DAkkS
Deutsche
Akkreditierungsstelle

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 testing laboratory

Minz Prüf + Test GmbH
Rübsanger Straße 52, 65551 Limburg

is competent under the terms of DIN EN ISO/IEC 17025:2018 to carry out tests in the following fields:

mechanical-technological and physical testing of material properties and examinations of resistance to environmental stress on plastics, elastomeric materials, thermoplastic elastomers, thermoplastics and duroplastic polymers

The accreditation certificate shall only apply in connection with the notice of accreditation of 16.06.2022 with the accreditation number D-PL-18566-01. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 14 pages.

Registration number of the certificate: **D-PL-18566-01-00**

Berlin, 16.06.2022	Dr. Tobias Poeste Head of Technical Unit	Translation issued: 02.11.2022	Head of Technical Unit

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

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

See notes overleaf.

Deutsche Akkreditierungsstelle GmbH

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The accreditation was granted pursuant to the Act on the Accreditation Body (AkkStelleG) and the Regulation (EC) No 765/2008 of the European Parliament and of the Council setting out the requirements for accreditation and market surveillance relating to the marketing of products. 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 Co-operation (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-PL-18566-01-00 according to DIN EN ISO/IEC 17025:2018

Valid from: 16.06.2022

Date of issue: 02.11.2022

Holder of certificate:

Minz Prüf + Test GmbH
Rübsanger Straße 52, 65551 Limburg

Tests in the fields:

mechanical-technological and physical testing of material properties and examinations of resistance to environmental stress on plastics, elastomeric materials, thermoplastic elastomers, thermoplastics and duroplastic polymers

Abbreviations used: see last page

Within the testing fields marked with * the testing laboratory is permitted, without being required to inform and obtain prior approval from DAkkS, the free choice of standard or equivalent testing methods.
The listed testing methods are exemplary. The testing laboratory maintains a current list of all testing methods within the flexible scope of accreditation.

The requirement for management systems in the DIN EN ISO/IEC 17025 are written in a language relevant for testing laboratories and are in total in accordance to the principles of the DIN EN ISO 9001.

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

1 Mechanical-technological Tests

1.1 Tensile and Flexural Properties *

ASTM D412 2016 (Reapproved 2021)	Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
ASTM D624 2000 (Reapproved 2020)	Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
ASTM D638 2014	Standard Test Method for Tensile Properties of Plastics
ASTM D790 2017	Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
DIN 53504 2017-03	Testing of Rubber - Determination of Tensile Strength at Break, Tensile Stress at Yield, Elongation at Break and Stress Values in a Tensile Test
DIN 53507 1983-03	Testing Rubber and Elastomers; Determination of the Tear Strength of Elastomers; Trouser Test Piece *(withdrawn standard)*
DIN 53515 1990-01	Determination of Tear Strength of Rubber Elastomers and Plastic Film Using Graves Angle Test Piece With Nick *(withdrawn standard)*
DIN 53530 1981-02	Testing of Organic Materials; Separation Test on Fabric Plies Bonded Together
DIN EN ISO 178 2019-08	Plastics - Determination of Flexural Properties
DIN EN ISO 527-1 2019-12	Plastics - Determination of Tensile Properties - Part 1: General Principles (ISO 527-1:2019)
DIN EN ISO 527-2 2012-06	Plastics - Determination of Tensile Properties - Part 2: Test Conditions for Moulding and Extrusion Plastics (ISO 527-2:2012)
DIN ISO 34-1 2016-09	Rubber, vulcanized or thermoplastic - Determination of tear strength - Part 1: Trouser, Angle and Crescent Test Pieces

