

Vacuum Systems for Steel Degassing

In steel production, raw steel is refined through secondary metallurgical processes. In these processes, vacuum is needed to degas and decarburize the melt, in addition to creating optimal conditions for desulfurization and removal of inclusions. KARAJET, being the first and only manufacturer of multi-stage ejector vacuum packages in Iran, with more than 27 years of experience has provided more than 50 vacuum systems for numerous satisfied customers.

A laboratory-scale 5-stage steam ejector vacuum system has been installed in the factory workshop for steel manufacturers to visit. This vacuum system can create vacuums as low as 0.3 millibars.

RH

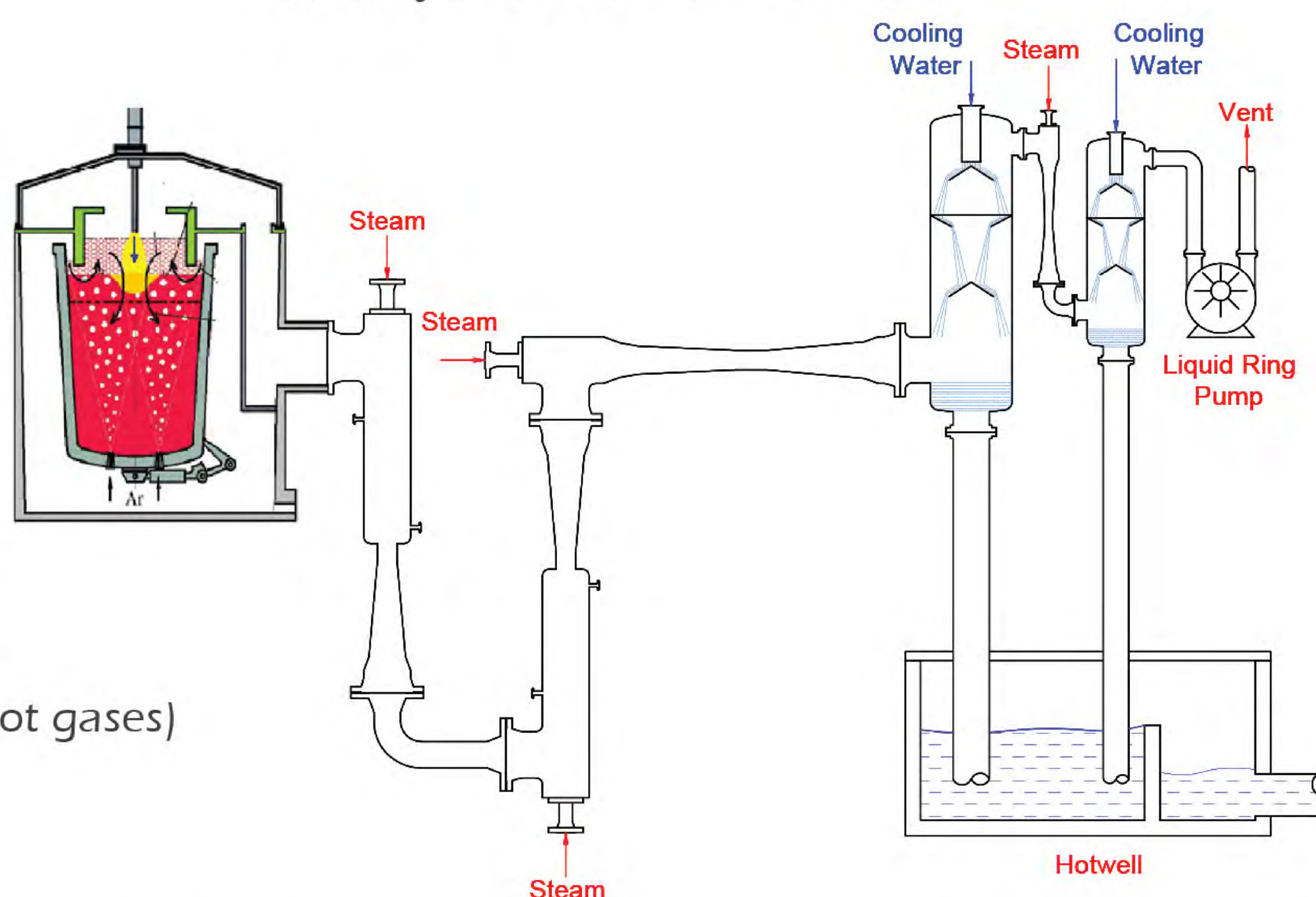
The Ruhrstahl-Heraeus (RH) degasser is the most widely used vacuum decarburization unit in secondary steelmaking processes, including the production of ultra-low carbon steel grades. These facilities process steels in ladle sizes of over 400 tonnes and require much larger pumping capacities, reaching up to 1,000,000 m³/hr or more.

VD/VOD

Steel degassing in tanks or in the ladle involves two basic processes: Vacuum Degassing (VD) for alloy steels; Vacuum Oxygen Decarburising (VOD) for stainless steels; and combinations of both treatments for low and ultra-low carbon steel grades. During treatment, the liquid steel ladle is placed in a stationary or movable vacuum tank.

Ejectors Vs. Dry Pumps

- Lower initial cost
- Less maintenance required
- Higher durability
- Higher capacity
- Less sensitive to dust
- Ability to install an automatic washing system
- No pre-cooling needed (ejectors can transport hot gases)



KARAJET Vacuum Systems

The vacuum suction flow rate of steam ejector vacuum systems are measured by dry air equivalent (DAE) flow rate in standard condition. The suction and vacuum flow rates of KARAJET vacuum system for steel VD process are presented in the table below. The following vacuum systems have four steam ejectors along with a liquid ring pump (LRP). Therefore, vacuum system main electrical power consumers are liquid ring and cooling water pumps (CWP).

Vacuum system suction flow			Motive Steam		Cooling water			Electrical Power Consumers
Dry Air Equivalent (kg/hr)	Temperature (°C)	Pressure (mbara)	Pressure (barg)	Consumption (kg/hr)	Inlet temperature (°C)	Outlet temperature (°C)	Volume Flow (m ³ /hr)	
30	20	0.67	7	860	30	38	51	LRP+CWP
70	20	0.67	7	1780	30	38	105	LRP+CWP
113	20	0.67	7	2800	30	38	165	LRP+CWP
158	20	0.67	7	3910	30	38	231	LRP+CWP
226	20	0.67	7	5100	30	38	301	LRP+CWP

