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## APPROVAL REPORT

**GLASS FIBER INSULATIONS WITH LAMTEC R-3035, R-3035 HD, R-3035 4x4, R-3035 5x5, WMP-F, WMP-VR, WMP-VR-R PLUS HD, WMP-10, WMP-30, WMP-50, ARENASHIELD & GYMGUARD FACINGS FOR USE AS CLASS 1 EXPOSED INTERIOR INSULATIONS IN METAL BUILDINGS**

**Prepared for:**

**U P TWIGA FIBERGLASS LIMITED  
"TWIGA HOUSE", 3 COMMUNITY CENTRE  
EAST OF KAILASH, NEW DELHI 110 065  
INDIA**

**Project ID: 3036266**

**Class: 4880**

**Date of Approval:** July 30, 2009

**Authorized by:** [Signature]

Richard P. Ferron, P.E., Assistant Vice President, Group Manager

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from

U P Twiga Fiberglass Limited  
“Twiga House”, 3 Community Centre  
East of Kailash, New Delhi 110 065  
India

**I INTRODUCTION**

1.1 U P Twiga Fiberglass Limited submitted their Twiga Insul Plus, Twiga Insul Prime, Twiga Insul FR and Twiga Insul + fiberglass insulations with Lamtec R-3035, R-3035 HD, R-3035 4x4, R-3035 5x5, WMP-F, WMP-VR, WMP-VR-R Plus HD, WMP-10, WMP-30, WMP-50, Arenashield and Gymguard facings and no facings to determine if they meet the approval requirements of the **Standard** listed below for use as Class 1 exposed interior insulations in metal buildings.

1.2 This Report may be reproduced only in its entirety and without modification.

1.3 **Standard:**

Title	Class Number	Date
Approval Standard for Class 1 Fire Rating of Insulated Wall or Wall and Roof/Ceiling Panels, Interior Finish Materials or Coatings, and Exterior Wall Systems	4880	October, 2005

1.4 Examination included a Room Test and an Ash Analysis. Lamtec Corporation released data from their Project I.D. # 3002339 for the purposes of this report. A description of the Room Test conducted in this program and the result is contained in the Project Data Record (PDR) for FM Approvals Project I.D. # 3002339.

1.5 Tests show that U P Twiga Fiberglass Limited’s Twiga Insul Plus, Twiga Insul Prime, Twiga Insul FR and Twiga Insul + fiberglass insulations with Lamtec R-3035, R-3035 HD, R-3035 4x4, R-3035 5x5, WMP-F, WMP-VR, WMP-VR-R Plus HD, WMP-10, WMP-30, WMP-50, Arenashield and Gymguard facings, or no facings, as tested meet the Approval requirements of the **Standard** listed above for Class 1 insulated wall or wall and roof/ceiling panels, interior finish materials or coatings, and exterior wall systems as outlined below.

1.6 **Listings:** The tested constructions meet the Approval criteria of FM Approvals when installed as specified in the **CONCLUSIONS** of this report. The products will be listed in RoofNAV and the Approval Guide, an online resource of FM Approvals.

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## II DESCRIPTION

- 2.1 Twiga Insul Plus, Twiga Insul Prime, Twiga Insul FR and Twiga Insul + are bonded faced or unfaced fiberglass insulation products. The Approved facers for use with these products are Lamtec R-3035, R-3035 HD, R-3035 4x4, R-3035 5x5, WMP-F, MP-VR, WMP-VR-R Plus, WMP-10, WMP-30, WMP-50, WCF-30, WCF-50, Arenashielf or Gymguard. The facers are adhered to the insulation with BONDMASTER 40-0857 adhesive.
- 2.2 All other components are as described in RoofNav or the Approval Guide, an online resource of FM Approvals.

