Serving Water Treatment Needs in Industry

The TREND

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Interpretation of Deposit Analysis

Lab News Update:

The Lab has been working through a considerable workload and we appreciate your patience. Please provide paperwork for all samples and note any special requests or time restraints on the lab request so we can properly manage the submitted samples.

Check this out!

The online catalog has been updated with several new items. This is a great resource for part numbers and pricing. Turn to the back page for more information!

Coming up next in The Trend

Field Testing and Techniques

The formation of various types of scales, sludges and deposits in industrial or commercial cooling, boiler and process systems occurs quite frequently. The presence of these types of deposits can present some serious problems. Scaling of boiler tubes can lead to tube failure. Deposits in heat exchangers lead to restricted flow and loss of system efficiency. An analytical analysis of these deposits is performed for several reasons. The results of this analysis can be used to determine how the deposit can best be removed or to determine if the deposit is the result of corrosive attack or excessive mineral concentration.

Boiler Tube Scale

CHEMTEX
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The interpretation of a deposit analysis necessitates an understanding of the various stages of the analysis and why each are performed.

A sample as received in the laboratory may contain any or all of the following:

- water
- hydrocarbon organic material (oil, grease)
- microbiological organic material (algae, bacteria, fungi)
- inorganic mineral deposits
- extraneous material

The analysis begins with a visual examination of the deposit noting physical characteristics such as color, texture, shape and form. Extraneous materials that may skew the analysis, such as weld slag or plastic material, are removed from the sample. The results of this visual inspection are noted in the top portion of the analysis as "Visual Observations".

If the deposit appears to be slime or microbiological in nature, ATP or dipslide results are recorded in the "Additional Comments" line along with any other relevant information.

All samples are dried to remove excess or entrained water. Since most deposits are water formed, this result is not reported in the analysis results. The removal of excess moisture ensures accurate Loss on Ignition and inorganic component results.

Carbonate (++)

Using a mortar and pestle, the dried sample is then crushed into a uniform sample for analysis. A small amount of sample is set aside for additional visual tests. Magnetic presence is reported if the deposit reacts with a magnet. One to two drops of 1:1 Hydrochloric are added to the deposit and the reaction is observed. The qualitative magnitude of the reaction is recorded as -, +, or ++ for Carbonate near the end of the report.

The deposit is ignited in a furnace at 850°C to determine Loss on Ignition. This procedure removes the organic material, including microbiological components, oil and grease, polymers and carbon dioxides from carbonate. This value is reports as a percent of the original sample as "Loss on Ignition" or L.O.I.

Carbonate (-)

The portion of the sample that remains after ignition is the inorganic component of the deposit, which includes calcium, magnesium, phosphate, iron, and copper. This analysis consists of a series of acid digestions on a hot plate designed to reduce the sample to a liquid form. This liquid and any remaining solid material are gravitationally filtered through an ashless filter. The filter and sediment are ignited in the furnace to remove filter weight. The weight of the remaining deposit is reported as "Acid Insoluble Material". This portion of the sample may include silica and other components that did not dissolve in the acid digestion.

The filtered portion of the deposit is diluted and analyzed by spectrophotometer. There are many inorganic compounds which may be present in the deposit. A deposit analysis will identify those components which are most common in water formed deposits as well as any other components requested or deemed necessary by the customer or the lab. These may include process or treatment components.

