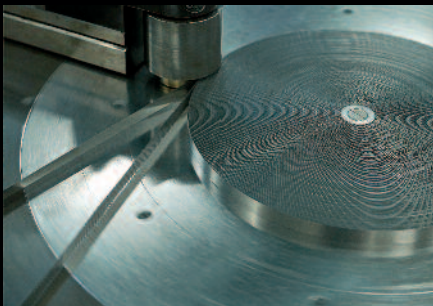
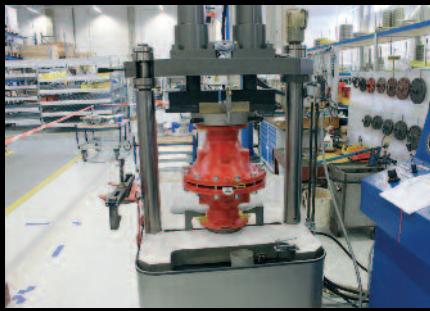


# KITO<sup>®</sup> Flame Arresters and Breather Valves



## About KITO Armaturen GmbH

The brand name KITO® has been associated with flame arresters manufactured in Braunschweig, Germany for over 90 years. KITO Armaturen GmbH was originally born of Wilke-Werke AG many years ago. The latter was responsible for developing the KITO® trademark and brand itself from an abbreviation for the old expression Kiestopf (or common gravel pot).

We regard collaboration on the latest standardization as essential, and we keep our customers up to date at all times with the latest developments and ideas in safety technology through appropriate training measures and seminars.

The size of our company enables us to identify speedy and highly flexible solutions for our customers' needs. Special customer-specific designs are part of our expertise, as are rapid approvals for special flame arresters. Our delivery times are short and reliable, adjusted to suit the requirements of our customers.

We regard our reputation as a reliable and trustworthy partner as a mark of our excellence.

## Certification

As a certified manufacturer of flame arresters and safety equipment, KITO® has a long-established QA system conforming to DIN EN ISO 9001:2015 and DIN EN ISO 14001:2015. Our products also comply with European Directive 2014/34/EU, with individual products having specific certification. KITO® is regularly audited by a third party.

We are an approved manufacturer pursuant to the Pressure Equipment Directive (PED), working with vessel codes AD 2000 and DIN EN ISO 3834-2 (EN 729-2). TÜV North Systems, a notified body, monitors our certification as a welding company.



# MADE IN GERMANY

# Flame Arresters

Flame arresters are devices fitted to the opening of an enclosure or connecting pipe work and designed to allow flow but prevent flame transmission. They are commonly used to protect tanks and installations from possible risks relating to the transport or storage of flammable liquids and gases.

Depending on the application, flame arrester may be installed as a single unit or as part of a system.

