

# Deutsche Akkreditierungsstelle GmbH

## Annex to the Accreditation Certificate D-PL-11169-01-00 according to DIN EN ISO/IEC 17025:2018

Valid from: 01.10.2021

Date of issue: 27.04.2022

Holder of certificate:

**TAZ Gesellschaft für Analyse und Meßtechnik mbH**  
**Joseph-von-Fraunhofer-Str. 4, 86551 Aichach**

Tests in the fields:

**spectrometric analyses of metallic materials using spark spectrometry (S-OES) and glow discharge optical emission spectrometry (GDOES) as well as deep profile analyses using glow discharge spectrometry; determination of chemical composition using X-ray fluorescence spectrometry (XRF) of metallic and non-metallic materials;**

**determination of N-, O-, H-, C- and S-concentrations of metallic materials using hot extraction with carrier gas (combustion);**

**Analysis of metallic materials using mobile spark spectrometry (S-OES) and mobile X-ray fluorescence spectrometry (XRF);**

**Hardness testing, determination of surface hardness and hardness traverses of metallic materials; metallographic and scanning electron microscopic tests (SEM) of surfaces and coating systems of metallic and non-metallic materials;**

**Determination of concentration of elements > atomic number 5 using energy dispersive X-ray micro analysis (EDX)**

**Within the scope of accreditation marked with \*, the testing laboratory is permitted, without being required to inform and obtain prior approval from DAkkS, the free choice of standards or equivalent test methods. The listed test methods are exemplary.**

*The management system requirements of DIN EN ISO/IEC 17025 are written in the language relevant to the operations of testing laboratories. Laboratories that conform to the requirements of this standard, operate generally in accordance with the principles of DIN EN ISO 9001.*

*The certificate together with the annex reflects the status as indicated by the date of issue.*

*The current status of any given scope of accreditation can be found in the directory of accredited bodies maintained by Deutsche Akkreditierungsstelle GmbH at <https://www.dakks.de/en/content/accredited-bodies-dakks>.*

Abbreviations used: see last page

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

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Within the scope of accreditation marked with \*\*\*, the testing laboratory is permitted, without being required to inform and obtain prior approval from DAkkS, to use standards or equivalent testing methods listed here with different issue dates.

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

### 1 Spectrometric Analyses of metallic materials using spark atomic emission spectrometry and glow discharge emission spectrometry

#### 1.1. Spark spectrometry with flexible scope \*

ASTM E 415 2017	Standard Test Method for Analysis of Carbon and Low-Alloy Steel by Spark Atomic Emission Spectrometry
ASTM E 1086 2014	Standard Test Method for Analysis of Austenitic Stainless Steel by Spark Atomic Emission Spectrometry
ASTM E 1251 2011	Standard Test Method for Analysis of Aluminium and Aluminium Alloys by Spark Atomic Emission Spectrometry <i>(withdrawn document)</i>
ASTM E 1999 2018	Standard Test Method for Analysis of Cast Iron by Spark Atomic Emission Spectrometry
ASTM E 2209 2013	Standard Test Method for Analysis of High Manganese Steel by Spark Atomic Emission Spectrometry
ASTM E 2994 2016	Standard Test Method for Analysis of Titanium and Titanium Alloys by Spark Atomic Emission Spectrometry and Glow Discharge Atomic Emission Spectrometry (Performance-Based Method)
ASTM E 3047 2016	Standard Test Method for Analysis of Nickel Alloys by Spark Atomic Emission Spectrometry
DIN EN 15079 2015-07	Copper and copper alloys - Analysis by spark optical emission spectrometry (S-OES)
DIN EN 14726 2019-06	Aluminium and aluminium alloys - Determination of the chemical composition of aluminium and aluminium alloys by spark optical emission spectrometry

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### 1.1.1 Spark spectrometry with in-house methods (without flexible scope)

