

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-PL-21039-01-00 according to DIN EN ISO/IEC 17025:2018

Valid from: 25.08.2020

Date of issue: 02.09.2021

Holder of certificate:

Framatome GmbH
Paul-Gossen-Straße 100, 91052 Erlangen

with the testing laboratory:

Framatome GmbH
Qualicon

at the locations:

Paul-Gossen-Straße 100, 91052 Erlangen
Am Pestalozziring 20a, 91058 Erlangen

Tests in the fields:

manual non-destructive testing (radiographic, ultrasonic, magnetic particle, penetrant, visual, leak and eddy current testing) and mechanized testing (ultrasonic, eddy current and visual testing) of metallic materials, plastics, carbon fiber reinforced materials and composite materials in plant and mechanical engineering, traffic engineering and aerospace

The testing laboratory is permitted within the specified testing fields, without being required to inform and obtain prior approval from DAkkS,

- 1) the free choice of standard or equivalent testing methods,**
- 2) the modification and refinement of testing methods.**

The listed testing methods are exemplary.

This document is a translation. The definitive version is the original German annex to the accreditation certificate.

Abbreviations used: see last page

*The certificate together with its annex reflects the status at the time of the date of issue. The current status of the scope of accreditation can be found in the database of accredited bodies of Deutsche Akkreditierungsstelle GmbH.
<https://www.dakks.de/en/content/accredited-bodies-dakks>*

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The testing laboratory is permitted within the specified testing fields, without being required to inform and obtain prior approval from DAkkS,

³⁾ to use standards or equivalent testing methods listed here with different issue dates.

The testing laboratory maintains a current list of all testing methods within the flexible scope of accreditation.

All procedures are carried out at both locations.

**1 Manual ultrasonic testing ^{1) 2)}
(Manual ultrasonic testing of components made of metal, plastic and composite materials for qualitative evaluation and wall thickness gauging for components made of metal or plastics)**

AD 2000-Merkblatt HP 5/3 Anlage 1 2015-04	Non-destructive testing of welded joints - Minimum technical requirements for non-destructive testing (here: <i>Chapter 3 - Ultrasonic testing</i>)
ASME BPVC.V-2019 Sect. V, Article 4 Ed. 2019	ASME Boiler and Pressure Vessel Code - Section V: Nondestructive Examination - Subsection A: Nondestructive methods of examination Article 4: Ultrasonic examination methods for welds
ASME BPVC.V-2019 Sect. V, Article 5 Ed. 2019	ASME Boiler and Pressure Vessel Code, Section V: Nondestructive Examination - Subsection A: Nondestructive methods of examination Article 5: Ultrasonic examination methods for materials
ASME BPVC.V-2019 Sect. V, Article 23 Ed. 2019	ASME Boiler and Pressure Vessel Code - Section V: Nondestructive Examination - Subsection B: Documents adopted by Section V, Article 23: SA-388 Standard practice for ultrasonic examination of steel forgings SA-435 Standard specification for straight beam ultrasonic examination of steel plates SA-577 Standard specification for ultrasonic angle beam examination of steel plates SA-745 Standard practice for ultrasonic examination of austenitic forgings SE-273 Standard practice for ultrasonic testing of the weld zone of welded pipe and tubing SE-797 Standard specification for measuring thickness by manual ultrasonic pulse echo contact method SE-2700 Standard practice for contact ultrasonic testing of welds using phased arrays

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ASME BPVC.XI.1-2019 Sect. XI, Article IWA-/IWB-/ IWC-/IWD-3000 Ed. 2019	ASME Boiler and Pressure Vessel Code, Section XI.1: Rules for In-service Inspection of Nuclear Power Plant Components, Division 1, Rules for Inspection and Testing Components of Light-Water-Cooled Plants; Article IWA-/IWB-/IWC-/IWD-3000: Acceptance standards App. I: Ultrasonic Examinations App. III: Ultrasonic examination of vessel and piping welds App. VIII: Performance demonstration for ultrasonic examination systems
ASTM E 114-15 2015	Standard Practice for Ultrasonic Pulse-Echo Straight-Beam Contact Testing
ASTM E 164-19 2019	Standard Practice for Contact Ultrasonic Testing of Weldments
ASTM E 587-15 2015	Standard Practice for Ultrasonic Angle-Beam Contact Testing
AVS D 11.2/50 2008-07	General guidelines for the procedure of ultrasonic tests
AVS D 11.3/50 1982-07	General guidelines for the procedure of manual ultrasonic tests with the tandem technology
DIN EN ISO 16810 2014-07	Non-destructive testing - Ultrasonic examination - General principles (here: <i>Chapter 9</i>)
DIN EN ISO 17640 2019-02	Non-destructive testing of welds - Ultrasonic testing - Techniques, testing levels, and assessment (here: <i>Chapters 8-11 and Annex A</i>)
DIN EN ISO 22825 2018-02	Non-destructive testing of welds - Ultrasonic testing - Testing of welds in austenitic steels and nickel-based alloys (here: <i>Chapter 11</i>)
QR E NDE No. 11.2/40 2018-05	NDE Procedure der IBOQ-G, Rev. o Ultrasonic examination
SEP 1915 1994-09	Ultrasonic testing of steel pipes for aberration (<i>withdrawn document</i>)
SEP 1918 1992-01	Ultrasonic testing of steel pipes for transverse defects (<i>withdrawn document</i>)

