DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. **K-4613**

Holder of Certificate

Torgy Mek. Industri AS
TØNSBERG, **Norway**

This is to certify that the
Insulation Materials for Gas Carriers

with type designation(s)
ASEplas 2010 SWA, ASEplas 2010 SWB, ASEplas 2010 SWC, ASEplas 2010 SWC1 & ASEplas 2010 SWD

is found to comply with
Det Norske Veritas' Type Approval Programme 1-503.2, 2009, Hardwood for Tank Supports

Application
For us as Thermal Isolator Blocks for Petrochemical and LNG Tanker applications.

Høvik, **2011-07-05**
for **Det Norske Veritas AS**

This Certificate is valid until
2015-12-31

Rikard Törnqvist **Head of Section**	DNV local office: **Sandefjord**	**Gisle Hersvik** **Surveyor**

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

Product description

ASEplas 2010SWA, 2010SWB, 2010SWC, 2010SWC1 and 2010SWD; Organic glass-reinforced polyester composites for use as Thermal Isolator Blocks for Petrochemical and LNG Tanker applications.

The following properties have been verified by Type Testing:

	ASEplas 2010				
Properties	**SWA**	**SWB**	**SWC**	**SWD**	**SWC1**
Density [g/cm^3]	1,92	1,74	1,22	1,38	1,49
Compressive strength, +150°C [MPa]	69	126	21	65	3
Compressive strength, 20°C [MPa]	131	230	64	124	88
Compressive strength, -196°C [MPa]	184	223	111	179	127
Shear strength, 20°C [MPa]	64	93	25	52	34
Water resistance (Compressive strength, 20°C) [% of original strength]	92	97	86	88	78
Service temperature [°C]	from +160 to - 196				
Thermal conductivity, 20°C [W/mK]	0,56	0,37	0,32	0,32	0,38

Remark;
Note that retention of compressive strength is less than the minimum 98% given by the Type Approval Programme No. 1-503.2, but the samples are tested without sealing of the cut edges.

Other properties may be requested from the Holder of Certificate.

Manufactured by

Torgy Atlantic Ltd., Llandough Industrial Estate Penarth Road, CF11 8RR Cardiff, United Kingdom

DNV local office: Bristol

Responsibility

The Holder of Certificate takes the responsibility that both design and production are in compliance with Rules, Standards and/or Regulations listed on page 1 of this certificate.

Application/Limitation

Area of application will be evaluated during approval of classified objects. Additional properties may be requested.

Type Approval documentation
Tests carried out

Type Testing carried out according to **Type Approval documentation**.

The following test report has been reviewed and used as basis for the approval:
- Testing of Moulding Compounds, Swansea University, dated December 2010.

The following test reports have been taken for information:
- BS 476: Part 5:1979 (Withdrawn Test Standard), Method of Test for Ignitability, Exova Report 198016 of 2011-01-07.
- BS 476: Part 6:1989+A1:2009, Method of Test for Fire Propoagation for Products, Exova Report 198022 of 2010-12-16.
- BS 476: Part 7:1997, Method for Classification of the Surface Spread of Flame of Products, Exova Report 198030 of 2010-12-16.

- UL-94, Vertical Burning Test for Classifying Materials V-0, V-1 or V-2, Exova Report 198031 of 2010-12-16.
- UL-94, Vertical Burning Test for Classifying Materials V-0, V-1 or V-2, Exova Report 198032 of 2010-12-16.
- UL-94, Vertical Burning Test for Classifying Materials V-0, V-1 or V-2, Exova Report 198033 of 2010-12-16.
- UL-94, Vertical Burning Test for Classifying Materials V-0, V-1 or V-2, Exova Report 198034 of 2010-12-16.
- UL-94, Vertical Burning Test for Classifying Materials V-0, V-1 or V-2, Exova Report 198035 of 2010-12-16.

Marking of product

Product shall be marked with *manufacturer's name*; **Torgy Atlantic Ltd., Cardiff, UK** and *type designation*.

Certificate Retention/Renewal Survey

The scope of the Retention/Renewal Survey is to verify that the conditions stipulated for the Type Approval is complied with and that no alterations are made to the product design or choice of materials.

Survey to be performed after two (2) years (Certificate Retention Survey) and at renewal after four (4) years (Certificate Renewal Survey).

The main elements of the survey are:

- Ensure that **Type Approval documentation** is available.
- Review design, materials, production process, and performance with respect to possible changes, in order to ensure compliance with **Type Approval documentation** and/or referenced material specifications.
- Ensure traceability between manufacturer's product marking and the DNV Type Approval Certificate.

END OF CERTIFICATE