

Deutsche Akkreditierungsstelle GmbH

Entrusted according to Section 8 subsection 1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV

Signatory to the Multilateral Agreements of
EA, ILAC and IAF for Mutual Recognition

Accreditation



The Deutsche Akkreditierungsstelle GmbH attests that the inspection body

MQ Engineering GmbH
Hansestraße 27, 18182 Rostock-Bentwisch

is competent under the terms of DIN EN ISO/IEC 17020:2012 as inspection body Type A
to carry out inspections in the following fields:

damage assessments and condition rating in metal-working industry as well as in plant engineering and construction, mechanical engineering, engine construction and ship-building based on results of mechanical test methods (bend testing, tensile testing, notch bar impact test, hardness test), metallography, on-site metallography, optical spark emission spectrometry (OES) and scanning electron microscopy (also with EDX) and nondestructive testing methods (visual testing, magnetic particle testing, penetrant testing, ultrasonic testing, radiographic testing) and identification of compliance with specified and - based on a professional judgement - general requirements

The accreditation certificate shall only apply in connection with the notice of accreditation of 13.11.2014 with the accreditation number D-IS-19274-01 and is valid until 12.11.2019. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 9 pages.

Registration number of the certificate: **D-IS-19274-01-00**

Berlin, 17.12.2014

signed Ralf Egnér
Head of Division

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

See notes overleaf.

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The publication of extracts of the accreditation certificate is subject to the prior written approval by Deutsche Akkreditierungsstelle GmbH (DAkkS). Exempted is the unchanged form of separate disseminations of the cover sheet by the conformity assessment body mentioned overleaf.

No impression shall be made that the accreditation also extends to fields beyond the scope of accreditation attested by DAkkS.

The accreditation was granted pursuant to the Act on the Accreditation Body (AkkStelleG) of 31 July 2009 (Federal Law Gazette I p. 2625) and the Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products (Official Journal of the European Union L 218 of 9 July 2008, p. 30). DAkkS is a signatory to the Multilateral Agreements for Mutual Recognition of the European co-operation for Accreditation (EA), International Accreditation Forum (IAF) and International Laboratory Accreditation Cooperation (ILAC). The signatories to these agreements recognise each other's accreditations.

The up-to-date state of membership can be retrieved from the following websites:

EA: www.european-accreditation.org

ILAC: www.ilac.org

IAF: www.iaf.nu

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-IS-19274-01-00 according to DIN EN ISO/IEC 17020:2012

Period of validity: 13.11.2014 to 12.11.2019

Date of issue: 17.12.2014

Holder of certificate:

MQ Engineering GmbH
Hansestraße 27, 18182 Rostock-Bentwisch

for its inspection body Type A

Inspections in the fields:

damage assessments and condition rating in metal-working industry as well as in plant engineering and construction, mechanical engineering, engine construction and shipbuilding based on results of mechanical test methods (bend testing, tensile testing, notch bar impact test, hardness test), metallography, on-site metallography, optical spark emission spectrometry (OES) and scanning electron microscopy (also with EDX) and nondestructive testing methods (visual testing, magnetic particle testing, penetrant testing, ultrasonic testing, radiographic testing) and identification of compliance with specified and - based on a professional judgement - general requirements

Abbreviations used: see last page

General rule for the inspection services:

MQE-07-2014/00
2014-07

Implementation of Inspection services / Damage assessment state
and reviews

in connection with:

VDI 3822
2011-11

*Failure analysis - Fundamentals and
performance of failure analysis*

VDI 3822
Sheet 1.4
2011-10

*Failure analysis - Failures caused by thermal
loading*

Annex to the Accreditation Certificate D-IS-19274-01-00

VDI 3822
Sheet 1.6
2010-11

Failure analysis - Liquid metal induced crack growth by hot dip galvanising

VDI 3822
Sheet 2
2008-04

Failure analysis - Failures caused by mechanical working conditions

VDI 3822
Sheet 3
2007-03

Failure analysis - Failures caused by corrosion in electrolytes

VDI 3822
Sheet 5
1999-01

Failure analysis - Failures caused by tribology working conditions

based on the results of following test standards for materials testing:

1 Mechanic-technological tests

1.1 Tensile test

DIN EN ISO 4136
2013-02

Destructive tests on welds in metallic materials - Transverse tensile test

DIN EN ISO 5178
2011-05

Destructive tests on welds in metallic materials - Longitudinal tensile test on weld metal in fusion welded joints

DIN EN ISO 6892-1
2009-12

Metallic materials - Tensile testing - Part 1: Method of test at room temperature
(here: *Methods A/B*)