DIN ISO 6133 2017-04	Rubber and Plastics - Analysis of Multi-peak Traces Obtained in Determinations of Tear Strength and Adhesion Strength
DIN 53539 1979-09	Testing of Elastomers; Evaluation of Tear Propagation, Adhesion and Peel Tests *(withdrawn standard)*
ISO 34-1 2015-06	Rubber, Vulcanized or Thermoplastic - Determination of Tear Strength - Part 1: Trouser, Angle and Crescent Test Pieces
ISO 34-2 2015-06	Rubber, Vulcanized or Thermoplastic - Determination of Tear Strength - Part 2: Small (Delft) Test Pieces
ISO 36 2020-03	Rubber, Vulcanized or Thermoplastic - Determination of Adhesion of Textile Fabrics
ISO 37 2017-11	Rubber, Vulcanized or Thermoplastic - Determination of Tensile Stress-Strain Properties
ISO 178 2019-04	Plastics - Determination of Flexural Properties - Amendment
ISO 527-1 2019-07	Plastics - Determination of Tensile Properties - Part 1: General Principles
ISO 527-2 2012-02	Plastics - Determination of Tensile Properties - Part 2: Test Conditions for Moulding and Extrusion Plastics
ISO 6133 2015-08	Rubber and Plastics – Analysis of Multi-Peak Traces Obtained in Determinations of Tear Strength and Adhesion Strength
JIS K 6251 2017-04	Rubber, Vulcanized or Thermoplastic - Determination of Tensile Stress-strain Properties
JIS K 6252-1 2015-02	Rubber, Vulcanized or Thermoplastic - Determination of Tear Strength - Part 1: Trouser, Angle and Crescent Test Pieces
JIS K 6252-2 2015-02	Rubber, Vulcanized or Thermoplastic - Determination of Tear Strength - Part 2: Small (Delft) Test Pieces

1.2 Impact Tests *

ASTM D256 2010 (Reapproved 2018)	Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics
DIN EN ISO 179-1 2010-11	Plastics - Determination of Charpy impact properties - Part 1: Non-instrumented impact test
DIN EN ISO 180 2020-03	Plastics - Determination of Izod Impact Strength
ISO 179-1 2010-06	Plastics - Determination of Charpy Impact Properties - Part 1: Non-Instrumented Impact Test
ISO 180 2019-11	Plastics - Determination of Izod Impact Strength

1.3 Hardness Tests *

ASTM D1415 2018	Standard Test Method for Rubber Property – International Hardness
ASTM D2240 2015 (Reapproved 2021)	Standard Test Method Rubber Property - Durometer Hardness
DIN 53519-2 1972-05	Testing of Elastomers - Determination of Indentation Hardness of Soft Rubber (IRHD), Hardness Testing on Specimens of Small Dimensions, Micro-testing (*withdrawn standard*)
DIN EN ISO 868 2003-10	Plastics and Ebonite - Determination of Indentation Hardness by Means of a Durometer (Shore Hardness)
ISO 868 2003-03	Plastics and Ebonite - Determination of Indentation Hardness by Means of Durometer (Shore Hardness)
DIN ISO 48 2016-09	Rubber, Vulcanized or Thermoplastic - Determination of Hardness (hardness between 10 IRHD and 100 IRHD) (*here: method M and N*) (*withdrawn standard*)

DIN ISO 48-2 2021-02	Rubber, Vulcanized or Thermoplastic - Determination of Hardness - Part 2: Hardness Between 10 IRHD and 100 IRHD (ISO 48-2 :2018)
DIN ISO 7619-1 2012-02	Rubber, Vulcanized or Thermoplastic - Determination of Indentation Hardness - Part 1: Durometer Method (Shore Hardness) (*withdrawn standard*)
DIN 53505 2000-08	Testing of Rubber - Shore A and Shore D Hardness Test (*withdrawn standard*)
DIN ISO 48-4 2021-02	Rubber, Vulcanized or Thermoplastic - Determination of Hardness - Part 4: Indentation Hardness by Durometer Method (Shore Hardness)
ISO 48-1 2018-08	Rubber, Vulcanized or Thermoplastic - Determination of Hardness - Part 1: Introduction and Guidance
ISO 48-2 2018-08	Rubber, Vulcanized or Thermoplastic - Determination of Hardness - Part 2: Hardness Between 10 IRHD and 100 IRHD
ISO 48-4 2018-08	Rubber, Vulcanized or Thermoplastic - Determination of Hardness - Part 4: Indentation Hardness by Durometer Method (Shore Hardness)
JIS K 6253-1 2012-03	Rubber, Vulcanized or Thermoplastic - Determination of Hardness - Part 1: General Guidance
JIS K 6253-2 2012-03	Rubber, Vulcanized or Thermoplastic - Determination of Hardness - Part 2: IRHD Method (Hardness Between 10 IRHD and 100 IRHD)
JIS K 6253-3 2012-03	Rubber, Vulcanized or Thermoplastic - Determination of Hardness - Part 3: Durometer Method

