

Technical Information Bulletin

Flexicell[®] NBR: Thermal Value Summary Report

AS/NZS 4859.1 (2018)

Introduction:

The National Construction Code (NCC) 2019 states that where thermal insulation is required, it must comply with AS/NZS 4859.1 (2018). This standard requires labelling of thermal insulation materials to include a declared thermal performance as calculated in Section 2.3.3.5, supported by data summarised in accordance with Section 2.3.3.9 (Thermal Value Summary Report) of the standard.

This document meets the requirements of Section 2.3.3.9.

Product Label Details:

All **Flexicell[®] NBR** products include the following information on the labelling or packaging as required by AS/NZS 4859.1 (2018):

- Product name
- Description of contents
- Name and address of manufacturer or supplier
- Identification of manufacturing plant
- Batch identification or other traceability information
- Safety guidance
- A statement of conformance with AS4859.1 2018
- Declared material R-Value, and the temperature at which it applies
- Number of pieces
- Nominal total area m² (sheets/rolls only)
- Nominal length, width and thickness of each piece
- Nominal net weight of contents (kg)

Calculations:

1. Statistical Calculations

Clause 2.3.3.5 of AS/NZS 4859 Part 1: 2018 has been used to calculate the results detailed in the below table. An example statistical calculation is detailed below for Flexicell Sheet 15mm, measured at the nominal thickness:

13 mm FLEXICELL® NBR		
s.no	Thickness	R value (resistance) (m ² .K)/W
1	13.26	0.42
2	13.34	0.43
3	13.45	0.43
4	13.49	0.43
5	13.23	0.42
6	13.34	0.43
7	13.49	0.43
8	13.59	0.43
9	13.62	0.43
10	13.69	0.44
Mean Values =		0.43
Standard Deviation		0.004404198

According to Equation 2.3.3.5(1), the declared Material R-Value is calculated as follows:

Declared Material R-Value = $0.43 - 0.393 \times 0.004404198 = \mathbf{0.42}$ rounded downwards to the nearest 0.01.

If thermal measurements have been performed on specimens at greater than nominal thickness, as permitted by Clause 2.3.3.4 $R_{50/90}$ shall be calculated at nominal thickness from the following equation.

$R_{\text{declared}} = d_n / \lambda_{50/90}$ Where d_n = nominal thickness, in metres.

Therefore, 13mm Planer thickness / 0.032 = R Declared Value **0.40** rounded downwards to the nearest 0.01.

2. Pre-formed Pipe Insulation Calculations

Clause 2.3.3.7 of AS/NZS 4859 Part 1: 2018 has been used to calculate the results for pipe insulation detailed in the Material R-Value table. The thermal conductivity of **Flexicell® NBR** in planar form, of the same specification as **Flexicell® NBR Tube**, was measured to Clause 2.3.3.5 of the Standard. The following formula was then applied to determine the Material R-Values of **Flexicell® NBR Tube**:

$$R = (\ln(r_o/r_i))/k,$$

Where R = Material R-Value of the preformed pipe insulation section, m².K/W
 r_o = insulation outer radius, m
 r_i = insulation inner radius, m
 k = thermal conductivity of the insulation in planar form, W/m.K.

References:

1. ASTM C518 Test reports, 20-006-187191Rv3
2. **R-values of Flexicell[®] NBR Tubes, Sheets / Rolls:**

Pipe ID (mm)	Wall Thickness (mm)							
	6	9	13	19	25	32	40	50
6	0.31	0.52	0.85	1.35	1.95	2.70	3.55	4.70
9	0.28	0.47	0.75	1.20	1.75	2.40	3.15	4.20
13	0.26	0.42	0.68	1.10	1.55	2.15	2.85	3.80
16	0.24	0.40	0.64	1.00	1.45	2.00	2.65	3.55
19	0.24	0.39	0.61	0.99	1.40	1.90	2.50	3.40
22	0.23	0.38	0.59	0.95	1.35	1.85	2.40	3.25
25	0.23	0.37	0.57	0.92	1.30	1.75	2.30	3.10
28	0.22	0.36	0.56	0.90	1.25	1.70	2.25	3.00
32	0.22	0.35	0.54	0.87	1.20	1.65	2.15	2.90
35	0.22	0.35	0.53	0.85	1.15	1.60	2.10	2.80
38	0.21	0.34	0.53	0.83	1.15	1.55	2.05	2.75
42	0.21	0.34	0.52	0.82	1.10	1.55	2.00	2.65
48	0.21	0.33	0.51	0.79	1.10	1.50	1.95	2.55
51	0.21	0.33	0.50	0.78	1.05	1.45	1.90	2.55
54	0.21	0.32	0.50	0.78	1.05	1.45	1.85	2.50
60	0.20	0.32	0.49	0.76	1.05	1.40	1.80	2.40
63	0.20	0.32	0.48	0.75	1.00	1.40	1.80	2.40
67	0.20	0.32	0.48	0.75	1.00	1.35	1.75	2.35
73	0.20	0.31	0.48	0.74	1.00	1.35	1.75	2.30
76	0.20	0.31	0.47	0.73	1.00	1.35	1.70	2.30
79	0.20	0.31	0.47	0.73	1.00	1.30	1.70	2.25
83	0.20	0.31	0.47	0.72	0.99	1.30	1.70	2.25
89	0.20	0.31	0.46	0.71	0.98	1.30	1.65	2.20
92	0.20	0.31	0.46	0.71	0.97	1.30	1.65	2.20
102	0.20	0.31	0.46	0.70	0.95	1.25	1.60	2.10
105	0.20	0.30	0.46	0.70	0.95	1.25	1.60	2.10
110	0.20	0.30	0.45	0.69	0.94	1.25	1.60	2.10
114	0.20	0.30	0.45	0.69	0.94	1.25	1.60	2.05
Planar	0.18	0.28	0.40	0.59	0.78	1.00	1.20	1.50

Sizes typically not manufactured as tubes; these R-Value figures are for reference only