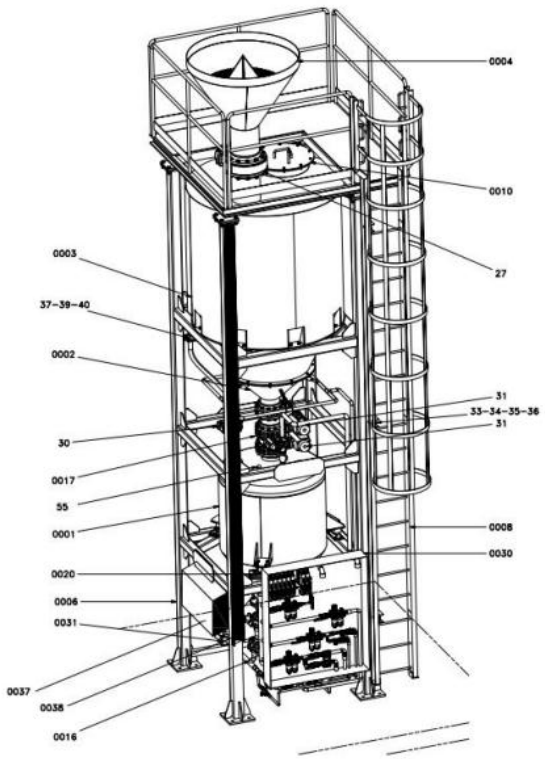
Automated Carbon & Oxygen Injection System for EAF

GENERAL SUPPLY ASPECTS

1. General Description:

The scope of works covers the supply and installation of a One Set of Carbon & Oxygen Injection System for Electric Arc Furnace.
We offers a Carbon & Oxygen Injection System that has been designed to meet the demanding requirements of the EAF process for the improvement of metallurgical process. The system uses closed loop control with real-time carbon flow rate feedback to provide the exact carbon flow rate that is requested at any time. The use of dispenser, with precise flow-rate control for each injector, allows efficient injections of carbon fines generates chemical energy by the combustion of C to CO in the liquid bath, and retain it in the slag/steel.
The foamed slag that transfers and distributes the chemical energy generated over the entire liquid steel surface. The capacity of the carbon injection system shall be able to sustain with the flow rates and quantities requirements of one carbon lance during at least an entire heat. Consequently we propose the supply of dispensers with 1500 liters capacity. The powder fines could be stored into storage silos. The dispenser should be installed as close as possible to the EAF, in the event that is not feasible, and it is necessary to move away from the furnace area, the maximum linear distance should not exceed 80 meters.
The process of filling the powder fines is automatically controlled by pneumatic on / off fail safe valves and level limit switch. The fines enter to the conveying pipeline, from the dispenser lower exits and transfer the mixture of fines and compressed air to the carbon lance. Our injection system runs trouble free operation with good quality and proper sizing of the powder fines. The equipments shall be equipped with Moisture removing system of the fine to remove the moist from the air that cause problem in maintenance with solenoids and valves and clogging of injection lines.
We will supply the piping basic engineering and the components to be installed in the fines transportation line from the dispenser to the injectors.



Advantages:

- Self-support steel frame for the Injector.
- Skid cabinet for compressed air.
- Complete Electrical cabinet fixed on dispenser Steel frame for ease of operation.
- Ceramic valve rating 4-20 mA for precise flow of fines.
- Air regulating valve rating 4-20 mA for easy air transportation.
- VORTEX meter is equipped for optimized consumption of air.
- Fast fines flow rate stabilization.
- The connections between the dispenser and pneumatic skid are made by flexible hose lines.
- Equipped with moisture removing system to avoid clogging of valve.

Scope of Supply:

The scope of supply comprises design, engineering, manufacture, quality control, Erection, Commissioning, Acceptance testing, training of operators, for Carbon Injection System. The steel structural works is included in our scope of supply.