2 Test of Physical Properties*

ASTM D792 2020	Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement (here: *method A*)
DIN 53479 1976-07	Testing of Plastics and Elastomers; Determination of Density *(withdrawn standard)*
DIN 53512 2000-04	Testing of rubber - Determination of Rebound Resilience (Schob Pendulum)

DIN 53568-1 1974-07	Testing of Plastics, Rubber and Elastomers - Determination of Residue on Ignition Without Chemical Pretreatment of the Specimen *(withdrawn standard)*
DIN EN ISO 1172 1998-12	Textile-glass-reinforced Plastics - Prepregs, Moulding Compounds and Laminates - Determination of the Textile-glass and Mineral-filler Content; Calcination Methods (here: *only textile-glass-reinforced plastics without mineral-filler*)
DIN EN ISO 1183-1 2019-09	Plastics - Methods for Determining the Density of Non-cellular Plastics - Part 1: Immersion Method, Liquid Pyknometer Method and Titration Method (here: *test-method: Immersion method*)
ISO 1183 2019-03	Plastics - Methods for Determining the Density of Non-cellular Plastics
DIN EN ISO 3451-1 2019-05	Plastics - Determination of Ash - Part 1: General methods (here: *method A*)
ISO 3451 2019-02	Plastics - Determination of Ash
DIN ISO 4649 2021-06	Rubber, Vulcanized or Thermoplastic - Determination of Abrasion Resistance Using a Rotating Cylindrical Drum Device
ISO 247-1 2018-07	Rubber – Determination of Ash – Part 1: Combustion Method
ISO 1172 1996-12	Textile-Glass-Reinforced Plastics, Peepregs, Moulding Compounds and Laminates – Determination of the Textile-glass and Mineral-Filter
ISO 2781 2018-06	Rubber, Vulcanized or Thermoplastic - Determination of Density
ISO 4649 2017-09	Rubber, Vulcanized or Thermoplastic - Determination of Abrasion Resistance Using a Rotating Cylindrical Drum Device
ISO 4662 2017-06	Rubber, Vulcanized or Thermoplastic - Determination of Density
JIS K 6264-1 2005-03	Rubber, Vulcanized or Thermoplastic - Determination of Rebound Resilience - Part 1: Guide

JIS K 6264-2 2005-03	Rubber, Vulcanized or Thermoplastic - Determination of Abrasion Resistance - Part 2: Testing Methods
JIS Z 8807 2012-05	Methods of Measuring Density and Specific Gravity of Solid

3 Determination of Compression Set *

ASTM D395 2018	Standard Test Methods for Rubber Property-Compression Set
DIN ISO 815-1 2022-04	Rubber, Vulcanized or Thermoplastic - Determination of Compression Set - Part 1: At Ambient or Elevated Temperatures
DIN ISO 815-2 2022-04	Rubber, Vulcanized or Thermoplastic - Determination of Compression Set - Part 2: At Low Temperatures
DIN ISO 2285 2013-12	Rubber, Vulcanized or Thermoplastic - Determination of Tension Set Under Constant Elongation, and of Tension Set, Elongation and Creep Under Constant Tensile Load
ISO 815-1 2019-11	Rubber, Vulcanized or Thermoplastic - Determination of Compression Set - Part 1: At Ambient or Elevated Temperatures
ISO 815-2 2019-11	Rubber, Vulcanized or Thermoplastic - Determination of Compression Set - Part 2: At Low Temperatures
ISO 2285 2019-07	Rubber, Vulcanized or Thermoplastic - Determination of Tension Set under Constant Elongation, and of Tension Set, Elongation and Creep under Constant Tensile Load
JIS K 6262 2013-09	Rubber, Vulcanized or Thermoplastic - Determination of Compression Set at Ambient, Elevated or Low Temperatures

