Protecting electrical equipment against mist hazards

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Problems from the perspective of implementing area classification

Most mist ‘problems’ are associated with secondary grade releases

- Many sites not hitherto zoned for mist
- Mists are not like gases, though are zoned as if they were
- Flange shrouds often impractical
- Retrospective fitting of zone 2 equipment can be prohibitively expensive
- No currently accepted route for a ‘mist exclusion’ approach
  - Sira uses this but would prefer it to be a recognised method

Is a zone 2 appropriate for mists?

NO! In terms of the ignition protection required, mists are closer to dusts

- Retrofitting zone 2 equipment has a high cost/benefit ratio
- Exclusion of mists, similar to ‘Ex t’, is enough
  - but should be done without resorting to certified equipment

Mist from a threaded joint

1” BSPT thread,
backed off ½ turn then
gently tightened again

Liquid: D40 kerosene

Pressure: 4 bar gauge

Mist source spraying onto a 1.12mm gap (<IP4X) in an enclosure cover

Liquid: D40 kerosene

Nozzle: 0.094mm^2

Pressure: 24 barg

Gap: 0.63mm, then 1.12mm

View from other side of test chamber

1.12mm gap

Spark ignition source

- NO IGNITION of the kerosene mist up to 1.12mm
- Liquid ‘condensed’ in the gap

Wish list for inclusion in IEC 60079-10-1

- Introduce the concept of mist zones, distinct from gas zones
- Permit suitably rugged enclosures meeting IP5X to be used with a mist hazard
  - external surface temperature assessment in normal operation
- Allow user to assess ignition prevention measures
  - requiring ATEX-certified equipment is a step too far for zone 2 (mist)
- More guidance on when mist formation can be classed as ‘catastrophic’
- Research needed to generate a look-up table of pressures versus mist zone radii
  - using gas equations for zone extent gives unrealistic radius
  - Sira tests indicated mist flammable only up to 1m from source

Your comments and suggestions?