1.2 Biegeversuch

DIN EN ISO 5173
2012-02

Destructive tests on welds in metallic materials - Bend tests

DIN EN ISO 7438
2012-03

Metallic materials - Bend test

1.3 Kerbschlagbiegeversuch

DIN EN ISO 148-1 2011-01	Metallic materials - Charpy pendulum impact test - Part 1: Test method
DIN EN ISO 148-1 Supplement 1 2014-02	Metallic materials - Charpy pendulum impact test - Part 1: Test method - Supplement 1: Special test pieces
DIN EN ISO 9016 2013-02	Destructive tests on welds in metallic materials - Impact tests - Test specimen location, notch orientation and examination

1.4 Technological tests

DIN EN ISO 8492 2014-03	Metallic materials - Tube - Flattening test
DIN EN ISO 8493 2004-10	Metallic materials - Tube - Drift-expanding test
DIN EN ISO 8495 2014-03	Metallic materials - Tube - Ring-expanding test
DIN EN ISO 8496 2014-03	Metallic materials - Tube - Ring tensile test

1.5 Hardness test

DIN EN ISO 868 2003-10	Plastics and ebonite - Determination of indentation hardness by means of a durometer (Shore hardness)
DIN EN ISO 6506-1 2006-03	Metallic materials - Brinell hardness test - Part 1: Test method
DIN EN ISO 6507-1 2006-03	Metallic materials - Vickers hardness test - Part 1: Test method
DIN EN ISO 6508-1 2006-03	Metallic materials - Rockwell hardness test - Part 1: Test method (Scales A, B, C, D, E, F, G, H, K, N, T) (here: <i>Scale C</i>)

Annex to the Accreditation Certificate D-IS-19274-01-00

DIN EN ISO 9015-1 2011-05	Destructive tests on welds in metallic materials - Hardness testing - Part 1: Hardness test on arc welded joints
DIN EN ISO 9015-2 2011-05	Destructive tests on welds in metallic materials - Hardness testing - Part 2: Microhardness testing of welded joints
DIN EN ISO 14271 2012-11	Resistance welding - Vickers hardness testing (low-force and micro-hardness) of resistance spot, projection and seam welds
DIN ISO 4384-1 2014-07	Plain bearings - Hardness testing of bearing metals - Part 1: Multi-layer bearings materials
DIN ISO 4384-2 2014-07	Plain bearings - Hardness testing of bearing metals - Part 2: Solid materials
DIN ISO 4386-2 1982-10	Plain bearings - Metallic multilayer plain bearings - Destructive testing of bond for bearing metal layer thicknesses ≤ 2 mm

1.6 Mobile hardness test

DIN 50156-1 2007-07	Metallic materials - Leeb hardness test - Part 1: Test method
DIN 50159-1 2008-10	Metallic materials - Hardness testing with the UCI method - Part 1: Test method

2 Optical spark emission spectrometry

MQE-10 2014-08	Optical spark emission spectrometry for the determination of 18 elements in low alloy, high alloy and mild steel
DIN EN ISO 14284 2003-02	Steel and iron - Sampling and preparation of samples for the determination of chemical composition
SEP 1805 1976-03	Sampling and sample preparation for the product analysis in the case of steel <i>(withdrawn document)</i>

3 Metallographical tests

3.1 Metallography

DIN EN ISO 643 2013-05	Steels - Micrographic determination of the apparent grain size
DIN EN ISO 945-1 2010-09	Microstructure of cast irons - Part 1: Graphite classification by visual analysis
DIN EN ISO 2639 2003-04	Steels - Determination and verification of the depth of carburized and hardened cases
DIN EN ISO 3887 2003-10	Steels - Determination of depth of decarburization
DIN EN ISO 17639 2013-12	Destructive tests on welds in metallic materials - Macroscopic and microscopic examination of welds
DIN EN 10247 2007-07	Micrographic examination of the non-metallic inclusion content of steels using standard pictures
DIN EN 10328 2005-04	Iron and steel - Determination of the conventional depth of hardening after surface heating
DIN 50190-3 1979-03	Hardness depth of heat-treated parts - Determination of the effective depth of hardening after nitriding
DIN 54150 1977-08	Non-destructive testing - Impression methods for surface examination (Replica-technique) <i>(withdrawn standard)</i>
SEP 1520 1998-09	Microscopic examination of carbide structure in steels by means of diagram series
SEP 1572 1971-08	Microscopic test of free cutting steels for solid nonmetallic inclusions in metal by means of strip mosaics

3.2 Ambulant component metallography

DIN 54150 1977-08	Non-destructive testing - Impression methods for surface examination (Replica-technique) <i>(withdrawn standard)</i>
MQE-26 2014-08	Ambulant component metallography

