

BEGG COUSLAND ENVIROTEC LTD.



Stick Test Procedure – Sulphuric Acid Service

WHAT IS A STICK TEST?

Take a rectangular (or 2nd choice, round) stick of 'white' wood, long enough to reach to the opposite side of the exit gas duct of a tower, and insert it through a sample port. (For best results, avoiding issues of gas turbulence, sample in a straight duct position)

Leave the stick in place for 2 minutes, with a flat side facing the gas flow, and then withdraw it for inspection. H₂SO₄ burns the white wood and leaves black marks.

Large droplets can be the result of by-pass or re-entrainment (see photograph above). Mist particles are identified as small, pin-prick sized marks. Droplets are the medium to large dots, and re-entrainment droplets are the larger spots (see left below). H₂SO₄ burns black and in heavy load cases leaves the stick wet (see right below).



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If there is significant SO₃ slip from a tower, a stick which is left in the duct for 5 – 10 minutes would turn dry, brown colour :



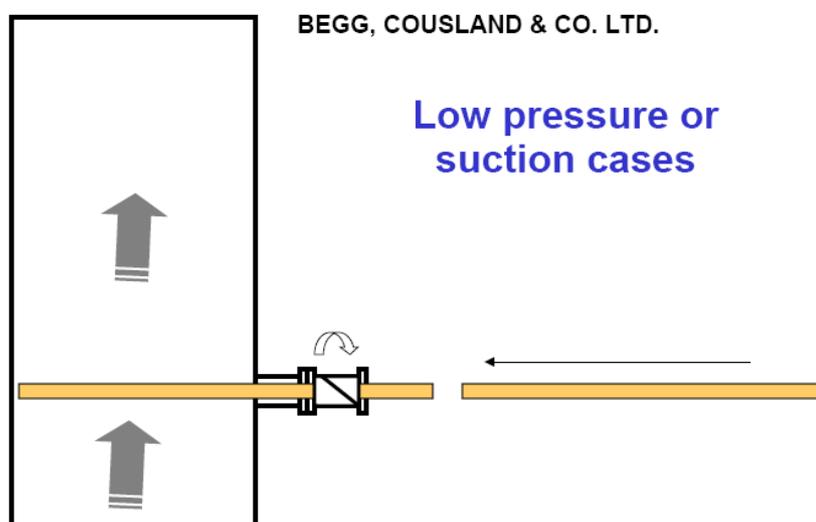
WHY DO A STICK TEST?

The stick test can show an acceptable or unacceptable acid exit from a tower, without the need for expensive sampling, thus flagging when a problem exists, and showing if and how it changes.

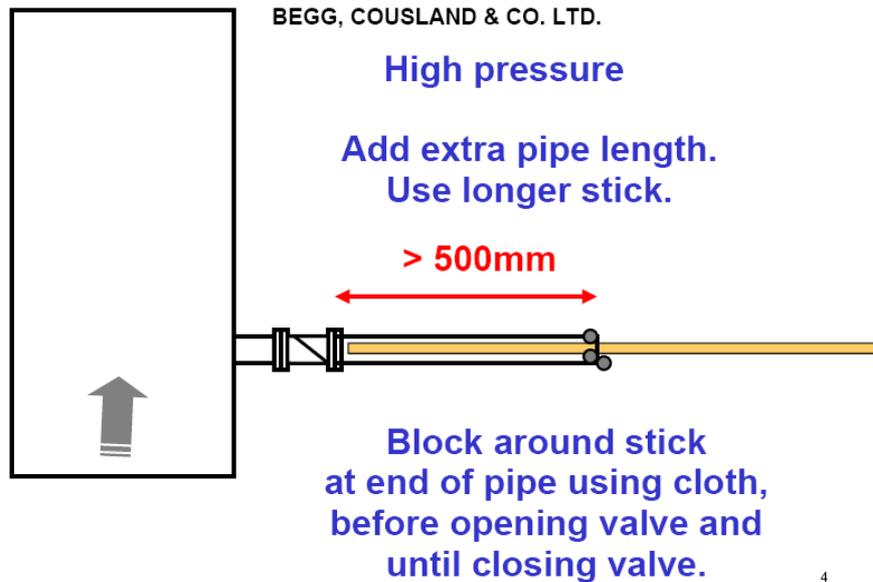
So what you see on the stick is primarily comparative evidence of mist & droplets, that helps a plant to monitor trends in plant / filter performance.

It is therefore recommended that stick tests are done regularly on the exit of each tower (once a week or once a month), and results are recorded / photographed to determine the trends.

This trend information can then be taken into account when troubleshooting, and in conjunction with pressure loss records (which surprisingly some plants still do not take or keep as separate filter values), it can effectively narrow down the likely cause of the problem.



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WHAT ELSE HELPS?

Regular stick tests & pressure loss readings show if changes are slow or sudden. If sudden, then it is easier to check at the time against plant operation events (Blockage with solids? Acid distributor problem? etc.)

- Monitoring of stack exit appearance.
- Monitoring of drainage rate from filters (not always possible)
- Monitoring of SO₃ absorption
- Knowledge of the filter installed and normal performance



SO₃ Slip ?

Or

Filter problem ?

BOTTOM LINE?

Stick tests help differentiate between 'events' & serious problems.

Stick tests can help differentiate between filter & process problems.

So when a shutdown approaches, everyone has either a better idea of what to expect, or a clear idea of what to inspect.

H₂SO₄ Filter Operating & Maintenance – Stick Tests
www.beggcousland.com