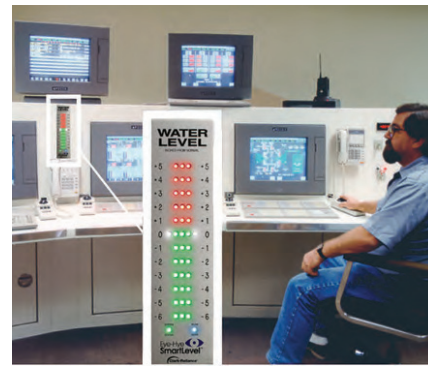
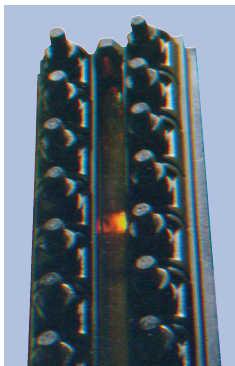


# INSPECTION GUIDELINES FOR DRUM LEVEL INSTRUMENTATION ON WATER TUBE BOILERS

Per Pressure Equipment Directive (PED) – Reference: EN 12952-7



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# Boiler Inspection Guidelines for Drum Level Instrumentation

Water Level Indicators (Refer to EN 12952-7, Par: 5.4.1):

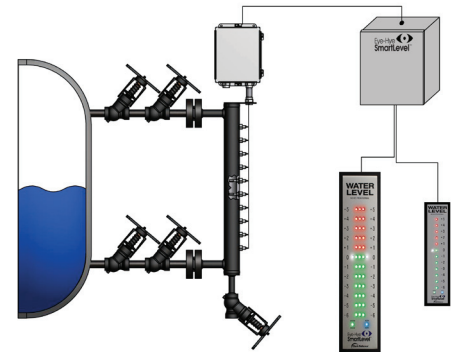
- One Water Gage Glass and any of the following:
  - \* Two Electronic Level Indication Instruments
  - \* A Level Controller that indicates level
  - \* A Limiter that indicates level

Instrument Piping from the boiler drum to Instrumentation (Refer to 5.4.2):

- The connecting piping must be > 20 mm inside diameter
- If multiple instruments use common piping the minimum inside diameter must be > 40 mm
- The steam piping installation must NOT accumulate condensate
- The water piping installation is to be horizontal or sloped downward toward the boiler to prevent a sediment trap

Lowest permissible water level “LWL” must be marked on the gage glass (Refer to 5.4.4):

- The lowest indicating limit must be at least 30 mm below the LWL



Electronic Level Indication System

Note: This image shows double isolation valves. This is a user option.

# Boiler Inspection Guidelines for Drum Level Instrumentation

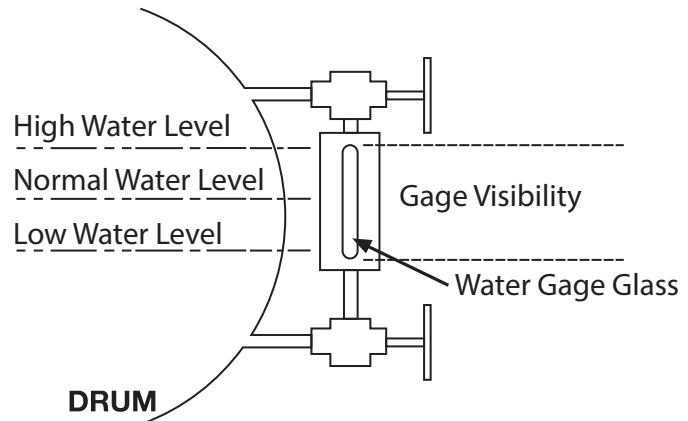
Valves (cocks) must be installed on Water Level Indicators for isolation and blow-down (drain). The open position shall be indicated. (Refer to Section 5.4.3)

During operation the following must be met:

- The actual water level must be in the indication range of the instrument (Refer to 5.4.6)
- The level gage glass must be designed to prevent excessive leakage in case of breakage, use isolation valves with Ball Checks to comply (Refer to 5.4.7)
- Blow down systems on water level indicators, controllers, and limiters must be installed
- Blow down operations shall be detectable to the operator (Refer to 5.4.8)
- If isolation valves are fitted on the piping to a limiter, an interlock system must be installed to shut off the heat supply, when the valves are not fully open.

Instruments required to protect against low water:

- An appropriate limiter shall interrupt and lock out the heat supply if a water shortage is detected (Refer to 5.5.1)
- The lowest setting is equal to the lowest permissible water level
- Piping requirements are the same as Water Level Indicators



## RECOMMENDATIONS

The following are not required by the PED but are suggested for safe and reliable operation:

1. Chain Operators should always be used to provide a safe means of operating gage glass isolation valves under normal conditions and in the event of glass leakage.
2. A conductivity probe system combined with a 4-20 mA transmitter, or, two conductivity probe systems provide the best reliability due to the redundancy of probe systems. The use of two or three differential pressure transmitters (redundant devices) is not recommended due to the likelihood of simultaneous common mode failure due to environmental variations (especially freeze-up) or loss of device sensing leg primes. Consider Guided Wave Radar Instruments as an alternative to differential pressure transmitters for fine resolution measurement of the water level.
3. A Magnetic Level Gage is not to be used to replace the required gage glass.
4. Transparent gage glass illumination should be provided to give optimum viewing of the drum level, especially in low lit areas and when the transparent gage is elevated above the viewing platform.
5. Bi-color ported type water gage glasses that display the water as green and the steam as red must be fitted with illumination for proper visual discrimination between water and steam.
6. Freeze protection for outdoor applications should be provided to prevent damage to the level instrumentation devices.
7. Exposed piping to the gage glass, or level indicating instruments, should be insulated to minimize any level density error due to cooling and condensate formation. Insulation also provides protection for plant personnel.

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