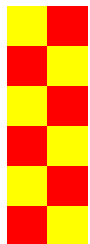




SCDF

The Life Saving Force

... for a safer Singapore



Integrity Test Requirements for Bulk Storage Tank and Pipings

CONFIDENTIAL

Current P&FM Tanks Requirement

Requirements for In-service Storage Tanks	
Inspection Technique	<ul style="list-style-type: none">- Radiographic Tests (R) & Hydrostatic (H)or- Equivalent Tests
Inspection Interval	<ul style="list-style-type: none">- Hydrostatic – 5 years- Radiographic – 10 years
Certification	<ul style="list-style-type: none">- Conducted or endorsed by a Professional Engineer



Current Integrity Test Requirements

- P&FM Regulations state the following test requirements for bulk tanks and pipelines:

Test Requirements	Objectives of Test
<p><u>Hydrostatic Test (5 years)</u> Remove product, fill tank with water, increase pressure</p>	<ul style="list-style-type: none">•Check for tank tightness•Check for leak and integrity of tank
Test Requirements	Objectives of Test
<p><u>Radiographic Test (10 years)</u> Clean and purge tank, place film on internal surface of tank, use x-rays / gamma rays to test</p>	<ul style="list-style-type: none">•Check on hidden flaws of welds and corroded surface for cracks, porosity and slag inclusion.



Proposed equivalent tests(Summary)

Storage Type	Alternative test for Hydrostatic (New)	Alternative test for Hydrostatic (every 5 years)	Alternative test for Radiographic (New 100% welded joints checks)	Alternative test for Radiographic (every 10 years)
Surface storage bulk tanks (eg. Diesel storage tank, petrol, tube tanks or etc..)	i) Pressure Test with visual checks ii) Ultrasonic Thickness Gauging (UTG)	i) Pressure Test with visual checks ii) Ultrasonic Thickness Gauging (UTG)	i)Phase Array UT (PAUT) ii) Magnetic Particle Test (MPI) iii) Dye Penetrant (DP) iv) Acoustic Emissions, (AE) (eg for tube trailers)	i)Phase Array UT (PAUT) ii) Magnetic Particle Test (MP) iii) Dye Penetrant (DP) iv) Acoustic Emissions, (AE) (eg for tube trailers)
For Underground Tank (Access to tank) e.g. Diesel storage tank, petrol, tube tanks or etc	i) Pressure Test with visual checks ii) Ultrasonic Thickness Gauging (UTG) iii) MASSTECH	i) Pressure Test with visual checks ii) Ultrasonic Thickness Gauging (UTG) iii) MASSTECH	i) Phase Array UT (PAUT) ii) Magnetic Particle Test (MPI) iii) Dye Penetrant (DP) iv) Pneumatic test (Air test)	i) Phase Array UT (PAUT) ii) Magnetic Particle Test (MP) iii) Dye Penetrant (DP)
For Underground Tank(Double wall tanks-FRP/Steel) (Unable to access to tank) e.g. petrol station, CNG service tank	i) Pressure Test with visual checks ii) Ultrasonic Thickness Gauging (UTG) iii) MASSTECH	i) Pressure Test with visual checks ii) Ultrasonic Thickness Gauging (UTG) iii) MASSTECH	i) Phase Array UT (PAUT) ii) Magnetic Particle Test (MPI) iii) Dye Penetrant (DP) iv) Pneumatic test (Air test)	NA (not accessible to do the NDT test) Only exemption. QP conducting the checks must certify that there is no access to tank buried.
Tanks for generators or other equipment (Single / Double wall) (above 250L)	i) Pressure Test with visual checks	i) Pressure Test with visual checks	i) Phase Array UT (PAUT) ii) Magnetic Particle Test (MPI) iii) Dye Penetrant (DP) iv) Eddy Current (EC)	i) Phase Array UT (PAUT) ii) Magnetic Particle Test (MP) iii) Dye Penetrant (DP) iv) Eddy Current (EC)
LNG Tanks (e.g. Satellite tank, customer stationary tank)	i) Pressure and Vacuum Test with visual checks	i) Pressure or Vacuum Test with visual checks	NA	NA (not accessible to do the NDT test)

Other equivalent tests

- Any other proposed new tests that are not listed in this document will not be accepted for submission as part of licensing requirements.
- Any new proposed equivalent tests will need to be reviewed by the SCDF P&FM committee which includes members from industry and academia and included in this master document before they can be accepted.



Thank You



CONFIDENTIAL



6/<11>