TAZ-VA 14 2021-05	Standard operating procedure for the spectrometric analysis using spark spectrometry of Mg, Al, Ti, Fe, Co, Ni, Cu, Zn based materials and on steel in the following finishes: low alloyed steel, high alloyed steel, automated steel, high speed steel and cast iron
TAZ-VA 27 2021-05	Determination of chemical composition using mobile spectralanalyse (optical emission spectrometry – OES) of Al, Fe and Cu based materials

### 1.2 Glow discharge optical emission spectroscopy with flexible scope \*

ASTM E 2994 2016	Standard Test Method for Analysis of Titanium and Titanium Alloys by Spark Atomic Emission Spectrometry and Glow Discharge Atomic Emission Spectrometry (Performance-Based Method)
DIN ISO 14707 2018-02	Surface chemical analysis - Glow discharge optical emission spectrometry (GD-OES) - Introduction to use
DIN EN ISO 3887 2018-05	Steels - Determination of the depth of decarburization

#### 1.2.1 Glow discharge optical emission spectroscopy - in-house methods (without flexible scope)

TAZ-VA 16 2017-07	Determination of alloy elements of following matrixes using glow discharge optical emission spectroscopy: Cu, Al, Ti, Ni, Zn and steel in finishes: low alloyed steel, high alloyed steel, automated steel, high speed steel and cast iron
TAZ-VA 25 2017-07	Standard operation procedure on qualitative and quantitative glow discharge optical spectroscopy GDOS-deep profile analysis for Mg, Al, Ti, Fe, Co, Ni, Cu, Zn based materials and plastics

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**2 Hardness testing on metallic materials; determination of surface hardness and hardness traverses \***

The test areas within the flexible scope are characterised by test parameters indicated in the following table:

<b>Test type</b>	<b>Measurand/ Test parameter</b>	<b>Measurement and test range</b>	<b>standards / characteristic test methods</b>
Hardness test Rockwell	Härte HRC HRA HRBW	10-70 20-95 10-100	DIN EN ISO 6508-1
Hardness tests Vickers, Brinell	Härte HV HBW	HV 0,025-30 HBW 1/5-10/3000	DIN EN ISO 6507-1 DIN EN ISO 6506-1

- DIN EN ISO 2639  
2003-04                      Steels - Determination and verification of the depth of carburized and hardened cases
  
- DIN EN ISO 4507  
2007-05                      Sintered ferrous materials, carburized or carbonitrided - Determination and verification of case-hardening depth by a micro-hardness test
  
- DIN EN ISO 6506-1  
2015-02                      Metallic materials - Brinell hardness test - Part 1: Test method (here: *HBW 1/5 - HBW 10/3000*)
  
- DIN EN ISO 6507-1  
2018-07                      Metallic materials - Vickers hardness test - Part 1: Test method (here: *HV 0,01 bis HV 30*)
  
- DIN EN ISO 6508-1  
2016-12                      Metallic materials - Rockwell hardness test - Part 1: Test method (here: *HRA, HRBW, HRC*)
  
- 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  
2016-10                      Destructive tests on welds in metallic materials - Hardness testing - Part 2: Microhardness testing of welded joints
  
- DIN EN 10328  
2005-04                      Iron and steel - Determination of the conventional depth of hardening after surface heating

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DIN 50190-3 1979-03	Hardness depth of heat-treated parts; determination of the effective depth of hardening after nitriding
DIN 50190-4 1999-09	Hardness depth of heat-treated parts - Part 4: Determination of the fusion hardening depth and the fusion depth

### 3 Metallographic tests \*\*\*

ASTM E 45 2018	Standard Test Method for Determining the Inclusion Content of Steel
ASTM E 112 2013	Standard Test Method for Determining Average Grain Size
DIN EN ISO 643 2020-06	Steels - Micrographic determination of the apparent grain size
DIN EN ISO 945-1 2019-10	Microstructure of cast irons - Part 1: Graphite classification by visual analysis
DIN EN ISO 3887 2018-05	Steels - Determination of the depth of decarburization
DIN EN ISO 1463 2004-08	Metallic and oxide coatings - Measurement of coating thickness - Microscopical method
SEP 1520 1998-09	Microscopic examination of carbide structure in steels by means of diagram series
SEP 1572 2019-03	Microscopic testing of free-cutting steels for sulfide non-metallic inclusions using standard images
SEP 1614 1996-09	Microscopic inspection of hot-work tool steels
DIN EN ISO 2624 1995-08	Copper and copper alloys - Estimation of average grain size
ISO 4967 2013-07	Steel - Determination of content of non-metallic inclusions - Micrographic method using standard diagrams
DIN EN 10247 2007-07	Micrographic examination of the non-metallic inclusion content of steels using standard pictures <i>(withdrawn standard)</i>