## III EXAMINATIONS AND TESTS

- 3.1 Samples were submitted for examination and testing as follows:
  - 3.1.1 Tests conducted were as required by the **Standard** listed in paragraph 1.3 above for Class 1 fire classification for installation to a maximum height of 30 ft. (9.1 m). All other tests were waived based on data release provided.
  - 3.1.2 All materials except those in Section II were produced under the FM Approvals Facilities and Procedures Audit program as indicated by FM Approval labels. All samples were considered to be representative of standard production and were examined and tested as indicated below.
  - 3.1.3 All components incorporated into test samples were selected by FM Approvals personnel. Test samples were prepared by, or under the supervision of, FM Approvals personnel.
  - 3.1.4 All data is on file at FM Approvals under Project I.D. # 3036266 along with other documents and correspondence applicable to this program.
- 3.2 Room Fire Test (conducted under Project I.D. # 3002339)
  - 3.2.1 A room fire test was conducted in accordance with Uniform Building Code Standard No. 26-3 (formerly 17-3) "Room Fire Test Standard for Interior of Foam Plastic Systems".
    - 3.2.1.1 The room fire test was conducted in a room sheathed on the ceiling and all four walls with glass fiber faced gypsum board secured to wood framing. A 2 ft 6 in. (760 mm) wide by 7 ft 0 in. (2135 mm) high door was located in one 8 by 8 ft (2440 by 2440 mm) wall (front). Sample insulation blankets were installed vertically on the 8 by 8 ft (2440 by 2440 mm) wall opposite the door (back) and the first 8 ft (2440 mm) of the adjacent 12 by 8 ft (3660 by 2440 mm) wall (left). Sample insulation blankets were installed on the first 8 ft (2440 mm) of the 8 ft (2440 mm) high ceiling adjacent to the left and back walls parallel to the 8 ft (2440 mm) dimension. Sample insulation blankets were held in place with horizontal 3-1/2 in. (90 mm) deep steel studs spaced approximately 4 ft (1220 mm) on center representing steel girts and 3.5 in. (90 mm) deep steel studs spaced approximately 4 ft (1220 mm) on center parallel to the 12 ft (3660 mm) room dimension representing purlins, secured through the sample insulation blankets to the wood framing behind the gypsum sheathing with 8 in. (205 mm) long self drilling screw. The sample insulation blanket sidejoints were stapled, rolled and stapled. The finished interior of the room after sample installation was 12 ft (3660 mm) long by 8 ft (2440 mm) wide by 8 ft (2440 mm) high.

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- 3.2.1.2 The exposure fire was a 15 by 15 in. (380 by 380 mm) 29.6 lb. (13.5 kg) crib of 1-1/2 in. (38 mm) square Douglas fir sticks conditioned to a moisture content of 7.7% placed at the intersection of the sample covered walls 1 in. (25 mm) from the interior of the sample insulation blankets and 3 in. (76 mm) above the noncombustible floor. The exposure fire was ignited using 1 lb. (0.45 kg) of shredded wood excelsior and 4 oz. (0.12 l) of ethanol.
- 3.2.1.3 The exposure fire was removed from the corner location 15 minutes after ignition and extinguished with water.
- 3.2.1.4 A video tape of the room fire test was taken through the door opposite the exposure fire. Temperature readings were taken at 1 second intervals using thermocouples located 3, 5 and 7 ft (915, 1525 and 2135 mm) above the floor 3 in. (76 mm) from the adjacent interior wall surfaces above the exposure fire and 1 in. below the ceiling at the center of the 8 by 8 ft (2440 by 2440 mm) sample ceiling area.
- 3.2.1.5 Performance in the room fire test is satisfactory if charring of the blanket facings and glass fiber insulation does not extend to the outer extremities of the test area within 15 minutes of the ignition of the excelsior and smoke levels generated during the test are not excessive.
- 3.2.2 Two 48 in. (1220 mm) wide by 50 ft (15 m) long by 6-3/8 in. (160 mm) thick sample insulation blankets with WMP-30 facings were supplied and installed as described in 3.2.1.1 above.
- 3.2.3 The results of the Uniform Building Code Standard No. 26-3 room test were as follows:
- 3.2.3.1 Visual observations during the test period were as follows:

