



# DET NORSKE VERITAS

## TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. **F-20542**

This is to certify that the  
**FRP Grating**

with type designation(s)

**Pandagrate (ECOGRATE) Molded Fiberglass gratings and Pandadeck (ECODECK) Pultruded Fiberglass gratings**

Manufactured by

**Chinagrate Composite Structures (Nantong) Co.,Ltd.  
Nantong, China**

is found to comply with

**Det Norske Veritas' Offshore Standards  
Det Norske Veritas' Rules for Classification of Ships  
Det Norske Veritas' Interpretation of SOLAS 1974 Convention as Amended**

Application

**For use in locations according to enclosed Structural Fire Integrity Matrix.**

This Certificate is valid until **2017-12-31**.

Issued at **Høvik** on **2013-09-10**

for **Det Norske Veritas AS**

DNV local station: **Nantong**

Approval Engineer: **Piotr Orzechowski**

**Petter Langnes  
Head of Section**

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.

**Product description**

“Pandagrate (ECOGRATE) Molded Fiberglass gratings and Pandadeck (ECODECK) Pultruded Fiberglass gratings”

The products is manufactured by:

- Chinagrate Composite Structures (Nantong) Co.,Ltd., Nantong, China.
- ECO INDUSTRIA E COMERCIO DE COMPOSITOS LTDA, Rio de Janeiro, Brazil.

1) Pandagrate (ECOGRATE) Molded Fiberglass gratings of the below categories:

- 1a) Orthophtalic Resin.
- 1b) Isophtalic Resin.
- 1c) Vinyl ester Resin.
- 1d) Phenolic Resin.
- 1e) ISO-FR Resin.

(For types and sizes, see Figure 1.)

2) Pandadeck (ECODECK) Pultruded Fiberglass gratings of the below categories:

- 2a) Isophthalic Resin.
- 2b) Vinyl ester Resin.

(For types and sizes, see Figure 1.)

Figure 1: Tests results according to ASTM E84-07, ASTM E84-05, ASTM E84-04 or ASTM E84-10b:

| Category as described above | Product name (ref. test report)                          | Flame Spread Index | Smoke Developed Index |
|-----------------------------|--|--------------------|-----------------------|
| 1a)                         | MOR1"x2'x6'/7043   | 15                 | 600                   |
| 1a)                         | Molded OR15412-1.5" thick 1.5" x 1.5" SM Grating         | 20                 | 350                   |
| 1b)                         | Molded IF10412A-1"thick 1" x 4" RM Grating               | 20                 | 400                   |
| 1b)                         | Molded IF10412-1"thick 1.5" x 1.5" SM Grating            | 20                 | 300                   |
| 1b)                         | Molded IF15412-1.5"thick 1.5" x 1.5" SM Grating          | 20                 | 180                   |
| 1b)                         | Molded IF15412-2"thick 2" x 2" SM Grating                | 15                 | 250                   |
| 1b)                         | Molded IF15412MA-1.5"thick 0.75" x 0.75" Mini SM Grating | 20                 | 300                   |
| 1c)                         | MVE1"x2'x6'/6017   | 10                 | 600                   |
| 1c)                         | Molded VE20412-2" Thick 2" x 2" SM Grating               | 15                 | 130                   |
| 1c)                         | Molded VE15412-1.5" thick 1.5" x 1.5" SM Grating         | 15                 | 160                   |
| 1d)                         | MPH 1" x 1 1/2" SM                                       | 5                  | 15                    |
| 1d)                         | MPH 1 1/2" x 1 1/2" SM                                   | 0                  | 0                     |
| 1d)                         | MPH 1-1/2" x 1-1/2" x 6" RM                              | 10                 | 20                    |
| 1d)                         | MPH 2" x 2" SM   | 0                  | 0                     |
| 1e)                         | MIF-ADA 1.5" thick 1" x 6" RM                            | 25                 | 350                   |
| 2a)                         | PIF1"x2'x6'/YE   | 5                  | 650                   |
| 2a)                         | Pultruded IFI60150-60% 1.5" thick Grating                | 20                 | 500                   |
| 2a)                         | Pultruded IFT50200-50% 2" thick Grating                  | 15                 | 500                   |
| 2b)                         | PVE1"x2'x6'/7015   | 5                  | 650                   |
| 2b)                         | Pultruded VEI60150-60% 1.5" thick Grating                | 15                 | 500                   |

(RM = Rectangular Mesh, SM = Square Mesh)

## Application/Limitation

For use in locations according to the below Structural Fire Integrity Matrix.

