

CERTIFICATE OF APPROVAL OF A POLYESTER RESIN

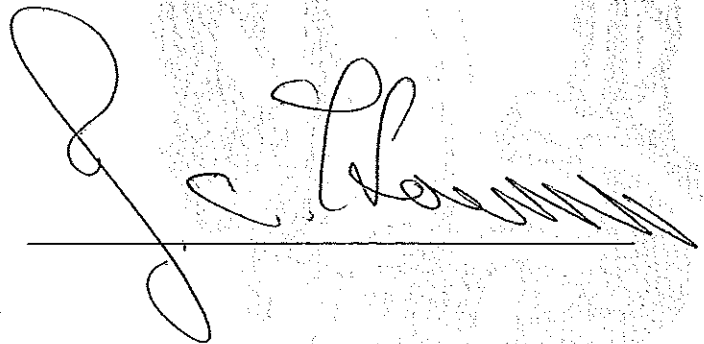
Certificate No. MATS/2071/3

This certificate is issued to the company named below. The resin described has been examined in accordance with the requirements of Lloyd's Register and is approved for use in constructions built under Lloyd's Register's survey. This approval is subject to Lloyd's Register being informed of any changes in or modifications to the resin and the product being used in accordance with the manufacturer's instructions and with the relevant requirements of Lloyd's Register's Rules and Regulations.

Company	DSM RESINS INTERNATIONAL BV SCHOONEBEEK THE NETHERLANDS
Trade name	PALATAL
Resin	U 569 TV-01
Application	Laminating resin
Type	Orthophthalic polyester resin
Characteristics	Pre-accelerated, Thixotropic , Contains wax
Applicable LR Rules	Rules and Regulations for Classification of Special Service Craft
Approved Variants	See attached Appendix

Valid until 1 October 2009

Date 24 June 2005



A handwritten signature in black ink, appearing to be 'C. Blom', is written over a horizontal line. The signature is stylized and cursive.

**CERTIFICATE OF APPROVAL A
OF POLYESTER RESIN**

Appendix to certificate MATS/2071/3

Approved Variants

PALATAL U 569 TV-02

Plus inhibitor, Plus additional accelerator

PALATAL U 569 TV-03

Plus inhibitor

PALATAL U 569 T-06

Not Pre-accelerated Plus inhibitor

SYNOLITE 1777-P-3

SYNOLITE 1777-G-3

Not Pre-accelerated, Not Thixotropic For vacuum resin infusion

SYNOLITE 1777-G-4

Not Pre-accelerated, Not Thixotropic For vacuum resin infusion

SYNOLITE 1777-G-45

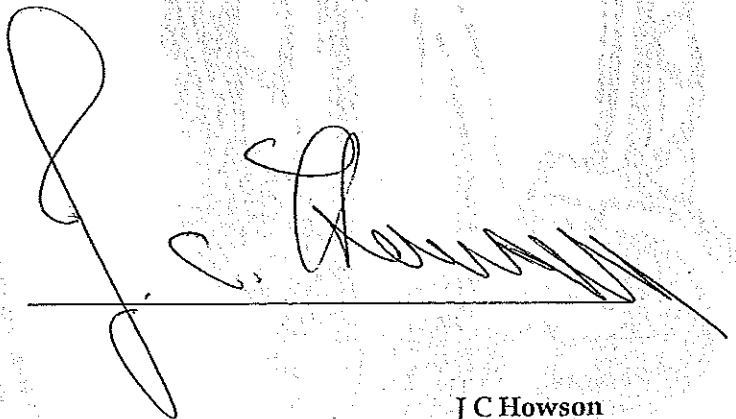
Not Pre-accelerated, Not Thixotropic For vacuum resin infusion

SYNOLITE 1777-G-5

Not Pre-accelerated, Not Thixotropic For vacuum resin infusion

VARIANTS OF PALATAL U 569 TV-01

Date 24 June 2005



J C Howson
Surveyor to Lloyd's Register EMEA
A member of the Lloyd's Register Group



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. K-2981

This Certificate consists of 3 pages

This is to certify that the
Polyester Resins

with type designation(s)
**Palatal U 569 TV-01, Palatal TV-02,
Palatal TV-03 and Palatal T-06**

Manufactured by
DSM Composite Resins Nederland B.V.
Schoonebeek, Netherlands

is found to comply with
Det Norske Veritas' Rules for Classification of High Speed and Light Craft, Grade 1
Det Norske Veritas' Tentative Rules for Certification and Classification of Boats 1997, Grade 1

Application
For use in marine vessels according to stated Rules.

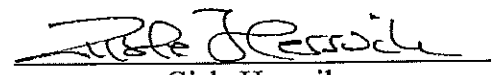
Place and date
Høvik, 2006-09-13
for DET NORSKE VERITAS AS


Hanne Anita Hjerpetjonn
Head of Section



Local Office
DNV Rotterdam

This Certificate is valid until
2010-12-31


Gisle Hersvik
Surveyor

Notice: 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.

If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In this provision 'Det Norske Veritas' shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.



Cert. No.: K-2981
File No.: 332.20

Product description

Palatal U 569 TV-01, Palatal TV-02, Palatal TV-03 and Palatal T-06; unsaturated, orthophthalic, LSE (Low Styrene Emission) polyester resin.

The following properties have been verified by Type Testing:

Property	Test Method	U 569 TV-03		
Fracture Elongation	ISO 527	3.21 / 2.61	%	mean / min
Tensile Strength	ISO 527	76.9 / 68.5	MPa	mean / min
Water Absorption	ISO 62	77.5 ¹⁾	mg	mmsv (mean)
HDT	ISO 75	79.3	°C	mmsv (mean)
Barcol Hardness	BS 4549	47	-	msv
Density	ISO 1675	1.08	g/cm ³	msv
Curing Procedure used for Type Testing	24 hrs at room temperature, 24 hrs at 60°C			

¹⁾ From: DNV Test Report no. 1030 3301/92

Legends:

- msv = Manufacturer's Specified Value, verified to be within $\pm 10\%$ of mean of Type Test results
mmsv = Manufacturer's Specified Minimum Value, verified to be below mean - 2 x standard deviation of Type Test results
mean = mean of Type Test results
min. = minimum value from Type Testing

Type Approval documentation

1. Previous Type Approval Certificate No. K-2149.
2. Letter and email from DNV Rotterdam, incl. Retention Survey Report of 2006-07-10.

Tests carried out

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

Marking of product

Product shall be marked with *manufacturer's name*; **DSM Composite Resins Nederland B.V.** 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).



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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