PRE INSULATED
DUCT SYSTEM

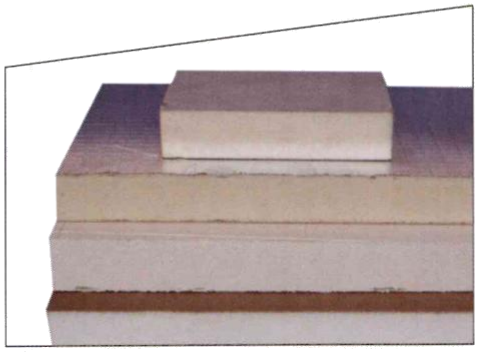
EASY PRE-INSULATED DUCT

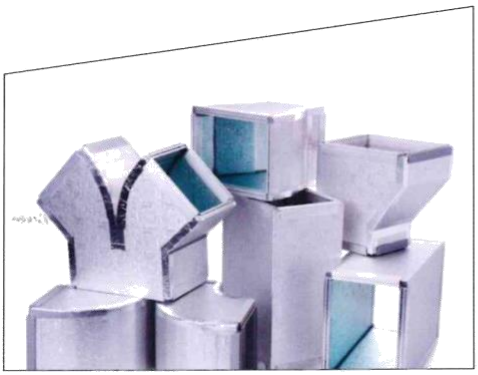
(MADE IN UAE)

BUILDING INSULATION

Thermal INSULATION

- ISO 9001, ISO 14001 & OHSAS 18001 certified
- Manfactured in accordance with BS EN 13165:2012
- Used for floor, roof, wall & wall cavities
- Insulation for EIFS / ETICS systems
- Insualtion boards available in Unfaced, Kraft, Aluminium & Fiberglass tissue facing



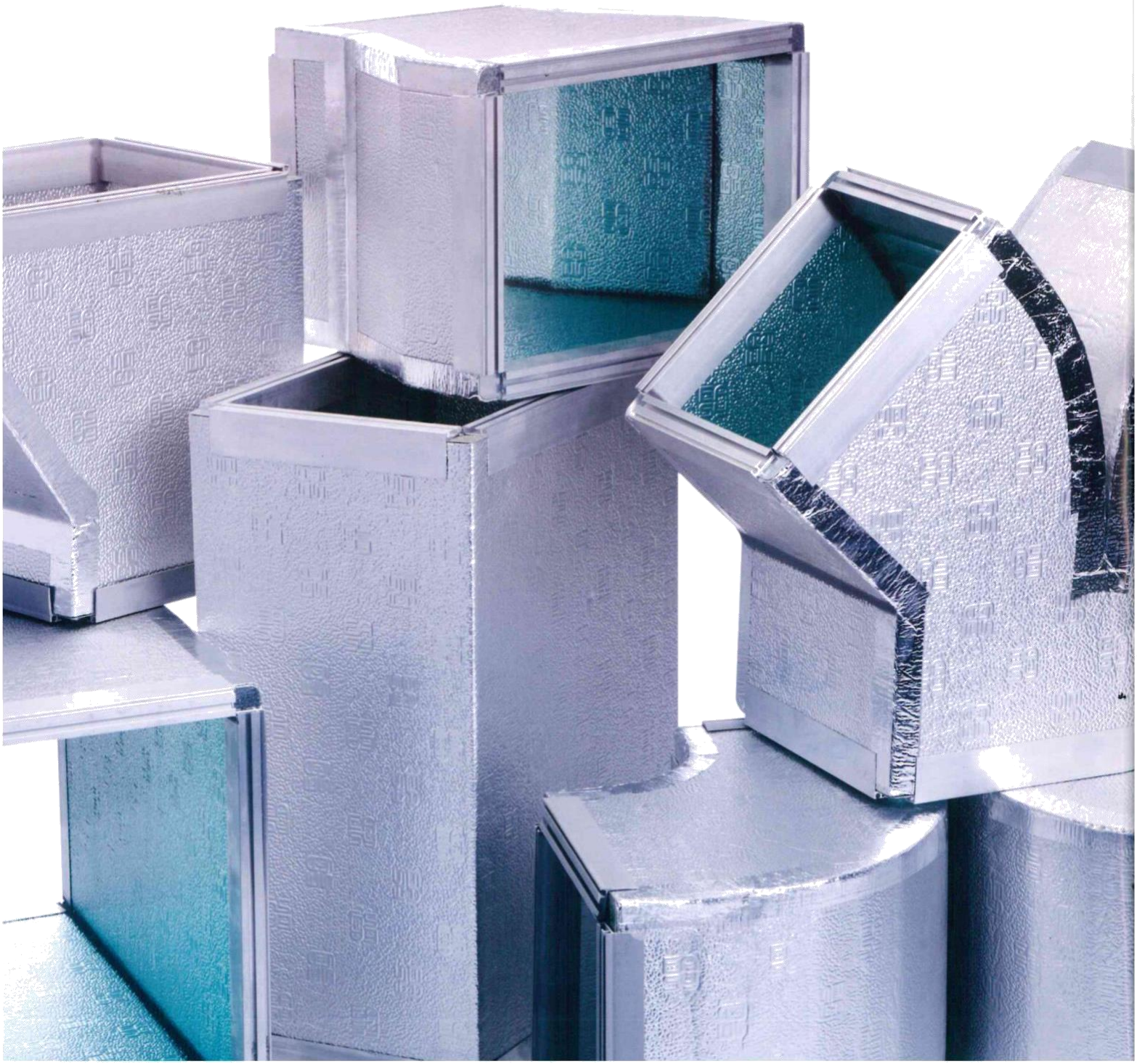


PRE INSULATED DUCT SYSTEM

- Lightweight, easy to fabricate and install
- Better thermal insulation properties
- Can be easily assembled at sites
- Better indoor air quality
- Complies to EN, BS, NES, ASTM
- DCL, DCD & ISO Certified
- UL GreenGuard accreditation

EASY®

PRE INSULATED DUCT SYSTEM



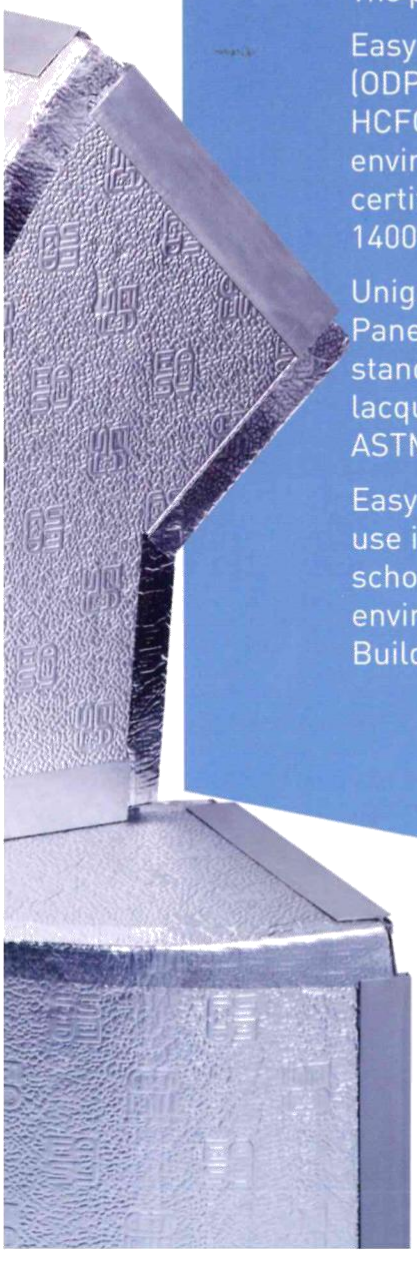
Since its inception in 2004, Unigulf Air Conditioning Industries LLC has built a strong reputation for its quality and efficiency. With the latest technology machines installed at its state-of-the-art manufacturing facilities in Dubai, the company produces pre-insulated panels which are used for fabricating ducts.

Unigulf adheres to stringent quality checks throughout the production process, to ensure that the panel production meets the highest standards. The manufacturing process is supervised by a team of credible and highly experienced professionals. The panels go through intensive quality checks, carried out by the Quality Control Department to ensure it meets the requirements of various markets. Unigulf has a dedicated in-house R&D team, giving the company the possibility of introducing better grades of polyols. This hence enables the products to comply with BS, EN, ASTM, UL standards and also comply with the local regulatory safety codes. The products are also DCL and DCD accredited.

Easy Panels have a Zero Ozone Depletion Potential (ODP), low Global Warming Potential and are CFC/HCFC free, thus preventing any harm to the environment. Unigulf Air Conditioning L.L.C has a certified Management System of ISO 9001: 2015, ISO 14001: 2015 and OHSAS 18001: 2007.

Unigulf also manufactures Easy + Pre Insulated Panels which meet the highest health and safety standards. These panels have a special antimicrobial lacquering, which has been evaluated according to ASTM G 21-13, ISO 22196: 2011 and ASTM E 2180.

Easy + Pre Insulated Panels are recommended for use in various industries like food processing, schools, health care facilities, cleanrooms, controlled environments and comply with modern-day Green Building Regulations



FEATURES

Third party assessments:

- UL GREENGUARD GOLD for Chemical Emission for Building Materials, Finishes and Furnishings.
- DCLD – Certificate of Product Conformity 2010 Al Safat Regulations and Specifications.
- Superior Thermal Conductivity (λ) 0,021 W/m K, the closed cell structure being more than 95% and meets the requirement of BS 5422: 2009.
- CFC/HCFC free. Tested by reputed Labs.
- EASY+ Pre-insulated panels are Antimicrobial treated for use in clean room applications.
- EASY Pre-insulated duct system is tested as per UNI EN 13403 : 2004 standars ("Ventilation for buildings – Non- metallic ducts – Duct works made from Insulation duct boards") for airtightness, stiffness and pressure resistance.
- Sound Absorption: Class "E" when tested in accordance with UNI EN ISO 354:2003
- Fire & Smoke Performance: EASY pre-insulated panels are certified as per EN 13501, ASTM E 84 (UL 723, NFPA 255) and BS 476 Part 6 & 7.
- Additional certification: NES 713 (Determination of Toxicity), IMO resolution MSC 61 (67) (Smoke & Toxicity) and ISO 5659 (Smoke generations determination of Optical Density).

CATALOGUE

PRE INSULATED DUCT SYSTEM

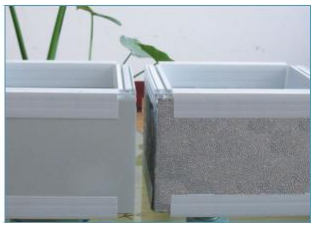
Features and Benefits

Hygiene & Air Quality

- No release of particles due to internal aluminum surface
- Improved Air Quality as the aluminum surface prevents growth of bacteria and fungi.

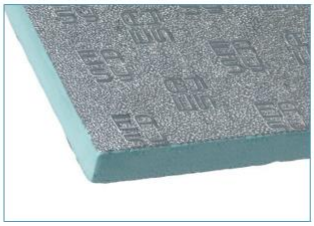
Air Seal

- Invisible flanging system ensures low level of Air Leaks when compared to conventional ducts.
- Elimination of the longitudinal leaks and the reduction of ones at the transversal junction.



Superior thermal Insulation

- High thermal insulation with closed cell structure and superior thermal conductivity @ λ 0.021 W/(m₀C)



type of material	Term. Conduct λ (10₀C)(W//(m₀C))
Fiber Glass	0.034
Nitrile Rubber	0.034
Easy Panel	0.021

Fire Resistance

- Self extinguishing properties,
- low fire participation
- No flaming droplets

Construction

- Possibilities to fabricate & repairs of ducts at workshop or directly at site.
- Ease of transport

Installation

- Lightness of Easy PID ensures easy installation and reduced weight on the structures.
- Less labor time and materials cut the cost of installation.

Environmental Friendly

- CFC- free production makes EASY PID environmentally friendly and eligible to green building concept.

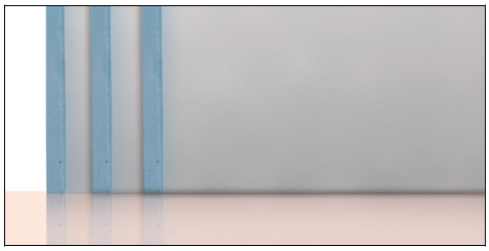
Economical

- Low thermal values and reduced air leakage helps in Energy saving and operating cost.
- Competitive compared to traditional ducts.

