

AUSTROADS TEST METHOD ATM 824

Determination of Opening Size of Seamless
Knitted Tubular Filter Fabric

# Scope

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This test method sets out the procedure for determining the range of dimensions of openings in sample areas of seamless knitted tubular filter fabric for use over corrugated plastic subsoil pipe.

# References

The following documents are referred to in this method: Nil.

# Equipment

1. A scale marked in mm
2. A cylinder of any opaque material of length approximately 250 mm with a diameter as follows:
3. 65 mm, if tubular filter fabric for use with 65 mm corrugated plastic pipe is to be tested
4. 100 mm, if tubular filter fabric for use with 100 mm corrugated plastic pipe is to be tested
5. 150 mm, if tubular filter fabric for use with 150 mm corrugated plastic pipe is to be tested.
6. A microscope capable of magnification x 30 with a suitable camera attachment and graticule
7. A pair of scissors
8. String
9. Clean tracing film
10. Tracing film showing 13 circles ranging from 4-18 mm diameter in 1 mm steps
11. 0.7 mm, HB lead pencil, or equivalent suitable pen.

# Procedure

1. Cut a 500 m length from the filter fabric sample.
2. Spread the 500 mm sample length out on a flat surface and without stretching the material mark off 3 gauge lengths of 125 mm, centrally positioned.
3. Fit the filter fabric centrally over the cylinder and tie one end with string.
4. Stretch the untied end such that the gauge length of 125 mm increases to $125×\left(\frac{100-L}{100}\right)$
where L is the longitudinal strain (in percent).
5. Place the cylinder with fabric under the microscope and photograph using 35 mm photographic format at three locations near the centre of each gauge length at a magnification of x 30 as shown
in Figure 1.
6. Photograph the graticule at a magnification of x 30, and determine the precise scale factor.
7. Place the clear tracing film over each of the photographs taken (e) and make a tracing of the openings as shown in Figure 2 so as to identify the 10 largest openings in each photograph. An opening is to be defined for this test to be the space between all adjacent strands. Single filaments projecting into the area are to be ignored. (See Figure 3). Care must be taken to distinguish strands deeper in the field of view from stray single filaments.
8. The diameter of the 10 largest inscribed circles is to be determined for each photograph. An inscribed circle should touch the opening perimeter at a minimum of 3 places which ideally are distributed over the perimeter. (See figure 4). The perimeter of an inscribed circle must always fall within the opening. The diameters of the openings are to be recorded in microns (µm) by referring the circles to the photographed graticule so as to accurately scale the photograph. The graticule is marked in µm such that when photographed through the microscope and processed in identical manner to the sample photographs it can be used to define the diameters of the set of circles, and so in turn the photographed openings in µm.
9. It should be noted that elongate openings may accept more than one inscribed circle. In such cases the size of opening is taken to be the diameter of the largest inscribed circle. (See Figure 5).
10. Count the openings with diameters of inscribed circles above 130 µm in each photograph. Partial openings on the perimeter of the photograph are to be excluded from the count.

# Calculation

Calculate the blended binder viscosity as follows:

1. Nominate the Representative Large Opening Size (DR) as the third largest diameter of the group of thirty diameters made up of the ten largest inscribed circles in each of the three photographs.
2. Combine the counts of openings with diameters of inscribed circles above 130 µm for the 3 photographs. Divide the total be the area represented on the 3 photographs to compute the number of openings above 130 µm diameter per 100 mm. This is nominated the Opening Index (l).

# Test Report

The following shall be reported:

1. Report the Representative Large Opening diameter (DR)
2. Report the Opening Index (l)
3. Report the range of diameters of the ten largest inscribed circles for each photograph.

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| A close-up of a piece of fabric  Description automatically generated | A close-up of a piece of fabric  Description automatically generated |
| **Figure 1** | **Figure 2** |
| Diagram  Description automatically generated | Diagram  Description automatically generated | Diagram  Description automatically generated |
| **Figure 3** | **Figure 4** | **Figure 5** |

Amendment Record

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| --- | --- | --- | --- |
| **Amendment no.** | **Clauses amended** | Action | Date |
| - | New test method |  | November 2023 |
|  |  |  |  |

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| --- | --- |
| **Key** |  |
| Format | Change in format |
| Substitution | Old clause removed and replaced with new clause |
| New | Insertion of new clause |
| Removed | Old clauses removed |

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| **Acknowledgement** |

This Austroads Test Method is based on Transport for New South Wales Test Method: T1524 Determination of opening size of seamless knitted tubular filter fabric.