Satec Limited
The Street, Englefield, Theale
Berkshire RG7 5ES - U.K.
Tel: +44 (0)1189 649 006
Fax: +44 (0)1189 640 074
Web:www.satec.co.uk

Treatment Systems for Process Water

Engineered Systems: Boiler Feedwater Deaerator

Case History: Jannsen, Eire

Background

Satec designed and supplied a 20 Tonne/Hour Boiler Feedwater Deaerator for Jannsen API3 in Cork, Eire. The deaerator combines the function of feed water heating and feed water surge and storage with the primary function of deaeration. In water, the presence of dissolved gases, oxygen, and carbon dioxide in particular, causes accelerated corrosion, especially at elevated temperatures such as are encountered in boilers and heat exchange equipment. It is the main purpose of the deaerator to prevent this corrosion by removing the dissolved gases from all sources of water entering the boilers.

Complete heating of boiler feed water is accomplished by direct contact between the water and the steam. As in all heat transfer applications, contact surface and duration of contact are important and are provided by sprays and atomisation.

Rendering the gases insoluble by heating to the boiling point does not of itself eliminate the gas from the mass of water. In order to escape from the mass of water the gas must diffuse through the surface film surrounding the particle of water. Through atomisation by the incoming steam and maintenance of a pure steam atmosphere by venting causes rapid diffusion and elimination of the gas.

Design Parameters

• Condensate Return	:	4,000 kg/hour @ 90ºC
• Make-up Water @ 2.0 Bar G	:	13,554 Kg/Hour, 10 ºC Max. Operation 800 Kg/Hour, 10 ºC Min. Operation
• Saturated Steam Supply	:	9 Bar G
• 100% dry and saturated including vent	:	1,500 Kg/Hour
• Normal Minimum	:	400 Kg/Hour
• Maximum Overflow	:	16,000 Kg/Hour
• Relief Valve Discharge Set @ 2 Bar G	:	1,962 Kg/Hour
• Feed Water Outlet @ 0.21 Bar G	:	16,000 Kg/Hour, 105 ºC
• Vent Steam	:	54 Kg/Hour Nominal

Equipment Installed

Deaerator	:	20 tonne/hour deaerator, 2146mm diameter x 6078mm tan/tan with a storage volume between normal operating levels of 16 m³. Unit complete with all control valves, instrumentation and safety valves
Steam Control Valve	:	North Vale Korting globe valve, spring and diaphragm actuator with electro magnetic positioner, input signal 4-20 mA d.c; output signal 3-15 PSIG

Satec Limited
The Street, Englefield, Theale
Berkshire RG7 5ES - U.K.
Tel: +44 (0)1189 649 006
Fax: +44 (0)1189 640 074
Web:www.satec.co.uk

Water Control Valve	:	North Vale Korting globe valve, spring and diaphragm actuator with electro magnetic positioner, input signal 4-20 mA d.c; output signal 3-15 PSIG
Overflow Valve	:	Aquamatic diaphragm valve 427 FDV with 3/2 – USV pilot solenoid valve
Pressure Relief Valve	:	TC Klinger full lift valve with pressure set to 2 bar g to pass 2,744 kg/hour
Vacuum Breaker	:	Spirax Sarco, type DCV1-Gun Metal Body
Liquid Level Gauge	:	TC Klinger Magnetic level gauge complete with transmitter 4-20 mA
Gauge Isolation Valves	:	TC Klinger ball valves with 25 PN16 Flanges
Pressure Transmitter	:	Endress & Hauser, type Cerabar with measuring range of 0 – 400 mbar g
Dual Loop Controller	:	Eurotherm model 2704 controller; 4-20 mA input / output with four alarm points.
Pressure Gauge	:	Star Instruments 150mm bourdon tube gauge with a range of 0 – 2.5 bar g
Temperature Gauge	:	Star Instruments 160mm dial bimetal thermometer coaxidal pattern with a range of 0 – 160 ºC
Vent Valve	:	Ogley ½" ball valve screwed BSP(F)