



Marine & Offshore

Certificate number: 20413/D0 BV

File number: MAT 1507-2008

Product code: 9007I

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

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APPROVAL CERTIFICATE for MATERIALS

This certificate is issued to

AG der Dillinger Hüttenwerke
Dillingen/ Saar - GERMANY

for the type of product

HIGHER STRENGTH HULL STEEL ROLLED PRODUCTS

Hot rolled plates in steel grades AH32/36/40, DH32/36/40 and EH32/36/40 , including Z properties.

Requirements:

Bureau Veritas Rules on Materials and Welding for the Classification of Marine Units

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 is a renewal of certificate N° 20413/C0 BV expiring on 24/08/2023

This certificate will expire on: 24 Aug 2028

For Bureau Veritas Marine & Offshore,

At BV HAMBURG, on 11 Jul 2023,

Udo Storm

This certificate was created electronically and is valid without signature



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.

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION :

Hot rolled plates

| Steel grade | Deoxydation practice & Refining | Delivery conditions |
|---|--|--|
| AH32-DH32-EH32 AH36-DH36-EH36 (Z25/Z35) | Killed and fine grain treated with Al, Al+Nb or Al+Nb+Ti | Normalised (N) up to 100mm |
| | Killed and fine grain treated with Al+Nb, Al+Nb+Ti, Al+Nb+V or Al+Nb+V+Ti | Thermomechanically Rolled (TMCP) up to 100mm |
| AH40-DH40-EH40 (Z25/Z35) | Killed and fine grain treated with Al+Nb, Al+Nb+Ti, Al+Nb+V or Al+Nb+V+Ti | Thermomechanically Rolled (TMCP) up to 100mm |

Steelmaking in BOF. Continuous Casting or Ingot Casting.

| Steel grade | Deoxydation practice & Refining | Delivery conditions |
|---|---|---------------------------------------|
| AH32*- DH32*- EH32* AH36*- DH36*- EH36* (Z25/Z35) | Killed and fine grain treated with Al, Al+Nb or Al+Nb+Ti | Normalised (N) from 100mm up to 170mm |

* Mechanical properties as per table shown below in paragraph 2.

Steelmaking in BOF. Continuous Casting or Ingot Casting.

2. DOCUMENTS AND DRAWINGS :

- "General Information" issued by Aktien-Gesellschaft der Dillinger Huttenwerke, dated February 2008 and submitted on August 2018.

Tensile properties for t > 100mm as per table below:

| Steel grade | Rm (MPa) | ReH (MPa min) | A5 (% min) |
|------------------|----------|---------------|------------|
| AH32, DH32, EH32 | 420-570 | 285 | 22 |
| AH36, DH36, EH36 | 470-620 | 325 | 21 |

Chemical composition and Charpy V tests are to be in accordance with the BV Rules requirements for t=100mm.

3. TEST REPORTS :

3.1 - Documents issued by AG der Dillinger Huttenwerke:

- "AH40TM - FH40TM Approval Report" dated October 2001.
- "AH32TM - EH40TM Approval Report" dated February 2008.
- "AH32N - EH36N Approval Report" dated May 2008.
- "Weldability Test for EH40TM steel - Report 05/2008 Rev.0" dated 30 April 2008.
- "Weldability Test for EH40TM steel - Report 06/2008 Rev.0" dated 30 April 2008.
- "Qualification tests according to EN 10225:2001 for S355G10+N steel - Report 13/2005 Rev.1" dated 27 June 2005.
- Selected inspection certificates 3.2 including Z-properties submitted on November 2017.

4. APPLICATION / LIMITATION :

As per Bureau Veritas Rules for Classification.

5. PRODUCTION SURVEY REQUIREMENTS :

5.1-The steel plates are to be supplied by AG der Dillinger Huttenwerke in compliance with the type and the requirements described in this certificate.

5.2-This type of product is within the category IBV of Bureau Veritas Rule Note NR320.

5.3-BV product certificate is required.