Types of Panels

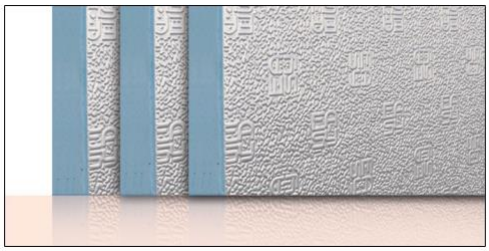
Conditioned Area Application

EZ–12AP21 CONDITIONED AREA PANEL	
Size Of The Panel	4000 X 1200 mm
Thickness Of The Panel	20.5 mm
Thickness internal/external aluminium	80 / 80 µm
Finish Of The Aluminium	Embossed



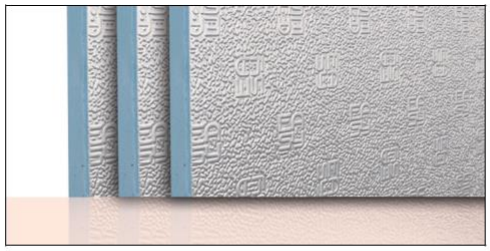
EZ–12ASP21 CONDITIONED AREA PANEL	
Size Of The Panel	4000 X 1200 mm
Thickness Of The Panel	20.5 mm
Thickness internal/external aluminium	80 / 80 µm
Finish Of The Aluminium	Embossed / Smooth

Unconditioned Area Application



EZ–12AS31 UNCONDITIONED AREA PANEL	
Size Of The Panel	4000 X 1200 mm
Thickness Of The Panel	30 mm
Thickness internal/external aluminium	80 / 200 µm
Finish Of The Aluminium	Embossed /Embossed

EZ–12AR31 UNCONDITIONED AREA PANEL	
Size Of The Panel	4000 X 1200 mm
Thickness Of The Panel	30 mm
Thickness internal/external aluminium	80 / 80 µm
Finish Of The Aluminium	Embossed /Embossed



EZ–12AS21 UNCONDITIONED AREA PANEL	
Size Of The Panel	4000 X 1200 mm
Thickness Of The Panel	20.5 mm
Thickness internal/external aluminium	80 / 200 µm
Finish Of The Aluminium	Embossed /Embossed

Certification Available:

- British Standard 476 part 6
- British Standard 476 part 7
- NES 713 toxicity index
- Third Party supervision ‘Certifier’ (CF 777) • CFC / HCFC free
- CertificateAntifungal CertifiedofThermal conductivity
- Dubai Central Laboratory Approved
- IMO CertifiedMSC67 (61)
- UL - 723 (ASTM E84)
- UL Greenguard
- Dubai Civil Defence

Technical Data Sheet

EZ-12AP21 / EZ-12ASP21 / EZ-12AS31 / EZ-12AR31 / EZ-12AS21

DESCRIPTION

Sandwich panels made of an insulating component in rigid PUR / PIR foam and laminated on both sides with embosed aluminium foil.

UTILIZATION

These panels are suitable for the construction of air-distribution ducts in air-conditioning and heating systems.

DIMENSION AND TOLERANCE

The standard production thickness are of 20.5 mm & 30mm with a tolerance of + / - 0.5 mm (within the tolerance foreseen by ISO 1923 standard). The standard production length is of 4000 mm with a tolerance of + / - 5 mm (within the tolerance specified by ISO 1923 standard).

The standard production width is of 1200 mm with a tolerance of + / - 3 mm (within the tolerance specified by ISO 1923 standard). The squaring operation is carried out with an accuracy of + / - 30°C. The fabricated duct can withstand a pressure of 1700 Pa.

INSULATING MATERIAL CHARACTERISTICS

The rigid foamed PUR / PIR of which these panels are made is a result of a chemical reaction between specifically formulated, first quality polyols and isocyanates. The polymer obtained from the specific reaction (which involves the transition from the liquid to the solid state) is physiologically and chemically inert, insoluble and unable to be metabolized.

The density of the panels with a thickness of 20mm foamed PUR / PIR is of 45 kg/m_3 with a tolerance of + / - 3 kg/m_3 panels with a thickness of 30mm foamed PUR / PIR is of 48 kg/m_3 with a tolerance of + / - 2 kg/m_3.

The sheathing is made up of embosed aluminium with a thickness of 80 µm and 200 µm on both sides of the panels depending on the type: this sheathing is coated with a lacquer based on vinyl resin on one side and on the other by thermo-welding lacquer based on vinyl resin. The panels are antifungal, treated for protection against mold, fungal and bacterial growth.

SPECIFIC HEAT CONDUCTIVITY

Thanks to the high number of closed cells, exceeding 95%, the foam of the panels has a coefficient of initial specific heat conductivity, measured according to ISO 8302 standard of 0,021 W/(m K) at the temperature of 10°C.

UTILIZATION TEMPERATURE

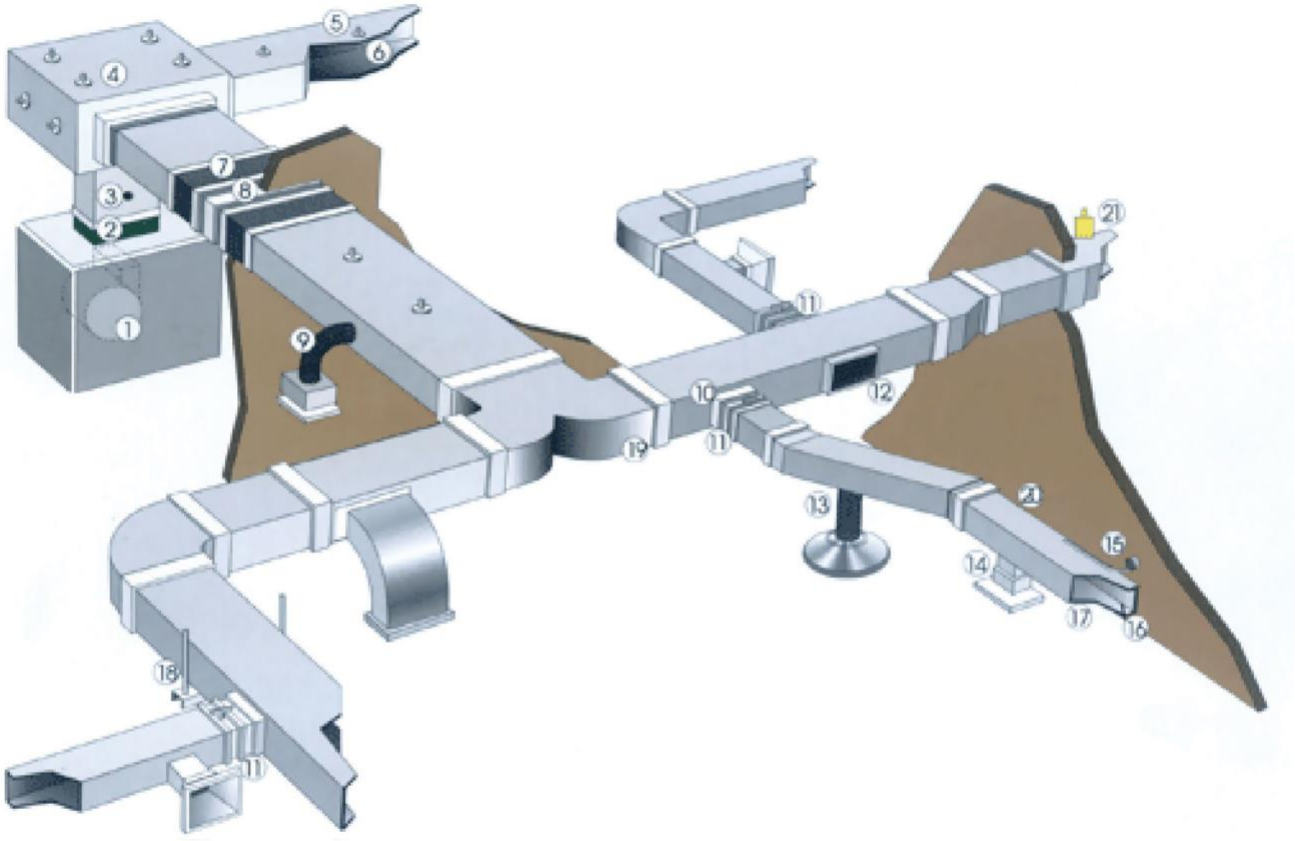
These panels can be used constantly in a temperature range from –30°C to +65°C without any substantial difference in thermo-ventilating insulation specifications.

PACKAGING

Delivery is made in packs of 10 panels for 20.5mm thick panels and standard packs of 7 panels for 30mm thick, packed with thermo-ventilating shrinkable polythene sheets.

WARNINGS

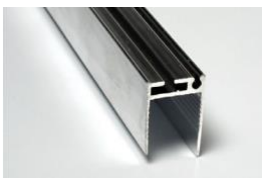
The information and data contained herein are based on the present technical knowledge and practical experience of manufacturer as well as on documentation considered reliable, but which has no binding value.



Invisible flange joint and tee connector

EZ-F102LO - Invisible flange joint aluminum 20 mm

This special alumiunium flange permits 20 mm th. ducts to be joined with extremely low leakage. The bars are supplied in 4 meter lengths.



EZ-FI03L0 - Invisible flange joint aluminum 30 mm

This special alumiunium flange permits 30 mm th. ducts to be joined with extremely low leakage. The bars are supplied in 4 meter lengths.

EZ-FI12L0 - Invisible flange joint polymer 20 mm

This special alumiunium flange permits 20 mm th. ducts to be joined with extremely low leakage. The bars are supplied in 4 meter lengths.

EZ-FT02LO / EZ-FT03LO - Tee connector flange joint 20/30 mm

This flange permits the flanging of one duct into the side of another take-offs as tap-in or plenum chamber. The bars are supplied in 4 meter length.

EZ-FHOOLO - H polymer bayonet

Built in shock-resistant polymer, this piece permits “invisible fl anges” to be connected. Supplied in 4 meter rods.

EZ-AP92LO / EZ-AP93LO - Covering angle 20/30 mm

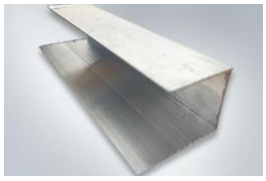
Grey polymer covering angle.

EZ-AZ92LO / EZ-AZ93L0 - Zinc-coated steel angle bracket 20/30 mm

1.5 mm thick zinc-coated steel angle bracket.

EZ-FU02LO / EZ-FU03LO18 - “U” Section bar in aluminium 20/30 mm

Used for fastening of anti-vibration joints, grills and volume control dampers. Supplied in 4 meter rods.



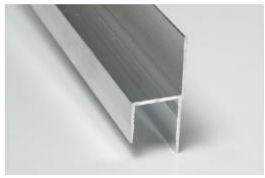
AHU & Grilles connections

EZ-FF02LO / EZ-FF3L0 - " F" section bar in aluminium - 20/30 mm

Permits all accessories with fastening frames higher than 20 mm to be fastened to the ducts. Supplied in 4 meter rods.

EZ-FC02L0 / EZ-FC03L0 - Chair section bar in aluminium - 20/30 mm

Used to fasten ducts to air handling units and in the assembly of linear diffusers. This section bar is supplied in 4 meter rods.



Reinforcement

EZ-FR00L0 - Reinforcement section bar in aluminium

Special high stiffness aluminium alloy reinforcement section bar.
Bars are supplied in 4 meters rods.

EZ-AD90L0 - Aluminium shaped disk

Aluminium disk to distribute the pressure created at the centre over a wider surface to prevent damage to the panel. Disk diameter 100mm, hole diameter 10 mm.

EZ-ASC230 Self threading screws

Hexagon head self-threading screws with washer. Used to fasten reinforcement section bars, wing-profile turning vanes and splitters in elbows, etc.

VCD (Volume Control Damper)

To maintain or control the air volume inside the duct. Specifically designed for low pressure duct system.

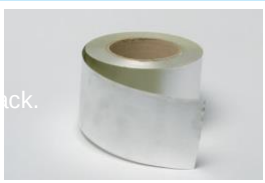
Glues, tapes and sealants

EZ-AG 90L0 - Paint glue 15 kg

Special glue formulated to obtain perfect adhesion on easy panels foam. The product is supplied ready-to-use. Diluition is possibile with special solvent

EZ-AT89L0 / 90LO - Easy aluminum tape

Self-adhesive aluminium tape to use in the construction of the ducts.



EZ-AS90L0 - Duct sealant

Single component silicone sealant. 280 cc stick.

EZ-AG85L0 - Profi les glue

Medium-viscosity adhesive for the gluing of aluminium and Polymer section bars. 500 gr pack.

ISO CERTIFICATE

Certificate

Standard **ISO 9001:2015**

Certificate Registr. No. **01 100 1444848/01**

Certificate Holder: **Unigulf Air Conditioning Industries LLC**
Plot 597-580, P.O. Box – 116145,
Street No. 13, DIP – 2, Dubai,
United Arab Emirates

Scope: Fabrication of Pre-Insulated Ducts & Manufacture of Pre-Insulated Duct Panel and Building Insulation Boards.

Proof has been furnished by means of an audit that the requirements of ISO 9001:2015 are met.

Validity: The certificate is valid in conjunction with the main certificate from 2020-03-26 until 2022-12-07.