4 Durability of Elastomers to Environmental Conditions *

ASTM D471 2016 (Reapproved 2021)	Standard Test Method for Rubber Property-Effect of Liquids
ASTM D573 2004 (Reapproved 2019)	Standard Test Method for Rubber - Deterioration in an Air Oven

ASTM D865 2011	Standard Test Method for Rubber - Deterioration by Heating in Air (Test Tube Enclosure)
ASTM D2000 2018	Standard Classification System for Rubber Products in Automotive Applications
ASTM D4289 2021	Standard Test Method of Elastomer Compatibility of Lubricating Greases and Fluids
ASTM D1149 2018-09	Standard Test Methods for Rubber Deterioration-Cracking in an Ozone Controlled Environment
CEC L-39-96 2015-06	The Evaluation of Oil-Elastomer Compatibility *(withdrawn guideline)*
CEC L-112-16 2018-06	The Evaluation of Oil-Elastomer Compatibility
DIN 53508 2000-03	Testing of Rubber - Accelerated Aging
DIN 53521 1987-11	Determination of the Behavior of Rubber and Elastomers When Exposed to Fluids and Vapours *(withdrawn standard)*
DIN ISO 1431-1 2017-04	Rubber, Vulcanized or Thermoplastic - Resistance to Ozone Cracking - Part 1: Static and Dynamic Strain Testing
DIN ISO 1817 2016-11	Rubber, Vulcanized or Thermoplastic - Determination of the Effect of Liquids
ISO 188 2011-10	Rubber, Vulcanized or Thermoplastic - Accelerated Aging and Heat Resistance tests
ISO 1431-1 2012-08	Rubber, Vulcanized or Thermoplastic -Resistance to Ozone Cracking - Part 1: Static and Dynamic Strain Testing
ISO 1817 2015-02	Rubber, Vulcanized or Thermoplastic - Determination of the Effect of Liquids

ISO 6072 2011-12	Rubber - Compatibility Between Hydraulic Fluids and Standard Elastomer Materials
JIS K 6257 2017-10	Rubber, Vulcanized or Thermoplastic - Determination of Heat Aging Properties
JIS K 6259-1 2015-09	Rubber, Vulcanized or Thermoplastic - Determination of Ozone Resistance - Part 1: Static and Dynamic Strain Testing

5 Thermoanalytical Analysis *

ASTM D6370 1999 (Reapproved 2019)	Standard Test Method for Rubber - Compositional Analysis by Thermogravimetry (TGA)
ASTM E1356 2008 (Reapproved 2014)	Standard Test Method for Assignment of the Glass Transition Temperatures by Differential Scanning Calorimetry
DIN 53545 2016-12	Testing of Rubber - Determination of Low-temperature Behavior of Elastomers - Principles and Test Methods
DIN EN ISO 11357-1 2017-02	Plastics - Differential Scanning Calorimetry (DSC) - Part 1: General Principles
DIN EN ISO 11357-2 2020-08	Plastics - Differential Scanning Calorimetry (DSC) - Part 2: Determination of Glass Transition Temperature and Glass Transition Step Height
DIN EN ISO 11357-3 2018-07	Plastics - Differential Scanning Calorimetry (DSC) - Part 3: Determination of Temperature and Enthalpy of Melting and Crystallization
DIN EN ISO 11357-4 2021-05	Plastics - Differential Scanning Calorimetry (DSC) - Part 4: Determination of Specific Heat Capacity
DIN EN ISO 11357-5 2014-07	Plastics - Differential Scanning Calorimetry (DSC) - Part 5: Determination of Characteristic Reaction-curve Temperatures and Times, Enthalpy of Reaction and Degree of Conversion
DIN EN ISO 11357-6 2018-07	Plastics - Differential Scanning Calorimetry (DSC) - Part 6: Determination of Oxidation Induction Time (Isothermal OIT) and Oxidation Induction Temperature (Dynamic OIT)