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DIN EN ISO 17639 2013-12	Destructive tests on welds in metallic materials - Macroscopic and microscopic examination of welds
DIN EN ISO 4499-3 2016-10	Hardmetals - Metallographic determination of microstructure - Part 3: Measurement of microstructural features in Ti (C, N) and WC/cubic carbide based hardmetals
DIN EN ISO 4499-4 2016-10	Hardmetals - Metallographic determination of microstructure - Part 4: Characterisation of porosity, carbon defects and eta-phase content

### 3.1 Metallographic test - in-house method (without flexible scope)

TAZ-VA 41 2021-05	Examination of cuts and surfaces of metallographic section
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## 4 Scanning electron microscopy

TAZ-VA 32 2021-05	Scanning electron microscopy (SEM) analyses of surfaces, coating systems and fractured surfaces of metallic and non-metallic materials - microlevel analysis - semi quantitative determination of elements greater than atomic no. 5 using energy dispersive X-ray (EDX) of metallic and non-metallic materials
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## 5 X-ray fluorescence analysis

TAZ-VA 57 2021-05	Determination of elements using X-ray fluorescence analysis (XRF) of Mg, Al, Ti, Fe, Ni, Cu, Zn, Sn, W based materials as well as precious metals (Ag, Au, Pt)
TAZ-VA 26 2021-05	Test for mixed up components using mobile X-ray fluorescence (XRF)

## 6 Determination of concentration of elements

### 6.1 Analyses of elements using combustion \*

DIN EN ISO 15350 2010-08	Steel and iron - Determination of total carbon and sulfur content - Infrared absorption method after combustion in an induction furnace (routine method)
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ASTM E 1019 2018	Standard Test Methods for Determination of Carbon, Sulfur, Nitrogen, and Oxygen in Steel, Iron, Nickel, and Cobalt Alloys by Various Combustion and Inert Gas Fusion Techniques
ASTM E 1941 2010	Standard Test Method for Determination of Carbon in Refractory and Reactive Metals and Their Alloys by Combustion Analysis
DIN EN ISO 9556 2002-04	Steel and iron - Determination of total carbon content - Infrared absorption method after combustion in an induction furnace

### 6.2 Analyses of elements using hot extraction \*

ASTM E 1409 2013	Standard Test Method for Determination of Oxygen and Nitrogen in Titanium and Titanium Alloys by Inert Gas Fusion
ASTM E 1447 2009	Standard Test Method for Determination of Hydrogen in Titanium and Titanium Alloys by Inert Gas Fusion Thermal Conductivity/ Infrared Detection Method
ASTM E 1019 2018	Standard Test Methods for Determination of Carbon, Sulfur, Nitrogen, and Oxygen in Steel, Iron, Nickel, and Cobalt Alloys by Various Combustion and Inert Gas Fusion Techniques
ASTM E 2792 2013	Standard Test Method for Determination of Hydrogen in Aluminium and Aluminium Alloys by Inert Gas Fusion
DIN EN 2003-010 2007-07	Aerospace series - Titanium and titanium alloys - Test methods - Part 010: Sampling for determination of hydrogen content
ASTM E 2575 2019	Standard Test Method for Determination of Oxygen in Copper and Copper Alloys by Inert Gas Fusion

### Abbreviations used:

ASTM E	American Society for Testing and Materials
DIN	German Institute for Standardisation
EN	European Standard
ISO	International Organisation for Standardisation
SEP	Steel and Iron Test Sheet of the Association of German Steel Institute
TAZ-VA	In house method of the TAZ GmbH

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