<u>Time(min:sec)</u>	<u>Observation</u>
0:00	Ignition of exposure fire.
0:34	Ignition of blanket facings immediately behind the exposure fire to approx. 3ft (900 mm)
1:30	Exposure flames to approx. 5 ft (1500 mm), moderate smoke to 1-1/2 ft (460 mm) below the top of the door frame.
2:17	Exposure flames to approx. 7 ft (2100 mm), blanket facings immediately behind the exposure fire continue to burn.
3:10	Exposure flames to approx. 7 ft (2100 mm), light smoke to approx. 1-1/2 ft (460 mm) below the top of the door frame.
3:33	Flaming intermittently to ceiling, very light smoke.
4:45	Flaming to ceiling, blanket facings behind the exposure fire are blackened floor to ceiling for approx. 2 ft (600 mm) from the corner and in a circular pattern approx. 2 ft (600 mm) onto the ceiling, light smoke.
6:50	Flaming intermittently to ceiling, blanket facings no longer involved.
8:24	Flaming to between 7 ft (2130 mm) and the ceiling, very light smoke.
9:19	No observable changes from last observation.
10:09	Flaming between 7 ft (2130 mm) and the ceiling, light smoke, blanket facings are not involved.
12:25	No observable changes from last observation.
14:22	Flaming to ceiling, crib about to collapse, light smoke.
15:00	Test terminated, exposure fire extinguished with water.
Note:	Ignition of the blanket facings on the ceiling was not observed during the test.

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- 3.2.3.2 Upon examination of the test blankets after the room fire test, no charring of the blanket facings was observed more than 4 ft (1.2 m) from the ignition corner. There was no charring of the glass fiber insulation substrate behind the facings.
- 3.2.3.3 Smoke levels generated by the test blankets during the test period were not considered excessive.
- 3.2.3.4 See Appendix A for a record of temperatures recorded at the thermocouple locations outlined in 3.2.1.4 above.
- 3.2.3.5 A videotape (8 mm format) is on file in the Technical Information Center at FM Approvals under J.I. 3002339.

3.3 Ignition Residue (Ash Test)

- 3.3.1 The ignition residue of the Twiga Insul Plus, Twiga Insul Prime, Twiga Insul FR and Twiga Insul + fiberglass insulation was determined in accordance with ASTM D482-07, Test Method for Ash from Petroleum Products.
  - 3.3.1.1 Performance is satisfactory if the ignition residue of the fiberglass insulation without adhesive or facers is greater than or equal to 91% (maximum 9% loss on ignition).
- 3.3.2 Test specimens were removed from fiberglass insulation samples taken during the production run of the samples observed during the first audit. Four samples of the insulation were tested.
- 3.3.3 The residue left after ignition of each test specimens was as follows:

Sample No.	Density, lb/ft <sup>3</sup> (kg/m <sup>3</sup> )	Thickness, in. (mm)	Percent Ash (by weight)	Loss on Ignition (%)
1	5.0 (80)	0.5 (12)	96.37	3.63
2	2.0 (32)	0.5 (12)	96.10	3.90
3	0.6 (10)	4.0 (100)	96.51	3.49
4	3.0 (48)	4.0 (100)	95.86	4.14

The test samples met the requirement of maximum 9% loss on ignition.

**IV MARKING**

- 4.1 The manufacturer shall mark each roll or shipping unit with the manufacturer's name and product trade name. In addition, the roll or shipping unit must be marked with the Approval Mark of FM Approvals.
- 4.2 Markings denoting Approval by FM Approvals shall be applied by the manufacturer only within and on the premises of manufacturing locations which are under the FM Approvals Facilities and Procedures Audit program.
- 4.3 The manufacturer agrees that use of the FM Approvals name or Approval Mark is subject to the conditions and limitations of the Approval by FM Approvals. Such conditions and limitations must be included in all references to Approval by FM Approvals.