DIN EN ISO 11358-1 2014-10	Plastics - Thermogravimetry (TG) of Polymers - Part 1: General Principles
ISO 9924-1 2016-08	Rubber and Rubber Products - Determination of the Composition of Vulcanizates and Uncured Compounds by Theromogravimetry - Part 1: Butadiene, Ethylene-Propylene Copolymer and Terpolymer, Isobutene-Isoprene, Isoprene and Styrene-Butadiene Rubbers
ISO 9924-2 2016-08	Rubber and Rubber Products - Determination of the Composition of Vulcanizates and Uncured Compounds by Theromogravimetry - Part 2: Acrylonitrile-Butadiene and Halobutyl Rubbers
ISO 9924-3 2009-03	Rubber and Rubber Products - Determination of the Composition of Vulcanizates and Uncured Compounds by Thermogravimetry - Part 3: Hydrocarbon Rubbers, Halogenated Rubbers and Polysiloxane Rubbers after Extraction
ISO 11357-1 2016-09	Plastics - Differential Scanning Calorimetry (DSC) - Part 1: General Principles
ISO 11357-2 2020-03	Plastics - Differential Scanning Calorimetry (DSC) - Part 2: Determination of Glass Transmission Temperature and Glass Transmission Step Height
ISO 11357-3 2018-03	Plastics - Differential Scanning Calorimetry (DSC) - Part 3: Determination of Temperature and Enthalpy of Melting and Crystallization
ISO 11357-4 2021-02	Plastics - Differential Scanning Calorimetry (DSC) - Part 4: Determination of Specific Heat Capacity
ISO 11357-5 2013-03	Plastics - Differential Scanning Calorimetry (DSC) - Part 5: Determination of Characteristic Reaction Curve Temperatures and Times, Enthaply of Reaction and Degree of Conversion
ISO 11357-6 2018-03	Plastics - Differential Scanning Calorimetry (DSC) – Part 6: Determination of Oxidation Induction Time (Isothermal OIT) and Oxidation Induction Temperature (OIT)
ISO 11357-7 2022-03	Plastics - Differential Scanning Calorimetry (DSC) – Part 7: Determination of Crystallization Kinetics
ISO 11358-1 2022-03	Plastics – Thermogravity (TG) of Polymers – Part 1: General Principles

6 Tests according to Factory Standards

PV 3307 2019-03	Elastomer Components - Plastic and Elastic Deformability
PV 3316 2007-06	Rubber Products - Reference Photographs after Exposure to Ozone
PV 3330 2021-01	Elastomer O-Rings - Compression Set (Plastic Deformation)
PV 3927 2017-11	Thermogravimetric Analysis for Plastics and Elastomers
PV 3973 2021-03	Elastomer Circular Sealing Rings - Determining Tensile Strength, Elongation at Tear and Stress Values in the Tensile Test
ZF Test Specification Nr. 0000 702 011d 2015-02	CEC-Oil-Elastomer-Resistance-Test
ZF Test Specification Nr. 0000 702 064e 2018-12	2L-Oil-Elastomer-Resistance-Test
ZF Test Specification Nr. 0000 702 107 2003-01	2L-Oil-Plastic-Compatibility-Test
ZF Test Specification Nr. 0000 702 689 2017-04	Elastomer – Resistance Test at Elevated Pressure

7 Tests according to VDA-Guidelines

VDA 290-130 2021-05	Elastomer Resistance - Determination of the Behavior Towards Test Condensate Mixtures (Blow-By)
VDA 675-101 2020-11	Elastomer Components in Motor Vehicles - Test Method to Identifiy Hardness - Micro Hardness Test (IRHD Method M)
VDA 675-102 1992-12	Elastomer Components in Motor Vehicles - Test Method to Identifiy Hardness - Shore A *(withdrawn guideline)*