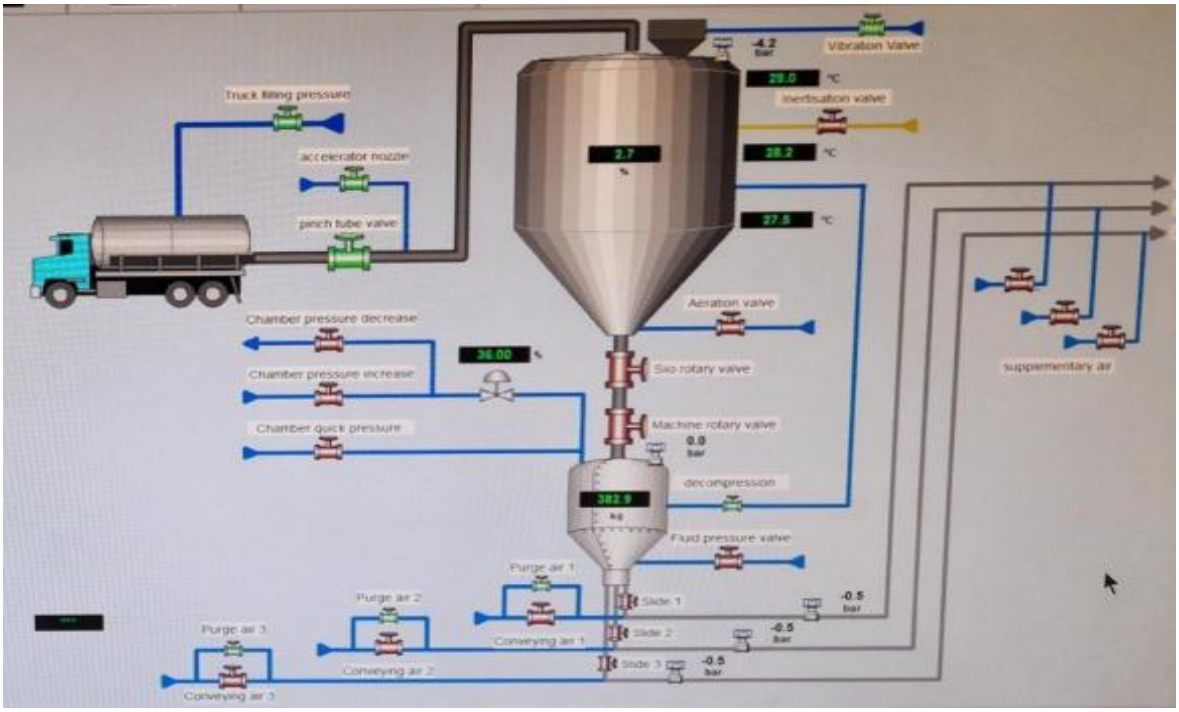
Operating Conditions
Description of mechanical equipment:

All mechanical equipment of the unit is based upon the following conditions:
Liquid steel production per year --- ton tap to tap.
Use of Scrap - 20 % + Cold DRI 80%
Cold DRI - 100 % + Scrap 0%
Heat size EAF – 65Ton

