CORPORACION VENEZOLANA DE GUAYANA

FERROMINERA ORINOCO

Project: Construction of the Second Line of Pellets Plant CVG Ferrominera Orinoco C.A. (FMO)

Gobierno Bolivariano de Venezuela | Ministerio del Poder Popular para Industrias y Producción Nacional

Proyecto: **Construcción de la Segunda Línea de Planta de Pellas de CVG Ferrominera Orinoco C.A.**

Project Synopsis

Entities Guvernment	CVG Ferrominera Orinoco C.A. Ministry of Popular Power of Industries and Domestic Production		
Contractor Company	China Metallurgical Group Corporation (MCC).		
Objective	Produce 3,000,000 tons of pellets which means revenue from product sales in order of $500,000,000 a year.		
Reach	This production will allow added value to the iron ore guaranteeing 100% of the raw material for the steel sector of domestic merchandise		
Contract Amount		Contract	
Funding Source	Long-Term Large Volume Fund	General Physical Advancement	76,51%
Start Date	20/07/2012	Financial Advancement	
Completion Date	25/01/2022	Current Situation	No Significant Progress

Gobierno Bolivariano de Venezuela | Ministerio del Poder Popular para Industrias y Producción Nacional

Proyecto: **Construcción de la Segunda Línea de Planta de Pellas de CVG Ferrominera Orinoco C.A.**

PROJECT PHYSICAL PROGRESS SUMMARY 76.51%

ID	DESCRIPTION	ADVANCE (%)	OBSERVATION
000	Temporary Facilities	100	Slope to run of the 2LPP.
000	General	80	
110	Mineral Reception	0	Pending completion of works of all buildings.
120	Mineral Recovery	30	
130	Additive Recovery	25	
211	Dosing Building	62	The Purchase and Installation of refractory coating has not been made
213	Sleeve Filter	0	
214	Dryer	76	
215	Control Room	69	
220	Grinding	59	No wiring and connection of any equipment to the rooms.
410	Material Dosage	52	
430	Mixing and Transporting	30	
511	Pelletization Building	22	
520	Return of Green Pellets	43	
611	Mobile Grill Building	58	The Central Control Program has not been received to be installed in the PLC.
620	Pellets Burner	58	
631	Annular Cooler Building	66	
641	Pellets Screening Room	0	Instrumentation of any equipment has not been installed.
642	Tower Transfers No. 6	51	

Proyecto: **Construcción de la Segunda Línea de Planta de Pellas de CVG Ferrominera Orinoco C.A.**

PROJECT PHYSICAL PROGRESS SUMMARY 76.51%

ID	DESCRIPTION	ADVANCE (%)	OBSERVATION
643	Screening Galleries	16	EMR Natural Gas Station Missing (Equipment and Construction).
711	Pellets Stacker		
712	Transfer Tower No. 9	62	
714	Galleries Stacking Products	70	Main Sub-Station 115Kv has an oil leak to be repaired and do not have Input connections 115Kv. Missing Bar Transfer from Bay 4.
720	Products Dispacth	41	
800	Waste Recovery	42	
820	Green Pellets	36	
830	Sludge	45	
A10	Fresh Water	52	Electric Room No. 2 has no input bar duct. The grounding resistors of the transformers are missing.
A20	Process Water	12	
A30	Drinking Water	28	
A40	Waste Water	37	
A60	Compressed Air Instruments	19	The grinding bodies are missing for the two (2) mills.
A70	Nitrogen and Natural Gas	0	
A90	Civil Works and Pipe Way	96	Installation of several Dust Collectors is missing.
B00	Main Sub-Station 115 Kv	76	

