)	P (Max.)	S (Max.)
St 22	Optional	0.10	0.45	0.035	0.035
St 23	Special Killed	0.10	0.45	0.030	0.030
St 24	Special Killed	0.08	0.40	0.025	0.025

Ref : DIN 1614/ 1984.

## STEELS FOR COLD ROLLED SHEETS AND STRIPS

grade	according to DIN.	C	Si	P	S	Mn	Strength		Elongation % Min.	Bending
							Yield. kg/mm <sup>2</sup>	Tensile kg/mm <sup>2</sup>		
General purpose	1003	0.15	0.15	0.06	0.06	0.20-0.60	Unlimited	28-50	Unlimited	180°
Drawing quality	1203	0.10	0.10	0.05	0.05	0.20-0.50	28	28-42	28	180°
Deep drawing quality	1302	0.10	0.10	0.04	0.04	0.20-0.50	26	28-38	34	180°
Extra deep drawing quality	1403	0.08	0.08	0.04	0.04	0.20-0.45	24	28-36	36	180°

Ref : DIN 1623/1981

EGYPTIAN STANDARD 1110/1971.

ISO 3574/76.

EURONORM : 130/77

EGYPTIAN IRON & STEEL Co.





## STEELS FOR REINFORCING BARS

### A - Chemical Composition of Steel Grades (Cast Analysis)

	max.	max.	max.
24/35 , 28/45	0.25	0.055	0.055
36/52 , 40/60	0.40	0.055	0.055

### B- Mechanical Properties

Grade	Strength min Kg/mm <sup>2</sup>	Strength min Kg/mm <sup>2</sup>	min %	Diameter mm	Mandrel Diameter
24/35	24	35	20	≤ 25	2d
				> 25	3d
28/45	28	45	18	≤ 25	2d
				> 25	3d
36/52	36	52	12	≤ 20	4d
				> 20 ≤ 36	5d
				> 36	--
40/60	40	60	10	≤ 20	4d
				> 20 ≤ 25	5d
				> 25 ≤ 36	6d
				> 36	--



**CORRESPONDING EQUIVALENT DIN DESIGNATION TO BSEN 10025/1990**

BSEN 10025 / 1990			DIN 17100 / 1980	
Designation according to Eu 25/ 1972	Type of deoxidation (1)	Sub group (2)	Steel grade	Type of deoxidation (3)
Fe 310 - 0	Opt.	—	St 33	Opt.
Fe 360 B	Opt.	BS	St 37-2	Opt.
Fe 360 B	FU	BS	U St 37-2	U
Fe 360 B	FN	BS	R St 37-2	R
Fe 360 D2	FF	QS	St 37-3 U	RR
Fe 360 D1	FF	QS	St 37-3 N	RR
Fe 360C	FN	QS	—	—
Fe 430 B	FN	BS	St 44-2	R
Fe 430 D2	FF	QS	St 44-3 U	RR
Fe 430 D1	FF	QS	St 44-3 N	RR
Fe 430 C	FN	QS	—	—
Fe 510 D2	FF	QS	St 52-3 U	—
Fe 510 D1	FF	QS	St 52-3 N	RR
Fe 510 B	FN	BS	—	RR
Fe 510 C	FN	QS	—	—
Fe 510 DD1	FF	QS	—	—
Fe 510 DD2	FF	QS	—	—
Fe 490 - 2	FN	BS	St 50-2	R
Fe 590 - 2	FN	BS	St 60-2	R
Fe 690 - 2	FN	BS	St 70-2	R

- (1) FU = Rimming steel, FN = Rimming steel not permitted  
 FF = Fully killed steel "Minimum 0.02 % Al or other element"  
 (2) BS = Base steel, QS = Quality steel.  
 (3) U = Rimming steel, R = Killed steel "including semi killed steel"  
 RR = Special killed steel.



COMPARISON WITH SOME INTERNATIONAL STANDARDS

DIN	ISO	EURONORM
1013	1035/1, DIS 1035/4	60
1014	1035/2, DIS 1035/4	59
1015	1035/4	61
1016	3573, 3576, 4995, 4996, 5951, 5952, 6316, 6317	48, 51, 112
1025	DP 657/10, DIS 657/6, 657/11, 657/15, 657/16	19,24,34,44,53,54
1026	657/11, 657/13	24,54
1028	DIS 657/1, 657/2	56
1029	DIS 657/2, DP 657/5	57
1541	3574, 4997, 5001	131
1543	7452	29
1614	3573, 3576, 6317	111
1623	3574, 4997, 5001, 6316	130
17100	630, 1052, 6316	25





DAIWA IRON & STEEL CO.