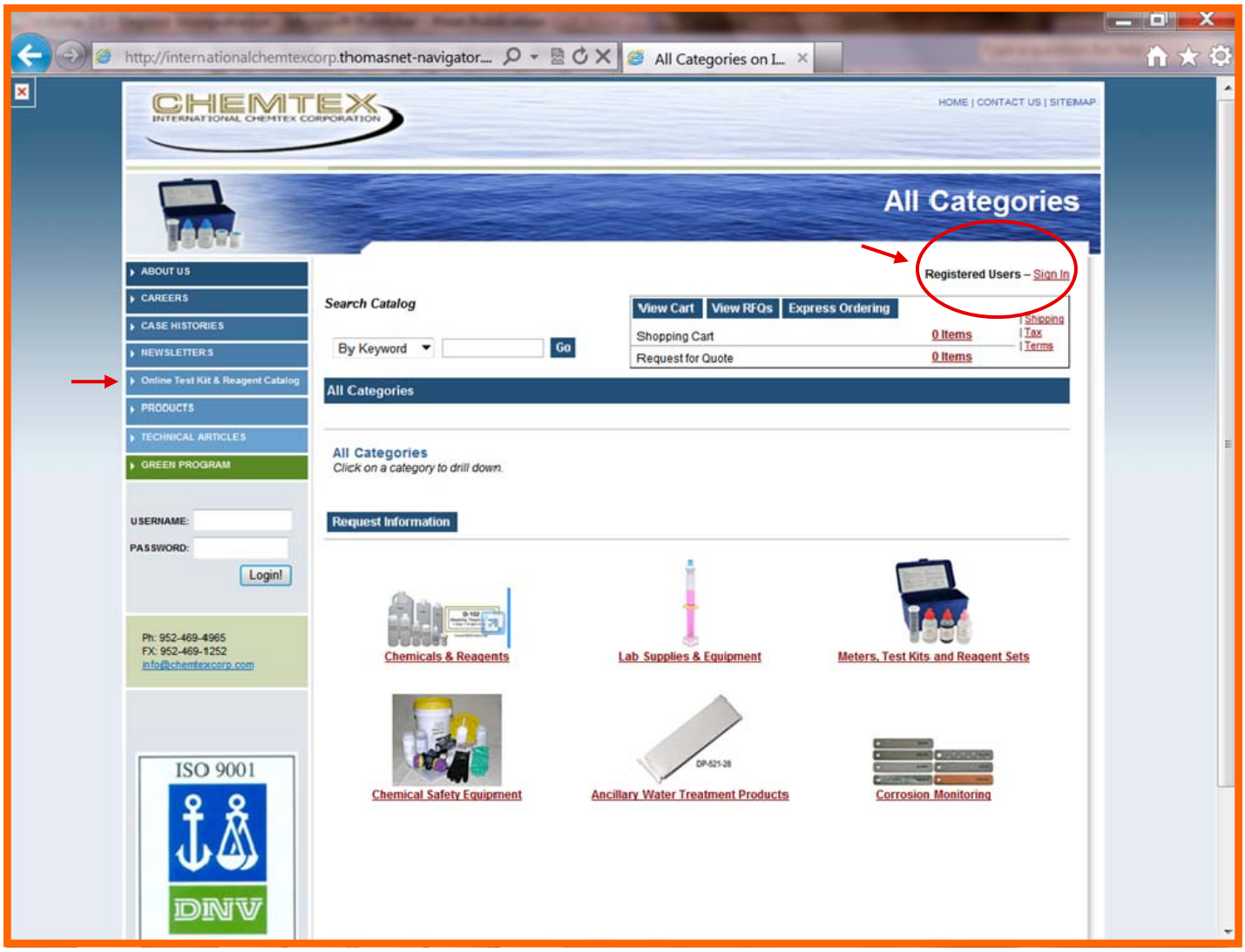
The most common type of scale deposit in cooling and boiler systems is calcium carbonate. This would be indicated by high calcium and high Loss on Ignition results on the deposit analysis along with ++ for qualitative carbonate. Other common deposits are calcium phosphate, iron oxide, magnesium silicate and calcium sulfate.

As with any laboratory analysis request, it is important to submit a sufficient sample amount for accurate analysis. A light dusting of sediment submitted in an envelope is very difficult to analyze. Ideally, a sample of 5 grams is sufficient or enough to fill a sample vial. If the lab deems there is not enough sample to perform a standard analysis, a spot test to determine the presence or absence of inorganic components may be possible.

Providing general information regarding the deposit location and chemical program treatment is helpful in determining the nature of the deposit. The Technical Department is best able to provide assistance when this information is communicated as each deposit analysis must be interpreted on an individual basis.

Lab Notes:

Winter months and freezing temperatures are approaching! When sending water samples in for analysis, be sure to leave extra room in the bottle for expansion if the water freezes. Also make sure the cap is on tightly to prevent leakage during shipment.



The Chemtex online catalog is a great resource for reagent and test equipment items! Get current pricing and place orders. Log into the catalog area (circled above) to see list prices. Contact Steph at skeck@chemtexcorp.com if you need your login information or have questions about the online catalog.