ID	DESCRIPTION	ADVANCE (%)	OBSERVATION
B20	Emergency Electric Generator	0	Electrostatic Precipitators have not been installed.
C10	Electrical Rooms	49	
C20	Electric Room No. 2	41	
C30	Electric Room No. 3	52	Finishes of all floor buildings are missing.
C40	Electric Room No. 4	53	
C50	Electric Room No. 5	28	
C60	Electric Room No. 6	13	Internal road and secondary equipment installation missing. Pumps, Compressors, Hydraulic Motors, Fans.
C70	Electric Room No. 7	38	
C80	Electric Room No. 8	29	
C90	Electric Room No. 9	21	
100	Infrastructure	26	
	Test without Full Load	0	The Construction of the oil warehouse is lacking.
	Load Test	0	Plant lightning rod installation is missing.
	Spare Parts 1 Year Operation	0	
	Training	0	
	EMR Natural Gas Station	0	Many plant pipes need to be completed: water, gas, lubrication. The Installation of the fire system must be completed. Central Control Room equipment has not been installed.
	Central Control Program	0	

CORPORACION VENEZOLANA DE GUAYANA

CONSTRUCTION OF THE SECOND LINE OF PELLETS IN THE CURRENT PLANT OF FERROMINERA ORINOCO, C.A.

FERROMINERA ORINOCO

OTHER PENDING ACTIVITIES

- Excavation and placement of EF-19 prefabricated foundations. FINE ORE BATTERY
- Assembly of structural elements of conveyor belt 012-BC02.
- Excavation of bases for conveyor belt on the north axis.
- Assembling, form working and emptying of conveyor bases on the north axis.
- Placing recuperator rails 012-RR01
- Welding of ducts of the dust handling system.021-BF02.
- Placing bolts on fan 021-FN09.
- Installation of structural elements of conveyor belt 021-BC03.
- Excavation for perimeter sidewalk and EDIF ramp.
- Floor slab assembly TRANSFER TOWER No. 5
- Formwork and emptying of pelletizing disc base grout, level +6,40. EDIF. PELETIZATION
- Conveyor belt installation 051.BC.05.
- Placement of reinforcing steel for floor.
- Fan Alignment (062.FN01) ROTATORY OVEN.
- Completion of the scope of the contract (completion of works, training, and testing)

Project: Renewal of the First Pellets Line
CVG Ferrominera Orinoco C.A. (FMO)

CORPORACION VENEZOLANA DE GUAYANA

Ferrominera Orinoco C.A.

FERROMINERA ORINOCO

Project Synopsis

Entities Government	CVG Ferrominera Orinoco C.A. Ministry of Popular Power of Industries and Domestic Production		
Contractor Company	Undefined		
Objective	Increase and sustain estimated production by 2,700,000 tons of Pellets per year.		
Reach	Adapt the different areas that make up the First Line of Pellets. In this sense, it is important to mention that line I of Pellets Plant, presents numerous complications for the achievement of production, such as greater damage at the equipment level: hardening and lack of spare parts for the rest of the areas, which decreases the availability and reliability of the plant. Therefore, the execution of the corresponding annual scheduled maintenance stops since 2008, as stated above, has led to pronounced wear and tear of all its equipment and structures. In this regard, it is important to mention that since 2015 there has been a stop plan, however, the passing of time and non-execution of these, have led to the scope of repairs being resized in successive opportunities.		
Funding Source	Undefined	General Physical Advancement	
Start Date	Undefined	Financial Advancement	

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Proyecto: **Renovación Equipos Primera Línea de Pellas de CVG Ferrominera Orinoco C.A.**

Flujograma Planta de Pellas

PELLETS PLANT - LINE I:

- **DESIGNER:** KOBE STEEL LTD. (KSL)
- **TECHNOLOGY:** Grill Oven Process (Allis Chalmers)
- **INVESTMENT:** 380 millions dollars
- **START OF OPERATION:** october of 1994.
- **NOMINAL CAPACITY:** 3,3 millions tons/year, 330 days of operation. Equivalent to 10.000 t/day.
- **PLANT DESIGN DATA:** Silica's expected rank: 0,5 ~ 1,2%.

