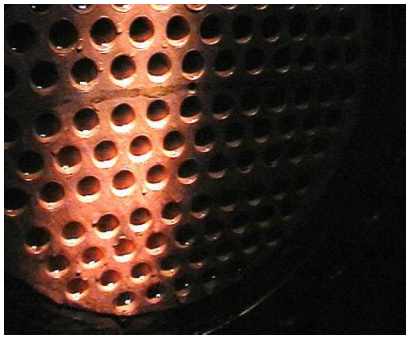
What to look for in descaling Heat Exchangers &other water-operated machinery



Water scale on any heat transfer surface reduces the effectiveness of that heat transfer. This results in reduced equipment efficiency while increasing energy consumption, increasing costs and even increasing plant downtime. Often this "buildup" problem is either ignored or relegated to "fixing it at the last minute or upon mechanical failure" status because of downtime costs. This is historically based on the premise that to descale takes a great deal of time.

Cleaning can be done either mechanically or with the use of chemicals. Mechanical cleaning obviously takes a great deal of downtime because to mechanically clean, you need to dismantle equipment. There is also the replacement of gaskets and seals adding to the cost. In addition, mechanical cleaning does not always get "all" the scale out.

Chemical cleaning can get at scale buildup not always reachable in mechanical cleaning. However, five other concerns need to be addressed with chemical cleaning:

- The corrosive effect on material (the metal, seals and gaskets) in the equipment in the system being cleaned.
- Flushing the material out after use.
- Making sure all the scale deposit is actually removed.
- Speed of the cleaning.
- Disposal of the material after use.

There are dozens of chemicals on the market that can descale. However, some can be prohibitively expensive to use in large applications, or very weak and slow so the problem of downtime still remains a major issue. It is very important that any descaler is not just an inhibited acid - many companies supply only that. But they tend to be slow, and often do not remove all the scale deposits since deposits can consist of calcium combined with rust, silica, oil, and whatever else can be in a water system. A descaling chemical should have adequate and quality detergents to remove such deposits. Inhibited acid alone will often not even touch some deposits.

Many products claim low or negligible corrosions rates but often meet that claim by simply supplying a slow, and weak, heavily diluted acid. In this case the customer is buying essentially expensive water. At the other extreme you may actually have a relatively good descaler that makes ridiculous claims of no corrosion at all. One such product that claimed no corrosion (and apparently continues to do so) once had a rather unpleasant interaction with the Ontario Ministry of Labour some years ago. So be very careful of such claims.

Having said the above, there are some good products available. A good descaler:

- Has low corrosion rates - it removes a good amount of scale but with low corrosion rates that are verifiable and does not harm seals and gaskets in a system
- Is easily rinsed out -being free rinsing, it does not need to be neutralized in the system after use because a quick flush with water will get the product out, leaving no residual (but it should still always be checked after use to make sure PH levels meet disposal standards prior to disposal in a sewer system)
- Provides good cleaning efficiency of more than just scale - there should be other ingredients to remove oil rust and loosen silica and anything else that often is mixed with the scale deposits
- Is fast to use and fast in actual cleaning - the major criteria for many companies is o minimize downtime so speed is important and any descaler must have the right mix of acids and detergents to clean scale, and anything else mixed with it quickly
- Is easy to dispose of - any spent material should be easily disposed of in a sewer system which means all ingredients must be biodegradable, corrosion rates must be low enough to avoid excess metal loss after use, and the PH after use should be above the standard for disposal and if not, easily neutralized.

One such product that is both cost effective and has proven tests to back up the claims is **Dynamic Descaler**.

One such test summary is shown below:

For this product, independent tests have been done using mussels in marine / Navy applications showing the following results:

Removal Rate of Mussel Shells:

	Dynamic Descaler	US based Competitor	Hydrochloric Acid
Time at 20ºC	2 hours	8-16 hours	Not Done
Time at 60ºC	30 minutes (100% conc.)	2.25 hours (100% conc.)	2.25 hours (15% conc.)
PH Reading	0.6	0.5	0.7

Conclusion: **Dynamic Descaler** was the most rapid of all products tested.

Furthermore the corrosion tests done on **Dynamic Descaler** at 20°C. indicated it to have the least metal loss over a 24 hour period on most of the materials tested.

Most heat exchangers and condenser tubes contain 90/10 copper-nickel or 70/30 copper-nickel. The results of an independent test, the average corrosion rate in mills per year (mpy) at standard conditions with **Dynamic Descaler** on these materials, show after 24 hours the following results which were almost 50% the rate of the nearest competitor:

Dynamic Descaler	90/10 copper nickel	14.9 average mpy
Competitor	90/10 copper nickel	25.9 average mpy
Dynamic Descaler	70/30 copper nickel	13.3 average mpy
Competitor	70/30 copper nickel	22.8 average mpy

The speed of the product should be of specific interest to maintenance and engineering personnel, especially in de-scaling large systems. The product is fast, easy to use, and cost-effective.

Dynamic Descaler is used extensively in the hot climates of Asia for example where many heat exchangers get scaled up with a relatively small amount of calcium but often a hard buildup on silica.

Dynamic Descaler has been able to clean even these difficult systems. The product manufacturer is confident that they will test against products now used and welcome any verification of test results. This is something you do not see every day and is a welcome invitation against companies that make claims without real verification.

Dynamic Descaler applications include:

- cooling towers
- all types of heat exchangers on the water side
- vacuum pumps
- water cooled machines of all sorts
- NFS approved for food industry applications
- Marine applications include ship CAC systems, heat exchangers, etc.

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