

CLIENT: TUFF INDUSTRIES INCORPORATED
9570 Bottom Wood Lake Road
Lake Country, British Columbia
Canada V4V 1S7

Test Report No: TJ8150-1B-SUMMARY

Issue Date: March 21, 2024

SAMPLE ID: Tufdek Type 4B internally reinforced, non-backed Polyvinyl Chloride (PVC) sheet-applied exposed roofing membrane.

SAMPLING DETAIL: Samples were selected at the location of manufacture by QAI representative Michael Fallon on July 16, 2021. Sample selection including the random selection of samples from minimum 4 dates of production, including various options available for Tufdek PVC membranes.

DATE OF RECEIPT: Samples were received at QAI Tulsa, OK division on July 26, 2021.

TESTING PERIOD: Testing of the Tufdek PVC membrane occurred from September 1, 2021 until completion in December 2023.

AUTHORIZATION: QAI proposal 21JL04081R5 dated May 11, 2021 signed by Tuff Industries Inc. personnel Bryan Hughes on May 12, 2021.

TEST(S) REQUESTED: Testing in accordance with the following method(s):

- CAN/CGSB-37.54-95 *Polyvinyl Chloride Roofing and Waterproofing Membrane* (CGSB 37.54).

CONCLUSIONS: Tufdek PVC sheet-applied exposed roofing of 60 mils thickness products confirmed to be representative of normally manufactured product at the point of manufacture, were found to comply with Type 4B material requirements as specified in CGSB 37.54.

Prepared By:

**Signed for and on behalf of
QAI Laboratories Inc.**

Matt Lansdowne
VP of Operations

Kent Adamson
President

1.0 SUMMARY OF TEST RESULTS

Table 1: Summary of Tufdek Results of Evaluation to CGSB 37.54

| PHYSICAL REQUIREMENTS | | UNIT | REQUIREMENT | RESULTS |
|--|-----|------------------|------------------------------------|-----------------------|
| Overall Thickness | | mm | ≥ 1.2 ± thickness | 1.54 |
| Thickness of Coating Over Scrim (Reinforcing Fabric) | | mm | ≥ 0.4 | MD: 0.66 CMD: 0.88 |
| Breaking Strength | MD | kN/m | ≥ 35 | 77 |
| | CMD | | | 68 |
| Elongation at Break | MD | % | ≥ 15 | 24 |
| | CMD | | | 27 |
| Lap Joint Strength | | % | ≥ 75 Breaking Strength | 126 |
| Low Temperature Impact | | - | No Cracks -30°C in 8 of 10 Samples | 10 of 10 PASS |
| Breaking Strength After Heat Aging | MD | % | ≥ 90 Breaking Strength | 98 |
| | CMD | % | | 99 |
| Low Temperature Flexibility After Heat Aging | MD | - | No Cracks -40°C | No Cracks |
| | CMD | - | No Cracks -40°C | No Cracks |
| Low Temperature Flexibility | MD | - | No Cracks -40°C | No Cracks |
| | CMD | - | No Cracks -40°C | No Cracks |
| Accelerated Weathering Visual Assessment | | - | No cracking, crazing or blistering | No damage PASS |
| Breaking Strength After Accelerated Weathering | MD | % | ≥ 90 | 99 |
| | CMD | % | | 96 |
| Elongation After Accelerated Weathering | MD | % | ≥ 90 | 93 |
| | CMD | % | | 90 |
| Low Temperature Impact after Accelerated Weathering | | - | No Cracks -10°C in 8 of 10 Samples | 10 of 10 PASS |
| Low Temperature Flexibility After Accelerated Weathering | MD | - | No Cracks -25°C | No Cracks |
| | CMD | - | No Cracks -25°C | No Cracks |
| Water Vapor Transmission, Maximum | | g/m ² | 4.0 per 24 hours | 1.28 |
| Effect of Water Absorption, Mass Increase | | % | ≤ 3 | 2.6 |
| Breaking Strength and Elongation after Water Absorption | MD | % | ≥ 90 | 98 |
| | CMD | % | | 96 |
| Elongation After Water Immersion | MD | % | ≥ 90 | 120 |
| | CMD | % | | 115 |
| Dimensional Change Without Load | MD | % | ≤ 0.5 | -0.4 |
| | CMD | % | ≤ 0.5 | 0.0 |
| Dimensional Change With Loading | MD | % | ≤ 0.5 | -0.3 |
| | CMD | % | ≤ 0.2 | 0.0 |
| Cone Penetration | | N | ≥ 30 | 429 |

Detailed results can be found on subsequent pages of this report.

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