



**DNV**

# DET NORSKE VERITAS

## TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. K-5284

This is to certify that the  
**Polyester Resins**

with type designation(s)

**Synthopan® 281, including the variants; Synthopan® 281-30, Synthopan® 281-40,  
Synthopan® 281 I P X-13, Synthopan® 281 I P X-15, Synthopan® 281 I P X-16,  
Synthopan® 281 I P X-17, Synthopan® 281 I P X-18, Synthopan® 281 I P X-19**

Manufactured by

**Synthopol Chemie Dr. rer. pol. Koch GmbH & Co. KG  
Buxtehude, Germany**

is found to comply with

Det Norske Veritas' Rules for Classification of High Speed, Light Craft and Naval Surface Craft, Grade 1  
Det Norske Veritas Standards' for Certification No. 2.21, Craft, 2010

Application

**For use in marine vessels according to stated Rules/Standards.**

Høvik, 2012-10-23  
for Det Norske Veritas AS



This Certificate is valid until  
**2016-12-31**

**Rikard Törnqvist**  
Head of Section

DNV local office:  
**Hamburg**

**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.  
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.



Certificate No.: K-5284  
File No.: 332.20  
Job Id.: 262.1-005976-3

## Product description

Unsaturated orthophthalic non-LSE (Low Styrene Emission) polyester resins:

Synthopan® 281, including variants ;  
Synthopan® 281-30,  
Synthopan® 281-40,  
Synthopan® 281 I P X-13,  
Synthopan® 281 I P X-15,  
Synthopan® 281 I P X-16,  
Synthopan® 281 I P X-17,  
Synthopan® 281 I P X-18,  
Synthopan® 281 I P X-19.

X = Low exothermic reaction

## Type Approval documentation

1. Previous Type Approval Certificate No. K-3559.
2. Email from DNV Hamburg of 2012-07-15, including Survey Report from DNV Hamburg of 2012-07-13.

## Tests carried out

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

## Marking of product

Product shall be marked with *manufacturer's name*; **Synthopol Chemie Dr. rer. pol. Koch GmbH & Co. KG, Buxtehude, Germany** and *type designation*; **Synthopan® 281, Synthopan® 281-30, Synthopan® 281-40, Synthopan® 281 I P X-13, Synthopan® 281 I P X-15, Synthopan® 281 I P X-16, Synthopan® 281 I P X-17, Synthopan® 281 I P X-18 or Synthopan® 281 I P X-19.**

## 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



# DET NORSKE VERITAS

## TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. K-5286

This is to certify that the  
**Polyester Resins**

with type designation(s)

**Synthopan® 981, including the variants; Synthopan® 981-71, Synthopan® 981-72,  
Synthopan® 981 X-71, Synthopan® 981 X-72, Synthopan® 981 X-73, Synthopan® 981 X-74,  
Synthopan® 981 X-75, Synthopan® 981 X-76**

Manufactured by

**Synthopol Chemie Dr. rer. pol. Koch GmbH & Co. KG  
Buxtehude, Germany**

is found to comply with

Det Norske Veritas' Rules for Classification of High Speed, Light Craft and Naval Surface Craft, Grade 1  
Det Norske Veritas Standards' for Certification No. 2.21, Craft, 2010

Application

**For use in marine vessels according to stated Rules/Standards.**

Høvik, 2012-10-23  
for Det Norske Veritas AS



This Certificate is valid until  
**2016-12-31**

**Rikard Törnqvist  
Head of Section**

DNV local office:  
**Hamburg**

**Gisle Hersvik  
Surveyor**

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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.



Certificate No.: K-5286  
File No.: 332.20  
Job Id.: 262.1-005976-3

## Product description

Unsaturated orthophthalic LSE (Low Styrene Emission) polyester resins:

Synthopan® 981, including variants;  
Synthopan® 981-71,  
Synthopan® 981-72,  
Synthopan® 981 X-71,  
Synthopan® 981 X-72,  
Synthopan® 981 X-73,  
Synthopan® 981 X-74,  
Synthopan® 981 X-75,  
Synthopan® 981 X-76.

X = Low exothermic reaction

## Type Approval documentation

1. Previous Type Approval Certificate No. K-3561.
2. Email from DNV Hamburg of 2012-07-15, including Survey Report from DNV Hamburg of 2012-07-13.

## Tests carried out

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

## Marking of product

Product shall be marked with *manufacturer's name*; **Synthopol Chemie Dr. rer. pol. Koch GmbH & Co. KG, Buxtehude, Germany** and *type designation*; **Synthopan® 981, Synthopan® 981-71, Synthopan® 981-72, Synthopan® 981 X-71, Synthopan® 981 X-72, Synthopan® 981 X-73, Synthopan® 981 X-74, Synthopan® 981 X-75 or Synthopan® 981 X-76.**

## 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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- Ensure traceability between manufacturer's product marking and the DNV Type Approval Certificate.

END OF CERTIFICATE