2020-04-28

TÜV Rheinland Cert GmbH
Am Grauen Stein · 51105 Köln

www.tuv.com

DAkkS Deutsche Akkreditierungsstelle D-ZM-16031-01-00

TÜVRheinland®
Precisely Right.

Certificate

Standard **ISO 14001:2015**

Certificate Registr. No. **01 104 1622589/01**

Certificate Holder: **Unigulf Air Conditioning Industries LLC**
Plot 597-580, P.O. Box – 116145,
Street No. 13, DIP – 2, Dubai,
United Arab Emirates

Scope: Fabrication of Pre-Insulated Ducts & Manufacture of Pre-Insulated Duct Panel and Building Insulation Boards.

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Validity: The certificate is valid in conjunction with the main certificate from 2020-03-26 until 2023-01-15.

2020-04-28

TÜV Rheinland Cert GmbH
Am Grauen Stein · 51105 Köln

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TÜVRheinland®
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Certificate

Standard **BS OHSAS 18001:2007**

Certificate Registr. No. **01 113 1622589/01**

Certificate Holder: **Unigulf Air Conditioning Industries LLC**
Plot 597-580, P.O. Box – 116145,
Street No. 13, DIP – 2, Dubai,
United Arab Emirates

Scope: Fabrication of Pre-Insulated Ducts & Manufacture of Pre-Insulated Duct Panel and Building Insulation Boards.

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Validity: The certificate is valid in conjunction with the main certificate from 2020-03-26 until 2021-03-11.

2020-04-28

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Certificate Registr. No. **01 100 1444848**

Certificate Holder: **Unigulf Air Conditioning Industries LLC**
Plot 597-580, P.O. Box – 116145,
Street No. 13, DIP – 2, Dubai,
United Arab Emirates

including the branch offices according to annex

Scope: Fabrication of Pre-Insulated Ducts & Manufacture of Pre-Insulated Duct Panel and Building Insulation Boards.
Trading of Refrigeration, Air Conditioning, Ventilation, Equipment Parts and Accessories.

Proof has been furnished by means of an audit that the requirements of ISO 9001:2015 are met.

Validity: The certificate is valid from 2020-03-26 until 2022-12-07.
First certification 2011

2020-04-28

TÜV Rheinland Cert GmbH
Am Grauen Stein · 51105 Köln

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Certificate

Standard **ISO 14001:2015**

Certificate Registr. No. **01 104 1622589**

Certificate Holder: **Unigulf Air Conditioning Industries LLC**
Plot 597-580, P.O. Box – 116145,
Street No. 13, DIP – 2, Dubai,
United Arab Emirates

including the branch offices according to annex

Scope: Fabrication of Pre-Insulated Ducts & Manufacture of Pre-Insulated Duct Panel and Building Insulation Boards.
Trading of Refrigeration, Air Conditioning, Ventilation, Equipment Parts and Accessories.

Proof has been furnished by means of an audit that the requirements of ISO 14001:2015 are met.

Validity: The certificate is valid from 2020-03-26 until 2023-01-15.
First certification 2017

2020-04-28

TÜV Rheinland Cert GmbH
Am Grauen Stein · 51105 Köln

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Deutsche Akkreditierungsstelle D-ZM-16031-01-00

TÜVRheinland®
Precisely Right.

Certificate

Standard **BS OHSAS 18001:2007**

Certificate Registr. No. **01 113 1622589**

Certificate Holder: **Unigulf Air Conditioning Industries LLC**
Plot 597-580, P.O. Box – 116145,
Street No. 13, DIP – 2, Dubai,
United Arab Emirates

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Validity: The certificate is valid from 2020-03-26 until 2021-03-11.
First certification 2017

2020-04-28

TÜV Rheinland Cert GmbH
Am Grauen Stein · 51105 Köln

www.tuv.com

DAkkS Deutsche Akkreditierungsstelle D-ZM-16031-01-00

TÜVRheinland®
Precisely Right.

COUNTRY OF ORIGIN

TO WHOM IT MAY CONCERN

Please be noted that the Easy Pre-Insulated Panels (EZ-12AP21, EZ-12ASP21, EZ-12AS31, EZ-12AR31, & EZ-12AS21) are produced and supplied from Unigulf Air-Conditioning Industries L.L.C – Details as follows:

M/S. UNIGULF AIRCONDITIONING INDUSTRIES L.L.C
DUBAI INVESTMENT PARK-2
P.O. Box 116145
Dubai, UAE.
Tel: +971-4-8208900

With Best Regards,
For Unigulf Air-Conditioning Industries L.L.C

Authorized Signatory

P.O.Box: 116145
DUBAI - U.A.E.
UNI GULF AIRCONDITIONING INDUSTRIES L.L.C

TESTING CERTIFICATES

1. **BS 476 PART 6 - Class "O" (Test By M/s. Exova Warringtonfire) (Method Of Test For The Fire Propagation For Products)**

2. **BS 476 PART 7 – Class "1"(Test By M/s. Exova Warringtonfire) (Method For Classification Of The Surface Spread Of Flame Of Products)**

3. **NES 713 (Test By M/s. Exova Warringtonfire) ("Determination of the toxicity index of the products of combustion from small specimens of materials")**

4. **IMO MSC 61(67) CERTIFICATE (Test By M/s. Exova Warringtonfire) ("Qualifying smoke generation and toxic potency of products")**

5. **CERTIFIRE – Third Party Supervision Certificate**

6. **UL-723 / NFPA 255-06 / ASTM E84-12 (Surface Burning Characteristics)**

7. **FUNGAL TEST REPORT (ASTM G21-96)**

8. **GREENGUARD CERTIFICATE**

9. **CFC / HCFC CERTIFICATE**

BS 476 PART 6 - Class “O”

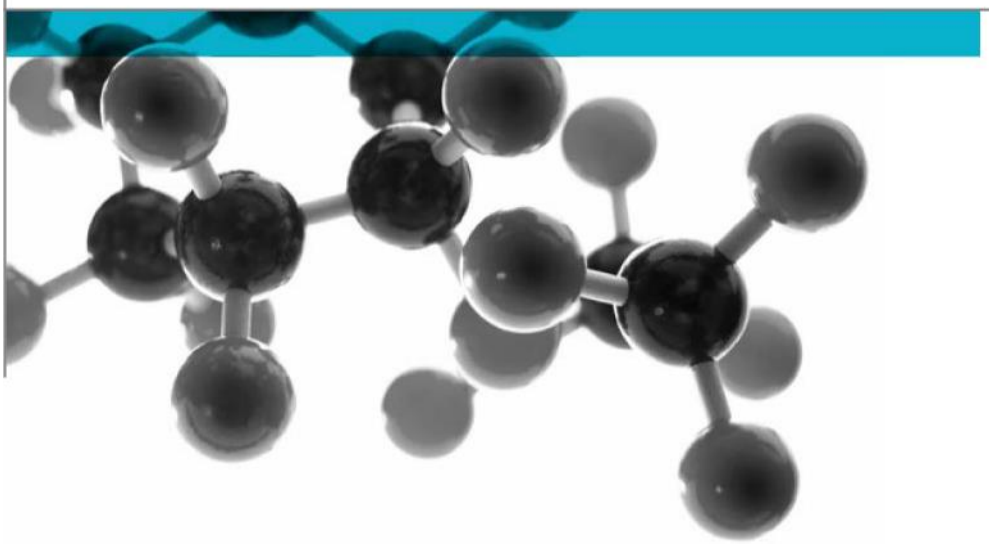
(Test By M/s. Exxova Warringtonfire)

(Method Of Test For The Fire Propagation For Products)

Exova Warringtonfire
Holmesfield Road
Warrington
WA1 2DS
United Kingdom

T : +44 (0 1925 655116
F : +44 (0) 1925 655419
E : warrington@exova.com
W: www.exova.com

BS 476: Part 6: 1989+A1:2009



Method Of Test For
Fire Propagation For Products

A Report To: Unigulf Air Conditioning Industries L.L.C.

Document Reference: 352589

Date: 16th June 2015

Issue No.: 1

Testing
Advising
Assuring

UKAS TESTING
0249

Executive Summary

Objective To determine the performance of the following product when tested in accordance with BS 476: Part 6: 1989+A1: 2009.

Generic Description	Product reference	Thickness	Weight per unit area or density
An aluminium foil faced ducting panel with flame retardant grade polyurethane insulating material	"12 AP 21 EASY DUCTING PANEL"	20.5±0.5mm	1.28 - 1.38kg/m²
Individual components used to manufacture composite:			
Foil (test face)	Unable to provide	80 microns	2700 - 2850kg/m³
Adhesive	Unable to provide	Unwilling to provide	Not stated
Foam	Unwilling to provide	20mm	45±3kg/m³
Please see pages 5 & 6 of this test report for the full description of the product tested			

Test Sponsor Unigulf Air Conditioning Industries L.L.C., P.O. Box: 116145, Dubai, U.A.E.

Test Results:

Fire propagation index, I	**=**	**7.5**
Sub index, i_1	**=**	**1.9**
Sub index, i_2	**=**	**4.5**
Sub index, i_3	**=**	**1.1**

Date of Test 13th March & 28th May 2015

Signatories

Responsible Officer C. Meachin * Technical Officer	Authorised S. Deeming * Business Unit Head

* For and on behalf of **Exova Warringtonfire**.

Report Issued: 16th June 2015

CONTENTS **PAGE NO.**

Test Details

Purpose of test	To determine the performance of a product when it is subjected to the conditions of the test specified in BS 476: Part 6: 1989+A1: 2009, "Fire tests on building materials and structures, method for fire propagation for products". The test was performed in accordance with the procedure specified in BS 476: Part 6: 1989+A1: 2009, and this report should be read in conjunction with that British Standard.
Scope of test	BS 476: Part 6: 1989+A1: 2009 specifies a method of test, the result being expressed as a fire propagation index, that provides a comparative measure of the contribution to the growth of fire made by an essentially flat material, composite or assembly. It is primarily intended for the assessment of the performance of internal wall and ceiling linings.
Fire test study group/EGOLF	Certain aspects of some fire test specifications are open to different interpretations. The Fire Test Study Group and EGOLF have identified a number of such areas and have agreed Resolutions which define common agreement of interpretations between fire test laboratories which are members of the Groups. Where such Resolutions are applicable to this test they have been followed.
Instruction to test	The test was conducted on the 13th March & 28th May 2015 at the request of Unigulf Air Conditioning Industries L.L.C., the sponsor of the test.
Provision of test specimens	The specimens were sampled by a representative of **Warrington Certification Ltd.** and these specimens were supplied by the sponsor of the test. **Exova Warringtonfire** was not involved in any selection or sampling procedure.
Conditioning of specimens	The specimens for testing to BS 476: Part 6: 1989+A1: 2009 together with the specimens for testing to BS 476: Part 7: 1997 were received on the 26th February & 26th May 2015. Prior to the tests, all of the specimens were conditioned to constant mass at a temperature of 23 ± 2°C and a relative humidity of 50 ± 5%. One specimen from the total sample submitted for test was selected for constant mass verification.
Form in which the specimens were tested	Composite - Combination of materials which are generally recognised in building constructions as discrete entities e.g. coated or laminated materials.
Exposed face	One of two identical faces of the specimens was exposed to the heating conditions of the test.

Description of Test Specimens

The description of the specimens given below has been prepared from information provided by the sponsor of the test. All values quoted are nominal, unless tolerances are given.

General description		An aluminium foil faced ducting panel with flame retardant grade polyurethane insulating material
Product reference		"12 AP 21 EASY DUCTING PANEL"
Name of manufacturer		Unigulf Air Conditioning Industries L.L.C.
Thickness		20.5±0.5mm (stated by sponsor) 20.65mm (determined by **Exova Warringtonfire**)
Weight per unit area		1.28 - 1.38kg/m² (stated by sponsor) 1.38kg/m^2 (determined by **Exova Warringtonfire**)
Product configuration		• Foil (test face) • Adhesive • Foam • Adhesive • Foil (reverse face)
Foil (Test face)	Generic type	Embossed aluminium
	Product reference	**See Note 1 Below**
	Detailed description	**See Note 1 Below**
	Name of manufacturer	**See Note 2 Below**
	Thickness	80 microns
	Density	2700 - 2850kg/m³
	Colour reference	"Silver / Aluminium"
	Flame retardant details	**See Note 1 Below**
Adhesive	General description	Heat sealing lacquer
	Generic type	**See Note 1 Below**
	Product reference	**See Note 1 Below**
	Name of manufacturer	**See Note 2 Below**
	Application rate	**See Note 2 Below**
	Application method	**See Note 2 Below**
	Flame retardant details	**See Note 1 Below**
	Curing process	**See Note 2 Below**
Foam	Generic type	Polyol and isocyanate
	Product reference	**See Note 2 Below**
	Detailed description	Polyurethane rigid foam made from polyol and isocyanate
	Name of manufacturer	Unigulf Air Conditioning Industries L.L.C.
	Thickness	20mm
	Density	45±3kg/m³
	Colour reference	"Blue"
	Flame retardant details	**See Note 2 Below**

Continued on next page

Brief description of manufacturing process	Manufactured in a continuous process. A mixture of liquid polyurethane is sprayed, foams up, solidifies and adheres to the two running aluminium foils which are maintained at specific distance apart depending upon required thickness of the composite panel.