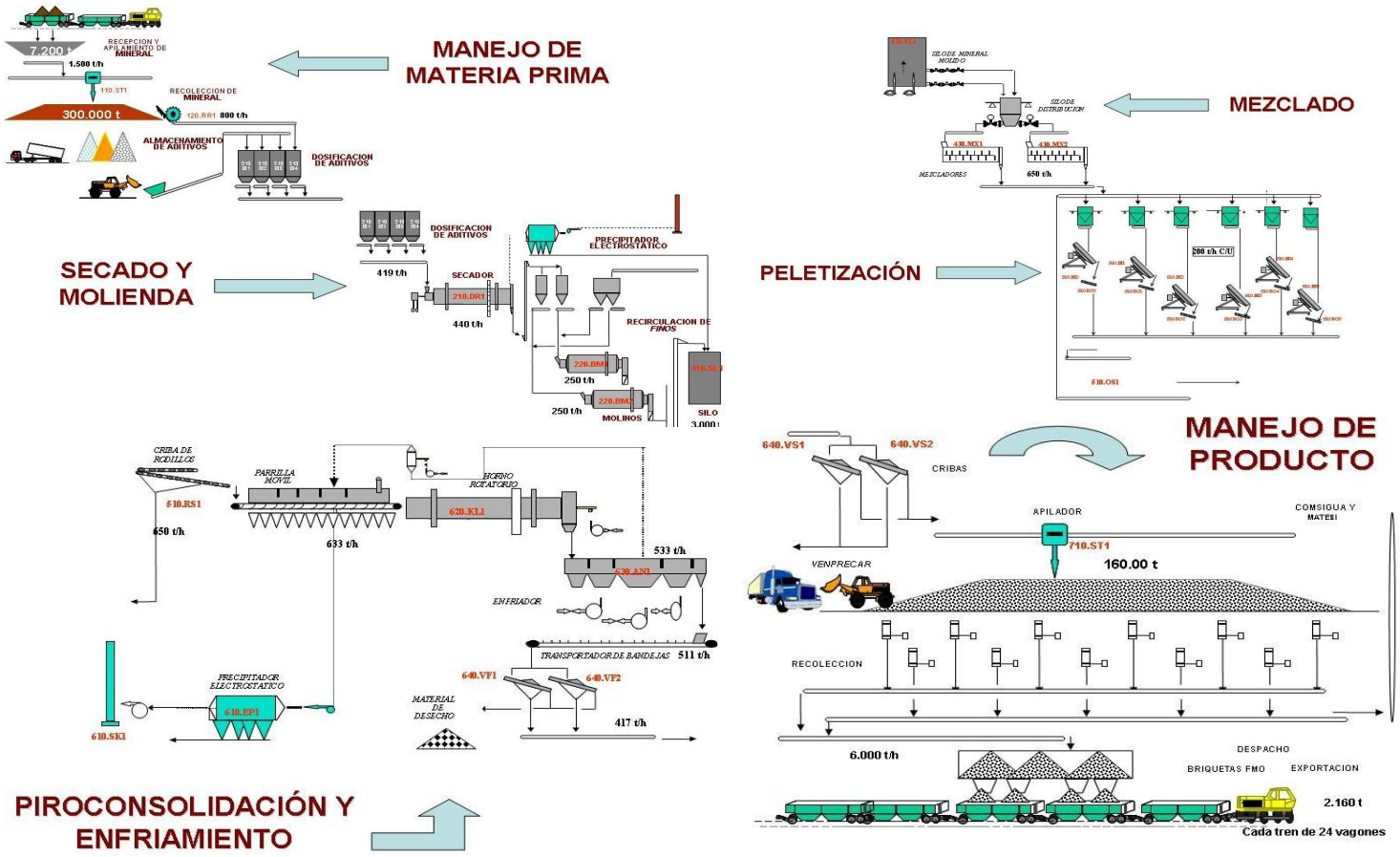
INSTALLED CAPACITY EXPANSION – LINE I

- **DESIGN:** KOBE STEEL LTD. (KSL)
- **INVESTMENT:** 20,8 millones de dólares
- **START OF OPERATION:** january of 2008
- **NOMINAL CAPACITY:** 4,0 millions tons/year, 330 days of operation. Equivalent to 12.000 t/day.