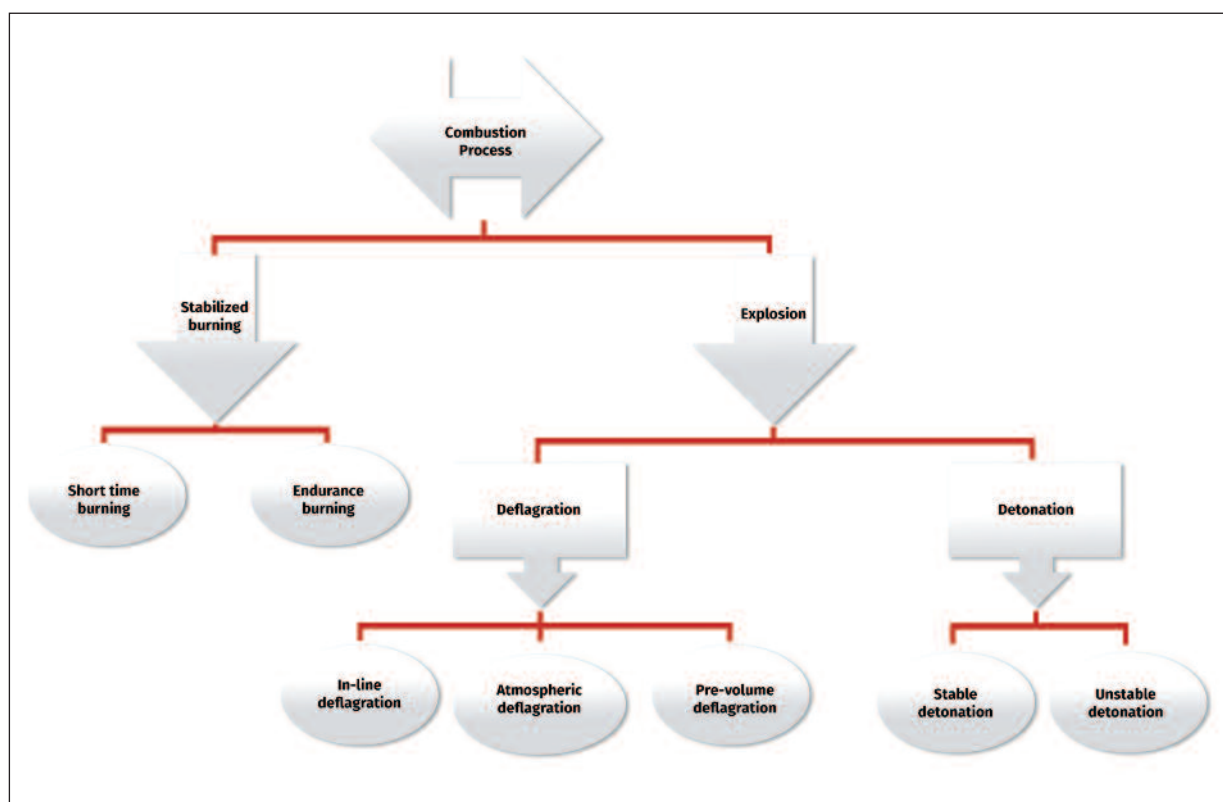
Flame arresters have no moving parts and consist of a housing and an element suitable for installation in a pipeline, vent lines or process plants.

All flame arresters designed and manufactured by KITO consist of layers of wound, corrugated metal ribbons. Their principle depends on heat from the flame as it strives to travel through narrow metal gaps.

KITO® flame arresters and valves with integrated flame arresters conform to the Product Directive 2014/34/EU of the European Union and bear the CE mark to indicate their conformity.

## Combustion Processes

The difference between various types of flame arresters is governed mainly by the nature of the explosion. Since explosive mixtures can burn in different ways, depending on the chemical composition, pre-compression, geometric shape of the combustion chamber, flame speed and other factors, it is quite important to define the combustion process in order to select the most suitable flame arrester.





## Explosion Group

Different gases react in a distinctive manner and have different flame propagation characteristics. For a simple classification and understanding, they are categorised according to their properties and hazard levels into explosion groups.

These explosion groups (or gas group) are defined based on the Maximum Experimental Safety Gap (MESG). The Maximum Experimental Safe Gap (MESG) is expressed in mm and defined as the maximum gap between two flat surfaces, which prevents flame transmission for all concentrations of a respective flammable gas/air mixture propagating from an inner explosion chamber through a 25-mm long path into an outer explosion chamber.

The test conditions are standardized in IEC 60079-20-1.

Explosion group		Max. experimental safety gap (mm)	Reference substance for testing flame arrester
IEC <sup>1</sup>	NEC <sup>2</sup>		
IIA1 <sup>3</sup>		≥ 1,14	Methane
IIA	D	> 0,90	Propane
IIB1	C	≥ 0,85	Ethene
IIB2	C	≥ 0,75	Ethene
IIB3	C	≥ 0,65	Ethene
IIB	B	≥ 0,5	Hydrogen
IIC	B	< 0,5	Hydrogen