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VDA 675-106 1992-12	Determination of Density (Method A) *(withdrawn guideline)*
VDA 675-116 2016-05	Elastomer Identification - Differential-Scanning-Calorimetry (DSC) *(withdrawn guideline)*
VDA 675-130 2016-05	Determining the Ash Content Without Chemical Pretreatment of the Specimen
VDA 675-135 2016-05	Elastomer Identification - Determining the Thermal Decomposition Behavior with Thermogravimetry (TG) *(withdrawn guideline)*
VDA 675-202 1992-12	Elastomer Components in Motor Vehicles - Test Method to Determine Properties - Shore A and D *(withdrawn guideline)*
VDA 675-205 1992-12	Elastomer-Components in Motor Vehicles - Test Method to Determine Properties of the Stress-Strain Behavior - Tensile Test *(withdrawn guideline)*
VDA 675-210 1992-12	Elastomer-Components in Motor Vehicles – Test Method to Determine Properties of the Stress-Strain Behavior- Tear Resistance (Graves) *(withdrawn guideline)*
VDA 675-211 1992-12	Elastomer-Components in Motor Vehicles – Test Method to Determine Properties of the Stress-Strain Behavior - Tear Resistance (Trouser Specimen) *(withdrawn guideline)*
VDA 675-216 1992-12	Elastomer Components in Motor Vehicles - Test Method to Determine Properties - Creep and Relaxation - Compression Set *(withdrawn guideline)*
VDA 675-217 1992-12	Elastomer Components in Motor Vehicles - Test Method to Determine Properties - Creep and Relaxation - Tension Set *(withdrawn guideline)*
VDA 675-219 1992-12	Determination of the Rebound Resilience *(withdrawn guideline)*

VDA 675-220 1992-12	Elastomer Components in Motor Vehicles – Test Method to Determine Properties - Resilience After Constant Deformation *(withdrawn guideline)*
VDA 675-222 2020-10	Elastomer: Testprocedure - Compression Set
VDA 675-226 1992-12	Elastomer Components in Motor Vehicles - Test Method to Determine Properties - Adhesion Test - Adhesion Test Fabric Elastomer *(withdrawn guideline)*
VDA 675-235 1992-12	Determinationf of Abrasion *(withdrawn guideline)*
VDA 675-241 2020-10	Elastomer Components in Motor Vehicles - Test Procedure for Identification - Corrosion Effect on Copper
VDA 675-301 2021-01	Elastomer Components in Motor Vehicles - Test Method to Determine Resistances -Determination of the Effect of Fluids
VDA 675-302 1992-12	Elastomer Components in Motor Vehicles – Test Method to Determine Resistances - Determination of the Effect of Testing Fuels *(withdrawn guideline)*
VDA 675-303 2020-11	Elastomer Components in Motor Vehicles - Test Method to Determine Resistances - Determination of the Effect of Coolant
VDA 675-304 2016-05	Elastomer Components in Motor Vehicles - Test Method to Determine Resistances - Determination of the Effect of Brake Fluids
VDA 675-305 2020-05	Elastomer Components in Motor Vehicles - Test Method to Determine Resistances - Determination of the Effect of Testing Greases *(withdrawn guideline)*
VDA 675-310 2020-05	Rubber and Elastomer Testing - Test Method to Determine Resistances - Accelerated Aging

abbreviations used:

ASTM	American Society for Testing and Materials
CEC	Coordinating European Council
DIN	Deutsches Institut für Normung e. V.
EN	European Norm
IEC	International Electrotechnical Commission
ISO	International Organisation for Standardisation
JIS	Japanese Industrial Standard
PV	Factory standard of Volkswagen AG
VDA	Verband der Automobilindustrie e.V.
ZF	Zahnradfabrik Friedrichshafen AG