Proyecto: **Renovación Equipos Primera Línea de Pellas de CVG Ferrominera Orinoco C.A.**

Flujograma Planta de Pellas

GENERAL FLOWCHART OF THE PELLETS PLANT PRODUCTION PROCESS



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Proyecto: **Renovación Equipos Primera Línea de Pellas de CVG Ferrominera Orinoco C.A.**

Detalle de Actividades

INCREASE AND SUSTAIN ESTIMATED PRODUCTION BY 2,700,000 TONS OF PELLETS PER YEAR		
AREA	**DESCRIPTION OF SYSTEM TO NORMALIZE**	**TECHNICAL SPECIFICATION REQUESTED**
AREA 100 **RECEPTION AND STACKING OF RAW MATERIAL**	RECEPTION PIT	ACQUISITION AND TECHNOLOGICAL ADEQUACY OF THE MINERAL RECEPTION PIT. MANUFACTURE ACQUISITION AND INSTALLATION OF EQUIPMENT AND MATERIALS TO STANDARDIZE SHRINK SYSTEMS RECONSTRUCTION OF THE WALK OF THE UNLOADING AREA OF THE WAGONS ACQUISITION AND INSTALLATION AIR CANNONS IN THE CENTRAL HOPPERS.
	DEFLECTING FEEDER	INCREASE OF THE CAPACITY AND TECHNOLOGICAL FITNESS OF THE PLOWS IN A RANGE OF 1100 t/h to 1500 t/h ADAPTING THE DIMENSIONS OF THE EQUIPMENT TO THE CURRENT HOPPER
	MINERAL STACKER	THE ACQUISITION AND INSTALLATION OF A NEW ORE STACKER SHOULD BE CONSIDERED RADIO COMMUNICATION WITH THE CONTROL ROOM INCLUDE LANE RAILS
	SLEEVE FILTER	ACQUISITION AND INSTALLATION OF DUST COLLECTORS TO ACTIVATE 110BF1/2
	SAMPLER	ACQUISITION AND INSTALLATION OF A SAMPLER
	MINERAL RECOVERY	ACQUISITION AND INSTALLATION OF A NEW ORE RECUPERATOR SHOULD BE CONTEMPLATED RADIO COMMUNICATION WITH THE CONTROL ROOM
	TRANSFER CART	INSTALLATION OF A NEW TRANSFER CART, ADAPTED TO THE CART
	ADDITIVE HOPPER	MODERNIZATION AND COMMISSIONING OF THE ADDITIVE INDICATION SYSTEM _REPOWER OF ADDITIVE LOAD CHUTE AND TRANSPORT
	MAGNETIC SEPARATOR	ACQUISITION AND INSTALLATION OF THE MAGNETIC SEPARATOR.
	FOUR-WAY GATE	MODERNIZATION AND CHANGE OF THE ORE GATE DRIVE SYSTEM.

Detalle de Actividades

CORPORACION VENEZOLANA DE GUAYANA

rominera Orinoco C.A.

F M

INCREASE AND SUSTAIN ESTIMATED PRODUCTION BY 2,700,000 TONS OF PELLETS PER YEAR

AREA 200 DRYING AND GRINDING	ROTARY DRYER	ACQUISITION AND INSTALLATION OF A ROTARY DRYER WITH NEW TECHNOLOGY SHOULD BE CONTEMPLATED TWO-YEAR SPARE PARTS START-UP DISASSEMBLY OF THE DRYER IN EXISTING PELLETS PLANT
	DUST COLLECTOR	PERFORM MODERNIZATION OF THE DUST COLLECTOR SYSTEM IN THE DRYING AREA.
	HOIST	ACQUISITION AND INSTALLATION OF HOIST.
	MAIN ENGINES	MAINTENANCE SERVICE TO MAIN ENGINES.
	ARTICULATED BAND FEEDER WITH BALANCE	REPOWERING THE MINERAL AND ADDITIVE DOSING SYSTEM TO THE DRYER ACQUISITION AND INSTALLATION OF THE DOSING SYSTEM TO MILLS WITH NEW TECHNOLOGY
	ANTI-CONTAMINANT SYSTEM	ACQUISITION AND INSTALLATION OF THE NECESSARY COMPONENTS TO INCREASE THE SUCTION CAPACITY IN THE SLEEVE FILTER.
	BALL MILL	MODERNIZATION OF THE FAN CONTROL SYSTEM ACQUISITION AND INSTALLATION OF COMPONENTS FOR BALL MILLS ROTATOR ON THE LOADING, UNLOADING, CROWNING SIDE LUBRICATION SYSTEM, INTERNAL SHIELDING PURCHASE OF SPARE PARTS
AREA 400 MIXED	MIXER	–
	BLOWER	UPDATE OR MODERNIZE BLOWER SYSTEMS.
		ACQUISITION AND INSTALLATION OF MIXERS WITH NEW TECHNOLOGY AND DUST TREATMENT SYSTEMS

