



Marine & Offshore

Certificate number: 36637/A0 BV

File number: ACM 135/2774/01

Product code: 2080H

This certificate is not valid when presented without the full attached schedule composed of 7 sections

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TYPE APPROVAL CERTIFICATE

This certificate is issued to

TIGRE MATERIAIS E SOLUCOES PARA CONSTRUCAO LTDA

Joinville - SC - BRAZIL

for the type of product

THERMOPLASTIC MATERIAL PIPES AND FITTINGS

CPVC Schedule 80 Pipes and Fittings

Requirements:

- Bureau Veritas Rules for the Classification of Steel Ships
- IMO Resolution A.753(18) as amended
- IMO Resolution MSC.307(88)-(2010 FTP Code) Annex 1, Part 2 and Part 5

This certificate is issued to attest that Bureau Veritas Marine & Offshore did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 27 Sep 2022

For Bureau Veritas Marine & Offshore,

At BV RIO DE JANEIRO, on 27 Sep 2017,

Lando Ribeiro



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with Bureau Veritas Marine & Offshore. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of Bureau Veritas Marine & Offshore available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against Bureau Veritas Marine & Offshore for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

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BV Mod. Ad.E 530 June 2017

This certificate consists of 3 page(s)

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION

CPVC Schedule 80 Pipes and Fittings

1.1 Design Specifications

| | |
|----------------------------------|------------|
| Nominal Size (inch) | 1/2" to 6" |
| Nominal External Pressure* (bar) | 1 |
| Max. Operating Temperature (°C) | 80 |

* $\leq P_{col}/3$, the collapse pressure (P_{col}) is not to be less than 3 bar

| Dimension | 1/2" | 3/4" | 1" | 1 1/4" | 1 1/2" | 2" | 2 1/2" | 3" | 4" | 6" |
|-------------------------------|------|------|------|--------|--------|------|--------|-----|------|------|
| Thickness (mm) | 3.8 | 4 | 4.6 | 4.9 | 5.2 | 5.7 | 7.1 | 7.9 | 8.8 | 11 |
| Max. Operating Pressure (bar) | 59.8 | 48.5 | 44.3 | 36.6 | 33 | 28.1 | 29.6 | 26 | 22.5 | 19.3 |

1.2 Fittings

- Adaptor (Socket x Male Thread), Reduction Bushing, CAP, Blind Flange, Female/Male Flange, 45/90° Elbow, Coupling, Coupling (Socket x Male Thread), Nipple, 45° Tee, Tee and Union.

1.3 Raw material

- ProTherm® 4353 CPVC

2. DOCUMENTS AND DRAWINGS

- Technical DataSheet dated 09/10/2012
- Technical catalogue dated Mai/2011
- Technical Specifications N° TS-1130-03 dated 19/07/2011 for pipes
- Technical Specifications N° TS-1212-00 dated 21/07/2011 for fittings

No departure from the above documents shall be made without the prior consent of the Society. The manufacturer must inform the Society of any modification or changes to these documents and drawings.

3. TEST REPORTS

3.1 Type tests performed at manufacturer's workshop and witnessed by a BV Surveyor:

- Internal pressure test (Short & Long terms), Axial Strength test, load deformation test, Temperature limitation test, Impact resistance test followed by internal pressure test, ageing test, fatigue test, fluid absorption test, external pressure test.

3.2 Flame Spread test performed at the Danish Institute of Fire and Security Technology (DBI)

3.3 Test report N0 VTP001129 dated 19/06/2017

3.4 Type tests not carried out:

- Fire Endurance test, Electrical conductivity test, Smoke generation and Toxicity test

4. APPLICATION / LIMITATION

4.1 Approved for sanitary/drains/scuppers discharges and non-essential applications where no fire endurance test is required according to Pt C, Ch 1, App 3 [2.3.1] of BUREAU VERITAS Rules or appendix 4 of IMO Resolution A.753 (18) when the abbreviations "O or NA" are specified. Further these products are not to be installed in hazardous areas.

4.2 Detailed drawings of piping system for each application on board ships are to be submitted for review of compliance with the Bureau Veritas Rules and the applicable regulations.

4.3 Penetration in watertight and fire class divisions is not covered by this approval. The drawing examination is subject to the Society's approval in each case.

4.4 The pipes assembly is to be carried out in accordance with the manufacturer's instructions and the person performing these tasks is to be qualified to the satisfaction of the Society Surveyor.

4.5 The pipes have not been type tested for fire Endurance test, electrical conductivity test, smoke generation and toxicity.

5. PRODUCTION SURVEY REQUIREMENTS

5.1 The products are to be supplied by **TIGRE MATERIAIS E SOLUÇÕES PARA CONSTRUÇÃO LTDA** in compliance with the type described in this certificate.

5.2 This type of product is within the category HBV of Bureau Veritas Rule Note NR320 and as such does not require a BV product certificate.

5.3 **TIGRE MATERIAIS E SOLUÇÕES PARA CONSTRUÇÃO LTDA** has to make the necessary arrangements to have its works recognised by Bureau Veritas in compliance with the requirements of NR320 for HBV products.

5.4 Each pipe is to be tested by the manufacturer at a hydrostatic pressure not less than 1.5 times the nominal pressure. Other recognised national or international standard may be accepted for pipes not employing hand lay up techniques. Depending upon the intended application the Society may require the pressure testing of each pipe.

For information, **TIGRE MATERIAIS E SOLUÇÕES PARA CONSTRUÇÃO LTDA** has declared to Bureau Veritas the following production site:

- TIGRE MATERIAIS E SOLUÇÕES PARA CONSTRUÇÃO LTDA: R. Dos Bororós, nº 84, Distrito Industrial, 89239-290 Joinville - SC, BRAZIL

6. MARKING OF PRODUCT

The product shall be marked with at least:

- Manufacturer's name or logo
- Type designation
- Size
- Pressure ratings
- The design standard
- Material used
- Date of fabrication / serial number

7. OTHERS

It is **TIGRE S.A. TUBOS E CONEXOES**'s responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

*** END OF CERTIFICATE ***