6. MARKING OF PRODUCT :

As per Bureau Veritas Rules for Classification. In addition to the material grade designation, products are to be marked with the symbol Z25, Z35 as appropriate.

7. OTHERS :

This certificate replaces approvals from No.20413/A0 BV to No.20413/C0 BV.

***** END OF CERTIFICATE *****



Marine & Offshore

Certificate number: 25178/C0 BV

File number: MAT 1507-2011

Product code: 9012I

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

www.veristar.com

APPROVAL CERTIFICATE for MATERIALS

This certificate is issued to

AG der Dillinger Hüttenwerke
Dillingen/ Saar - GERMANY

for the type of product

FERRITIC STEEL ROLLED PRODUCTS FOR LOW TEMPERATURE APPLICATIONS

Hot rolled plates in steel grade 9.0 Ni

Requirements:

Bureau Veritas Rules on Materials and Welding for the Classification of Marine Units

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 is a renewal of certificate N° 25178/B0 BV expiring on 23/09/2021

This certificate will expire on: 23 Sep 2026

For Bureau Veritas Marine & Offshore,

At BV HAMBURG, on 27 Aug 2021,

Jens Bauermeister



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.

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION :

Hot rolled plates in Ferritic steel.

| Steel grade | Deoxidation practice and Refining | Delivery condition |
|-------------|---------------------------------------|--|
| 9.0 Ni | Killed and fine grain treated with Al | Double Normalised and Tempered (N+N+T) with thickness up to 50mm |
| | | Quenched and Tempered (Q+T) with thickness up to 50mm |

Steelmaking by Basic Oxygen Converter. Continuous casting or Ingot casting.

2. DOCUMENTS AND DRAWINGS :

- "Report concerning Tests for approval by Det Norske Veritas of 9% Nickel steel" issued by AG Dillinger Hüttenwerke and dated November 1980.
- "Approval report" issued by AG Dillinger Hüttenwerke and dated September 2011.

3. TEST REPORTS :

- "Report concerning Tests for approval by Det Norske Veritas of 9% Nickel steel" issued by AG Dillinger Hüttenwerke and dated November 1980.
- Statistic production results of chemical and mechanical properties of 9% Ni steels issued by AG Dillinger Hüttenwerke.
- Weldability test report issued by Meyer Werft GmbH and dated 15 February 2012.
- "Approval report" issued by AG Dillinger Hüttenwerke and dated September 2011.

4. APPLICATION / LIMITATION :

As per Bureau Veritas Rules for Classification.

5. PRODUCTION SURVEY REQUIREMENTS :

- 5.1-The steel plates are to be supplied by AG der Dillinger Hüttenwerke in compliance with the type and the requirements described in this certificate.
- 5.2-This type of product is within the category IBV of Bureau Veritas Rule Note NR320.
- 5.3-BV product certificate is required.

6. MARKING OF PRODUCT :

As per Bureau Veritas Rules for Classification.

7. OTHERS :

This certificate replaces approvals from No.25178/A0 BV to No.25178/B0 BV.

*** END OF CERTIFICATE ***



Marine & Offshore

Certificate number: 25957/C0 BV

File number: MAT 1507-2011

Product code: 9012I

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

www.veristar.com

APPROVAL CERTIFICATE for MATERIALS

This certificate is issued to

AG der Dillinger Hüttenwerke
Dillingen/ Saar - GERMANY

for the type of product

FERRITIC STEEL ROLLED PRODUCTS FOR LOW TEMPERATURE APPLICATIONS

Hot rolled plates in steel grade 5.0 Ni for low temperature applications

Requirements:

Bureau Veritas Rules on Materials and Welding for the Classification of Marine Units

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 is a renewal of certificate N° 25957/B0 BV expiring on 28/09/2021

This certificate will expire on: 28 Sep 2026

For Bureau Veritas Marine & Offshore,

At BV HAMBURG, on 27 Aug 2021,

Jens Bauermeister



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.