Detalle de Actividades

rominera Orinoco C.A.

CORPORACION VENEZOLANA DE GUAYANA

INCREASE AND SUSTAIN ESTIMATED PRODUCTION BY 2,700,000 TONS OF PELLETS PER YEAR

F M

AREA 500 PELLETIZING	SCREENING OF ROLLERS AND PELLETIZING DISCS	ACQUISITION AND INSTALLATION OF CRIBA METAL DESIGN 7 PURCHASE OF SPARE PARTS REPOWERING PELLETIZING DISCS.
	MOBILE GRILL	ACQUISITION AND INSTALLATION OF COMPONENTS AND SPARE PARTS TO REPOWER THE MOBILE GRID
AREA 600 HARDENING AND COOLING	ROTARY OVEN	ACQUISITION AND INSTALLATION OF COMPONENTS AND SPARE PARTS TO REPLACE THE ROTARY FURNACE
	ANNULAR COOLER	ACQUISITION AND INSTALLATION OF COMPONENTS AND SPARE PARTS FOR THE COOLER
ÁREA 700 STACKING	STACKER	ACQUISITION AND INSTALLATION OF A NEW ORE STACKER SHOULD BE CONTEMPLATED RADIO COMMUNICATION WITH THE CONTROL ROOM INCLUDE LANE RAILS
PRODUCT	SAMPLER	SERVICE FOR THE ACQUISITION AND INSTALLATION OF A SAMPLER
	SLEEVE FILTER	MODERNIZE OR ADAPT THE DUST COLLECTOR SYSTEM
AREA 800	WATER PUMP	ACQUISITION AND INSTALLATION OF EQUIPMENT SYSTEMS FROM PROCESS SYSTEMS
	SEWAGE TREATMENT PLANT	RECOVER THE SYSTEM
AREA 1300	INDUSTRIAL AIR COMPRESSORS	ACQUISITION AND CHANGE OF 3 INDUSTRIAL AIR COMPRESSORS
	AIR COMPRESSOR INCLUDED AIR DRYER	ACQUISITION AND CHANGE OF 1 INSTRUMENTATION AIR COMPRESSORS.

Proyecto: **Renovación Equipos Primera Línea de Pellas de CVG Ferrominera Orinoco C.A.**

