

Steam Generation, Waste Heat and Condensate Recovery Level and Flow Applications



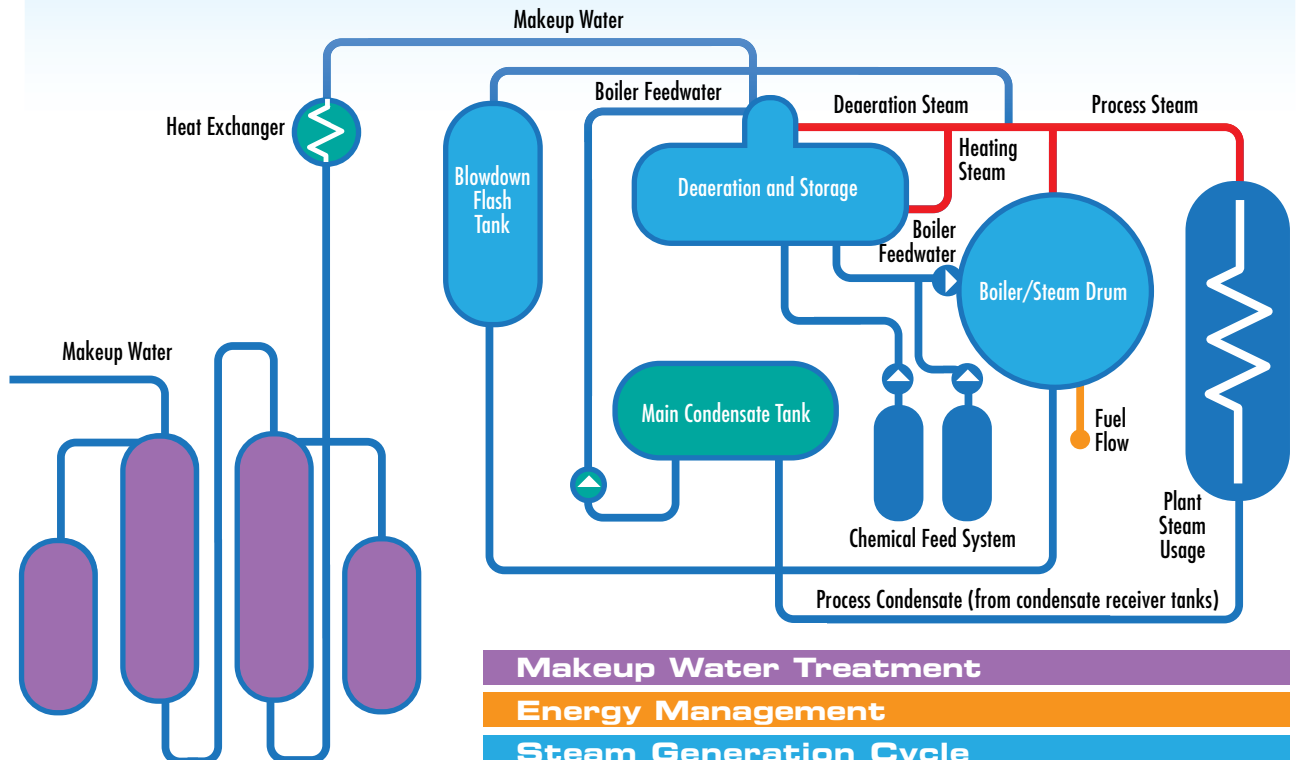
A Special Applications Bulletin to Optimize the Steam Generation Process for Profit

Steam generation is a core operating function in many industries including pulp and paper, chemicals, petroleum refining and food processing. Companies in these markets rely on Magnetrol® as a trusted instrumentation partner who can improve operational efficiency and total cost of ownership.

We are experts in the application of high-performance level and flow control solutions for power generation. We can help you optimize your steam generation processes – and your bottom line.



Steam Generation and Condensate Recovery System



Makeup Water Treatment

Energy Management

Steam Generation Cycle

- Boiler/Steam Drum
- Deaerator
- Blowdown Flash Tank & Blowdown Tank

Condensate & Waste Heat Recovery

- Condensate Receiver Tank & Main Condensate Tank
- Condensate Pumps & Associated Valves
- Shell & Tube Heat Exchangers/Condensers

MAKEUP WATER TREATMENT



Level instrumentation for chemical storage monitoring should resist chemical attack, remain unaffected by changes in the vapor space and provide performance verification and visibility during product transfer.

