

DO YOU FEEL LUCKY?

Are you betting \$1,000,000 to save \$1,000?



A cleaned mesh mist eliminator may look like new, but our research clearly shows performance can suffer.

K KOCH-GLITSCH™

Are you gambling your plant's future by cleaning and reusing your knitted mesh mist eliminator?

Because of tightening maintenance budgets and shortened turnaround schedules, all operations engineers and maintenance planners are taking a hard look at their turnaround priorities.

Some maintenance needs are obvious—compressor vibration, corroded piping, or fouled heat exchangers cannot be ignored because they are costing your plant production capacity right now! The choices made for maintenance priorities are always a gamble, and the tradeoff is: “Pay me now or pay me later.”

When plant operators clean and reuse a knitted mesh mist eliminator to save money, they need to consider the odds. Are they betting that saving \$1,000 now will not cost them compressor damage, plugged or corroded equipment, or loss of capacity that could cost the plant \$1,000,000, or more, before the next scheduled turnaround?

The Test

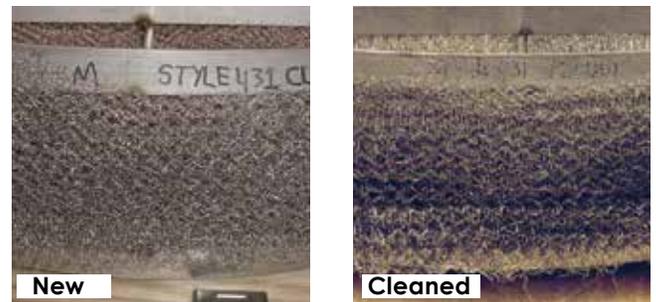
To help evaluate the risks, we obtained a used YORKMESH™ style 431 pad, which had been removed from an amine absorber during a routine refinery turnaround. Inspection of the pad revealed some moderate solids buildup. Using the normal refinery practice, the pad was cleaned with detergent and high-pressure washing. It was taken to our pilot plant facility in Wichita, Kansas, USA, to compare its performance with an otherwise identical brand new DEMISTER™ pad. Tests were conducted in the 36 in [914 mm] diameter test tower.



Test facility in Wichita, Kansas, USA.

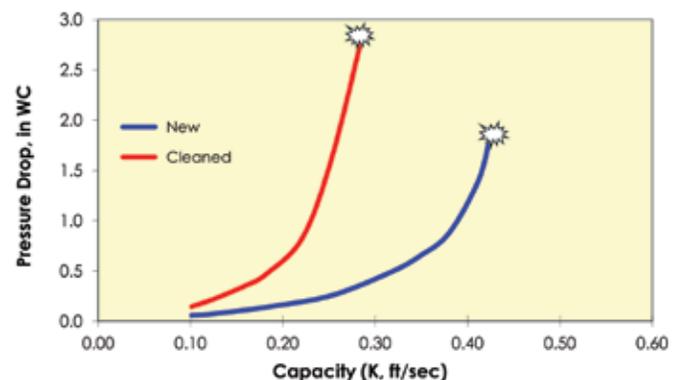
The Results

On the surface, the cleaned and new mesh pads look very similar.



Appearances can be deceiving.

But solids that were not removed by the cleaning are hidden in the middle of the cleaned pad and reduced the original capacity by 31%. In addition, wire surface corrosion roughened the originally smooth wire surfaces, which increased the liquid being held in the mesh, leading to further reduction in capacity. The tests showed that the current capacity of the pad at flooding was now 15% below the traditionally used $K=0.35$ ft/sec [$K=0.10$ m/sec] design velocity.



Capacity comparison, new vs. cleaned mesh.

What Are The Risks?

If this mist eliminator were reused in the process, the consequences could be expensive.

While some of the mist elimination problems demand immediate attention, many take time to appear. Operations personnel often will not even know there is a problem while the entrainment quietly damages compressors, turbines, fans, heat exchangers, or downstream piping, or while expensive amines silently disappear downstream. If your mist elimination equipment is not performing at its original capacity, your operations could be experiencing:

- ▶ Corrosion in downstream equipment
- ▶ Fouling of heat exchangers, compressors, turbines
- ▶ Increasing environmental emissions
- ▶ Reduced product purity
- ▶ Excessive molecular sieve regeneration
- ▶ Increasing makeup of expensive amine solvents
- ▶ Reduced equipment capacity
- ▶ Extra pressure drop, especially in vacuum service

Often these symptoms are never tied back to the root cause. Does the small amount you save balance these risks?