Detalle de Actividades

INCREASE AND SUSTAIN ESTIMATED PRODUCTION BY 2,700,000 TONS OF PELLETS PER YEAR		
AREA 1400		MODERNIZATION AND CONDITIONING SERVICE OF THE FIRE CONTROL SYSTEM.
GENERAL	MUD SYSTEM PUMPS	ACQUISITION AND INSTALLATIONS OF MUD AND SINK SYSTEM PUMPS. ACQUISITION AND CHANGE OF MUD PIPES
	CONVEYOR TAPES.	PURCHASE OF ROLLERS AND REPLACEMENT TAPES.
CONTROL AND POWER SYSTEM	CONTROL	UPDATING THE PLANT CONTROL SYSTEM AND INSTALLING THE RE-CONSTRUCTION. ACQUISITION AND INSTALLATION FOR THE ADEQUACY OF LOCAL PELLETIZATION (BLP) AND HARDENING PANELS (KLP).
	VIDEO SYSTEM FOR PROCESS CONTROL	SUPPLY, MANUFACTURE AND COMMISSIONING OF VIDEO SYSTEMS FOR PROCESS CONTROL
	POWER BOXES AND UPS	PERFORM A PROCESS OF MODERNIZATION AND UPDATING OF THE DIFFERENT COMPONENTS OF MEDIUM AND HIGH VOLTAGE MEASUREMENT SYSTEMS, FOR THEIR RECOVERY
	MOTORS	ACQUISITION OF HIGH, MEDIUM AND LOW VOLTAGE ELECTRIC MOTORS.
	SCALES	SUPPLY OF EQUIPMENT FOR ADEQUACY SYSTEMS OF LOAD CELLS FOR AREA 500 WEIGHERS
INFRASTRUCTURE	ELECTRIC ROOMS	NORMALIZE THE CONDITIONS OF ELECTRICAL ROOMS. NORMALIZE VENTILATION AND AIR EXTRACTION SYSTEMS FROM BASEMENTS, BUILDINGS AND GALLERIES OF THE PLANT.
	COMPRESSOR ROOM	NORMALIZE AND CONDITION THE COMPRESSOR ROOM - CONSTRUCTION OF THE NEW THICKENER TANK DRAIN NETWORK. CONSTRUCTION OF DISCHARGE FOR THE LAGOON OF SEDIMENTATION IN MAIN CHANNEL. SUPPLY, MANUFACTURE AND ASSEMBLY OF LOAD ELEVATOR FOR MOBILE GRILL. RECONSTRUCTION OF BASES AND STRUCTURES OF TORRES SUPPORTS OF THE PLANT TAPES.

Proyecto: **Renovación Equipos Primera Línea de Pellas de CVG Ferrominera Orinoco C.A.**

Detalle de Actividades

INCREASE AND SUSTAIN ESTIMATED PRODUCTION BY 2,700,000 TONS OF PELLETS PER YEAR		
AREA	**DESCRIPTION OF SYSTEM TO NORMALIZE**	**TECHNICAL SPECIFICATION REQUESTED**
FANS	NON-PROCESS FANS MEDIUM AND LARGE COMPLETE	RECOVERY AND ACQUISITION OF SPARE PARTS FROM NON-PROCESS FANS
	FULL SMALL NON-PROCESS FANS	ACQUISITION AND INSTALLATION OF EQUIPMENT AND SPARE PARTS OF NON-PROCESS FANS
	PROCESS FANS	ACQUISITION AND INSTALLATION OF EQUIPMENT AND SPARE PARTS OF AREA 600 PROCESS FANS
SECURITY	INTERCOM SYSTEM ON THE PLANT	

PRODUCT SHEET

PRODUCT:	BRIQUETTE
TRADE NAME:	HOT BRIQUETTED IRON (HBI) A
SCIENTIFIC NAME:	DIRECT REDUCED IRON (A)-BRIQUETTES HOT-MOULDED(HBI)
SECTOR:	IRON STEEL
TARIFF CODE:	7203.10.00.00
TARIFF DESCRIPTION:	Ferrous products obtained by direct reduction of iron ore
PRODUCT PRESENTATION:	Briquette (iron pad) with the following dimensions: 102 x 51 x 25.4
HANDLING UNIT (PACKING AND PACKAGING):	TONS
PRODUCT DATA SHEET (DETAILED INFORMATION/ CHARACTERISTICS/COMPOSITION/ PROPERTIES)	**Matesi, Materiales Siderúrgicos, S.A.** **Quality** **Laboratory** **Briquette Quality Specifications** **Product: Direct Reduction Iron (A) Hot Molded Briquettes**

Chemical Analysis

Analysis	Specifications Esp.	Max	Min
Fe (Total)	-	-	89
Fe (Metal)	-	-	82,5
Coal (C)	-	-	0,8
Ganga	-		-
Total	-	6,5	-
Fósforo (P)	-	0,130	-
Azufre (S)	-	0,040	-
Humedad		0,5	

