

SEWERMAX® POLYPROPYLENE PIPES AND FITTINGS

TESTING

FIELD ACCEPTANCE TESTING

Field-testing is used for identifying installation problems such as damaged pipes, poor embedment compaction and jointing deficiencies. Where a fully water tight system is required as in the case of sewers, a properly structured leakage testing program is usually required to obtain acceptance. However this is not usually needed in the case of underground stormwater drains. A diametral deflection check as the principle indicator can easily make an assessment of the structural integrity of a SewerMAX® pipe/soil system.

LEAKAGE TESTING

A leakage check on a buried pipeline can be completed using any one of the following methods:

- Hydrostatic Pressure Test
- Vacuum Test
- Low Pressure Air Test
- Infiltration Test

The air and vacuum tests are usually more convenient as they do not require water. An infiltration observation or test measurement is a further option where a pipeline is installed well below the water table.

HYDROSTATIC (EXFILTRATION) TESTING

The pipeline should be filled with water to a height of not less than 1 m above the natural ground level at the highest point of the test length but not exceeding 6 m at the lowest point of the test length. A minimum of 2 hours should elapse to allow temperatures to stabilise. Then during a minimum time span of 30 minutes any fall in water level in the test vessel must not exceed the hourly allowance amount shown in the below table.

If this is not achieved the pipeline shall be carefully examined visually for leaks, and any defects repaired. The pipeline should then be retested.

HYDROSTATIC PRESSURE TEST LEAKAGE LIMITS

DN	MAKE UP ALLOWANCE* (Litres/m/hour)	DN	MAKE UP ALLOWANCE* (Litres/m/hour)
225	0.11	450	0.21
300	0.14	525	0.25
375	0.18	600	0.28

* Based on an allowance of 0.5 litres per hour per mm diameter per km (Reference, ASINZS2566.2)

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LOW PRESSURE AIR (EXFILTRATION) TESTING

The test length of pipeline should be generally restricted to lengths between maintenance holes (the most convenient places for fixing temporary bulkheads).

The procedure for low-pressure air testing of larger diameter pipelines is potentially hazardous because of the large forces exerted during testing. Temporary bulkheads must resist these forces and the serious safety consequences should there be an accidental bulkhead blow-out.

The procedure is as follows:

1. Pump in air slowly until a pressure of 28KPa above any external ground water pressure is reached (but do not in any case exceed 50KPa gauge).
2. Maintain the pressure for at least 3 minutes.
3. If no leaks are detected during this phase, shut off the air supply.

The low pressure air test for a test length of pipeline is satisfactory if the test pressure does not drop more than 7KPa, within the time period shown in the below table from air supply shut-off. In any case should there be no discernible pressure loss after 1 hour has elapsed, the test can be considered satisfactory and terminated.

If the pipeline fails the test, re-pressurise to 28KPa and check for leaks. This may be assisted by the use of leak detecting equipment. Leaks in shallow installations with joints exposed may be detected by pouring a concentrated solution of soft soap and water over joints and fittings. Repair and then repeat the test.

INFILTRATION TESTING

Where a freestanding water table exists at a level of at least 1.5 m above the pipeline and 150 mm above any lateral connections, the absence of infiltration can remove the need for either of the previous pressure tests. In all cases where infiltration is observed the source should be investigated and the leak plugged. Where the size of the catchment and number of side connections precludes this approach then the inflow should be measured over a 24-hour period and the principal informed for determination of the acceptable allowable inflow. Generally this should not exceed 5 litres/mm diameter/km length/day.

MINIMUM ALLOWABLE TIMES FOR TEST (FOR 7 KPa PRESSURE DROP)

MINIMUM ALLOWABLE TIME* (MINUTES) FOR TEST LENGTH SHOWN			
DN	50m	100m	150m
225	4	5	8
300	6	9	14
375	7	14	22
450	10	21	31
525	14	28	42
600	18	37	55

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STRUCTURAL ASSESSMENT

Deflection Testing

Deflection measurements are often used as an additional quality control device to indirectly assess the relative compactions achieved during installation and whether the required structural performance has been achieved. A visual line-of-site inspection will usually indicate any abnormal deflections. The reason for these should be investigated. An acceptance test requiring a pullthrough Go or No Go proving tool may be specified to ensure that the actual short-term vertical deflection does not exceed the allowable vertical deflection given in the below table. Where required, a prover of the allowable deflected internal diameter less a further tolerance of 2.5 millimetres, should be pulled through the pipeline by hand or means of a hand operated winch.

PROVER DESIGN

Suitable types of provers are described in AS/NZS 2566.2. A lightweight vaned type with a minimum of eight vanes between 1.0 and 1.3 pipe diameters in length may be used. The acceptable prover diameter should be determined after giving consideration to the effect of different time periods after completion of construction. These are given in the below table.

Where a prover cannot pass along the test length, the cause of the obstruction should be ascertained, e.g. by remote TV investigation, and appropriate remedial construction undertaken. This may require the exposure of the affected section of the pipeline and the re-compaction of the side support material probably without removing pipes. That is SewerMAX® pipes are not usually damaged by excessive deflections and a visual inspection should be sufficient to determine if any pipe replacement is required.

MAXIMUM ALLOWABLE PROVER DIAMETERS FOR NOMINATED TIMES AFTER COMPLETION OF THE BACKFILL

		24 HOURS	3 DAYS	7 DAYS	14 DAYS	30 DAYS	3 MONTHS	1 YEAR
ADJUSTMENT FACTOR		0.7	0.75	0.85	0.95	1	1.1	1.2
DEFLECTION (%)		3.5	3.8	4.3	4.8	5.0	5.5	6.0
DN	PIPE ID							
225	225	215	214	213	212	211	210	209
300	299	286	285	284	282	282	280	279
375	373	357	357	355	353	352	350	348
450	447	429	428	426	423	422	420	418
525	522	501	500	497	495	493	491	488
600	596	573	571	568	565	564	561	558

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