Note 1: The sponsor was unable to provide this information.

Note 2: The sponsor was unwilling to provide this information.

The description of the specimens as given above is not as detailed as would usually be the case for descriptions included in **Exova Warringtonfire** test reports and the description may not fully comply with the requirements of the test standard. In all other respects however the tests were conducted fully in accordance with the requirements of the test standard and the test results are valid**.**

Test Results

Results

A total of three specimens were tested. The laboratory record sheet relating to each of the test specimens is appended to this report (refer to Tables 1, 2 and 3).

Throughout the test on each specimen careful observation was made of the product's behaviour within the apparatus and special note was taken of any of the phenomena listed in clause 9.2 of the Standard. None of the listed phenomena was observed and the test results on all three specimens tested were valid.

The following test results were obtained for the product.

Fire propagation index, I	**=**	**7.5**
Sub index, i_1	**=**	**1.9**
Sub index, i_2	**=**	**4.5**
Sub index, i_3	**=**	**1.1**

NOTE: If a suffix 'R' is included in the above fire propagation index, I, then this indicates that the results should be treated with caution.

Applicability of test result

The test results relate only to the behaviour of the test specimens of the product under the particular conditions of test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

The test results relate only to the specimens of the product in the form in which they were tested. Small differences in the composition or thickness of the product may significantly affect the performance during the test and may therefore invalidate the test results. Care should be taken to ensure that any product which is supplied or used is fully represented by the specimens which were tested.

Validity

The specification and interpretation of fire test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over five years old should be considered by the user. The laboratory that issued the report will be able to offer, on behalf of the legal owner, a review of the procedures adopted for a particular test to ensure that they are consistent with current practices, and if required may endorse the test report.

Table 1

Laboratory Record Sheet

FIRE PROPAGATION TEST - BS476:PART 6:1989+A1:2009

Specimen No. : 1 **Date : 13-Mar-15**

Time mins t	Specimen Temperature Deg C Ts	Calibration Temperature Deg C Tc	Ts-Tc/10t	Sub Index Of Performance
0.50	16	13	0.60	
1.00	24	19	0.50	
1.50	31	24	0.47	
2.00	36	28	0.40	
2.50	41	32	0.36	
3.00	47	37	0.33	2.66
4.00	87	72	0.38	
5.00	130	109	0.42	
6.00	180	136	0.73	
7.00	233	158	1.07	
8.00	267	174	1.16	
9.00	282	190	1.02	
10.00	283	198	0.85	5.63
12.00	284	214	0.58	
14.00	281	226	0.39	
16.00	275	233	0.26	
18.00	276	240	0.20	
20.00	274	248	0.13	1.57
Total Index of Performance S			**=**	**9.86**

SubIndex s1 **2.66**

SubIndex s2 **5.63**

SubIndex s3 **1.57**

Index of Performance S **9.86**

Table 2

Laboratory Record Sheet

FIRE PROPAGATION TEST - BS476:PART 6:1989+A1:2009

Specimen No. : 2 **Date : 13-Mar-15**

Time mins t	Specimen Temperature Deg C Ts	Calibration Temperature Deg C Tc	Ts-Tc/10t	Sub Index Of Performance
0.50	15	12	0.60	
1.00	23	17	0.60	
1.50	29	22	0.47	
2.00	33	28	0.25	
2.50	38	31	0.28	
3.00	44	36	0.27	2.46
4.00	80	69	0.28	
5.00	117	105	0.24	
6.00	156	129	0.45	
7.00	199	150	0.70	
8.00	245	167	0.98	
9.00	280	181	1.10	
10.00	291	193	0.98	4.72
12.00	284	210	0.62	
14.00	269	220	0.35	
16.00	262	230	0.20	
18.00	259	238	0.12	
20.00	259	241	0.09	1.37
Total Index of Performance S			**=**	**8.56**

SubIndex s1 **2.46**

SubIndex s2 **4.72**

SubIndex s3 **1.37**

Index of Performance S **8.56**

Table 3

Laboratory Record Sheet

FIRE PROPAGATION TEST - BS476:PART 6:1989+A1:2009

Specimen No. : 3 **Date : 28-May-15**

Time mins t	Specimen Temperature Deg C Ts	Calibration Temperature Deg C Tc	Ts-Tc/10t	Sub Index Of Performance
0.50	16	15	0.20	
1.00	21	20	0.10	
1.50	26	25	0.07	
2.00	29	30	0.00	
2.50	33	33	0.00	
3.00	38	36	0.07	0.43
4.00	71	68	0.08	
5.00	114	103	0.22	
6.00	165	126	0.65	
7.00	197	144	0.76	
8.00	217	163	0.68	
9.00	223	174	0.54	
10.00	224	184	0.40	3.32
12.00	220	201	0.16	
14.00	221	209	0.09	
16.00	226	219	0.04	
18.00	228	225	0.02	
20.00	226	227	0.00	0.30
Total Index of Performance S			**=**	**4.06**

SubIndex s1 **0.43**

SubIndex s2 **3.32**

SubIndex s3 **0.30**

Index of Performance S **4.06**

Author:	C. Meachin	Issue Date:	16th June 2015
Client:	Unigulf Air Conditioning Industries L.L.C.	Issue No.:	1

BS 476 PART 7 – Class “1”

(Test By M/s. Exxova Warringtonfire)

(Method For Classification Of The Surface Spread Of Flame Of Products)

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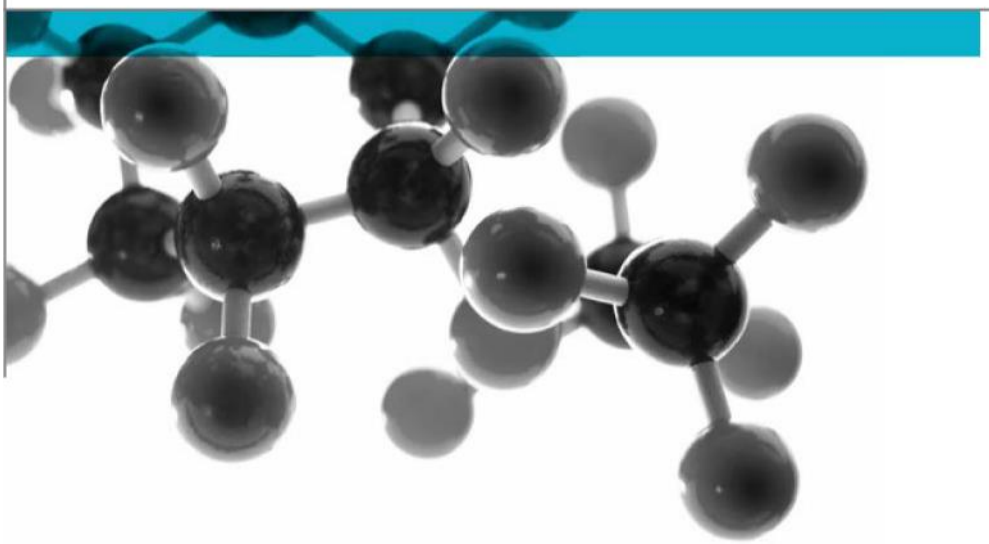
BS 476: Part 7: 1997



Method For Classification Of The Surface Spread Of Flame Of Products

A Report To: Unigulf Air Conditioning Industries L.L.C.

Document Reference: 352590

Date: 16th June 2015

Issue No.: 1

Testing
Advising
Assuring

UKAS TESTING
0249

Executive Summary

Objective To determine the surface spread of flame classification of the following product when tested in accordance with BS 476: Part 7: 1997.

Generic Description	Product reference	Thickness	Weight per unit area or density
An aluminium foil faced ducting panel with flame retardant grade polyurethane insulating material	"12 AP 21 EASY DUCTING PANEL"	20.5±0.5mm	1.28 - 1.38kg/m²
Individual components used to manufacture composite:			
Foil (test face)	Unable to provide	80 microns	2700 - 2850kg/m³
Adhesive	Unable to provide	Unwilling to provide	Not stated
Foam	Unwilling to provide	20mm	45±3kg/m³
Please see pages 5 & 6 of this test report for the full description of the product tested			

Test Sponsor Unigulf Air Conditioning Industries L.L.C., P.O. Box: 116145, Dubai, U.A.E.

Test Results: **Class 1**

Date of Test 13th March & 28th May 2015

Signatories

Responsible Officer C. Meachin * Technical Officer	Authorised S. Deeming * Business Unit Head

* For and on behalf of **Exova Warringtonfire**.

Report Issued: 16th June 2015

CONTENTS **PAGE NO.**

Test Details

Purpose of test	To determine the performance of a product when it is subjected to the conditions of the test specified in BS 476: Part 7: 1997, "Fire tests on building materials and structures, method for classification of the surface spread of flame of products". This test was therefore performed in accordance with the procedure specified in BS 476: Part 7: 1997 and this report should be read in conjunction with that British Standard.
Scope of test	BS 476: Part 7: 1997 specifies a method of test for measuring the lateral spread of flame along the surface of a specimen of a product orientated in the vertical position, and a classification system based on the rate and extent of flame spread. It provides data suitable for comparing the performances of essentially flat materials, composites, or assemblies, which are used primarily as the exposed surfaces of walls or ceilings.
Fire test study group/EGOLF	Certain aspects of some fire test specifications are open to different interpretations. The Fire Test Study Group and EGOLF have identified a number of such areas and have agreed Resolutions which define common agreement of interpretations between fire test laboratories which are members of the Groups. Where such Resolutions are applicable to this test they have been followed.
Instruction to test	The test was conducted on the 13th March & 28th May 2015 at the request of Unigulf Air Conditioning Industries L.L.C., the sponsor of the test.
Provision of test specimens	The specimens were sampled by a representative of **Warrington Certification Ltd.** and these specimens were supplied by the sponsor of the test. **Exova Warringtonfire** was not involved in any selection or sampling procedure.
Conditioning of specimens	The specimens for testing to BS 476: Part 6: 1989+A1: 2009 together with the specimens for testing to BS 476: Part 7: 1997 were received on the 26th February & 26th May 2015. Prior to the tests, all of the specimens were conditioned to constant mass at a temperature of 23 ± 2°C and a relative humidity of 50 ± 5%. One specimen from the total sample submitted for test was selected for constant mass verification.
Form in which the specimens were tested	Composite - Combination of materials which are generally recognised in building constructions as discrete entities e.g. coated or laminated materials. Each specimen was tested in direct contact with a nominally 12mm thick non-combustible backing board.
Exposed face	One of two identical faces of the specimens was exposed to the heating conditions of the test.

Description of Test Specimens

The description of the specimens given below has been prepared from information provided by the sponsor of the test. All values quoted are nominal, unless tolerances are given.

General description		An aluminium foil faced ducting panel with flame retardant grade polyurethane insulating material
Product reference		"12 AP 21 EASY DUCTING PANEL"
Name of manufacturer		Unigulf Air Conditioning Industries L.L.C.
Thickness		20.5±0.5mm (stated by sponsor) 20.65mm (determined by **Exova Warringtonfire**)
Weight per unit area		1.28 - 1.38kg/m² (stated by sponsor) 1.38kg/m^2 (determined by **Exova Warringtonfire**)
Product configuration		• Foil (test face) • Adhesive • Foam • Adhesive • Foil (reverse face)
Foil (Test face)	Generic type	Embossed aluminium
	Product reference	**See Note 1 Below**
	Detailed description	**See Note 1 Below**
	Name of manufacturer	**See Note 2 Below**
	Thickness	80 microns
	Density	2700 - 2850kg/m³
	Colour reference	"Silver / Aluminium"
	Flame retardant details	**See Note 1 Below**
Adhesive	General description	Heat sealing lacquer
	Generic type	**See Note 1 Below**
	Product reference	**See Note 1 Below**
	Name of manufacturer	**See Note 2 Below**
	Application rate	**See Note 2 Below**
	Application method	**See Note 2 Below**
	Flame retardant details	**See Note 1 Below**
	Curing process	**See Note 2 Below**
Foam	Generic type	Polyol and isocyanate
	Product reference	**See Note 2 Below**
	Detailed description	Polyurethane rigid foam made from polyol and isocyanate
	Name of manufacturer	Unigulf Air Conditioning Industries L.L.C.
	Thickness	20mm
	Density	45±3kg/m³
	Colour reference	"Blue"
	Flame retardant details	**See Note 2 Below**

Continued on next page

Brief description of manufacturing process	Manufactured in a continuous process. A mixture of liquid polyurethane is sprayed, foams up, solidifies and adheres to the two running aluminium foils which are maintained at specific distance apart depending upon required thickness of the composite panel.