3.3 Scanning electron microscopy

MQE-11 2014-08	Procedure of Scanning Electron Microscopy (SEM)
MQE-12 2014-08	Procedure of Energy Dispersive X-ray analysis (EDX)

4 Manual non-destructive test

4.1 Visual test

DIN EN ISO 17637 2011-05	Non-destructive testing of welds - Visual testing of fusion-welded joints
DIN EN 13018 2001-07	Non-destructive testing - Visual testing - General principles
DIN EN 1370 2012-03	Founding - Examination of surface condition

4.2 Magnetic particle test

DIN EN ISO 9934-1 2002-03	Non-destructive testing - Magnetic particle testing - Part 1: General principles
DIN EN ISO 17638 2010-03	Non-destructive testing of welds - Magnetic particle testing
DIN EN 1369 2013-01	Founding - Magnetic particle testing

Annex to the Accreditation Certificate D-IS-19274-01-00

DIN EN 10228-1
1999-07 Non-destructive testing of steel forgings - Part 1: Magnetic particle inspection

DIN EN ISO 23278
2010-03 Non-destructive testing of welds - Magnetic particle testing of welds - Acceptance levels

4.3 Penetrant test

DIN EN ISO 3452-1
2014-09 Non-destructive testing - Penetrant testing - Part 1: General principles

DIN EN 1371-1
2012-02 Founding - Liquid penetrant testing - Part 1: Sand, gravity die and low pressure die castings

DIN EN 1371-2
1998-07 Founding - Liquid penetrant inspection - Part 2: Investment castings

DIN ISO 4386-3
1992-11 Plain bearings - Metallic multilayer plain bearings - Non-destructive penetrant testing

DIN EN 10228-2
1998-06 Non-destructive testing of steel forgings - Part 2: Penetrant testing

DIN EN ISO 23277
2010-03 Non-destructive testing of welds - Penetrant testing of welds - Acceptance levels

4.4 Ultrasonic test

DIN EN ISO 17640
2011-04 Non-destructive testing of welds - Ultrasonic testing - Techniques, testing levels and assessment

DIN ISO 4386-1
1992-11 Plain bearings - Metallic multilayer plain bearings - Non-destructive ultrasonic testing of bond

DIN EN 10160
1999-09 Ultrasonic testing of steel flat product of thickness equal to or greater than 6 mm (reflection method)

DIN EN 10228-3
1998-07 Non-destructive testing of steel forgings - Part 3: Ultrasonic testing of ferritic or martensitic steel forgings

DIN EN 10308
2002-03 Non-destructive testing - Ultrasonic testing of steel bars

Annex to the Accreditation Certificate D-IS-19274-01-00

DIN EN 12680-1 2003-06	Founding - Ultrasonic examination - Part 1: Steel castings for general purposes
DIN EN 12680-3 2012-02	Founding - Ultrasonic testing - Part 3: Spheroidal graphite cast iron castings
DIN EN 14127 2011-04	Non-destructive testing - Ultrasonic thickness measurement
DIN 54123 1980-10	Non-destructive test - Ultrasonic method of testing claddings, produced by welding, rolling and explosion
SEP 1915 1989-12	Ultrasonic testing of steel tubes for longitudinal defects (<i>withdrawn standard</i>)
DIN EN ISO 11666 2011-04	Non-destructive testing of welds - Ultrasonic testing - Acceptance levels

4.5 Radiographic test

DIN EN 12681 2003-06	Founding - Radiographic examination
DIN EN ISO 17636-1 2013-05	Non-destructive testing of welds - Radiographic testing - Part 1: X- and gamma-ray techniques with film
DIN EN ISO 10675-1 2013-12	Non-destructive testing of welds - Acceptance levels for radiographic testing - Part 1: Steel, nickel, titanium and their alloys
DIN EN ISO 19232-1 2013-12	Non-destructive testing - Image quality of radiographs - Part 1: Determination of the image quality value using wire-type image quality indicators
DIN EN ISO 19232-3 2014-02	Non-destructive testing - Image quality of radiographs - Part 3: Image quality classes
DIN EN ISO 5579 2014-04	Non-destructive testing - Radiographic testing of metallic materials using film and X- or gamma rays - Basic rules

4.6 Applicable cross-process standards for NDT

DIN EN ISO 5817 2014-06	Welding - Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) - Quality levels for imperfections
DIN EN ISO 6520-1 2007-11	Welding and allied processes - Classification of geometric imperfections in metallic materials - Part 1: Fusion welding

abbreviations used:

MQE	Procedure of MQ Engineering GmbH
SEP	Steel-Iron-test sheets from the German Iron and Steel Institute