Guidelines for Inspecting a Boiler

Technical Bulletin 1-006
Boiler Systems

Boiler Inspection

The purpose of a boiler inspection is to provide early warning of potential problems and determine the water treatment program’s effectiveness.

Inspection Frequency

Steam boilers should have an internal inspection a minimum of once per year. Where water quality and/or program control is poor, more frequent inspections may be necessary.

General Guidelines

All manhole and handhole covers should be removed to provide a thorough inspection. Have a working flashlight and a scraping tool, such as a knife or screwdriver, with you.

Safety Guidelines

1. Follow all plant safety rules regarding confined space entry and lock out/tag out. Use proper engineering controls and personal protective equipment.
2. Make sure all online valves that could allow steam, chemicals, and water to enter the boiler are locked and tagged out in a safe position.
3. Notify all operators and anyone that is working on the boiler before entering.
4. Be sure you have a safe air supply to the boiler. Ensure that any traces of nitrogen, amines, or any toxic fumes are evacuated. Some moisture absorbents used for dry storage may generate toxic fumes. The presence of nitrogen would only be likely if the boiler had been stored with a nitrogen blanket.
5. Never enter a boiler with a high voltage (110 Volts) light or extension cord.
6. Never inspect a boiler alone. Always have someone outside the entrance who can be signaled for help.

What to Observe

Note: take pictures and make notes on the current inspection. All observations should be compared to notes and photos of the previous inspection.

1. Point of chemical feed - is the chemical fed so it is well distributed through the boiler before it comes in contact with the blowdown pipe?
2. Continuous blowdown piping - look for corrosion or plugging of the blowdown pipe.
3. Point where the feedwater enters the boiler - if a scaling problem exists, it will probably be more noticeable where the feedwater enters the boiler. If the feedwater line has been removed or has an inspection port, look for corrosion and/or scale deposits in the line.
4. Water line - is the water line a broad band indicating an unstable water level? Does the position of the water line vary along the length of the drum indicating surging? Is the water line a safe level above the tubes? Is the water level high, decreasing the available steam space and possibly causing carryover?
5. Check the condition of baffles and screens.
6. Oxygen corrosion - if oxygen corrosion is present, is it active? Oxygen corrosion is identified by well-defined pits or a very pockmarked surface. Active pits are identified by a reddish brown oxide cap (tubercle). If the pit is active, removal of the cap exposes within the pit black iron oxide or shiny metal.
7. Scale - location? Thickness? Is it loose or hard? Composition? Color? If the amount of the deposit is considered a problem, send a sample to the lab for analysis.
8. Sludge - excessive sludge deposits could indicate hard water intrusion or insufficient bottom blowdown. Sludge baked on the top portion of tubes (firedtube boiler) could indicate insufficient cooling prior to draining the boiler.
Reports
Every inspection deserves a written report and should address corrosion, scaling, overall condition, and recommendations. All of the above observations should be noted in the Inspection Report. Reference the differences compared to the previous inspection.

![Example of an Inspection Report](image-url)

<table>
<thead>
<tr>
<th>Date Inspected:</th>
<th>Account Name:</th>
<th>Account Number:</th>
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<th>Location:</th>
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<tr>
<th>Unit Inspected:</th>
<th>Operation (Days/Year):</th>
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<thead>
<tr>
<th>Samples Collected:</th>
<th>Chemical Treatment Used (List Products):</th>
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<tbody>
<tr>
<td>Deposit</td>
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<td>Water</td>
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<td>Photos</td>
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<table>
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<tr>
<th>Observations</th>
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<tbody>
<tr>
<td>Point Of Chemical Feed</td>
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<tr>
<td>Continuous Blowdown</td>
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<tr>
<td>Point Where Feedwater Enters The Boiler</td>
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<td>Water Line</td>
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<tr>
<td>Condition Of Baffles And Screens</td>
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<tr>
<td>Oxygen Corrosion</td>
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<td>Scale</td>
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<td>Sludge</td>
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<th>Customer Signature:</th>
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Example of an Inspection Report