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION :

Hot rolled plates in nickel steel for low temperature applications.

| Steel grade | Deoxydation practice & Refining | Delivery conditions |
|-------------|---------------------------------|--|
| 5.0 Ni | Killed Fine grain treated | Normalized and Tempered (N+T) for thickness up to 35mm |
| | Killed Fine grain treated | Quenched and Tempered (Q+T) for thickness between 25 mm and 50mm |

Steelmaking by Basic Oxygen process Converter Linz-Donawitz. Continuous casting.

2. DOCUMENTS AND DRAWINGS :

As per following mechanical specification issued by AG der Dillinger Hüttenwerke:

| Grade | Thickness (mm) | Tensile properties | | | Charpy V properties | |
|--------|------------------|---------------------------------------|---------------------------------------|----------------|---------------------|-------------------------------|
| | | Yield stress ReH (N/mm ²) | Tensile strength (N/mm ²) | Elongation (%) | Test temp. (°C) | KVT energy (J) |
| 5.0 Ni | t < or = 30 | 395min. | 540 min. | 22 min. | -110 | Ave. min. 27 Indiv. min 18 |
| | 30 < t < or = 50 | 375min. | 540 min. | 22 min. | -110 | Ave. min. 27 Indiv. min 18 |

Manufacturing data as per report titled "Nuance 5Ni" issued by Forges et Aciers de Dilling and dated 10/01/1989.

3. TEST REPORTS :

- Report Ref. 30490/87 issued by Dillinger Hütte and dated 24/06/1987.
- Report "Nuance 5Ni" issued by Forges et Aciers de Dilling and dated 10/01/1989.
- Statistics results issued by AG der Dillinger Hüttenwerke and dated 31/08/2011.

4. APPLICATION / LIMITATION :

As per Bureau Veritas Rules for Classification.

5. PRODUCTION SURVEY REQUIREMENTS :

- 5.1-The steel plates are to be supplied by AG der Dillinger Hüttenwerke in compliance with the type and the requirements described in this certificate.
- 5.2-This type of product is within the category IBV of Bureau Veritas Rule Note NR320.
- 5.3-BV product certificate is required.

6. MARKING OF PRODUCT :

As per Bureau Veritas Rules for Classification

7. OTHERS :

This certificate replaces approvals No. AP/D-06-02-112/a. and from No. 25957/A0 BV to No.25957/B0 BV.

*** END OF CERTIFICATE ***



Marine & Offshore

Certificate number: 39698/C0 BV

File number: MAT 1507-2014

Product code: 9009I

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

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APPROVAL CERTIFICATE for MATERIALS

This certificate is issued to

AG der Dillinger Hüttenwerke
Dillingen/ Saar - GERMANY

for the type of product

EXTRA HIGH STRENGTH STEEL ROLLED PRODUCTS

Hot rolled plates in steel grades E460, F460 including Z35 properties

Requirements:

Bureau Veritas Rules on Materials and Welding for the Classification of Marine Units

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: 10 Feb 2030

For Bureau Veritas Marine & Offshore,

At BV HAMBURG, on 10 Feb 2025,

Udo Storm

This certificate was created electronically and is valid without signature



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.

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION :

Hot rolled plates.

| Steel grade | Deoxidation practice and Refining | Delivery condition |
|----------------------|---------------------------------------|---|
| E460 - F460 (Z35) | Killed and fine grain treated with Al | Thermomechanical Rolling (TM) with thickness up to 80mm |

Steelmaking in BOF converter and Vacuum degassing. Continuous Casting.