Note 1: The sponsor was unable to provide this information.

Note 2: The sponsor was unwilling to provide this information.

The description of the specimens as given above is not as detailed as would usually be the case for descriptions included in **Exova Warringtonfire** test reports and the description may not fully comply with the requirements of the test standard. In all other respects however the tests were conducted fully in accordance with the requirements of the test standard and the test results are valid**.**

Test Results

Results and observations

The test results for the individual specimens, together with observations made during the test and comments on any difficulties encountered during the test are given in Appendix 1.

Classification

In accordance with the class definitions given in BS 476: Part 7: 1997; the specimens tested are classified as Class 1.

Criteria for classification

If the prefix 'D' or suffix 'R' or 'Y' is included in the classification, this indicates that the results should be treated with caution. An explanation of the reason for the prefix and suffixes is given in Appendix 2, together with the classification limits specified in the Standard.

Applicability of test result

The test results relate only to the behaviour of the test specimens of the product under the particular conditions of test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

The test results relate only to the specimens of the product in the form in which they were tested. Small differences in the composition or thickness of the product may significantly affect the performance during the test and may therefore invalidate the test results. Care should be taken to ensure that any product which is supplied or used is fully represented by the specimens which were tested.

Validity

The specification and interpretation of fire test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over five years old should be considered by the user. The laboratory that issued the report will be able to offer, on behalf of the legal owner, a review of the procedures adopted for a particular test to ensure that they are consistent with current practices, and if required may endorse the test report.

Appendix 1 – Test Results

SPECIMEN No.	1	2	3	4	5	6
Maximum distance travelled at 1.5 minutes (mm)	<50	<50	<50	<50	<50	<50
Distance (mm)	Time to travel to indicated distance (minutes : seconds)					
75 165 190 215 240 265 290 375 455 500 525 600 675 710 750 785 825						
Time to reach maximum distance travelled	1:00	1:00	1:00	1:00	1:00	1:00
Maximum distance travelled in 10 minutes (mm)	<50	<50	<50	<50	<50	<50

Note: Six specimens are usually tested. If the test on any specimen is deemed to be invalid, as defined in the Standard, it is permissible for up to a maximum of nine specimens to be tested in order to obtain the six valid test results.

Observations made during test and comments on any difficulties encountered during the test:

None.

Appendix 2 – Classification criteria

Classification of spread of flame

Classification	Spread of Flame at 1.5 min		Final Spread of Flame	
	Limit (mm)	Limit for one specimen (mm)	Limit (mm)	Limit for one specimen (mm)
Class 1	165	165 + 25	165	165 + 25
Class 2	215	215 + 25	455	455 + 45
Class 3	265	265 + 25	710	710 + 75
Class 4	Exceeding the limits for class 3			

Explanation of prefix and suffixes which may be added to the classification

1. A suffix R is added to the classification if more than six specimens are required in order to obtain six valid test results (e.g. class 2R).

2. A prefix D is added to the classification of any product which does not comply with the surface characteristics specified in the Standard and has therefore been tested in a modified form (e.g. class D3).

3. A suffix Y is added to the classification if any softening and/or other behaviour that may affect the flame spread occurs (e.g. class 3Y).

For example, a classification of D3RY could be achieved indicating (a) a modified surface has been used; (b) a class 3 result has been obtained; (c) additional specimens have been used to obtain 6 valid results and; (d) softening and/or other behaviour has occurred which is considered to have affected the test result.

NES 713 (Test By M/s. Exxova Warringtonfire)

("Determination of the toxicity index of the products of combustion from small specimens of materials")

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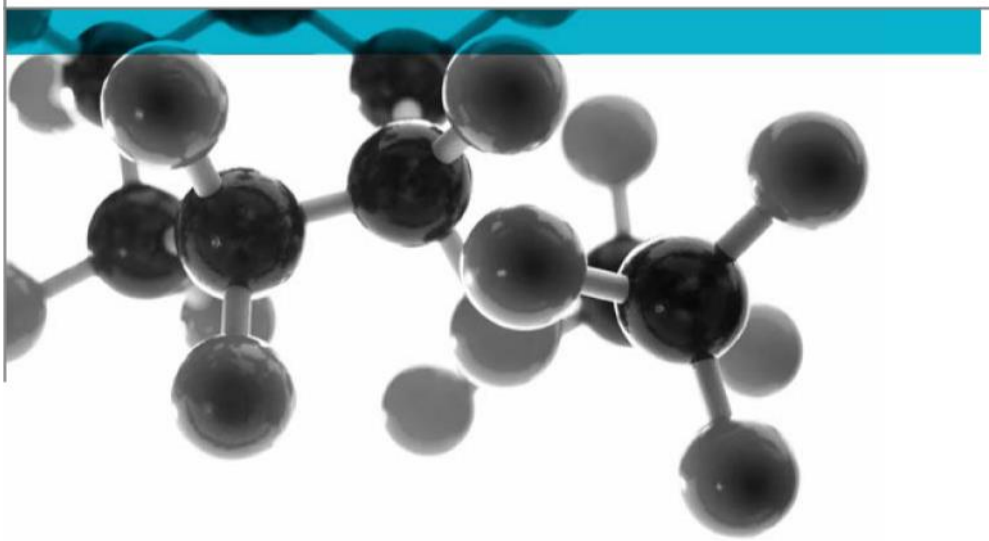
Defence Standard 02-713: Issue 2: 13th April 2006



Determination Of The Toxicity Index Of The Products Of Combustion From Small Specimens Of Materials

A Report To: Unigulf Air Conditioning Industries L.L.C

Document Reference: Additional Test Report No. 320310

Date: 17th August 2012

Issue No.: 2

Testing
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0249

Executive Summary

Objective To determine toxic index of the products of combustion from small specimens of the following product in accordance with Defence Standard 02-713: Issue 2.

Generic Description	Product reference	Thickness	Weight per unit area or density
Polyurethane foam insulation board faced on both sides with an embossed aluminium foil facing	"12AP21"	20mm	1.4kg/m²
Individual components used to manufacture composite:			
Aluminium foil facing	Unwilling to provide	80 microns	230g/m²
Insulation	"EASY Panel"	20mm	48kg/m³
Please see page 5 of this test report for the full description of the product tested			

Test Sponsor Unigulf Air Conditioning Industries L.L.C, P.O.Box 116145, Dubai, United Arab Emirates

Summary of Test Results: **The tests provide an average toxicity index of 7.40.**

Date of Test 28th July 2010

This test report is additional to that issued as WF 195266 dated the 29th July 2010 and has been issued at the request of the sponsor. The original test report remains valid and is not replaced by this additional test report. The product referred to in the original report and this additional test report has not been re-tested since the original test and neither has a technical review of the original test report resulting in any technical changes been carried out.

The original sponsor's name has been removed and "Unigulf Air Conditioning Industries L.L.C" has been inserted. The sponsor of the test has stated that the material described in this additional report is identical to the material which was tested. The original and alternative name of the sponsor has been documented and the documentation is maintained in the confidential file covering this investigation.

Signatories

Responsible Officer T. Benyon * Technical Officer	Authorised S. Deeming * Operations Manager

* For and on behalf of **Exova Warringtonfire**.

Report Issued: 17th August 2012

CONTENTS PAGE NO.

Test Details

Purpose of test

To determine the performance of specimens of a material when they are subjected to the conditions of test specified in Defence Standard Defence Standard 02-713 (NES 713): Issue 2, Publication Date 2006 Incorporating Naval Engineering Standard NES 713 Category 2 (Issue 3 Publication Date March 1985) Determination Of The Toxicity Index Of The Products Of Combustion From Small Specimens Of Materials.

The test was performed in accordance with the procedure specified in Defence Standard 02-713: 2006 and this report should be read in conjunction with that Standard.

Scope of test

Defence Standard 02-713: 2006 specifies a test method for determining the combustion characteristics of a series of materials. The test explores the toxicity of the products of combustion in terms of small molecular species arising when a small sample of material is completely burnt in excess air under specified conditions of the test. The test does not necessarily determine the total toxicity of all constituents of the products of combustion under actual fire conditions.

The test may be used to compare the particular combustion characteristics of a series of materials, both natural and synthetic types. Combustion characteristics tests alone are not suitable for assessing the total fire hazard of products under actual fire conditions.

Definition

Defence Standard 02-713: 2006 defines Toxicity Index as follows:

The summation of the toxicity factors (C /Cf) of selected gases produced by combustion of a material under the conditions specified in the test.

Instruction to test

The test was conducted on the 28th July 2010 at the request of the original sponsor of the test.

Provision of test specimens

The specimens were supplied by the original sponsor of the test. A member of Warrington Certification Limited selected the specimens during an audit visit on the 18th May 2010.

Conditioning of specimens

The specimens were received on the 5th July 2010.

The specimens were conditioned at temperatures of 23 ± 2°C and a relative humidity of 50 ± 5% RH, for 24 hours.

Test chamber

The test chamber consists of an airtight enclosure with a volume of 1.0m^3.

Burner

A Bunsen burner operating on methane and modified to provide an external supply of air to the flame was used when conducting the test.

Description of Test Specimens

The description of the specimens given below has been prepared from information provided by the original sponsor of the test. All values quoted are nominal, unless tolerances are given.

General description		Polyurethane foam insulation board faced on both sides with an embossed aluminium foil facing
Product reference		"12AP21"
Overall thickness		20mm (stated by sponsor) 20.41mm (determined by **Exova Warringtonfire**)
Overall weight per unit area		1.4kg/m^2 (stated by sponsor) 1.34kg/m^2 (determined by **Exova Warringtonfire**)
Name of manufacturer		Unigulf Air Conditioning Industries L.L.C
Product configuration		Facing Insulation Facing
Facing	Product reference	**See Note 1 below**
	Generic type	Embossed aluminium foil facing incorporating the word "EASY" over it's surface
	Name of manufacturer	Unigulf Air Conditioning Industries L.L.C
	Colour	"Aluminium"
	Thickness	80 microns
	Weight per unit area	230g/m²
	Flame retardant details	The aluminium facing is inherently flame retardant
Bonding process to apply aluminium facing to insulation		The aluminium foil facing is auto adhesively bonded to the insulation during the manufacturing process
Insulation	Product reference	"EASY Panel"
	Generic type	Expanded polyurethane foam
	Name of manufacturer	Unigulf Air Conditioning Industries L.L.C
	Thickness	20mm
	Density	48kg/m³
	Colour	"Blue"
	Flame retardant details	**See Note 1 below**
Brief description of manufacturing process		During a continuous production cycle components of the foam (which are sprayed onto the lower aluminium foil) pass from the liquid to the solid state, thus reaching the required thickness and auto adhesively bonded to both aluminium foil faces.

Note 1: The sponsor of the test was unwilling to provide this information.

Test Results

Applicability of test results

The test results relate only to the behaviour of the specimens of the product under the particular conditions of test; they are not intended to the sole criterion for assessing the potential smoke hazard of the product in use.

The test results relate only to the specimens of the product in the form in which they were tested. Small differences in the composition or thickness of the product may significantly affect the performance during the test and will therefore invalidate the test results. It is the responsibility of the supplier of the product to ensure that the product, which is supplied, is identical with the specimens, which were tested.

This test result alone does not assess the fire hazard of the material, or a product made from this material, under actual fire conditions. Consequently, the results of this test alone are not to be quoted in support of claims with respect to the fire hazard of the material or product under actual fire conditions. The results when used alone are only to be used for research and development, quality control and material specifications.

Toxicity index per 100g material:

Test Run	Result
1	7.204
2	7.595
Average	**7.40**

Tables 1 and 2 give the individual toxicity index for all gases found on each test run and also the total toxicity index, Appendix 1 details observations made during the test. Figures in () in column 3 of the tables are for the concentration from the background determination.

Conclusion

The tests provide an average toxicity index of 7.40.

Validity

The specification and interpretation of fire test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over five years old should be considered by the user. The laboratory that issued the report will be able to offer, on behalf of the legal owner, a review of the procedures adopted for a particular test to ensure that they are consistent with current practices, and if required may endorse the test report.

Table 1

Test No. 1 Test Mass: 1.0006g

GAS	ANALYSIS METHOD	LIMIT OF DETECTION *(ppm)*	CONCENTRATION OBSERVED ppm (Background)	Co	Cf	Co/ Cf
Carbon Dioxide	CIT	2.0	2000 (2000)	0	100000	0
Carbon Monoxide	CIT	1.0	50 (5)	4497	4000	1.1243
Phenol	CIT	5.0	0	0	250	0
Ammonia	CIT	1.0	0	0	750	0
Hydrogen Sulphide	CIT	0.5	0	0	750	0
Sulphur Dioxide	CIT	0.1	0	0	400	0
Formaldehyde	CIT	0.2	0	0	500	0
Hydrogen Chloride	CIT	0.2	2	200	500	0.3998
Hydrogen Bromide(3)	IC	0.1	0	0	150	0
Hydrogen Cyanide	CIT	0.2	5	500	150	3.3313
Nitrogen Oxides	CIT	0.1	5 (1)	400	250	1.5990
Hydrogen Fluoride	CIT	1.0	0	0	100	0
Acrylonitrile	CIT	0.5	3	300	400	0.7496

Toxicity Index = 7.204

Notes
1. CIT = Colorimetric Indicator Tube (NB. There is a potential for interference with these tubes)
2. A concentration of zero is assumed for a CIT showing no reaction.
3. Hydrogen Bromide determination was carried out using Ion Chromatography (IC).
4. Figures in () in column 3 of the tables are for the concentration from the background determination.