- **Continuous Level:** Eclipse® Model 706 Guided Wave Radar Transmitter, Pulsar® Model R86 Non-Contact Radar Transmitter, Echotel® Model 355 Ultrasonic Non-Contact Switch, Jupiter® Magnetostrictive Transmitter
- **Point Level:** Model T20 Single-Stage Float Level Switch, Echotel® Model 961/962 Ultrasonic Contact Switch
- **Visual Indication:** Aurora® Magnetic Level Indicator

ENERGY MANAGEMENT



Effective flow control technology can optimize air-to-fuel ratio, manage energy consumption by monitoring fuel gas flow and prevent wasted electricity by detecting compressed air leaks.

- **Flow Measurement:** Thermo® Model TA2 Thermal Mass Flow Meter

STEAM GENERATION



Boiler/Steam Drum

Efficient separation of water and steam in the boiler or steam drum is critical to steam quality and operational profitability. Fluctuations in demand have dramatic effects on instrumentation performance, due to “shrink” and “swell” caused by pressure changes.

Continuous Level: ECLIPSE Model 706 Guided Wave Radar Transmitter with a 7YS Steam Probe

Point Level: Model B40 Float-Actuated or Series 3 External Caged Switches

Visual Indication: Atlas™ or Aurora® Magnetic Level Indicators can be supplied with switches or transmitters



Deaerator

The deaerator removes impurities (oxygen and other corrosive gases) from feed water and leverages steam to preheat feed water prior to boiler entry. Accurate, reliable measurement ensures sufficient supply of feed water for the boiler.

Continuous Level: ECLIPSE Model 706 Guided Wave Radar Transmitter with a 7YS Steam Probe

Point Level: Model B35 External Caged Float-Actuated Switch, ASME B31.1 Construction

Visual Indication: ATLAS or AURORA Magnetic Level Indicators can be supplied with switches or transmitters



Blowdown Flash Tank & Blowdown Tank

Continuous or manual blowdown of the boiler minimizes scaling and corrosion caused by water impurities and also facilitates heat and energy recovery through the use of flash steam. Effective level control technology at the boiler side eliminates energy losses from unnecessary blowdown to prevent false carryover conditions.

BLOWDOWN TANK:

Continuous Level: ECLIPSE Model 706 Guided Wave Radar Transmitter with a 7YS Steam Probe, E3 Modulevel® Displacer-Actuated Transmitter

FLASH TANK:

Continuous Level: ECLIPSE Model 706 Guided Wave Radar Transmitter with a 7YS Steam Probe

Point Level: Model B40 Float-Actuated Sealed Caged Switch

Visual Indication: ATLAS or AURORA Magnetic Level Indicators can be supplied with switches or transmitters



49%

Up to an estimated 49% of energy can be recovered through the use of flash steam routed to heat exchangers or the deaerator, to preheat boiler makeup water or support the deaeration process, respectively.



CONDENSATE & WASTE HEAT RECOVERY



Condensate Receiver Tank & Main Condensate Tank

Level control of condensate tanks is critical to optimize condensate and waste heat recovery, as well as protect hardware.

Continuous Level: ECLIPSE Model 706 Guided Wave Radar Transmitter, or JUPITER Magnetostrictive Transmitter

Point Level: ECHOTEL Model 961 Single Point Ultrasonic Level Switch, or Series 75 Sealed External Caged Float-Actuated Level Switch, or Model B40 External Caged Float-Actuated Level Switch

Visual Indication: ATLAS or AURORA Magnetic Level Indicators can be supplied with switches or transmitters



Condensate Pumps & Associated Valves

Level/flow control plays the important role of protecting condensate pumps from dead head, run out, overheating and cavitation.

- **Flow Detection:** THERMATEL TD1/TD2 Thermal Dispersion Flow/Level/Interface Switch

Shell & Tube Heat Exchangers/Condensers

Shell and tube heat exchanger/condenser allows what would otherwise be waste energy to be recovered in the form of flash steam from the receiver tank to preheat makeup water or other process fluids through the heat of condensation.

- **Continuous Level:** ECLIPSE Model 706 Guided Wave Radar Transmitter

- **Point Level:** Series 3 Sealed External Caged Float Actuated Level Switch

- **Visual Indication:** AURORA Magnetic Level Indicator



\$244K

*Conservatively, the effects of poor level and flow control performance on the condensate recovery system can cost from **\$78K** to **\$244K** annually in hidden maintenance expenses.*

**Contact the power generation experts
at Magnetrol® International for best-in-class
level and flow control.**



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