Size Distribution

Mesh	Specifications Esp.	Max	Min
<6,35 mm	-	5	-
>6.35 mm	-	-	95

Physical Analysis

Analysis	Specifications Esp.	Max	Min
Ap. density (g/m3)	-	-	5,00
	-	-	0,5
Weight Size (mm)	**102x51x25.4**		

Date of Analysis	June 24, 2020
PRODUCT IMAGE:	
PRODUCING, MARKETING AND EXPORTING COMPANIES	MATESI, MATERIALES SIDERURGICOS, S.A. (PRODUCER)
RIF	G-20011311-1
PRODUCTION/STORAGE/EXPORT CAPACITY	PRODUCTION CAPACITY 1,500,000 MT PER YEAR

DRI (A) Technical Profile COMSIGUA

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COMSIGUA

REDUCTION PROCESS

Midrex is an iron making process, developed for the production of direct reduced iron (DRI). It is a gas-based shaft furnace process is a solid state reduction process which reduces iron ore pellets or lump ore into DRI without their melting using reducing gas generally formed from natural gas.

PRODUCT SPECIFICATIONS

Características Químicas (Chemical Characteristics)

Descripción (Description)	Unidad (Unit)	Especificación (Specification)
Fe Total (ISO 2597/Covenin 1237)	%	90,00 min.
Fe Metallic (ISO 16878)	%	85,00 min.
Carbón (Carbon) (ISO 9686)	%	0,80 min.
Azufre (Sulfur) (ISO 9686)	%	0,010 max.
Fósforo (Phosphorus) (ISO 4687/Covenin 1686)	%	0,135 max.
Ganga (Gangue) (SiO_2+Al_2O_3+CaO+MgO)	%	6,65 max.

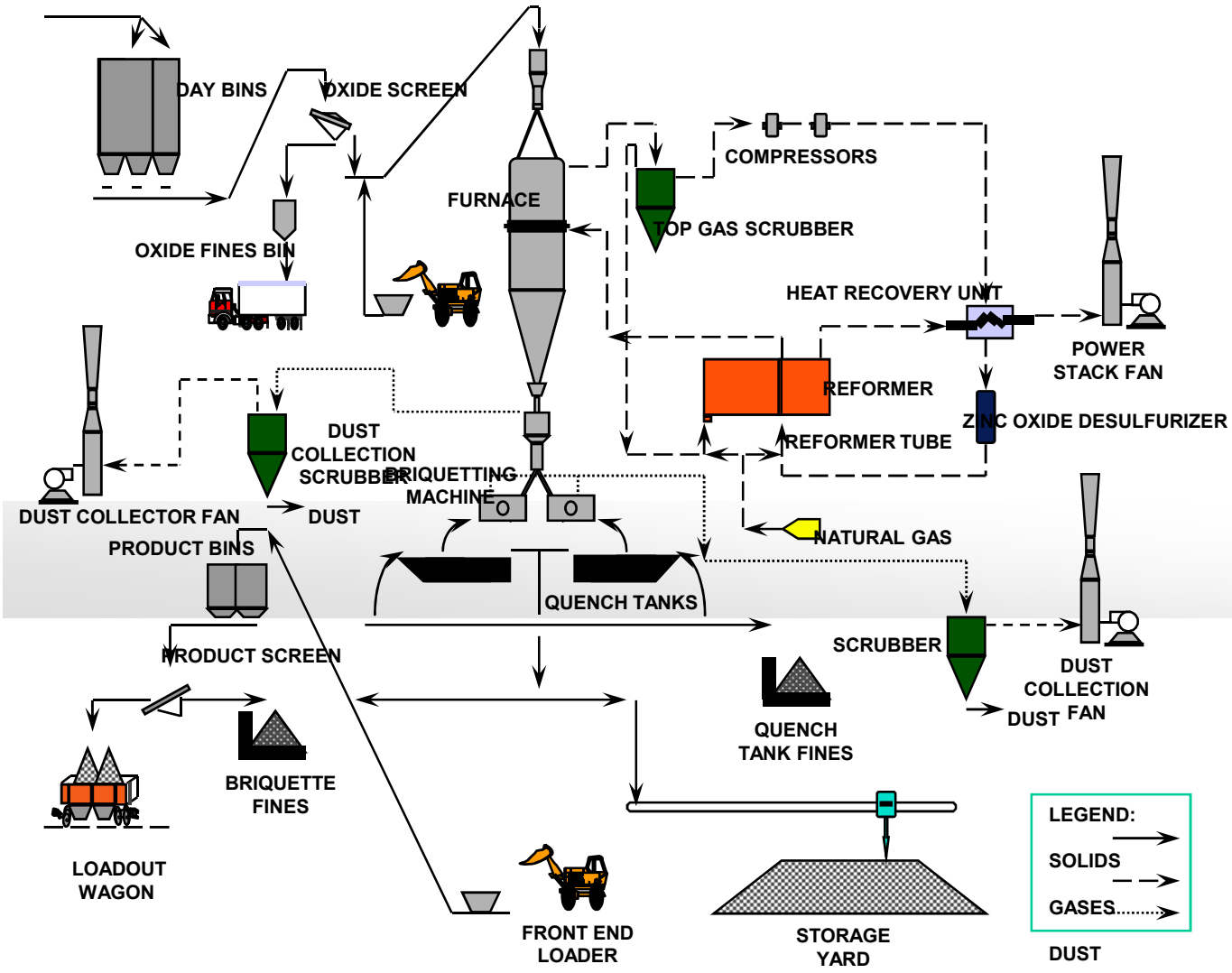
Características Físicas (Physical Characteristics)