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SEP 1919 1977-06	Ultrasonic testing for laminations of pipes of creep-resistant steels <i>(withdrawn document)</i>
SEP 1920 1984-12	Ultrasonic testing of rolled semi-finished products on internal material discontinuities
SEP 1922 1985-07	Ultrasonic testing of forgings of ferritic steel <i>(withdrawn document)</i>
SEP 1923 2009-02	Ultrasonic testing of steel forgings to stringent standards, in particular for components in turbine and generator systems

**2 Mechanized ultrasonic testing ^{1) 2)}
(Mechanized ultrasonic testing of components made of metal, plastic and composite materials for qualitative evaluation by means of validated methods)**

ASME BPVC.V.2019 Sect. V, Article 4 Ed. 2019	ASME Boiler and Pressure Vessel Code - Section V: Nondestructive Examination - Subsection A: Nondestructive methods of examination Article 4: Ultrasonic examination methods for welds
ASME BPVC.V-2019 Sect. V, Article 5 Ed. 2019	ASME Boiler and Pressure Vessel Code - Section V: Nondestructive Examination - Subsection A: Nondestructive methods of examination Article 5: Ultrasonic examination methods for materials
ASME BPVC.V-2019 Sect. V, Article 23 Ed. 2019	ASME Boiler and Pressure Vessel Code - Section V: Nondestructive Examination - Subsection B: Documents adopted by Section V Article 23: SA-388 Standard practice for ultrasonic examination of steel forgings SA-435 Standard specification for straight beam ultrasonic examination of steel plates SA-577 Standard specification for ultrasonic angle beam examination of steel plates SA-745 Standard practice for ultrasonic examination of austenitic forgings SE-273 Standard practice for ultrasonic testing of the weld zone of welded pipe and tubing SE-2700 Standard practice for contact ultrasonic testing of welds using phased array

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<p>ASME BPVC.XI.1-2019 Sect. XI, Article IWA-/IWB-/ IWC/IWD-3000 Ed. 2019</p>	<p>ASME Boiler and Pressure Vessel Code, Section XI.1: Rules for Inservice Inspection of Nuclear Power Plant Components, Division 1, Rules for Inspection and Testing of Components of Light-Water-Cooled Plants; Article IWA-/IWB-/IWC-/IWD-3000: Acceptance standards App. I: Ultrasonic Examinations App. III: Ultrasonic examination of vessel and piping welds App. VIII: Performance demonstration for ultrasonic examination systems</p>
<p>DIN 25435-1 2014-01</p>	<p>In-service inspections for primary coolant circuit components of light water reactors - Part 1: Automated ultrasonic inspection (here: <i>Chapter 7</i>)</p>
<p>DIN EN ISO 10893-8 2011-07</p>	<p>Non-destructive testing of steel tubes - Part 8: Automated ultrasonic testing of seamless and welded steel tubes for the detection of laminar imperfections</p>
<p>DIN EN ISO 10893-10 2011-07</p>	<p>Non-destructive testing of steel tubes - Part 10: Automated full peripheral ultrasonic testing of seamless and welded (except submerged arc-welded) steel tubes for the detection of longitudinal and/or transverse imperfections</p>
<p>DIN EN ISO 16823 2014-07</p>	<p>Non-destructive testing - Ultrasonic testing - Transmission technique</p>
<p>DIN EN ISO 16826 2014-06</p>	<p>Non-destructive testing - Ultrasonic testing - Examination for discontinuities perpendicular to the surface</p>

**3 Radiographic testing ^{1) 2)}
(Radiographic testing of components made of metal, plastic and composite materials up to a maximum energy of 10 MeV by means of x-ray films for qualitative evaluation)**

