Test Report No. 7191059121-MEC13/01-EAH
dated 04 Jun 2013

PSB Singapore

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DEW / FROST POINT MEASUREMENTS

OF

DGU WITH A SET OF ADJUSTABLE BLIND ENCLOSED WITHIN

WITH

REFERENCE TO ASTM E 576 – 08

TESTED FOR: Unicos Tech Pte Ltd
33 Ubi Ave 3, #07-57 Vertex
Singapore 408868

Attn: Mr Jackson Ang

TEST METHOD: Dew/frost point measurements were conducted with reference to ASTM E 576 – 08 Standard Test Method for Frost/Dew Point of Sealed Insulating Glass Units in the Vertical Position.

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1. INTRODUCTION

This document consists of the dew/frost point measurements of double glazed unit (DGU) conducted at TÜV SÜD PSB premises for Unicos Tech Pte Ltd.

This report describes the test procedures and records the results obtained for the respective tests.

2. TEST OBJECTIVE AND SPECIFICATION

2.1 TEST OBJECTIVE

The objective of this report is to provide dew/frost point measurement of DGU. Dew/frost point is defined as the temperature at which visible condensation or frost first appears on the inner surface of the glass.

2.2 TEST SPECIFICATION

The test method for dew/frost point measurement is with reference to ASTM E 576 – 08.

3. DESCRIPTION OF TEST SPECIMEN

The descriptions of the DGU sample are as follows:

Nominal DGU size	:	558.8 mm (W) x 914.4 mm (H)
Glass type	:	1 piece of 25.5 mm thick tempered DGU comprising 3.2 mm thick clear tempered glass + 19.1 mm thick air space with blind + 3.2 mm thick clear tempered glass
Sealant	:	Polusulfide

Refer to Page 5 for the drawing of the DGU sample.

4. TEST PROCEDURE

Test Equipment

Test equipments used consist of the following:

