

Australian/New Zealand Standard®

Methods of testing underground marking tape

Method 4: Chemical resistance

1 SCOPE This Standard sets out a method for determining the chemical resistance of underground marking tape by immersion in diesel oil, sulfuric and hydrochloric acid, ammonium hydroxide, sodium nitrate and hydrogen sulfide.

2 REFERENCED DOCUMENTS The following documents are referred to in this Standard:

AS/NZS

- 4275 Methods of testing underground marking tape
- 4275.1 Method 1: Elongation at break
- 4275.5 Method 5: Background discolouration
- 4275.6 Method 6: Adhesion of print

3 REAGENTS The following reagents are required:

- (a) Diesel oil.
- (b) Sulfuric acid (dilute solution adjusted to pH 1).
- (c) Hydrochloric acid (dilute solution adjusted to pH 1).
- (d) Ammonium hydroxide (dilute solution adjusted to pH 11).
- (e) Saturated solution of sodium nitrate.
- (f) Hydrogen sulfide gas (undiluted).

4 PREPARATION OF TEST SPECIMENS The preparation shall be as follows:

- (a) Twelve test specimens of size approximately 150 mm by 50 mm shall be cut along the tape such that each test specimen contains both background colouring and markings.
- (b) Twenty-four longitudinal test specimens and 24 transverse test specimens shall be prepared in accordance with AS/NZS 4275.1.
- (c) The remaining length of marking tape, including the length from which the test specimens have been taken, shall be stored in a lightproof enclosure.

5 CONDITIONING Test specimens shall be conditioned in an oven maintained at $50 \pm 5^\circ\text{C}$ for $168 \pm 2, -0$ h, immediately prior to testing.

6 PROCEDURE The procedure shall be as follows:

- (a) Place the following test specimens into each of the reagents:
 - (i) Two test specimens, each 150 mm x 50 mm.
 - (ii) Four test specimens cut longitudinally in accordance with Clause 4(b).
 - (iii) Four test specimens cut transversely in accordance with Clause 4(b).

- (b) Immerse the test specimens, except those for the ammonium hydroxide and hydrogen sulfide tests, in the above reagents for either—
- (i) a period of 12 weeks and store in a lightproof enclosure at an ambient temperature of $20 \pm 5^{\circ}\text{C}$; or
 - (ii) a period of 30 d and store in a lightproof enclosure at an ambient temperature of $50 \pm 5^{\circ}\text{C}$.

Immerse the ammonium hydroxide test specimens for either—

- (iii) a period of six weeks and store the immersed specimen in a lightproof enclosure at an ambient temperature of $20 \pm 5^{\circ}\text{C}$; or
- (iv) a period of 15 d and store the immersed specimen in a lightproof enclosure at an ambient temperature of $50 \pm 5^{\circ}\text{C}$.

Immerse the hydrogen sulfide test specimens for a period of one week and store in a lightproof enclosure at an ambient temperature of $20 \pm 5^{\circ}\text{C}$.

NOTE: For test specimens, with a density less than that of the reagent, a sinker of lead or other dense material may be used to assist immersion.

- (c) Remove the test specimens from each reagent. Each test specimen shall be washed with distilled water sufficiently to remove the reagent from its surface, and then dried.
- (d) Determine the change in background colour of the 150 mm x 50 mm test specimens in accordance with AS/NZS 4275.5.
- (e) Determine the adhesion of print on the 150 mm x 50 mm test specimens in accordance with AS/NZS 4275.6.
- (f) Test the longitudinal and transverse test specimens in accordance with AS/NZS 4275.1 to determine elongation at break.

7 REPORT The test report shall contain the following:

- (a) The immersion conditions selected for each test specimen.
- (b) Any test specimen(s) and the corresponding immersion reagent(s) for which the background discolouration exceeds Scale 3.
- (c) Any test specimen(s) and the corresponding immersion reagent(s) for which more than 10% of the printing area was removed.
- (d) The mean elongation at break in the longitudinal direction for test specimens immersed in each reagent.
- (e) The mean elongation at break in the transverse direction for test specimens immersed in each reagent.
- (f) Reference to this Australian/New Zealand Standard, i.e. AS 4275.4.