



TYPE APPROVAL

Certificate No.:
TA-DNV-CP-0082-07316-0

Issued:
2022-12-28

Valid until:
2027-12-27

Issued for:

Glass Fibre Rovings

with type designation(s)

E7DR-386T Series

As specified in Annex 1

Issued to:

Jushi Group Co., Ltd.

669 Wenhua Rd.(S.), Tongxiang Economic Development Zone, Zhejiang 314500, China

According to:

DNV-SE-0436:2021-09 Shop approval in renewable energy

and

DNV-CP-0082:2021-09 Type approval – Glass fibre rovings

Applying:

DNV-SE-0441:2021-10 Type and component certification of wind turbines

Based on the documents listed in Annex 1.

This Type Approval supersedes the Type Approval WP1430055HH.

Any significant changes in the design and/or quality of the material will render this Type Approval invalid.

Hellerup, 2022-12-28
For DNV Renewables Certification

Hamburg, 2022-12-28
For DNV Renewables Certification

Bente Vestergaard
Service Line Leader

Bernhard Krüger
Project Manager

TYPE APPROVAL – ANNEX 1

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Product description and application

E7DR-386T series is a direct glass fibre roving for weaving, pultrusion and filament winding to be used in FRP components of wind turbine rotor blades or other applications such as marine, pipes, tubes, tanks and pultruded structural shapes.

Approved variants

E7DR16-200-386T, E7DR17-600-386T, E7DR17-1200-386T, E7DR17-1500-386T and E7DR17-2400-386T

Type Approval documentation

| | |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Technical data sheet(s) | E7 386T Direct Roving TDS |
| Test report(s) | Test Report Glass Fiber Roving (E7DR16-200-386T), BG180531106, issued 2018-05-31 Test Report Glass Fiber Roving (E7DR17-600-386T), BG180531107, issued 2018-05-31 Test Report Glass Fiber Roving (E7DR17-1200-386T), BG180531108, issued 2018-05-31 Test Report Glass Fiber Roving (E7DR17-1500-386T), BG180531109, issued 2018-05-31 Test Report Glass Fiber Roving (E7DR17-2400-386T), BG180531110, issued 2018-05-31 Test Report Glass Fiber Roving (E7DR16-200-386T), BG190709106, issued 2019-07-09 Test Report Glass Fiber Roving (E7DR17-600-386T), BG190709107, issued 2019-07-09 Test Report Glass Fiber Roving (E7DR17-1200-386T), BG190709108, issued 2019-07-09 Test Report Glass Fiber Roving (E7DR17-1500-386T), BG190709109, issued 2019-07-09 Test Report Glass Fiber Roving (E7DR17-2400-386T), BG190709110, issued 2019-07-09 |
| Inspection report(s) | WIR-10325803-001-Rev00, DNV, dated 2021-04-23 |
| Quality control documentation | ISO9001:2015 Certificate, 20319142/1-1, issued 2022-03-01, valid until 2025-02-28 Several CoAs |

Material Properties

| Properties | Variant 1 (E7DR16-200-386T) | Variant 2 (E7DR17-600-386T) | Variant 3 (E7DR17-1200-386T) | Variant 4 (E7DR17-1500-386T) | Variant 5 (E7DR17-2400-386T) | Unit |
|-------------------------------|--------------------------------|--------------------------------|---------------------------------|---------------------------------|---------------------------------|------|
| Type of glass | H-glass | H-glass | H-glass | H-glass | H-glass | [-] |
| Type of sizing | Silane 386T | Silane 386T | Silane 386T | Silane 386T | Silane 386T | [-] |
| Matrix compatibility | Polyester, Vinyl ester, Epoxy | Polyester, Vinyl ester, Epoxy | Polyester, Vinyl ester, Epoxy | Polyester, Vinyl ester, Epoxy | Polyester, Vinyl ester, Epoxy | [-] |
| With or without twist | Without | Without | Without | Without | Without | [-] |
| Filament diameter | 16 | 17 | 17 | 17 | 17 | µm |
| Linear density ⁽¹⁾ | 200 | 600 | 1200 | 1500 | 2400 | tex |

⁽¹⁾ According to ISO 1889, ± 5%

Approved production sites

Jushi Group Co. LTD
 669 Wenhua Rd. (S.), Tongxiang Economic Development Zone
 Zhejiang 314500, China

Last workshop inspection: 2021-04-23

Periodic assessment

2.5 years after the last workshop inspection, the client shall inform DNV about any modifications in production. An intermediate inspection might be needed based on the implemented changes.