2. DOCUMENTS AND DRAWINGS :

2.1-Chemical composition specification on ladle (wt.%) for grades E460/F460 used by AG der Dillinger Hüttenwerke as per EN 10225:

| Elements | C | Mn | Si | P | S | Alt (1) | Ti (3) | V (2,3) | Ni |
|-------------|------|------|------|---------|-------|---------|--------|---------|------|
| Min. | - | - | 0.15 | - | - | 0.015 | - | - | - |
| Max. | 0.14 | 1.65 | 0.55 | 0.020 | 0.007 | 0.055 | 0.025 | 0.080 | 0.70 |
| Elements | Cr | Cu | Mo | Nb(2,3) | N (1) | Ca | B | Ceq | Pcm |
| Min. | - | - | - | - | - | - | - | - | - |
| Max. | 0.25 | 0.30 | 0.25 | 0.040 | 0.010 | 0.005 | 0.0005 | 0.43 | 0.22 |

(1) Alt/N ratio shall be a minimum of 2:1; (2) The sum of V+Nb is not to exceed 0.09%; (3) The sum of V+Nb+Ti is not to exceed 0.11%; Ceq = C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15; Pcm = C+Si/30+(Mn+Cu+Cr)/20+Ni/60+Mo/15+V/10+5B.

2.2-Material specification as per S460G2+M Z35 - EN 10225.

2.3-CTOD test have been carried out on butt weld assembly with plate grade E460, 80mm, Heat No.356211, according to test method BS 7448 and results are summarized hereafter:

| Grade | Welding method | Heat Input (KJ/cm) | Condition | Temperature | Notch position | CTOD values (mm) |
|-------|----------------|--------------------|------------------|-------------|-----------------|------------------------|
| E460 | SAW | 16 | As welded + PWHT | 0°C | fusion line | 2.45; 0.20; 2.14; 1.59 |
| | | | | | fusion line+2mm | 3.23; 2.52; 3.00 |
| | | | | | fusion line+5mm | 2.92; 3.29; 2.47 |
| E460 | SAW | 50 | As welded + PWHT | 0°C | fusion line | 0.39; 0.40; 0.76 |
| | | | | | fusion line+2mm | 2.49; 2.01; 2.04 |
| | | | | | fusion line+5mm | 1.92; 2.26; 1.88 |

2.4-CTOD test have been carried out on butt weld assembly with plate grade S460 G2+M (E460), 100mm, Heat No.342906, according to test method BS 7448 and results are summarized hereafter:

| Grade | Welding method | Heat Input (KJ/cm) | Condition | Temperature | Notch position | CTOD values (mm) |
|-------|----------------|--------------------|-----------|-------------|----------------|------------------|
| E460 | SAW | 35 | As welded | -10°C | fusion line | 0.73; 0.30; 0.87 |
| | | | | | IS/SC-HAZ | 3.21; 1.01 |

2.5- Documents issued by AG der Dillinger Hüttenwerke:

- "Approval test report - FH46TM+Z35" dated July 2011.
- Thickness measurement procedure Ref.A-D472-0303 dated 20/01/2025.

3. TEST REPORTS :

3.1-Documents issued by AG der Dillinger Hüttenwerke:

- Report Ref.01/2010 dated 15/04/2010.
- "Approval test report - FH46TM+Z35" dated July 2011.

- "Welding laboratory report 09/2012" dated September 2012.
- Test certificate No. 397266 dated 16/10/2014.
- Data issued for steel grade E460/F460 and dated 13/12/2019.

4. APPLICATION / LIMITATION :

As per Bureau Veritas Rules for Classification.

5. PRODUCTION SURVEY REQUIREMENTS :

5.1 - The steel plates are to be supplied by AG der Dillinger Hüttenwerke in compliance with the type and the requirements described in this certificate.

5.2 - This type of product is within the category IBV of Bureau Veritas Rule Note NR320.

5.3 - BV product certificate is required.

5.4 - For information, AG der Dillinger Hüttenwerke has declared to Bureau Veritas the following production site:

AG der Dillinger Hüttenwerke
Werkstraße 1
66763 Dillingen/ Saar
GERMANY

6. MARKING OF PRODUCT :

As per Bureau Veritas Rules for Classification.

In addition to the material grade designation, products are to be marked with the symbol Z35 as appropriate.

7. OTHERS :

7.1 - It is AG der Dillinger Hüttenwerke'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.

7.2 - This certificate supersedes the Type Approval Certificate N°39698/B0 BV issued by the Society.