<p>ASME BPVC.V-2019 Sect. V, Article 2 Ed. 2019</p>	<p>ASME Boiler and Pressure Vessel Code - Section V: Nondestructive Examination - Subsection A: Nondestructive methods of examination Article 2: Radiographic Examination</p>
<p>ASME BPVC.V-2019 Sect. V, Article 22 Ed. 2019</p>	<p>ASME Boiler and Pressure Vessel Code - Section V: Nondestructive Examination - Subsection B: Documents adopted by Section V Article 22: SE 94 Standard Guide for radiographic examination SE-1030 Standard test method for radiographic examination of metallic castings</p>

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ASTM E1032-19 2019	Standard Practice for Radiographic Examination of Weldments Using Industrial X-Ray Film
ASTM E1742/E1742M-18 2018	Standard Practice for Radiographic Examination
DIN 25435-7 2014-01	In-service inspections for primary coolant circuit components of light water reactors - Part 7: Radiographic testing
DIN EN 12681-1 2018-02	Founding - Radiographic testing - Part 1: Film techniques
DIN EN ISO 5579 2014-04	Non-destructive testing - Radiographic testing of metallic materials using film and X- or gamma rays - Basic rules (here: <i>Chapter 6</i>)
DIN EN ISO 17636-1 2013-05	Non-destructive testing of welds - Radiographic testing - Part 1: X- and gamma-ray techniques with film
QR E NDE No. 11.4/40 2013-10	NDE Procedure der IBOQ-G, Rev. o Radiographic Examination of Welds and Castings

**4 Magnetic particle testing¹⁾²⁾
(Manual inspection of the surface and near-surface regions of ferromagnetic materials for qualitative evaluation by magnetic particle testing)**

AVS D 11.1/50 2006-02	General guidelines for the procedure of surface tests according to of magnetic particle- and penetrant method (here: <i>Chapter 3</i>)
DIN 25435-2 2014-01	In-service inspections for primary coolant circuit components of light water reactors - Part 2: Magnetic particle and penetrant testing (here: <i>Magnetic particle testing</i>)
DIN EN 1369 2013-01	Founding - Magnetic particle testing
DIN EN 10228-1 2016-10	Non-destructive testing of steel forgings - Part 1: Magnetic particle inspection
DIN EN ISO 9934-1 2017-03	Non-destructive testing - Magnetic particle testing - Part 1: General principles (here: <i>Chapters 7-14</i>)

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DIN EN ISO 17638
2017-03 Non-destructive testing of welds - Magnetic particle testing

SEP 1935
1982-06 Seam testing of castings of steel - Magnetic powder test
(*withdrawn document*)

**5 Penetrant testing ^{1) 2)}
(Manual surface crack testing of components made of metal and plastics for qualitative evaluation by penetrant testing)**

ASME BPVC.V-2019
Sect. V, Article 6
Ed. 2019 ASME Boiler and Pressure Vessel Code - Section V: Nondestructive Examination - Subsection A: Nondestructive methods of examination
Article 6: Liquid penetration examination

ASME BPVC.V-2019
Sect. V, Article 24
Ed. 2019 ASME Boiler and Pressure Vessel Code - Section V: Nondestructive Examination - Subsection B: Documents adopted by Section V
Article 24: SE-165 Standard practice for liquid penetrant examination for general industry

ASTM E 165/E 165M-18
2018 Standard Practice for Liquid Penetrant Testing for General Industry

ASTM E 1417/E 1417M-16
2016 Standard Practice for Liquid Penetrant Testing

AVS D 11.1/50
2006-02 General guidelines for the procedure of surface tests according to of magnetic particle- and penetrant method
(here: *Chapter 4*)

DIN 25435-2
2014-01 In-service inspections for primary coolant circuit components of light water reactors - Part 2: Magnetic particle and penetrant testing
(here: *Penetrant testing*)

DIN EN 10228-2
2016-10 Non-destructive testing of steel forgings - Part 2: Penetrant testing

DIN EN ISO 3452-1
2014-09 Non-destructive testing - Penetrant testing - Part 1: General principles
(here: *Chapter 8*)

DIN EN ISO 10893-4
2011-07 Non-destructive testing of steel tubes - Part 4: Liquid penetrant inspection of seamless and welded steel tubes for the detection of surface imperfections

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QR E NDE No. 11.1/40
2018-10

NDE Procedure der IBOQ-G, Rev. v
Liquid Penetrant Examination of Products Forms, Weld Edges and
Welds

