TYPE APPROVAL

Certificate No.:	Issued:	Valid until:
TA-DNV-CP-0082-10597-0	2025-02-28	2030-02-28

Issued for:

Glass fibre rovings

with type designation(s)

E6DR-386T Series

As specified in Annex 1

Issued to:

Jushi Group Co., Ltd.

669 Wenhua Road (S.), Tongxiang Economic Development Zone, Zhejiang 314500, P.R. China

According to:

DNV-SE-0436:2022-09 Shop approval in renewable energy

and

DNV-CP-0082:2024-09 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 WP 1630050HH.

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

Hellerup, 2025-02-28

For DNV Renewables Certification

Harrison, Christopher
Service Line Leader, Component Certification

DAkkS Deutsche Akkreditierungsstelle D-ZE-22290-01-00

By DAkkS according DIN EN IEC/ISO 17065 accredited Certification Body for products. The accreditation is valid for the fields of certification listed in the certificate.

Shanghai, 2025-02-28

For DNV Renewables Certification

Li, Yu Hua
Project Manager

TYPE APPROVAL – ANNEX 1

Product description and application

This Type Approval covers the untwisted E6-386T direct roving with E6 glass formulation for filament winding, pultrusion, and weaving applications of FRP components of wind turbine generators (rotor blades, nacelle covers, spinners). The E6-386T direct roving has a silane-based sizing for amine and anhydride curing epoxy systems.

Approved variants

This Type Approval covers the direct E-glass roving E6-386T with silane-based sizing for amine and anhydride curing epoxy systems with linear densities 300tex, 600tex, and 900tex and filament diameters of 13μm or 17μm:

E6DR13-300-386T, filament diameter: 13μm
E6DR17-600-386T, filament diameter: 17μm
E6DR17-900-386T, filament diameter: 17μm

Limitations for the product

The approval is limited for application of the product in blades of wind turbines.
Any significant changes in design and/or quality of the material will render the approval invalid.

Type Approval documentation

Technical data sheet(s)	TDS E6DR-386T, E6 386T Direct Roving, For Filament Winding, Pultrusion, Weaving, issued by China Jushi Co., Ltd.
Safety data sheet(s)	J1251-001, Q/JS J0520-2019, Version No. 6, Safe use instructions of roving, issued by Jushi Group Co., Ltd., dated 2019-08-15
Test report(s)	BG200710101, RVE. B, Test Report Glass Fibre Roving (E6DR13-300-386T), issued by Testing Center, Jushi Group Co., Ltd., dated 2020-07-10
	BG200710103, Test Report Glass Fibre Roving (E6DR17-600-386T), issued by Testing Center, Jushi Group Co., Ltd., dated 2020-07-10
	BG200710104, Test Report Glass Fibre Roving (E6DR17-900-386T), issued by Testing Center, Jushi Group Co., Ltd., dated 2020-07-10
	Annex 1 实验条件.xls (specimen preparation),
Inspection documentation	WIR-10596-A176-001, Rev.0, Workshop Inspection Report, issued by DNV, dated 2024-12-05
Quality control documentation	20319142/2, Certificate ISO 9001:2015, issued by DEKRA Certification GmbH, dated 2025-02-24
	2403-09951, Certificate of analysis, E6DR13-300-386T, issued by Jushi Group Co., Ltd., production date 2023-07-05
	2403-09951, Certificate of analysis, E6DR17-600-386T, issued by Jushi Group Co., Ltd., production date 2023-05-12 – 2023-07-11
	2403-09951, Certificate of analysis, E6DR17-900-386T, issued by Jushi Group Co., Ltd., production date 2023-05-04

TYPE APPROVAL – ANNEX 1

Material properties
(All the values are mean values from type testing)

Properties	Test method	E6DR13-300-386T	E6DR17-600-386T	E6DR17-900-386T	Unit
Linear density	ISO 1889	298	613	880	tex
Filament diameter	ISO 1888	13.2	17.0	16.8	µm
Loss of ignition	ISO 1887	0.47	0.58	0.59	%
Moisture content	ISO 3344	0.05	0.05	0.04	%
Tensile strength	ISO 3341	0.60	0.52	0.47	N/tex

Approved production sites

Jushi Group Co., Ltd.
669 Wenhua Road (S.)
Tongxiang Economic Development Zone
Zhejiang 314500
P.R. China

Last workshop inspection date: 2024-11-05

Certificate maintenance

A periodical assessment needs to be carried out 2.5 years after the issue date of the Type Approval. In the case of major changes of the approved production processes and methods during the validity time of the Type Approval, the changes shall be reported to DNV. An intermediate inspection of the production workshop(s) might be needed based on the implemented changes. A workshop holding a valid Shop Approval for manufacturing of composite materials is exempted from the periodical assessment.