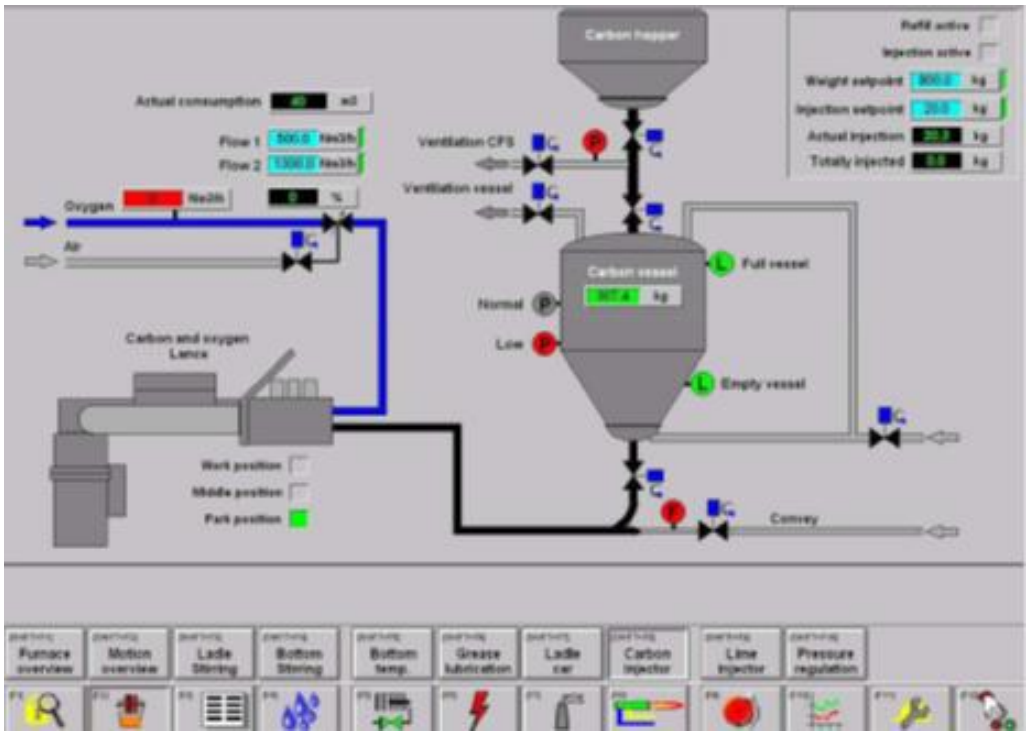
General Process Description:
- Technical Specifications & Scope (Annexure - I).
- Prices (Annexure – II).
- Terms & Conditions (Annexure – III)

2. TECHNICAL PARAMETERS

1	Carbon Injection unit	1 set	
1.1	Pressure tank	1 set	$2m^3$
1.2	Weighing unit	3 pcs.	PAVONE
1.3	Wear resistant ceramic hose	1 set	DN50 8.5m+2.5m
1.4	Pressure transmitter	3 pcs.	Wiki
1.5	Dispenser	1 set	With PID diagram
1.6	Pneumatic bleeding ball valve	1 pc.	DN50
1.7	Manual butterfly valve	1 pc.	DN200
1.9	Pneumatic butterfly valve	1 pc.	DN200
1.10	Flexible hose	1 pc.	DN200
1.11	Bottom valve block	1 set	
a	Manual ball valve	1 pc.	DN50, Nanjing Jilei
b	Pneumatic ball valve	1 pc.	DN50, Nanjing Jilei
c	Regulating valve (wear resistant alloy)	1 pc.	DN25, FISHER
d	Injector	1 pc.	Fabricated part



1	Pneumatic control pane	1 set	
1.1	Protective box	1 set	
1.2	Flow meter	1 pc.	DN25, 40m^3/h, E+H
1.3	Regulating valve	1 pc.	FISHER
1.4	Pneumatic valve	4 pcs.	With PID diagram, Nanjing Jilei



1	Electrical control part	1 set	
1.1	Slave station communication panel	1 set	Profibus
1.2	Carbon spraying local operation panel	1 set	Profibus
1.3	Console	1 set	In control room

COMBUSTION SYSTEM

Valvle Stand OXYGEN/N2 VALVE STAND Oxygen/N2 valve stand, DN125 PN40 main input. Header with manual and on-off ball valves, ½" by-pass circuit, pressure gauge, temper. trasmitter, pressure trasmitter, manual vent valve. 4 output lines for supersonic lances DN65, 100÷ 1500 Nm^3/h flowrate. 4 output lines for burners DN50, 100÷700 Nm^3/h flowrate. Each line is provided with: manual ball valve, on-off ball valve, Vortex flowmeter, control valve with digital positioner, by-pass (only for supersonic lances lines) of control valve with on-off ball valve and needle valve, Nitrogen purging input, manual vent ball valve with limit switches. Nitrogen DN50 PN16 header with ball valve, pressure gauge, pressure switch. Each fluxing line has: manual ball valve, on-off ball valve, needle valve, check valve. Instrument Air is taken from Nirtrogen; 1 filter regulator to supply control valves and 1 f.r. for on-off valves. Each on-off valve is provided with box with limit switches Electric construction for safe area. Junction box with remote I/O cards SIEMENS ET200 SP) Approximate dimensions cm 420x110x230(h).