Table 2

Test No. 2 Test Mass: 1.0017g

GAS	ANALYSIS METHOD	LIMIT OF DETECTION *(ppm)*	CONCENTRATION OBSERVED ppm (Background)	Co	Cf	Co/ Cf
Carbon Dioxide	CIT	2.0	2000 (2000)	0	100000	0
Carbon Monoxide	CIT	1.0	50 (5)	4492	4000	1.1231
Phenol	CIT	5.0	0	0	250	0
Ammonia	CIT	1.0	0	0	750	0
Hydrogen Sulphide	CIT	0.5	0	0	750	0
Sulphur Dioxide	CIT	0.1	0	0	400	0
Formaldehyde	CIT	0.2	0	0	500	0
Hydrogen Chloride	CIT	0.2	4	400	500	0.7986
Hydrogen Bromide(3)	IC	0.1	0	0	150	0
Hydrogen Cyanide	CIT	0.2	5	500	150	3.3277
Nitrogen Oxides	CIT	0.1	5 (1)	400	250	1.5973
Hydrogen Fluoride	CIT	1.0	0	0	100	0
Acrylonitrile	CIT	0.5	3	299	400	0.7487

Toxicity Index = 7.595

Notes
1. CIT = Colorimetric Indicator Tube. (NB. There is a potential for interference with these tubes)
2. A concentration of zero is assumed for a CIT showing no reaction.
3. Hydrogen Bromide determination was carried out using Ion Chromatography (IC).
4. Figures in () in column 3 of the tables are for the concentration from the background determination

Observations

Steady state conditions			
Flame Temperature	Within tolerance		
Specimen No.	Ignition Time	Extinction Time	Total Burn Time
1	0:01	0:50	49 seconds
2	0:01	0:50	49 seconds

Due to the low density of the specimen, in accordance with clause 10.2.6 of the standard to prevent it from being displaced by the force of the gas flame it was held in place on the support using a loop of 0.56mm tinned annealed solid copper wire.

Revision History

Issue No : 2	Issue Date: 17th August 2012
Revised By: T. Benyon	Approved By: S. Deeming
Reason for Revision: This document replaces issue 1 (dated 15th August 2012) of the same number which has been withdrawn. The name of the manufacturer detailed in the product description of the issue 1 report was incorrect and the correct name has been detailed in this issue 2 report.	

Issue No :	Issue Date:
Revised By:	Approved By:
Reason for Revision:	

IMO MSC 61(67) CERTIFICATE

(Test By M/s.Exxova Warringtonfire)

("Qualifying smoke generation and toxic potency of products")

Exova Warringtonfire
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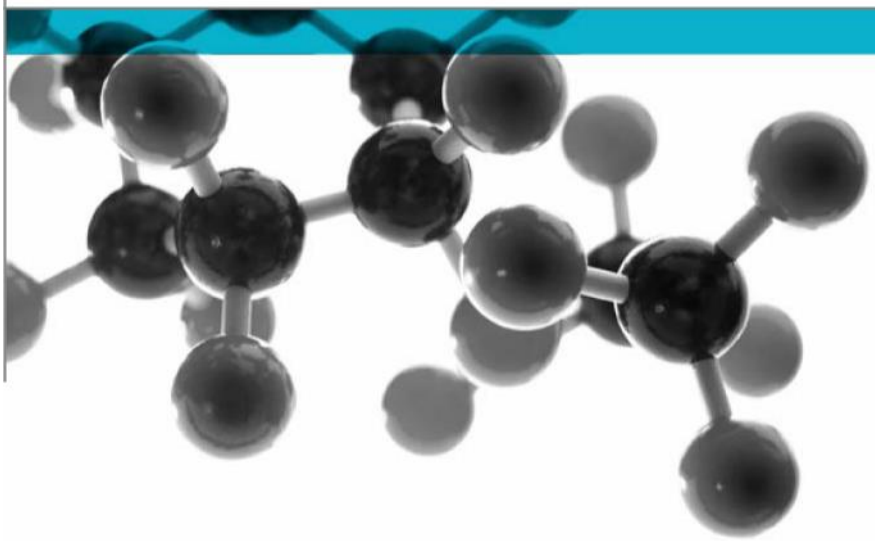
IMO Resolution MSC 61(67): Annex 1: Part 2



Smoke & Toxicity

A Report To: Unigulf Air Conditioning Industries L.L.C

Document Reference: Additional Test Report No. 320309

Date: 17th August 2012

Issue No.: 2

Testing
Advising
Assuring

UKAS TESTING
0249

Executive Summary

Objective To determine the performance of the following product when tested in accordance with IMO Resolution MSC 61(67): Annex 1, Part 2.

Generic Description	Product reference	Thickness	Weight per unit area or density
Polyurethane foam insulation board faced on both sides with an embossed aluminium foil facing	"12AP21"	20mm	1.4kg/m²
Individual components used to manufacture composite:			
Aluminium foil facing	Unwilling to provide	80 microns	230g/m²
Insulation	"EASY Panel"	20mm	48kg/m³
Please see page 5 of this test report for the full description of the product tested			

Test Sponsor Unigulf Air Conditioning Industries L.L.C, P.O.Box 116145, Dubai, United Arab Emirates

Summary of Test Results: **The specimens as tested achieved the criteria for smoke generation and toxicity for bulkhead, wall and ceiling linings, floorcoverings, primary deck coverings and plastic pipes / cables as specified in the Resolution.**

Date of Test 19th July 2010

This test report is additional to that issued as WF 195120 dated the 29th July 2010 and has been issued at the request of the sponsor. The original test report remains valid and is not replaced by this additional test report. The product referred to in the original report and this additional test report has not been re-tested since the original test and neither has a technical review of the original test report resulting in any technical changes been carried out.

The original sponsor's name has been removed and "Unigulf Air Conditioning Industries L.L.C" has been inserted. The sponsor of the test has stated that the material described in this additional report is identical to the material which was tested. The original and alternative name of the sponsor has been documented and the documentation is maintained in the confidential file covering this investigation.

Signatories

Responsible Officer J. Lucas-Cox * Principal Chemist	Authorised S. Deeming * Operations Manager

* For and on behalf of **Exova Warringtonfire**.

Report Issued: 17th August 2012

CONTENTS **PAGE NO.**

Test Details

Purpose of test

This test method, adopted by the International Maritime Organisation, specifies a procedure for qualifying smoke generation and toxic potency of products and thus their suitability for use in maritime construction.

The tests were performed in accordance with the procedure specified in IMO Resolution MSC, 61(67) Annex 1, Part 2 as amended by MSC/Circ.916 dated 4th June 1999 and revised by MSC/Circ.1008 dated 8th June 2001, and it is advised that this report is read in conjunction with these documents.

Scope of test

IMO Resolution MSC 61(67) Annex 1, Part 2 (Ref.1) specifies that smoke generation tests should be conducted in accordance with ISO 5659: 1994, Part 2 (Ref.2).

The Resolution also details a classification system based on the maximum specific optical density of smoke occurring during the test, averaged over three replicate tests, carried out in each of three test conditions.

In addition, the Resolution specifies limits for seven toxic gases which must not be exceeded in any of the three test conditions.

Fire test study group/EGOLF

Certain aspects of some fire test specifications are open to different interpretations. The Fire Test Study Group and EGOLF have identified a number of such areas and has agreed Resolutions which define common agreement of interpretations between fire test laboratories which are members of the Groups. Where such Resolutions are applicable to this test they have been followed.

Instruction to test

The test was conducted on the 19th July 2010 at the request of the original sponsor of the test.

Conditioning of specimens

The specimens were received on the 5th July 2010.

Prior to test the specimens were conditioned to constant mass at a temperature of 23 ± 2°C and a relative humidity of 50 ± 5%.

Exposed face

One of two identical faces of the specimens was exposed to the radiant heat of the test when the specimens were mounted in the test position.

Substrate

None

Provision of test specimens

The specimens were supplied by the original sponsor of the test. A member of Warrington Certification Limited selected the specimens during an audit visit on the 18th May 2010.

Description of Test Specimens

The description of the specimens given below has been prepared from information provided by the original sponsor of the test. All values quoted are nominal, unless tolerances are given.

General description		Polyurethane foam insulation board faced on both sides with an embossed aluminium foil facing
Product reference		"12AP21"
Overall thickness		20mm (stated by sponsor) 20.41mm (determined by **Exova Warringtonfire**)
Overall weight per unit area		1.4kg/m^2 (stated by sponsor) 1.34kg/m^2 (determined by **Exova Warringtonfire**)
Name of manufacturer		Unigulf Air Conditioning Industries L.L.C
Product configuration		Facing Insulation Facing
Facing	Product reference	**See Note 1 below**
	Generic type	Embossed aluminium foil facing incorporating the word "EASY" over it's surface
	Name of manufacturer	Unigulf Air Conditioning Industries L.L.C
	Colour	"Aluminium"
	Thickness	80 microns
	Weight per unit area	230g/m²
	Flame retardant details	The aluminium facing is inherently flame retardant
Bonding process to apply aluminium facing to insulation		The aluminium foil facing is auto adhesively bonded to the insulation during the manufacturing process
Insulation	Product reference	"EASY Panel"
	Generic type	Expanded polyurethane foam
	Name of manufacturer	Unigulf Air Conditioning Industries L.L.C
	Thickness	20mm
	Density	48kg/m³
	Colour	"Blue"
	Flame retardant details	**See Note 1 below**
Brief description of manufacturing process		During a continuous production cycle components of the foam (which are sprayed onto the lower aluminium foil) pass from the liquid to the solid state, thus reaching the required thickness and auto adhesively bonded to both aluminium foil faces.

Note 1: The sponsor of the test was unwilling to provide this information.

Test Results

Test procedure

A 75mm x 75mm specimen was mounted horizontally inside a smoke chamber of the design specified in ISO 5659 Part 2, 25mm below a cone shaped, radiant electric heater capable of producing a uniform irradiance of 50kW/m^2 on the specimen surface. A premixed propane/air pilot flame of length 30mm may be applied 10mm above the specimen surface.

Three replicate specimens are tested in each of the following three test conditions:

1. Irradiance of 25kW/m^2 in the presence of pilot flame.
2. Irradiance of 25kW/m^2 in the absence of pilot flame.
3. Irradiance of 50kW/m^2 in the absence of pilot flame.

The attenuation of a light beam passing through the evolved smoke is measured and the results are reported in terms of the maximum Specific Optical Density attained during the test, given by the equation:

$$Ds = (V/(A*L)*\log_{10}(100/T)$$

Where:

V	=	total volume of the chamber (m^3)
A	=	exposed area of the specimen (m^2)
L	=	optical length (m) of smoke measurement
T	=	% light transmitted.

Test duration is a minimum of ten minutes. This period is extended by a further ten minutes if the maximum Specific Optical Density has not been reached.

The sampling of the fire effluent created in the chamber during the test for the analysis of the concentration of the seven different gases for which criteria are given is conducted using a variety of methods as defined in the internal operating procedure.

In all cases, the sample is taken from the geometric centre of the chamber and sample lines are kept as short as possible.

For the analysis of oxides of nitrogen and carbon monoxide, continuous measurements are made throughout the duration of the test.

Carbon monoxide (CO) is determined continuously using a pre-calibrated non-dispersive infra-red analyser. The values reported are those averaged over a 3 minute period of maximum smoke obscuration.

Oxides of Nitrogen (NO_x) are determined continuously using a chemiluminesence analyser. Again, the values reported are those averaged over a 3 minute period of maximum smoke obscuration.

For the other gases, single point analysis is conducted. The gases are absorbed into aqueous media and analysed remotely. Two types of media are used; 0.1M sodium hydroxide solution and 0.3% Hydrogen Peroxide solution. The gases are sampled over a two minute period of maximum smoke density by bubbling the gases through the media using a fritted funnel Dreschel bottle arrangement.

Hydrogen Cyanide (HCN) is determined from gases absorbed into a solution of sodium hydroxide and analysed using ion chromatography. Hydrogen Fluoride (HF), Hydrogen Chloride (HCl), Hydrogen Bromide (HBr) and Sulphur Dioxide (SO_2) are absorbed into a solution of 0.3% hydrogen peroxide and are also analysed by ion chromatography.