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**V REMARKS**

The glass fiber blankets, adhesive and facings have not been evaluated for the toxicity of the products of combustions.

**VI FACILITIES AND PROCEDURES AUDITS**

The U P Twiga Fiberglass Limited manufacturing location in Dist. Thane, Maharashtra, India and the Lamtec Corporation's manufacturing location in Flanders, NJ are subject to periodic audit inspections to determine that the quality and uniformity of the materials has been maintained and will provide the same level of performance as originally Approved by FM Approvals. The facilities and quality control procedures in place have been found to be satisfactory to manufacture product identical to that examined and tested as described in this report.

**VII MANUFACTURER'S RESPONSIBILITIES**

- 7.1 To assure compliance with their procedures in the field, the manufacturer shall supply to the installer such necessary instruction or assistance required to produce the desired performance achieved in the tests.
- 7.2 The manufacturer shall notify FM Approvals of any planned change in the Approved products prior to general sale or distribution, using Form 797, Approved Product Revision Report.

**VIII DOCUMENTATION**

The following document describes Twiga Insul Plus, Twiga Insul Prime, Twiga Insul FR and Twiga Insul + fiberglass insulations and is filed under Project ID 3036266.

<u>Document</u>	<u>Issue or Revision</u>	<u>Description</u>
Facilities & Procedure Audit Manual @ Maharashtra, India	July 2009	Manufacture of Twiga Insul Plus, Twiga Insul Prime, Twiga Insul FR and Twiga Insul +

**IX CONCLUSIONS**

- 9.1 Test results indicate that maximum 4 in. (100 mm) thick Twiga Insul Plus, Twiga Insul Prime, Twiga Insul FR and Twiga Insul + unfaced or faced with Lamtec R-3035, R-3035 HD, R-3035 4x4, R-3035 5x5, WMP-F, WMP-VR, WMP-VR-R Plus HD, WMP-10, WMP-30, WMP-50, Arenashield and Gymguard facings meet the FM Approvals Standard 4880 (2005) Approval requirements for Class 1 fire classification of exposed interior insulation systems for installation in metal buildings to a maximum height of 30 ft (9.1 m).
- 9.2 Twiga Insul Plus, Twiga Insul Prime, Twiga Insul FR or Twiga Insul + is installed horizontally or vertically, facing side to the interior when faced, on metal building walls over steel studs or girts prior to the installation of the exterior metal siding. It is held in place when the siding is secured

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through the blankets into the studs or girts. Twiga Insul Plus, Twiga Insul Prime, Twiga Insul FR or Twiga Insul + is installed facing side to the interior (down), when faced, on metal building ceilings over steel purlins or joists prior to the installation of the metal roofing. It is held in place when the roofing is secured through the blankets into the purlins or joists. The windstorm classification for the roof assemblies is that of the metal roof assembly.


- 9.2 Tests show that the tested roof constructions in and of themselves would not create a need for automatic sprinklers.
- 9.3 Since a duly signed Master Agreement is on file for this customer, Approval is effective as of the date of this report.
- 9.4 Continued Approval will depend upon satisfactory field experience and periodic Facilities and Procedures Audits.

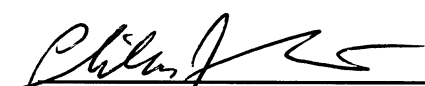
**TESTING SUPERVISED BY:** J.M. Goodwillie, Jr, Travis Heath

**PROJECT DATA RECORD:** Project I.D.: 3036266

**ORIGINAL TEST DATA:** Project I.D.: 3002339

**ATTACHMENTS:** Test #01 Lamtec Corporation Room 832-6232-66 - 8-27-1999

**REPORT BY:**   
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**REPORT REVIEWED BY:**   
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**Appendix A**

**Attachment: Test #01 Lamtec Corporation Room 832-6232-66 -8-27-1999**

**Test #01 Lamtec Corporation Room 832-6232-66 08-27-1999**  
**Job Index # 30023.39**  
**1032 Scans**

