THE USE OF GLASS WATER GAUGES IN THE SAFE OPERATION OF BOILERS

Shortage of water is the greatest single factor contributing to damage and accidents with boilers.

Glass water gauges are compulsory fittings to provide a positive indication of the water level in the boiler. The operation of a boiler with water gauges which are not in correct working order constitutes a serious hazard to personnel and property.

To ensure the correct functioning of water gauges it is necessary to test them regularly and correctly. This should be recognized by all persons concerned in the operation of boilers, both operating personnel and management.

The correct testing of water gauges is not a difficult procedure and should be carried out at least once in every shift.

The adjoining figure illustrates a typical water gauge fitting; with the handles of the cocks in the position shown (pointing vertically down) the steam and water cocks are open to the boiler and the drain cock is in the closed position. The reason for requiring the steam and water cock handles to be vertically down when the cocks are open is to prevent the cocks accidentally closing themselves through lack of slackness or vibration, which would occur if the handles were horizontal. Similarly, the drain cock would tend to open if the handle were horizontal.

To test the water gauge correctly proceed as follows:

1. Open drain cock. This allows steam and water to pass out via the drain pipe.
2. Shut water cock (leaving drain cock open). With the steam cock open, steam only passes out of the drain pipe.
3. Shut steam cock. With the steam cock and the water cock shut any blow at the drain indicates a faulty cock.
4. Open water cock (with the drain cock still open). Water only passes out of the drain pipe.
5. Open steam cock and close drain cock. The blow should cease and the water should return smartly in the glass.

N.B. During the test a faulty cock, by continuing to blow when shut, may hide a blockage at the other end of the gauge.

If there is not a free open blow when testing the cocks or if the water does not return smartly in the glass it indicates that there is a partial blockage. If, for example, when testing as per (2) above there was not a free open blow from the drain it would indicate there was a partial blockage in the steam cock or the steam passageway to the gauge glass.

In this case shut the steam and water cocks and open the drain cock to shut off and release all pressure from the water gauge. Remove the cleaning plug and standing to one side slowly open the steam cock, pass a piece of wire (bent so that you are clear of any issuing steam) through the cock and steam passageway, thus clearing the blockage. When cleared, shut the steam cock, replace the cleaning plug and repeat the water gauge as above.

Blockage in the water cock or the water passageway is cleared by a similar procedure after removing the water and cleaning plug.

A complete blockage, either at the steam end or the water end, will result in a false reading, usually a full glass. This can be demonstrated by closing one or other cock on a gauge in service.

Momentarily closing the steam cock is useful in deciding if the water level, out of sight at the glass, is still above the water cock passageway.

When two gauges in service show different levels it is usually the highest level which is false. However leakage at the gauge results in false levels, high or low, depending on the location of the leak.

To check if a tubular glass is full or empty when no level can be seen, place the fingers at an angle behind the glass. If water is present the fingers will appear "broken", the part behind the glass showing through as though horizontal.

There have been occasions where blockage of the gauge has been caused by the gauge glass being too long or too short. In such cases it is necessary to replace the gauge glass with one of correct length.

If the glass is too long it will prevent probing with wire to clear the steam passageway and may be blocked by contact with the access plug.

When tightening the glands on a glass of correct length tighten the water end gland nut first, holding the glass down on the seat in the water cock to prevent the glass rising. Continue to hold the glass down while tightening the steam end and gland as an added precaution.

Should the glass be allowed to rise there are two risks of blockage. The first is by the end of the glass coming into contact with the underside of the access plug. The second is by the water end gland packing being squeezed under the glass as the nut is tightened.

A short glass will allow blockage by the packing being squeezed over the end of the glass at the steam end gland, despite other precautions, when the nut is tightened.

NEVER OPERATE A GAUGE GLASS WITH THE PROTECTOR, A THREE SIDED GLASS 'BOX', REMOVED OR DISPLACED. The open side must be directed away from the attendant.

Before putting a gauge glass into service heat the glass and fittings by opening the drain cock and slightly opening the steam and water cocks. To put it into service, with your back to the gauge, close the drain cock. Then open the steam and...