Test Results

GAS		Limit (ppm)	Reading (ppm)		
			Condition 1	Condition 2	Condition 3
Carbon Monoxide	CO	1450	62	9	39
Hydrochloric Acid	HCl	600	ND	ND	5
Hydrogen Bromide	HBr	600	ND	ND	ND
Hydrogen Fluoride	HF	600	ND	ND	ND
Hydrogen Cyanide	HCN	140	ND	ND	ND
Nitrous Fumes	NO_x	350	7	ND	ND
Sulphur Dioxide	SO_2	120	ND	ND	ND
Averaged Specific Optical Density		*	1	2	189

Key:
ND indicates non-detected.
* indicates the SOD must be ≤500 for floor coverings; ≤400 for primary deck coverings, plastic pipes and cables; ≤200 for bulkhead wall and ceiling linings.

Observations recorded during the tests are detailed in Appendix 1 of this report.

Summary of Results

The specimens as tested achieved the criteria for smoke generation and toxicity for bulkhead, wall and ceiling linings, floorcoverings, primary deck coverings and plastic pipes / cables as specified in the Resolution.

Validity

This report is valid for a period for fifteen years from the date of test.

This report may only be reproduced in full. Extracts or abridgements shall not be published without permission of **Exova Warringtonfire**.

The tests results relate only to the specimens of the product in the form in which they are tested, they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use. Small differences in the composition or thickness of the product may significantly affect the performance during the test and may therefore invalidate the test results. Care should be taken to ensure that any product which is supplied or used is fully represented by the specimens that were tested.

The quantity of each specific toxic gas species generated is dependant upon the fire model used and the burning behaviour of the specimen during each individual fire test. The quantitative determination of combustion products therefore relates only to the specimens tested under the conditions stated and when combustion occurs as described in this test report.

References

1. International Maritime Organisation Resolution MSC 61(67) 1996; The International Code for Application of Fire Test Procedures, Annex 1, Part 2: Smoke and Toxicity Test.

2. ISO 5659 Plastics - Smoke Generation - Part 2 1994: Determination of Optical Density by a Single Chamber Test.

Appendix 1 – Observations during test

Condition			25kW/m^2 In The Presence Of A Pilot Flame	25kW/m^2 In The Absence Of A Pilot Flame	50kW/m^2 In The Absence Of A Pilot Flame
Optical Density Maximum Specific	Specimen 1	Ds (max)	1	1	221
		D (Clear beam)	1	0	6
	Specimen 2	Ds (max)	2	1	207
		D (Clear beam)	1	0	11
	Specimen 3	Ds (max)	1	3	137
		D (Clear beam)	1	1	4

Condition	Specimen Number	Time To Ds (Max) (s)	Mass Loss (g)
25kW/m^2 in the presence of a pilot flame	1	1200	0.6
	2	1200	0.5
	3	1200	0.9
25kW/m^2 in the absence of a pilot flame	1	1200	0.6
	2	1200	0.6
	3	1200	0.7
50kW/m^2 in the absence of a pilot flame	1	510	3.2
	2	600	3.2
	3	510	2.9

	25kW/m² In The Presence Of A Pilot Flame			25kW/m² In The Absence Of A Pilot Flame			50kW/m² In The Absence Of A Pilot Flame		
Specimen No.	1	2	3	4	5	6	7	8	9
Colour of smoke produced	Light	Light	Light	Light	Light	Light	Light	Dark	Light
Expansion distance towards heater (mm)	0	0	0	0	0	0	0	0	0
Ignition time in seconds (if applicable)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	390	N/A
Extinction time in seconds (if applicable)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	End	N/A
Additional comments	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
0 = Did Not Occur	* = Did Not Re- ignite			N/A = Not Applicable					

Revision History

Issue No : 2	Issue Date : 17th August 2012
Revised By: J. Lucas-Cox	Approved By: S. Deeming
Reason for Revision: This document replaces issue 1 (dated 15th August 2012) of the same number which has been withdrawn. The name of the manufacturer detailed in the product description of the issue 1 report was incorrect and the correct name has been detailed in this issue 2 report.	

Issue No :	Issue Date :
Revised By:	Approved By:
Reason for Revision:	

CERTIFIRE

Third Party Supervision Certificate

CERTIFICATE OF APPROVAL
No CF 777

This is to certify that, in accordance with TS00 General Requirements for Certification of Fire Protection Products The undermentioned products of

UNIGULF AIR CONDITIONING INDUSTRIES LLC

597 – 580 DIP II,
P.O. Box 116145, Dubai, United Arab Emirates
Office: +971 (0) 4 880 2900 Fax: +971 (0) 4 884 7999

Have been assessed against the requirements of the Technical Schedule(s) denoted below and are approved for use subject to the conditions appended hereto:

CERTIFIED PRODUCT	TECHNICAL SCHEDULE
"EASY Preinsulated Panel"	**TS19 Rigid Polyurethane Foam**

Signed and sealed for and on behalf of Exova (UK) Limited trading as Warrington Certification

Paul Duggan
Certification Manager

Issued: 9th February 2011
Revised: 20th February 2018
Valid to: 2nd June 2020

CERTIFICATE No CF 777
UNIGULF AIR CONDITIONING INDUSTRIES LLC

"EASY Preinsulated Panel"

1. "EASY Preinsulated Panel" is a poly isocyanate foam insulation board faced on both sides with an embossed aluminium foil facing, manufactured by Unigulf Air Conditioning Industries LLC. It may be differentiated from other panels by its embossed surface pattern, incorporating "Easy" over its surface.

2. The products are approved on the basis of:

   i) Initial type testing in accordance with the following standards:

   a) British standard BS 476: Part 6
   b) British standard BS 476: Part 7

   ii) A design appraisal against TS19.
   iii) Certification of quality management systems to ISO9001:2015, OHSAS 18001: 2007 & ISO 14001: 2015
   iv) Audit testing
   v) Inspection and surveillance of factory production control

3. This approval certifies that:

   a) "EASY Preinsulated Panel" satisfies the criteria for a class 0 product and for a class 1 product, as defined in paragraphs A13(b) of Approved Document B, `Fire Safety', to the Building Regulations 2000 for applications requiring Class 0 or Class 1 surface. The product also satisfies the requirements for Class 0 and Class 1 surface specified in the Building Standards (Scotland) Regulations 2007 and the building regulations (Northern Ireland) 2000.

4. This approval is applicable only to "EASY Preinsulated Panel" as supplied by the manufacturers and when fixed in accordance with their recommendations. Coating, decoration or other post-production treatment will invalidate this approval and may adversely affect the product's fire performance.

5. The approval relates to on going production. The product's immediate packaging is identified with the manufacturers' name, the product name or number, the CERTIFIRE name or name and mark, together with the CERTIFIRE certificate number and application where appropriate.

Issued: 9th February 2011
Revised: 20th February 2018
Valid to: 2nd June 2020

CERTIFICATE No CF 777
UNIGULF AIR CONDITIONING INDUSTRIES LLC

The product is described as follows:

General description		An aluminium foil faced ducting panel made with insulating material produced from special fire retardant grade Polyol and MDI
Product reference		"EASY Preinsulated Panel"
Name of manufacturer		Unigulf Air Conditioning Industries L.L.C.
Thickness		20.5±0.5mm (stated by sponsor)
Weight per unit area		1.18 - 1.38kg/m² (stated by sponsor)
Product configuration		• Foil (test face) • Adhesive • Foam • Adhesive • Foil (reverse face)
Foil (Test face)	Generic type	Embossed aluminium
	Product reference	**See Note 1 Below**
	Detailed description	**See Note 1 Below**
	Name of manufacturer	**See Note 2 Below**
	Thickness	80 ±0.02microns
	Density	2700 - 2850kg/m³
	Colour reference	"Silver / Aluminium"
	Flame retardant details	**See Note 1 Below**
Adhesive	General description	Heat sealing lacquer
	Generic type	**See Note 1 Below**
	Product reference	**See Note 1 Below**
	Name of manufacturer	**See Note 2 Below**
	Application rate	**See Note 1 Below**
	Application method	**See Note 1 Below**
	Flame retardant details	**See Note 1 Below**
	Curing process	**See Note 1 Below**
Foam	Generic type	Rigid insulation foam comprising polyol and isocyanate
	Product reference	**See Note 1 Below**
	Detailed description	Rigid insulation foam produced from fire retardant grade polyol and isocyanate
	Name of manufacturer	Unigulf Air Conditioning Industries L.L.C.
	Thickness	20mm
	Density	42 - 48kg/m³
	Colour reference	"Light Blue"
	Flame retardant details	**See Note 1 Below**

Note 1: The sponsor was unable to provide this information.
Note 2: The sponsor of the test has provided this information but at the specific request of the sponsor, these details have been omitted from the report and are instead held on the confidential file relating to this investigation.

Issued: 9th February 2011
Revised: 20th February 2018
Valid to: 2nd June 2020

DCL CERTIFICATE

DCD CERTIFICATE

UL-723 / NFPA 255-06 / ASTM E84-12
(Surface Burning Characteristics)

TEST REPORT

REPORT NUMBER: 100715564COQ-005a
ORIGINAL ISSUE DATE: July 6, 2012

EVALUATION CENTER
Intertek Testing Services NA Ltd.
1500 Brigantine Drive
Coquitlam, B.C. V3K 7C1
Canada

RENDERED TO

Unigulf Airconditioning Industries L.L.C.
PO. Box 116145
Dubai, United Arab Emirates

PRODUCT EVALUATED: 12AP21 EASY brand Insulated Duct Panels
EVALUATION PROPERTY: Surface Burning Characteristics

Report of testing 12AP21 EASY brand Insulated Duct Panels for compliance with the applicable requirements of the following criteria: UL 723-2010 *Surface Burning Characteristics of Building Materials.*

1 Table of Contents

PAGE

2 Introduction

Intertek Testing Services NA Ltd. (Intertek) has conducted testing for Unigulf Airconditioning Industries L.L.C. to evaluate the surface burning characteristics of 20.5 mm thick foam panels with aluminum cover facing on both sides. Testing was conducted in accordance with the standard methods of UL 723-2010 *Surface Burning Characteristics of Building Materials*.

This evaluation began April 20, 2012 and was completed the same day.

3 Test Samples

3.1. SAMPLE SELECTION

Samples were submitted to Intertek directly from the client and were not independently selected for testing. The sample panels were received at the Evaluation Center on April 3, 2012.

SAMPLE AND ASSEMBLY DESCRIPTION

Upon receipt of the samples at the Intertek Coquitlam laboratory they were placed in a conditioning room where they remained in an atmosphere of 23 3 C (73.4 5 F) and 50 5% relative humidity.

The sample material was identified by the client as 12AP21 EASY brand insulated duct panels, measuring 20.5 mm. thick x 24 in. wide x 8 feet long with an aluminum cover facing on both sides.

For this trial run, three 8 ft. long by 24 in. wide sample panels were butted together and placed on the upper ledge of the flame spread tunnel to form the required 24 ft. sample length. A layer of 6 mm reinforced cement board was placed over top of the samples, the tunnel lid was lowered into place, and the samples were then tested in accordance with of UL 723-2010.

4 Testing and Evaluation Methods

4.1. TEST STANDARD

The results of the tests are expressed by indexes, which compare the characteristics of the sample under tests relative to that of select grade red oak flooring and inorganic-cement board.

(A) Flame Spread Classification:

This index relates to the rate of progression of a flame along a sample in the 25 foot tunnel. A natural gas flame is applied to the front of the sample at the start of the test and drawn along the sample by a draft kept constant for the duration of the test. An observer notes the progression of the flame front relative to time.

The test apparatus is calibrated such that the flame front for red oak flooring passes out the end of the tunnel in five minutes, thirty seconds (plus or minus 15 seconds).

(B) Smoke Developed:

A photocell is used to measure the amount of light, which is obscured by the smoke passing down the tunnel duct. When the smoke from a burning sample obscures the light beam, the output from the photocell decreases. This decrease with time is recorded and compared to the results obtained for red oak, which is defined to be 100.

5 Testing and Evaluation Results

5.1. RESULTS AND OBSERVATIONS

(A) Flame Spread

The resultant flame spread classifications are as follows:
(Classification rounded to nearest 5)

Sample	Flame Spread	Flame Spread Classification
12AP21 EASY brand insulated duct panels	21	20

(B) Smoke Developed

The areas beneath the smoke developed curve and the related classifications are as follows:
(For smoke developed indexes 200 or more, classification is rounded to the nearest 50. For smoke developed indexes less than 200, classification is rounded to nearest 5)

Sample	Smoke Developed	Smoked Developed Classification
12AP21 EASY brand insulated duct panels	279	300

(C) Observations

During the tests, the sample surface ignited at approximately 63 seconds; the flame began to progress along the sample until it reached the maximum flame spread.