1. Frost/dew-point apparatus
2. Digital thermometer with themocouple
3. Vertical attachement fixture

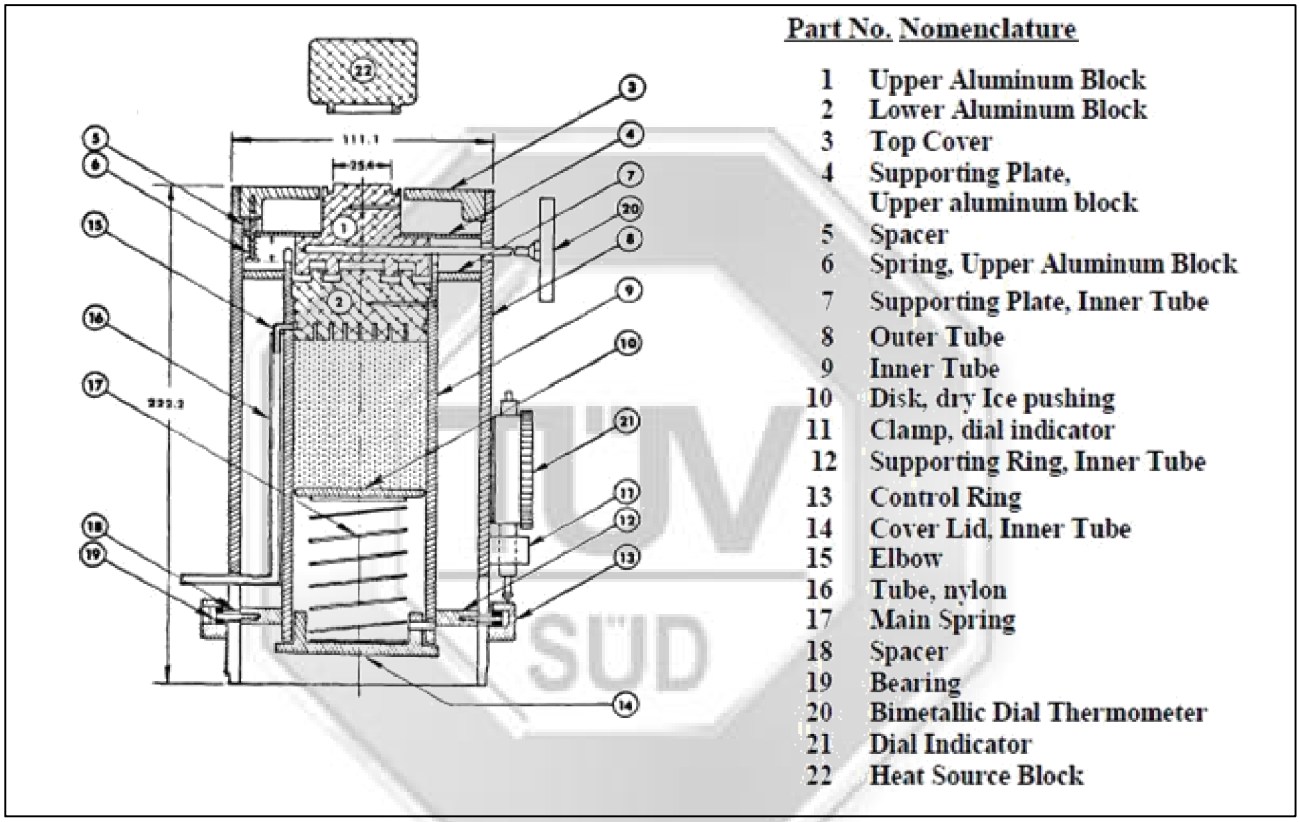


Fig. 1: Schematic drawing of frost/dew-point apparatus.

Test Procedure

1. Charge the apparatus with dry ice.
2. Using the heat source block, raise the temperature of measuring surface to a desired temperature range.
3. Attach the fixture and apparatus to the DGU glass surface.
4. Wet the measuring surface with acetone.
5. Observe the measuring surface when the temperature starts to drop at suitable intervals. The dew/frost point is the temperature at which visible condensation or frost first appears on the inner surface of the glass.
6. If dew/frost point cannot be checked from the other side of the unit, unhook the clamping spring and slide out the apparatus far enough to examine the exterior glass surface.

5. TEST RESULTS

Dew/Frost Point Measurements

Temperature: 28.8 °C Relative Humidity: 83.0 %

Sample	Date	Time	Temperature (°C)	Observation
1	29/05/2013	1126	25.4	No Condensation/Frost Observed
		1130	18.0	
		1136	9.8	
		1145	0	
		1149	-10.0	
		1153	-20.2	
		1158	-30.3	
		1205	-40.0	