SEP 1936
1982-06

Seam testing of castings of steel - Penetration testing
(*withdrawn document*)

6 Visual testing ^{1) 2)}
(Visual testing of external and internal surfaces of components made of metal, carbon fiber reinforced materials, composite materials and plastics for qualitative evaluation by visual testing)

ASME BPVC.V-2019
Sect. V, Article 9
Ed. 2019

ASME Boiler and Pressure Vessel Code - Section V: Nondestructive Examination - Subsection A: Nondestructive methods of examination
Article 9: Visual examination

DIN 25435-4
2014-01

In-service inspections for primary coolant circuit components of light water reactors - Part 4: Visual testing

DIN EN 13018
2016-06

Non-destructive testing - Visual testing - General principles
(here: *Chapters 5 and 6*)

DIN EN ISO 17637
2017-04

Non-destructive testing of welds - Visual testing of fusion-welded joints

QR E NDE No. 11.6/40
2018-05

NDE Procedure der IBOQ-G, Rev. n
Visual Examination

7 Leak testing ^{1) 2)}
(Testing of components made of metal, carbon fibre reinforced materials, composite materials and plastics for localization of leaks by means of bubble emission techniques or for localization of leaks and/or determination of leak rates by means of tracer gas method or pressure change method)

ASME BPVC.V-2019
Sect. V, Article 10
Ed. 2019

ASME Boiler and Pressure Vessel Code - Section V: Nondestructive Examination - Subsection A: Nondestructive methods of examination
Article 10: Leak testing

AVS D 9/50
2019-11

General guidelines for the procedure of the leak tests

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DIN EN 1593 1999-11	Non-destructive testing - Leak testing - Bubble emission techniques
DIN EN 12266-1 2012-06	Industrial valves - Testing of metallic valves - Part 1: Pressure tests, test procedures and acceptance criteria - Mandatory requirements (here: <i>Attachment A.3</i>)
DIN EN 12266-2 2012-04	Industrial valves - Testing of metallic valves - Part 2: Tests, test procedures and acceptance criteria - Supplementary requirements (hier: <i>Attachment A.3</i>)
DIN EN 13184 2001-07	Non-destructive testing - Leak test - Pressure change method
DIN EN ISO 20485 2018-05	Non-destructive testing - Leak testing - Tracer gas method
KTA 3405 2015-11	Leakage Test of the Containment Vessel
QR E NDE No. 11.3/40 2018-05	NDE Procedure der IBOQ-G, Rev. d Leak Testing of Pressure Components or Parts

8 Eddy current testing ²⁾

(Manual and mechanized eddy current testing of metallic components for the determination of layer thickness/remaining wall thickness or for qualitative evaluation)

DIN 25435-6 2014-01	In-service inspections for primary coolant circuit components of light water reactors - Part 6: Eddy current testing of steam generator heating tubes
DIN 54141-3 1987-02	Non-destructive testing; eddy current testing of pipes and tubes; procedure (<i>withdrawn standard</i>)
DIN EN ISO 15549 2019-10	Non-destructive testing - Eddy current testing - General principles (here: <i>Chapter 12</i>)
DIN EN ISO 2360 2017-12	Non-conductive coatings on non-magnetic electrically conductive base metals - Measurement of coating thickness - Amplitude-sensitive eddy-current method

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9 Comprehensive standards for NDT ¹⁾

**9.1 Comprehensive standards for NDT on pressurized equipment and nuclear energy components
(Non-destructive testing on pressurized equipment and nuclear energy components for qualitative evaluation)**