6 Conclusion

The 20.5 mm thick 12AP21 EASY brand insulated duct panels submitted by Unigulf Airconditioning Industries L.L.C., exhibited the following flame spread characteristics when tested in accordance of UL 723-2010 *Surface Burning Characteristics of Building Materials.*

Sample	Flame Spread Classification	Smoked Developed Classification
12AP21 EASY brand insulated duct panels	20	300

The conclusions of this test report may not be used as part of the requirements for Intertek product certification. Authority to Mark must be issued for a product to become certified. Please refer to the Building Code for classification ratings for the values achieved above.

INTERTEK TESTING SERVICES NA LTD.

Tested and
Reported by: _____
Greg Philp
Technician – Building Products

Reviewed by: _____
Kal Kooner, P.Eng.
Manager – Building Products

GP

APPENDIX A

DATA SHEETS

UL723 DATA SHEETS

ASTM E84

Date: 04 20 2012
Project Number: 100715564
Test Number: 1
Operator: Greg Philip

TEST RESULTS

FLAMESPREAD INDEX: 20

SMOKE DEVELOPED INDEX: 300

SPECIMEN DATA . . .

Time to Ignition (sec):	63
Time to Max FS (sec):	130
Maximum FS (feet):	4.9
Time to 980 F (sec):	Never Reached
Time to End of Tunnel (sec):	Never Reached
Max Temperature (F):	504
Time to Max Temperature (sec):	597
Total Fuel Burned (cubic feet):	37.00
FS*Time Area (ft*min):	40.3
Smoke Area (%A*min):	227.5
Unrounded FSI:	20.8
Unrounded SDI:	279.1

CALIBRATION DATA . . .

Time to Ignition of Last Red Oak (Sec):	48.0
Red Oak Smoke Area (%A*min):	81.5

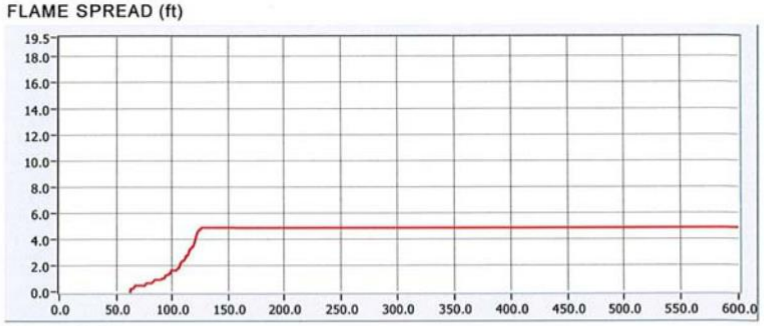
TESTED BY

REVIEWED BY

UL723 DATA SHEETS

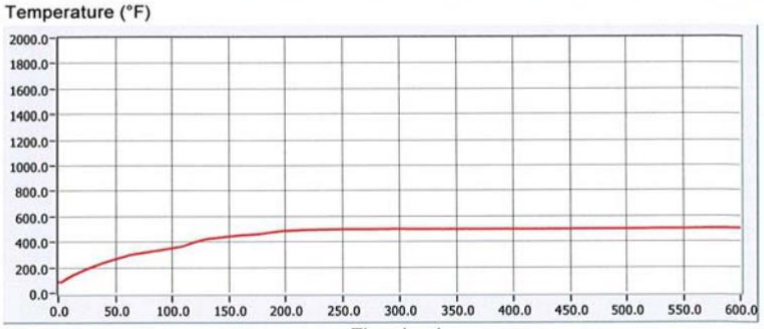
Project No: 100715564 Page 2 of 2

FLAME SPREAD (ft)



Smoke (%A)

Temperature (°F)



Time (sec)

600

REVISION SUMMARY

DATE	PAGE(S)	SUMMARY
July 6, 2012	All	Original Issue Date

FUNGAL TEST REPORT (ASTM G21-96)

Al Futtaim Exova LLC
Dubai Investments Park
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Testing. Advising. Assuring.

REPORT OF TESTS

Description	One Sample of Easy Polyurethane Preinsulated Panel with 80 MI Aluminium Facing -Panel B		
Tested for	Unigulf Air Conditioning Industries (L.L.C), Post Box No.2328, Dubai		
Lab Ref. No.	WR12-05676 (Page 1 of 2)	Request No.	WQ12-01834
Date Received	21.06.2012	Date Reported	31.07.2012

Client's reference : Requisition dated. 21.06.2012
AFE sample no. : W12-001834/02

1.0 Introduction

Further to the test work instructions received from M/s Unigulf Air Conditioning Industries (L.L.C), Dubai, dated 21.06.2012, one sample of Easy Polyurethane Preinsulated Panel with 80 MI Aluminium Facing-Panel B provided has been tested for the following by Al Futtaim Exova LLC;

2.0 Fungal Resistance

Test method reference: ASTM G 21-96 (Reapproved 2002); Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi

Summary of the method:

This procedure is used to challenge samples of synthetic polymeric materials in the form of molded and fabricated articles, tubes, rods, sheets and film materials with a known amount of suitable organisms and observe the ability of the test materials to resist fungal growth under controlled conditions.

Test specimens are prepared with the Easy Polyurethane Preinsulated Panel with 80 MI Aluminium Facing-Panel B in the size of 50 by 50-mm pieces. Three specimen and controls were analyzed. The test fungi (*Aspergillus niger* and *Penicillium species*) mixed spore suspension is prepared as per instructions in the standard procedure. The suspension of test fungi is standardized by diluting in a sterile nutritive salt solution to obtain a required concentration of mixed spore suspension. This standardized mixed spore suspension is sprayed onto the test specimens placed on sterile solidified nutrient-salts agar in Petri dishes. Inoculated test specimens and controls are incubated at 28 to 30°C for 28 days under humid conditions. Observations for visible effects are made at the end of the incubation period and visual rating of fungal growth is judged on a 0 to 4 rating scale while rating at 4 indicates heavy growth and rating at 0 indicates the specimen is free of fungal growth.

3.0 Test results

Test Duration	Visual Observations	Rating
Day 07	No growth was observed	0
Day 14	No growth was observed	0
Day 21	No growth was observed	0
Day 28	No growth was observed	0
Final Rating as per ASTM	**0**	

Remarks:

1. *Aspergillus niger* and *Pencillium species* are used as mold representatives
2. No unusual changes in the physical appearance of the sample was observed
3. Controls were satisfactory

(11)

4. Specimens were examined microscopically at 40x and growth was judged on the rating scale of 0 to 4 as follows;

Observation	Rating
None	0
Traces of Growth (<10%)	1
Light Growth (10-30%)	2
Medium Growth (30-60%)	3
Heavy Growth (60% to complete coverage)	4

(07)

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S.K. Saji
Asst. Laboratory Manager - Chemistry

For and on behalf of Al Futtaim Exova (L.L.C)
Tested by: NZ, Date tested: 26.06.2012-29.07.2012
Sampled by the client, certificate of sampling was not given.

GREENGUARD CERTIFICATE

CERTIFICATE
OF COMPLIANCE

GREENGUARD

PRODUCT CERTIFIED FOR
LOW CHEMICAL EMISSIONS
UL.COM/GG
UL 2818

Unigulf Air Conditioning

EASY PREINSULATED PANEL
AND EASY FABRICATED DUCT

88573-410
Certificate Number

02/24/2017 - 02/24/2020
Certificate Period

Certified
Status

UL 2818 - 2013 Standard for Chemical Emissions for Building Materials, Finishes and Furnishings

Products tested in accordance with UL 2821 test method to show compliance to emission limits in UL 2818, Section 7.1.

GREENGUARD Certification Criteria for Building Products and Interior Finishes

Criteria	CAS Number	Maximum Allowable Predicted Concentration	Units
TVOC(A)	-	0.50	mg/m³
Formaldehyde	50-00-0	61.3 (50 ppb)	µg/m³
Total Aldehydes (B)	-	0.10	ppm
Particle Matter less than 10 µm (C)	-	50	µg/m³
4-Phenylcyclohexene	4994-16-5	6.5	µg/m³
Individual VOCs (D)	-	1/10th TLV	-

(A) Defined to be the total response of measured VOCs falling within the $C_6 – C_{16}$ range, with responses calibrated to a toluene surrogate.

Maximum allowable predicted TVOC concentrations for GREENGUARD (0.50 mg/m³) fall in the range of 0.5 mg/m³ or less, as specified in CDPH Standard Method v1.1.

(B) The sum of all measured normal aldehydes from formaldehyde through nonanal, plus benzaldehyde, individually calibrated to a compound specific standard. Heptanal through nonanal are measured via TD/GC/MS analysis and the remaining aldehydes are measured using HPLC/UV analysis.

(C) Particle emission requirement only applicable to HVAC Duct Products with exposed surface area in air streams (a forced air test with specific test method) and for wood finishing (sanding) systems.

(D) Allowable levels for chemicals not listed are derived from 1/10th of the Threshold Limit Value (TLV) industrial work place standard (Reference: American Conference of Government Industrial Hygienists, 6500 Glenway, Building D-7, and Cincinnati, OH 45211-4438).

CERTIFICATE
OF COMPLIANCE

Unigulf Air Conditioning

EASY PREINSULATED PANEL
AND EASY FABRICATED DUCT

88573-420
Certificate Number

02/24/2017 - 02/24/2020
Certificate Period

Certified
Status

UL 2818 - 2013 Gold Standard for Chemical Emissions for Building Materials, Finishes and Furnishings

Product tested in accordance with UL 2821 test method to show compliance to emission limits on UL 2818. Section 7.1 and 7.2.

GREENGUARD Gold Certification Criteria for Building Products and Interior Finishes

Criteria	CAS Number	Maximum Allowable Predicted Concentration	Units
TVOC (A)	-	0.22	mg/m³
Formaldehyde	50-00-0	9 (7.3 ppb)	µg/m³
Total Aldehydes (B)	-	0.043	ppm
4-Phenylcyclohexene	4994-16-5	6.5	µg/m³
Particle Matter less than 10 µm (C)	-	20	µg/m³
1-Methyl-2-pyrrolidinone (D)	872-50-4	160	µg/m³
Individual VOCs (E)	-	1/2 CREL or 1/10oth TLV	-

(A) Defined to be the total response of measured VOCs falling within the C_6 – C_{16} range, with responses calibrated to a toluene surrogate. Maximum allowable predicted TVOC concentrations for GREENGUARD Gold (0.22 mg/m³) fall in the range of 0.5 mg/m³ or less, as specified in CDPH Standard Method v1.2.

(B) The sum of all measured normal aldehydes from formaldehyde through nonanal, plus benzaldehyde, individually calibrated to a compound specific standard. Heptanal through nonanal are measured via TD/GC/MS analysis and the remaining aldehydes are measured using HPLC/UV analysis.

(C) Particle emission requirement only applicable to HVAC Duct Products with exposed surface area in air streams (a forced air test with specific test method) and for wood finishing (sanding) systems.

(D) Based on the CA Prop 65 Maximum Allowable Dose Level for inhalation of 3,200]g/day and an inhalation rate of 20 m³/day

(E) Allowable levels for chemicals not listed are derived from the lower of 1/2 the California Office of Environmental Health Hazard Assessment (OEHHA) Chronic Reference Exposure Level (CREL) as required per the CDPH/EHLB/Standard Method v1.2 and BIFMA level credit 7.6.2 and 1/100th of the Threshold Limit Value (TLV) industrial work place standard (Reference: American Conference of Government Industrial Hygienists, 6500 Glenway, Building D-7, and Cincinnati, OH 45211-4438).

CFC / HCFC CERTIFICATE

Forschungsinstitut für Wärmeschutz e.V.
München

Determination of the cell gas composition of rigid insulation foam
Test report: Q.2-16-34

Applicant: **Unigulf Air Conditioning Industries L.L.C.**
Dubai, Vereinigte Arabische Emirate

Material Identification: **„EASY brand pre insulated Panel"**

PU sandwich panel, with aluminium foil on both sides
Colour: blue
Sample size: 400 mm x 400 mm x 20 mm

Sampling: Sent by applicant in October 2016.
Registration no.: 2564 on 04.10.2016.

Procedure:

Five cell gas samples were taken with a gas tight syringe about 10 mm under the surface from the middle of the specimen under a helium flow.
With the gas chromatograph the relative cell gas composition of the cell gas sample was determined by comparing the retention times and measuring the peak areas.

Literature: W. Albrecht, Cell-gas Composition – An Important Factor in the Evaluation of Long-term Thermal Conductivity in Closed-cell Foamed Plastics. Cellular Polymers, Vol.1, No.5, 2000, pp. 319-331.

Results:

EASY brand pre insulated Panel	Only Air- and CO_2-cellgases were found in the tested sample

The accuracy of the described method: approx. 1 volume-%.
Only peaks with a fraction of not less than 0.5 volume-% were determined.

Remarks:
The measured values are only valid for the time of measurement and will change due to cellgas diffusion.

Gräfelfing, 21. October 2016
Department specialist

Dipl.-Ing. (FH) C. Karrer

Tester

A. Bergler

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