6. PHOTOGRAPHS

Photo 1: DGU test sample

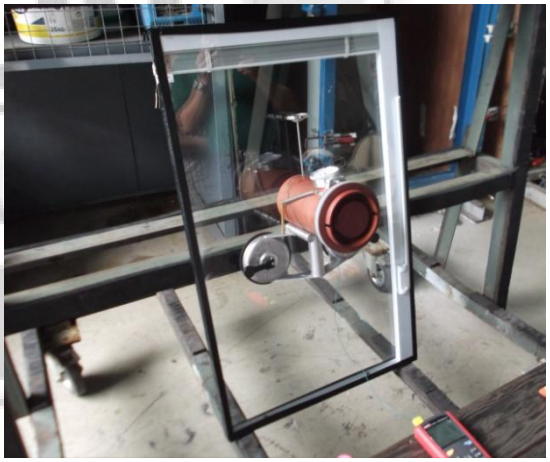
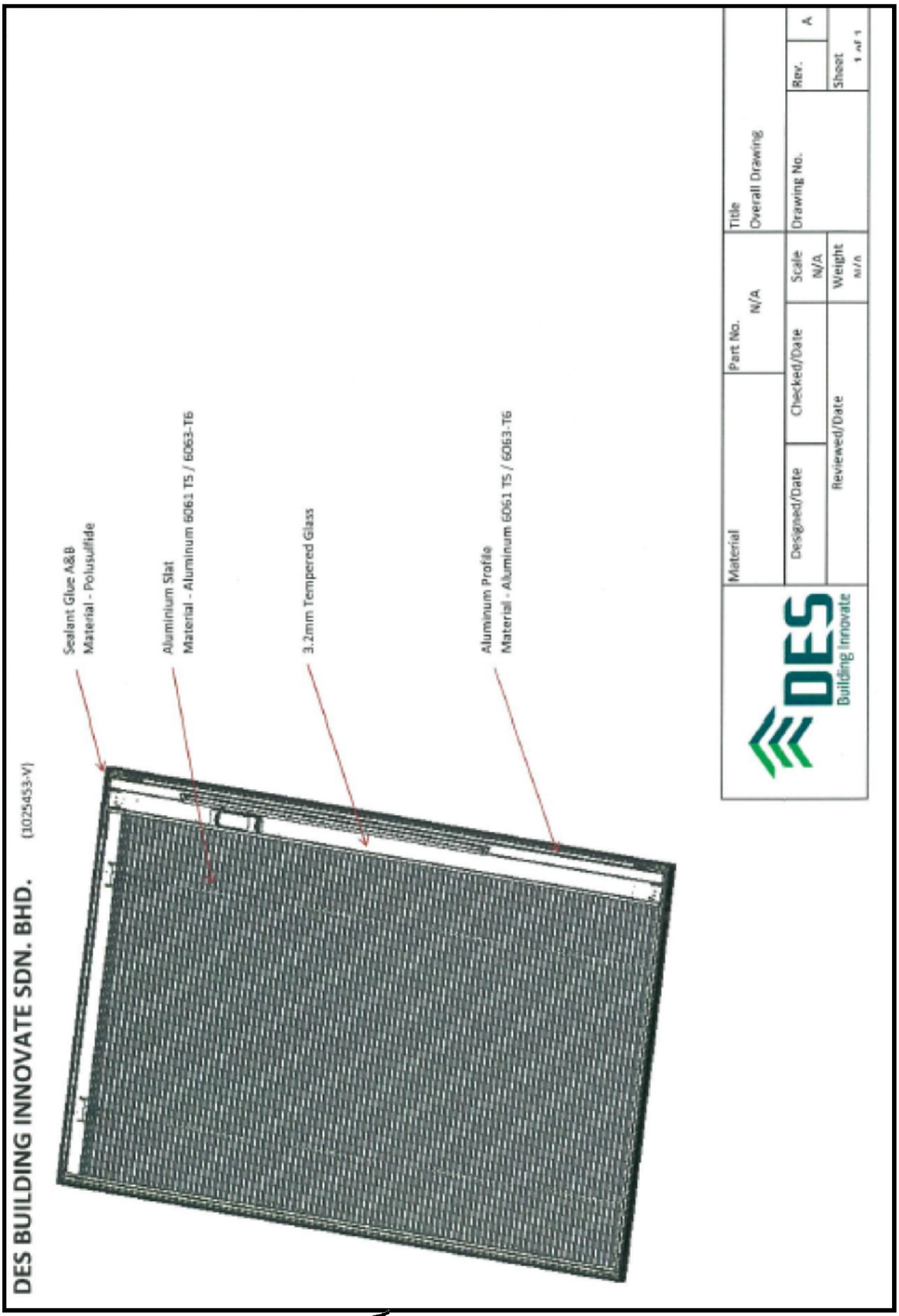


Photo 2: Test setup

Photo 3: Test temperature at 18 °C

Photo 4: Test temperature at -40 °C

7. DRAWING


DES BUILDING INNOVATE SDN. BHD.
(1025453-V)
Sealant Glue A&B
Material - Polusulfide
Aluminium Slat
Material - Aluminum 6061 T5 / 6063-T6
3.2mm Tempered Glass
Aluminum Profile
Material - Aluminum 6061 T5 / 6063-T6
DES
Building Innovate
Material
Part No.
N/A
Designed/Date
Checked/Date
Reviewed/Date
Scale
N/A
Weight
Title
Overall Drawing
Drawing No.
Rev.
A
Sheet
1 of 1

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July 2011