

# TYPE APPROVAL

Certificate No.:  
TA-DNV-CP-0084-08340-1

Issued:  
2023-03-17

Valid until:  
2028-02-14

Issued for:

## Sandwich core material

with type designation(s)

## Gurit<sup>®</sup> Kerdyn<sup>™</sup> Green

As specified in Annex 1

Issued to:

## Gurit Italy S.R.L.

Via Torino 105, Volpiano (TO) 10088 Italy

According to:

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

and

### **DNV-CP-0084:2021-09 Type approval – Sandwich core materials**

Applying:

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

Based on the documents listed in Annex 1.

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

Hellerup, 2023-03-17  
For DNV Renewables Certification

Hamburg, 2023-03-17  
For DNV Renewables Certification



**Bente Vestergaard**  
Service Line Leader

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.

**Bernhard Krüger**  
Project Manager

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## Product description and application

A cross-linked, closed-cell PET (Polyethylene terephthalate) foam core material for sandwich construction.

## Approved variants

- Kerdyn Green 80
- Kerdyn Green 100
- Kerdyn Green 115
- Kerdyn Green 135
- Kerdyn Green 150
- Kerdyn Green 200
- Kerdyn Green 235
- Kerdyn Green 250
- Kerdyn Green 300

## Type Approval documentation

Technical data sheet(s)	PDS-Kerdyn Green-11-0223, Gurit® Kerdyn® Green RECYCLABLE STRUCTURAL FOAM, Gurit
Safety data sheet(s)	Rev.4.6, Gurit Kerdyn Green, Gurit, dated 2022-03-23
Test report(s)	11260, Test report, Gurit, dated 2018-01-05 427, Rev.1.6, Test report, Gurit® Kerdyn™ Green DNV Renewal, Gurit, dated 2023-03-03
Inspection documentation	WIR-08340-001-00, Workshop Inspection Report, DNV, dated 2023-02-23 WIR-08340-002-00, Workshop Inspection Report, DNV, dated 2023-02-23 WIR-08340-003-00, Workshop Inspection Report, DNV, dated 2023-02-24 WIR-08340-004-00, Workshop Inspection Report, DNV, dated 2023-02-03
Quality control documentation	10000403579-MSC-DANAK-DNK, ISO 9001:2015 certificate, DNV, dated 2023-01-26 113936-2012-AQ-RGC-RvA, ISO 9001:2015 certificate, DNV GL, dated 2020-04-21 72243-2010-AQ-DEN-DANAK, ISO 9001:2015 certificate, DNV, dated 2022-02-28 Several certificates of analysis

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## Material properties

All values are average values (minimum values within brackets) and have been verified by testing.

Variant	Test Method	Kerdyn® Green 80	Kerdyn® Green 100	Kerdyn® Green 115	Kerdyn® Green 135	Kerdyn® Green 150	Kerdyn® Green 200	Kerdyn® Green 235	Kerdyn® Green 250	Kerdyn® Green 300
Nominal Density	(1)	80	100	115	135	150	200	235	250	300
Density Range	(1)	75 - 85	95 - 105	110 - 120	130 - 140	145 - 155	190 - 210	225 - 245	240 - 260	288 - 312
Compr. Strength	(2)	0.86 (0.50)	1.30 (0.94)	1.65 (1.28)	2.12 (1.75)	2.49 (2.12)	3.79 (3.41)	4.63 (3.73)	5.21 (4.5)	6.5 (5.5)
Compr. Modulus	(2)	74.0 (46.0)	91.0 (63.0)	105.0 (77.0)	126.0 (96.0)	142.0 (112.0)	203.0 (173.0)	246.0 (200.0)	276.0 (230.0)	335.0 (270.0)
Shear Strength	(3)	0.59 (0.47)	0.80 (0.68)	0.97 (0.84)	1.20 (1.08)	1.40 (1.26)	2.04 (1.52)	2.23 (1.70)	2.36 (1.76)	2.66 (1.99)
Shear Strength	(5)	0.58 (0.43)	0.79 (0.64)	0.95 (0.80)	1.17 (1.02)	1.35 (1.19)	1.95 (1.50)	2.17 (1.60)	2.31 (1.78)	2.65 (2.06)
Shear Modulus	(4)	18.0 (14.0)	25.0 (21.0)	30.0 (26.0)	37.0 (34.0)	43.0 (39.0)	62.0 (59.0)	76.0 (72.0)	83.0 (79.0)	105.0 (101.0)
Shear Modulus	(6)	16.0 (13.0)	23.0 (20.0)	27.0 (24.0)	34.0 (31.0)	39.0 (36.0)	57.0 (54.0)	69 (64.0)	75.0 (72.0)	93.0 (90.0)
Tensile Strength	(7)	1.54 (0.70)	1.82 (0.99)	2.02 (1.19)	2.27 (1.44)	2.45 (1.63)	2.98 (2.17)	3.26 (2.50)	3.42 (2.61)	3.77 (2.96)
Heat Resistance	(8)	–	–	–	–	–	–	–	–	≤47

(1) Density according to ISO 845 in kg/m<sup>3</sup>.

(2) Compressive properties according to ISO 844:2014, procedure B in MPa.

(3) Shear strength parallel (0°) to welding lines according to ASTM C273 in MPa.

(4) Shear modulus parallel (0°) to welding lines according to ASTM C273 in MPa.

(5) Shear strength perpendicular (90°) to welding lines according to ASTM C273 in MPa.

(6) Shear modulus perpendicular (90°) to welding lines according to ASTM C273 in MPa.

(7) Flatwise tensile test according to ASTM C 297 with specimen made of pure foam in MPa.

(8) Heat resistance according to DNV GL Class Programme CP-0084 in °C with a retention of shear strength ≥80%.

ASTM D1621-73 procedure B and ISO 844:2014 procedure B work on the same technical principle and provide comparable test results.

ASTM C273 and ISO 1922 work on the same technical principle and provide comparable test results.



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## Approved production sites

GURIT Italy S.r.l.  
Via Torino 105,  
Volpiano (TO)  
10088 Italy.

Last workshop inspection date: 2023-02-06

Gurit Tianjin Composite Material Co.,Ltd  
No.1 Hengtong Road YSP,  
TEDA,Tianjin,  
P.R.China,301726.

Last workshop inspection date: 2023-01-17

JSB Kitting Matamoros, S. A. De C. V. (GWS  
MATAMOROS)  
Avenida Guillermo Gonzalez  
Camarena No.9005,  
Parque Industrial La Ventana CP 87569  
Matamoros, Tamaulipas, Mexico.

Last workshop inspection date: 2023-02-10

Gurit Wind Pvt. Ltd.  
GB-140A,GB-140B,GB-170,  
Greenbase Industrial and Logistics Park,  
Thriveni Nagar, Vadakkupattu Village,  
Sriperumbudur Taluk,  
Kanchipuram – 603 204, India

Last workshop inspection date: 2023-02-03

## Periodical assessment

2.5 years after this Type Approval is issued, the client shall inform DNV about any modifications in production. 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 for the material in question is exempted from a periodical assessment.