*** END OF CERTIFICATE ***



Marine & Offshore

Certificate number: 59414/B0 BV

File number: MAT 1507-2019

Product code: 9010I

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

www.veristar.com

APPROVAL CERTIFICATE for MATERIALS

This certificate is issued to

AG der Dillinger Hüttenwerke
Dillingen/ Saar - GERMANY

for the type of product

PLATES FOR BOILERS AND PRESSURE VESSELS

Hot rolled plates in steel grade P460NH according to EN 10028-3

Requirements:

Bureau Veritas Rules on Materials and Welding for the Classification of Marine Units

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: 03 Mar 2030

For Bureau Veritas Marine & Offshore,

At BV HAMBURG, on 03 Mar 2025,

Udo Storm

This certificate was created electronically and is valid without signature



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.

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION

Hot rolled plates.

| Steel grade | Deoxydation practice & Refining | Delivery conditions |
|--------------------------------|--|--|
| P460NH according to EN 10028-3 | Killed and V treated | Normalised (N) with thickness up to 35mm |

Steelmaking by BOF, vacuum degassing; Continuous casting.

2. DOCUMENTS AND DRAWINGS

2.1 - Document issued by AG der Dillinger Hüttenwerke:

- "Self-disclosure of Dillinger" dated 11/10/2019.
- Thickness measurement procedure Ref.A-D472-0303 dated 20/01/2025.

3. TEST REPORTS

3.1 - Documents issued by AG der Dillinger Hüttenwerke:

- Report "P460NH according to EN 10028-3, Delivery condition: Normalised (N), Thickness: 24mm" dated 07/01/2020.
- Approval report dated 20/04/2020, Welding laboratory report 08/2020 dated 08/07/2020.

4. APPLICATION / LIMITATION

As per Bureau Veritas Rules for Classification.

5. PRODUCTION SURVEY REQUIREMENTS

5.1 - The steel plates are to be supplied by AG der Dillinger Hüttenwerke in compliance with the type and the requirements described in this certificate.

5.2 - This type of product is within the category IBV of Bureau Veritas Rule Note NR320.

5.3 - BV product certificate is required.

5.4 - For information, AG der Dillinger Hüttenwerke has declared to Bureau Veritas the following production site:

AG der Dillinger Hüttenwerke
Werkstraße 1
66763 Dillingen/ Saar
GERMANY

6. MARKING OF PRODUCT

As per Bureau Veritas Rules for Classification.

7. OTHERS

7.1 - It is AG der Dillinger Hüttenwerke'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.

7.2 - This certificate supersedes the Type Approval Certificate N° 59414/A2 BV issued by the Society.

***** END OF CERTIFICATE *****



Marine & Offshore

Certificate number: 66411/A0 BV

File number: MAT 1507-2021

Product code: 9010I

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

www.veristar.com

APPROVAL CERTIFICATE for MATERIALS

This certificate is issued to

AG der Dillinger Hüttenwerke
Dillingen/ Saar - GERMANY

for the type of product

PLATES FOR BOILERS AND PRESSURE VESSELS

Steel plates in grades P690QL1 and Dillimax690PE

Requirements:

Bureau Veritas Rules on Materials and Welding for the Classification of Marine Units

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 2027

For Bureau Veritas Marine & Offshore,

At BV HAMBURG, on 27 Sep 2022,

Jens Bauermeister

This certificate was created electronically and is valid without signature



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.

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION

Hot rolled plates.

| Steel grade | Deoxydation practice & Refining | Delivery conditions |
|---|--|--|
| DILLIMAX690PE according to Dillinger specification DH-E69-B | Killed and Al + Nb treated | Quenched and Tempered (QT) with thickness up to 80mm Direct Quenched and Tempered (DQT) with thickness up to 18mm |
| P690QL1 according to EN 10028-6 | Killed and Al + Nb treated | Quenched and Tempered (QT) with thickness up to 80mm Direct Quenched and Tempered (DQT) with thickness up to 18mm |

Steelmaking by BOF, vacuum degassing; Continuous casting.