### Structural Fire Integrity Matrix.

| Location  | Service  | All products as listed in Figure 1        |
|---|--|---|
| Machinery Spaces  | Walkways or areas which may be used for escape, or access for fire fighting, emergency operation or rescue | NO  |
|   | Personnel walkways, catwalks, ladders, platforms or access areas other than those described above          | NO  |
| Cargo Pump Rooms  | All personnel walkways, catwalks, ladders, platforms or access areas                                       | NO  |
| Cargo Holds   | Walkways or areas which may be used for escape, or access for fire fighting, emergency operation or rescue | NO  |
|   | Personnel walkways, catwalks, ladders, platforms or access areas other than those described above          | YES                                       |
| Cargo Tanks   | All personnel walkways, catwalks, ladders, platforms or access areas                                       | NO  |
| Fuel Oil Tanks  | All personnel walkways, catwalks, ladders, platforms or access areas                                       | YES, if Condition 1) is met. (See below.) |
| Ballast Water Tanks   | All personnel walkways, catwalks, ladders, platforms or access areas                                       | YES, if Condition 1) is met. (See below.) |
| Cofferdams, void spaces, double bottoms, pipe tunnels, etc.               | All personnel walkways, catwalks, ladders, platforms or access areas                                       | YES, if Condition 1) is met. (See below.) |
| Accommodation, service, and control spaces                                | All personnel walkways, catwalks, ladders, platforms or access areas                                       | NO  |
| Lifeboat embarkation or temporary safe refuge stations in open deck areas | All personnel walkways, catwalks, ladders, platforms or access areas                                       | NO  |
| Open Decks or semi-enclosed areas   | Walkways or areas which may be used for escape, or access for fire fighting, emergency operation or rescue | NO  |
|   | Personnel walkways, catwalks, ladders, platforms or access areas other than those described above          | YES                                       |
|   | Gangway for safe access to bow on tankers according to IMO MSC.62(67)                                      | NO  |

Condition 1) Only if these spaces **not** are within accommodation, service and control spaces, and normally **not** entered when underway.

Each product is to be supplied with its manual for installation and maintenance.

## Type Approval documentation

Certification in accordance with Standard for Certification No. 1.2, Type Approval, January 2013.

### Test reports from SGS U.S. Testing Company Inc., California (ASTM E84-07):

- No. 1212307-1 dated 8 January 2008 (type Molded VE20412-2" Thick 2" x 2" SM Grating)
- No. 1212307-2 dated 9 January 2008 (type Pultruded IF160150-60% 1.5" thick Grating)
- No. 1212307-3 dated 9 January 2008 (type Molded IF10412A-1"thick 1" x 4" RM Grating)
- No. 1212307-4 dated 9 January 2008 (type Molded IF10412-1"thick 1.5" x 1.5" SM Grating)
- No. 1212307-5 dated 9 January 2008 (type Molded IF15412-1.5"thick 1.5" x 1.5" SM Grating)
- No. 1212307-6 dated 9 January 2008 (type Molded IF15412-2"thick 2" x 2" SM Grating)

- No. 1212307-7 dated 9 January 2008 (type Molded IF15412MA-1.5"thick 0.75" x 0.75" Mini SM Grating)
- No. 1212307-8 dated 9 January 2008 (type Molded OR15412-1.5" thick 1.5" x 1.5" SM Grating)
- No. 1212307-9 dated 9 January 2008 (type Molded VE15412-1.5" thick 1.5" x 1.5" SM Grating)
- No. 1212307-12 dated 9 January 2008 (type Pultruded IFT50200-50% 2" thick Grating)
- No. 1212307-13 dated 9 January 2008 (type Pultruded VEI60150-60% 1.5" thick Grating)

Test reports from Intertek Testing Services NA, Inc., San Mateo, California (ASTM E84-05):

- No. 3152682SAT-001 dated 29 May 2008 (type PVE1"x2'x6'/7015)
- No. 3152682SAT-002 dated 29 May 2008 (type PIF1"x2'x6'/YE)
- No. 3152682SAT-003 dated 29 May 2008 (type MOR1"x2'x6'/7043)
- No. 3152682SAT-005 dated 29 May 2008 (type MVE1"x2'x6'/6017)

Test reports from Omega Point Laboratories Inc., San Mateo, California (ASTM E84-04):

- No. 17170-123824 dated 15 February 2005 (type MPH 1" x 1 1/2" SM)
- No. 17170-123825 dated 15 February 2005 (type MPH 1 1/2" x 1 1/2" SM)
- No. 17170-123826 dated 15 February 2005 (type MPH 2" x 2" SM)
- No. 17170-124579 dated 2 June 2005 (type MPH 1-1/2" x 1-1/2" x 6" RM)

Test report from Southwest Research Institute, San Antonio, Texas (ASTM E84-10b)

- No. 01.16045.01.144 dated 24<sup>th</sup> June 2011 (type MIF-ADA 1.5" thick 1" x 6" RM)

Drawing No. MIF-ADA 1.5"H 1"x6" RM, dated 11<sup>th</sup> May 2011, China Grate.

### Tests carried out

Tested according to ASTM E84-07, ASTM E84-05, ASTM E84-04 or ASTM E84-10b.

### Marking of product

The product or packing is to be marked with name of manufacturer and type designation.

### Periodical Assessment for Retention of the Type Approval Certificate

DNV's surveyor is to be given permission to perform Periodical Assessments at any time during the validity of this certificate and at least every second year. The arrangement is to be in accordance with procedure described in Standard for certification No. 1.2 Type Approval Item 4.