



APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:
AMMM00000MS
Revision No:
2

This is to certify:

That

NIROBO Metallverarbeitungs-GmbH
Ostring 25, 63533 Mainhausen,
Germany

is an approved manufacturer of
Steel Pipes and Fittings

in accordance with
DNV rules for classification – Ships

and the following particulars:

| | |
|---------------------------------|---|
| Product | Fittings |
| Application area | Piping fittings |
| Steel type | Austenitic stainless, Ferritic-austenitic (Duplex) stainless, See page 2 |
| Manufacturing method | Seamless, Welded, Cold formed |
| Max. outer diameter | See page 2 |
| Max. wall thickness | See page 2 |
| Heat treatment condition | Solution heat treated |

Manufacturer(s) approved by this certificate is/are accepted to deliver according to DNV GL, DNV and GL rules.
Materials to be applied to DNV classed object shall fulfill the material requirements in the applicable DNV class rules.

Issued at **Hamburg** on **2022-03-25**

This Certificate is valid until **2025-02-28**.

DNV local station: **Augsburg**

Approval Engineer: **Christian Wildhagen**

for **DNV**

Digitally Signed By: Roehr, Stefan

Location: DNV GL Hamburg, Germany

Signing Date: 25.03.2022 , on behalf of



Thorsten Lohmann
Head of Section

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Form code: AM 311

Revision: 2021-03

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Page 1 of 2

Particulars of the approval

Piping fittings

| Steel type | Grade ³⁾ | Manufacturing method ¹⁾ | Max. outer diameter [mm] | Max. wall thickness [mm] | Heat treatment condition ²⁾ |
|-----------------------|---------------------|------------------------------------|--------------------------|--------------------------|--|
| Austenitic | 1.4301 | EFW, CFS | 406,4 | 18 | SHT |
| | 1.4306 | EFW, CFS | 406,4 | 18 | SHT |
| | 1.4307 | EFW, CFS | 406,4 | 18 | SHT |
| | 1.4401 | EFW, CFS | 406,4 | 18 | SHT |
| | 1.4404 | EFW, CFS | 406,4 | 18 | SHT |
| | 1.4435 | EFW, CFS | 406,4 | 18 | SHT |
| | 1.4436 | EFW, CFS | 406,4 | 18 | SHT |
| | 1.4541 | EFW, CFS | 406,4 | 18 | SHT |
| | 1.4550 | EFW, CFS | 406,4 | 18 | SHT |
| | 1.4571 | EFW, CFS | 406,4 | 18 | SHT |
| 22Cr duplex stainless | | EFW, CFS | 115 | 9 | SHT |

Remarks:

- 1) CFS: cold finished seamless
EFW: electric fusion welded
- 2) SHT: Solution Heat Treated (solution annealing)
- 3) Suitable pipe grades shall be selected from the following recognised standards:
ISO 9329 Part 4, ISO 9330 Part 6, EN 10216 Part 5, EN 10217 Part 7, ASTM A269, ASTM A312, ASTM A358, ASTM A789, ASTM A790, ASTM A928 and JIS G3459



APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:
AMMM0000MR
Revision No:
2

This is to certify:

That
NIROBO Metallverarbeitungs-GmbH
Ostring 25-27, 63533 Mainhausen,
Germany

is an approved manufacturer of
Wrought Copper and Copper Alloys

in accordance with
DNV rules for classification – Ships

and the following particulars:

| | |
|---------------------------------|---|
| Application area | Copper and copper alloy fittings |
| Product | Seamless fittings |
| Alloy type | Copper-Nickel 90-10 |
| Manufacturing method | Cold forming process |
| Max. outer diameter | See page 2 |
| Heat treatment condition | See page 2 |

Manufacturer(s) approved by this certificate is/are accepted to deliver according to DNV GL, DNV and GL rules. Materials to be applied to DNV classed object shall fulfill the material requirements in the applicable DNV class rules.

Issued at **Hamburg** on **2022-03-28**

This Certificate is valid until **2025-02-28**.

DNV local station: **Augsburg**

Approval Engineer: **Stefan Röhr**



for **DNV**

Digitally Signed By: Wildhagen, Christian
Location: DNV GL Hamburg, Germany
Signing Date: 29.03.2022, on behalf of

Thorsten Lohmann
Head of Section

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Page 1 of 2

Particulars of the approval

Copper alloy fittings

| Alloy type | Grade | Manufacturing method ¹⁾ | Max. outer diameter [mm] | Heat treatment condition |
|---------------------|----------------------------------|------------------------------------|--------------------------|--------------------------|
| Copper-Nickel 90-10 | CuNi10Fe1Mn acc. to. EN 12451 | CFS | 406,4 | acc. to standard |

Remarks:

¹⁾ CFS: Cold finished seamless