2. DOCUMENTS AND DRAWINGS

2.1- Document issued by AG der Dillinger Hüttenwerke:

- "General information production process" dated September 2022.
- "Dillinger specification DH-E69-B" dated October 2004

2.2-Chemical composition specification on ladle (%) for grades DILLIMAX690PE used by AG der Dillinger Hüttenwerke as per Dillinger specification DH-E69-B.

3. TEST REPORTS

3.1-Documents issued by AG der Dillinger Hüttenwerke:

- "Test report_S690QL" dated 13/05/2022.
- "Weldability test_S690QL" dated 02/2022.

4. APPLICATION / LIMITATION

As per Bureau Veritas Rules for Classification.

This approval is limited to heat treatments QT and DQT as applied on tested plates.

5. PRODUCTION SURVEY REQUIREMENTS

5.1 - The steel plates are to be supplied by AG der Dillinger Hüttenwerke in compliance with the type and the requirements described in this certificate.

5.2 - This type of product is within the category IBV of Bureau Veritas Rule Note NR320.

5.3 - BV product certificate is required.

6. MARKING OF PRODUCT

As per Bureau Veritas Rules for Classification.

7. OTHERS

Nil.

*** END OF CERTIFICATE ***



Marine & Offshore

Certificate number: 73553/A0 BV

File number: MAT 1507-2022

Product code: 9009I

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

www.veristar.com

APPROVAL CERTIFICATE for MATERIALS

This certificate is issued to

AG der Dillinger Hüttenwerke
Dillingen/ Saar - GERMANY

for the type of product

EXTRA HIGH STRENGTH STEEL ROLLED PRODUCTS

Steel plates in grade S690QL

Requirements:

Bureau Veritas Rules on Materials and Welding for the Classification of Marine Units

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 2027

For Bureau Veritas Marine & Offshore,

At BV HAMBURG, on 27 Sep 2022,

Jens Bauermeister

This certificate was created electronically and is valid without signature



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THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION

Hot rolled plates.

| Steel grade | Deoxydation practice & Refining | Delivery conditions |
|--------------------------------|---------------------------------|--|
| S690QL according to EN 10025-6 | Killed and Al + Nb treated | Quenched and Tempered (QT) with thickness up to 80mm Direct Quenched and Tempered (DQT) with thickness up to 18mm |

Steelmaking by BOF, vacuum degassing; Continuous casting.

2. DOCUMENTS AND DRAWINGS

2.1- Document issued by AG der Dillinger Hüttenwerke:

- "General information production process" dated September 2022.

2.2-CTOD test have been carried out on butt weld assembly with plate No.24225, grade S690QL, 80mm, Heat No.510338, according to test method ISO 15653 and results are summarized hereafter:

| Grade | Welding method | Heat Input (kJ/cm) | Condition | Temperature | Notch position | CTOD values (mm) |
|--------|----------------|--------------------|-----------|-------------|----------------|--------------------|
| S690QL | FCAW | 12.5 | As welded | -10°C | CG HAZ | 0.22 ; 0.45 ; 0.15 |
| | SAW | 23 | As welded | -10°C | CG HAZ | 0.24 ; 0.28 ; 0.14 |

3. TEST REPORTS

3.1-Documents issued by AG der Dillinger Hüttenwerke:

- "Test report_S690QL" dated 13/05/2022.

- "Weldability test_S690QL" dated 02/2022.

4. APPLICATION / LIMITATION

As per Bureau Veritas Rules for Classification.

This approval is limited to heat treatments QT and DQT as applied on tested plates.

5. PRODUCTION SURVEY REQUIREMENTS

5.1 - The steel plates are to be supplied by AG der Dillinger Hüttenwerke in compliance with the type and the requirements described in this certificate.

5.2 - This type of product is within the category IBV of Bureau Veritas Rule Note NR320.

5.3 - BV product certificate is required.

6. MARKING OF PRODUCT

As per Bureau Veritas Rules for Classification.

7. OTHERS

Nil.

*** END OF CERTIFICATE ***