<p>ASME BPVC.III-2019 Sect. III, Article NB/NC/ND-5000 Ed. 2019</p>	<p>The American Society of Mechanical Engineers (ASME), Boiler and Pressure Vessel Code; Section III: Rules for Construction of Nuclear Facility Components; Division 1; Subsection NB - Class 1: Components - Subsection NC - Class 2: Components; Subsection NB - Class 3: Components; Article NB/NC/ND-5000: Examination</p>
<p>ASME BPVC.V-2019 Sect. V, Article 1 Ed. 2019</p>	<p>ASME Boiler and Pressure Vessel Code - Section V: Nondestructive Examination - Subsection A: Nondestructive methods of examination Article 1: General requirements</p>
<p>ASME BPVC.XI-2019 Sect. XI, Article IWA-/IWB-/IWC-/IWD-2000 Ed. 2019</p>	<p>ASME Boiler and Pressure Vessel Code; Section XI: Rules for Inservice Inspection of Nuclear Power Plant Components - Division 1: Rules for inspection and testing components of light-water cooled plants - Article IWA-/IWB-/IWC-/IWD-2000: Examination and inspection</p>
<p>NBIC Part 1 to 3 Ed. 2019</p>	<p>National Board of Boiler and Pressure Vessel Inspectors - National Board Inspection Code (NBIC) - Part 2: Inspection, incl. NDE, of boilers, pressure vessels and pressure relief devices (Part 1: Installation; Part 3: Repairs and Alterations)</p>
<p>KTA 3201.1 2017-11</p>	<p>Components of the Reactor Coolant Pressure Boundary of Light Water Reactors - Part 1: Materials and Product Forms (here for: <i>RT, UT, MT</i>) (here Chapter: <i>3.3.8, 4.4, 5.4, 6.4, 7.4, 8.4, 9.4, 10.4, 11.4, 12.4, 13.4, 14.4, 16.4, 17.4, 18.4, 19.4, 20.4, 21.4.2.4, 21.4.3.1, 22.4, 23.4, 24.4, 25.6, 26.6, 27.6, 28.2.3.2.3, 29.4.3</i>)</p>
<p>KTA 3201.3 2017-11</p>	<p>Components of the Reactor Coolant Pressure Boundary of Light Water Reactors - Part 3: Manufacture (here for: <i>RT, UT, MT, PT</i>) (here: <i>Chapter 12</i>)</p>
<p>KTA 3201.4 2016-</p>	<p>Components of the reactor coolant pressure boundary of light water reactors - Part 4: Inservice inspections and operational monitoring (here for: <i>RT, UT, MT, PT, VT, E</i>)</p>

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KTA 3211.1 2017-11	Pressure and activity retaining components of systems outside the primary circuit - Part 1: Materials (here for: <i>RT, UT, MT, PT, ET</i>) (here: <i>Attachments B, E, F, G, H</i>)
KTA 3211.3 2017-11	Pressure and Activity Retaining Components of Systems Outside the Primary Circuit - Part 3: Manufacture (here for: <i>RT, UT, MT, PT</i>) (here: <i>Chapter 11</i>)
KTA 3211.4 2017-11	Pressure and Activity Retaining Components of Systems Outside the Primary Circuit - Part 4: Inservice Inspections and Operational Monitoring (here for: <i>RT, UT, MT, PT, ET, VT</i>)
KTA 3401.3 1986-11	Steel Reactor Safety Containment - Part 3: Manufacture (here for: <i>RT, UT, MT, PT</i>) (here: <i>Chapter 6, 9.3, 10.4, 10.8</i>)
KTA 3401.4 2017-11	Steel Containment Vessels - Part 4: In-service Inspections (here for: <i>LT, VT</i>)
SEP 1914 1983-08	Non-destructive testing of fusion-welded seams in pipes of stainless steels (here for: <i>RT, UT</i>)
SEP 1916 1989-12	Non-destructive testing of fusion-welded ferritic steel-tubes (here for: <i>RT, UT, MT, PT</i>)

**9.2 Comprehensive standards for NDT on railway components
(Non-destructive testing on railway components for qualitative evaluation)**

DIN 27201-7 2014-05	State of railway vehicles - Basic principles and production technology - Part 7: Non-destructive testing (here for: <i>RT, UT, MT, ET, PT, VT</i>)
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10 Further comprehensive regulations for NDT ³⁾

SSMFS 2008:13 2009-01	Strahlsäkerhetsmyndighetens föreskrifter om mekaniska anordningar i visa kärntekniska anläggningar (Swedish Radiation Safety Authority's Regulations concerning Mechanical Devices in Certain Nuclear Facilities) (here for: <i>UT, ET, VT</i>)
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abbreviations used:

AD-HP	Pressure Vessel; Production and Testing
ASME BPVC	American Society of Mechanical Engineers; Boiler and Pressure Vessel Code
ASTM	American Society for Testing and Materials
AVS	Standard operation procedure
ET	Eddy current testing
KTA	Nuclear Commission
LT	Leak testing
MT	Magnetic particle testing
NBIC	National Board Inspection Code
PA	Test instruction (In-house method by Framatome GmbH)
PT	Penetrant testing
QR E NDE No. XX.X/XX	Quality Requirement (Hausverfahren der Framatome GmbH)
RT	Radiographic testing
SEP	Iron-Steel-test sheets from the German Iron and Steel Institute
SSMFS	Procedures document of the Swedish Nuclear Regulatory Authority
TOFD	Time-of-Flight Diffraction
UT	Ultrasonic testing
VT	Visual testing

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