Descripción (Description)	Unidad (Unit)	Especificación (Specification)
Densidad a Granel (Bulk Density)	gr/cm^3	2,50 - 2,80
Densidad Aparente (Apparent Density)	gr/cm^3	5,00 min.
Tamaño Nominal (Nominal DRI (A) Size)	mm	110 x 50 x 30 (Piezas rotas son aceptables) (Broken Pieces are acceptables)
Distribución Granulométrica (Size Distribution) < 6,35 mm	%	5,00 max.

Hot Briquetted Iron (HBI)

HBI is the preferred DRI product for the merchant metallics market because it is much denser than CDRI, which reduces the reoxidation rate. This enables HBI to be stored and transported without special precautions under the International Maritime Organization (IMO) code for shipping solid bulk cargoes. It can be used in the EAF, BF, and BOF. HBI is made by compressing DRI discharged from the MIDREX® Shaft Furnace at ≥ 650° C into pillow-shaped briquettes witha typical size of 30 x 50 x 110 mm and a density ≥ 5 gm/cc. No binder is used to make HBI.

DRI (A)
COMSIGUA PROCESS FLOW



TECHNICAL TAB

PRODUCT:

DIRECT REDUCTION IRON (A) BRIQUETTES, HOT MOLDED

SPECIFICATIONS:

CHEMICAL SPECIFICATIONS

Parameters	% P/P
Total Iron (FeT)	89,60 Mín.
Metallic Iron (Fe°)	84,70 Mín.
Carbon (C)	0,80 Mín.
Phosphorus (P)	0,130
Máx. Sulfur (S)	0,010
Máx. Bargain (SiO_2+Al_2O_3+CaO+MgO)	6,50 Máx.

PHYSICAL SPECIFICATIONS

Parameters	
Size	108 mm x 48 mm x 32 mm Broken briquettes are acceptable
Weight	0,5 – 0,7 kg
Apparent Density	≥ 5,00 g/cm^3
Bulk Density	2,40 – 2,80 t/m^3.
Particle Size Distribution:	
> 6,35 mm	95,0 % (p/p) Mín.
< 6,35 mm	5,0 % (p/p) Máx.
Moisture	0,50 % (p/p) Máx.

DESCRIPTION

It is a metallic grey material, molded in the form of briquettes, resulting from a densification process wherein the iron feed matter obtained by direct reduction is molded to a temperature above 650oC and whose density is greater than 5.00 g/cm^3.

USES

Alternative source of metal for steel and blast manufacturing processes in electric arc furnaces, converters, and blast furnaces.

June 2020