Metallurgical equipment. Steelmaking equipment. After-furnace ladle treatment

VACUUM DEGASSING UNIT

Steel vacuum treatment in the ladle with application of argon blow (VD process) allows performing almost all processes for steel refining such as degassing, deoxidation, desulphurization, removal of non-metallic inclusions per one treatment cycle. This technology is of great significance as it is the only process that can accomplish two tasks in one operation, namely degassing and desulphurization of steel. In such case due to intense interchange of matters “metal-slag”, the desulphurization is performed in parallel with actual vacuum treatment. The main advantage of this system comparatively with others is more compact design, low capital investment and low operating expenses during down time.

During steel making with extra low content of carbon (VOD process) the relationship between carbon oxidizing reaction equilibrium and pressure is used. Adjustable oxygen lance is firmly mounted in the middle of vacuum chamber cover to perform oxidation during steel vacuum treatment in the ladle. Necessary precondition for oxidation in vacuum is steel agitation with argon as intensity of carbon oxide buildup at its low temperature is not sufficient to agitate the melt for all metal volume carry-over to the surface of reaction and for equalization of composition and temperature throughout the height of the ladle. VD or VOD process is controlled from operating desk where all major parameters are registered and form where all mechanisms are controlled by means of operating device.

Metallurgical equipment. Steelmaking equipment.
After-furnace ladle treatment

VACUUM DEGASSING UNIT

ADVANTAGES OF STEEL VACUUM TREATMENT IN THE LADLE (CHAMBER VACUUM DEGASSING)

- effective degassing is obtained by means of more intensive argon blow through bottom blow-off elements;
- effective deoxidation is realized by means of non-metallic inclusions absorption by refinery slag;
- on application of small amount of refinery slag the desulphurization degree can make 85...97% at sulphur initial level of 0,3...0,035%;
- efficient operation in intermittent mode without additional energy consumption in intervals;
- vacuum vessel do not have a contact with liquid steel;
- special refractory for lining is not required;
- preheating of the mechanisms is not required;
- possibility to operate within different time periods.

Achieved performances

Parameter	Value
Vacuum level, mbr	0,67
Vacuum buildup time, min	до 5
Processing	VD/VOD
Assurance of final working pressure in hollow vacuum chamber, mm Hg	0,35…0,5
System leakproofness, (leakage), kg/h	< 16

Technical characteristic

Parameter	Value
Ladle capacity,t	30/40/60/90
Type of vacuum pump according to productivity	ПЭВН 300х0,5
Number of stepping points	5
Negative pressure, mm of mercury column	0,5
Time for vacuum buildup	5
Type of unit	VD-VOD
Steam consumption, t/h	11,8
Content reduction, ppm: - S - N2 - H2	 < 20 < 35 < 1,5