Do You Feel Lucky?

Inspectors look at the bottom of the mesh mist eliminator for problems. But fouling is normally not observed at the bottom of the mesh until buildup is well under way in the middle, because incoming entrainment acts as a wash to flush solids off the bottom surface. Once fouling can be seen from the bottom of the mesh, it is usually too late to get the center of the pad clean. As the deposits increase, the buildup accelerates. This occurs especially in the center of the mesh where buildup is difficult to see and impossible to fully clean without destroying the mist eliminator.

If they are feeling lucky, plant operators can use maintenance history to predict the future. They could gamble by not inspecting existing mist eliminators or assume, because the bottom is clean, that the mesh mist eliminator is okay to reuse. But solids buildup, encouraged by wire surface corrosion, can appear after years of satisfactory service and generally cannot be seen until much too late.

Plant operators may take a chance to save some money by attempting to clean and reinstall the used mist eliminator for another 3- to 4-year operating cycle. As our test results show, it is not unusual that a third of the capacity has been lost forever. Solids buildup will take up right where it left off before shutdown, but with a head start compared to the beginning of the last startup.

Another problem that is overlooked when cleaning and replacing is the damage that is done to the used mist eliminator during removal, handling, and reinstallation. When the new pad was built, each section was made slightly oversized to allow compression at the joints and against the vessel wall. Compression from the initial installation does not spring back when the sections are removed, and handling the mist eliminator during cleaning will add to the problems. The reinstallation does not need to look as bad as the photo below before you have serious performance problems.



Would YOU gamble on this mist eliminator reinstallation?

Improve Your Odds

Plant operators can make some easy improvements to minimize the risks and increase mesh operating life.

- ▶ Replace with a new traditional-style mist eliminator
- ▶ Upgrade to a high-capacity mesh mist eliminator

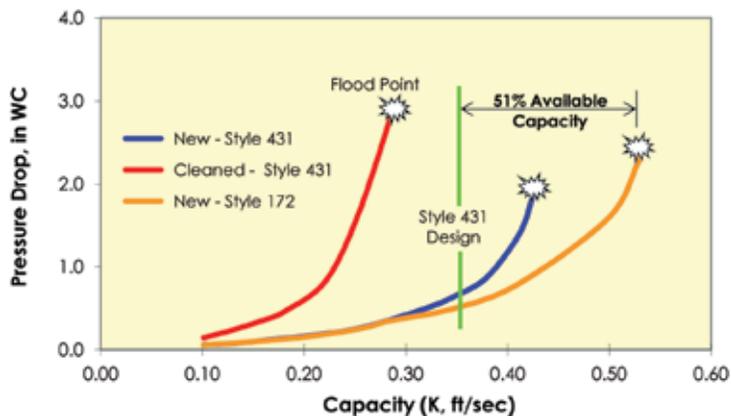
Traditional DEMISTER™ Mist Eliminators

Installing a new traditional-style mist eliminator will provide a clean start on the fouling and corrosion cycle. If you operate with the same feeds, at the same conditions, for the same time period, you have an idea what to expect. Can you confidently predict that your plant will operate in the future the same as it operated in the past?

High-capacity DEMISTER™ Mist Eliminators

Upgrading to the high-capacity DEMISTER™ technology allows significant improvements in both capacity and fouling resistance while maintaining the same efficiency. The latest technology mesh designs take advantage of more effective internal mesh structure and are completely interchangeable with the traditional mesh mist eliminators currently in service.

In the example shown below, using a cleaned mesh mist eliminator will not provide adequate operating performance to your next turnaround.



Style 172 - 51% available capacity compared to Style 431 design point.

If nothing changes in your process, the traditional style 431 may get you to your next turnaround; however, using a YORKMESH™ knitted mesh style 172 increases capacity by > 20% over the traditional style 431 pad. The extra capacity may not be needed immediately, but the extra capacity can be critical when fouling starts to reduce the available safety factor. As shown in the graph, using the style 172 knitted mesh mist eliminator shifts the dangerous re-entrainment point much further from your operating rates.

The choices made for maintenance priorities are always a gamble, and the tradeoff is: **“Pay me now or pay me later.”**

Which choice will you make?

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