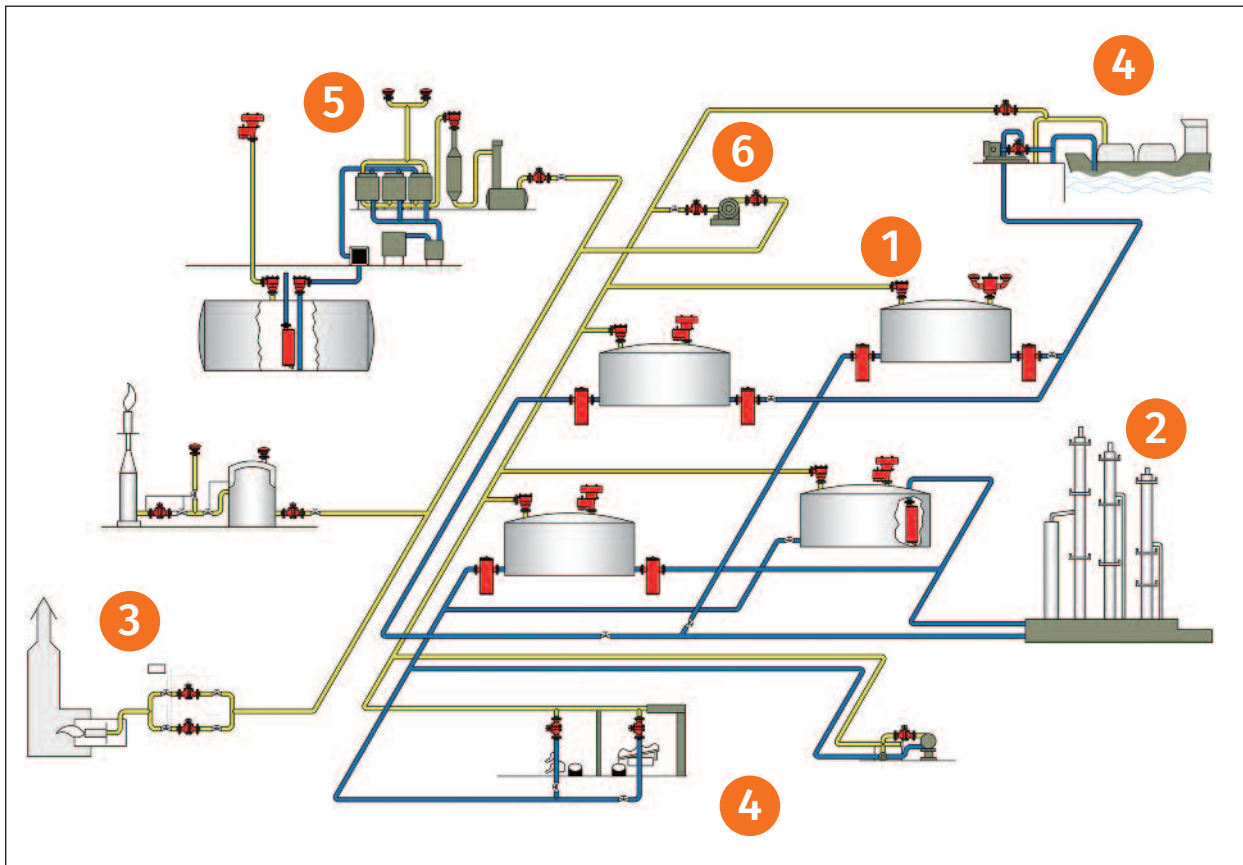
1 – IEC International Electric Code

2 – NEC National Electric Code

3 – In accordance with ISO 16852



# KITO® Application – Industries Overview



Source: NFPA 69

- 1 Tank farms
- 2 Process plants
- 3 Thermal treatment plants
- 4 Loading and unloading process as part of logistics
- 5 Vapour recovery units (VRU's)
- 6 Components as safety part of devices
- 7 Protection of other plants – not illustrated

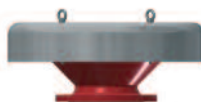
**...and many more...**

- Pharmaceutical
- Fertilisers & agro-chemicals
- Waste treatment
- Mining
- Food & beverages
- Bioethanol / Biodiesel
- Pulp & paper
- Equipment manufacturers

# QUALITY PROTECTION

## Flame Arresters

End-of-line or In-line Flame Arresters



Model	BEH-6*	VH*	EFA-Def0*	EFA-Det4*	RG-Det4*
Service	Deflagration proof, endurance burning proof	Deflagration proof	Deflagration proof, short-time burning proof	Deflagration proof, short-time burning proof	Deflagration proof, short-time burning proof
Application	Vapour/air or gas/air mixtures of Explosion Groups IIA1, IIA, IIB1, IIB3	Vapour/air or gas/air mixtures of Explosion Groups IIA1, IIA, IIB1, IIB3, IIC	Vapour/air or gas/air mixtures of Explosion Groups IIA1, IIA, IIB1, IIB3, IIC	Vapour/air or gas/air mixtures of Explosion Groups IIA1, IIA, IIB1, IIB3, IIC	Vapour/air or gas/air mixtures of Explosion Groups IIA1, IIA, IIB1, IIB3, IIC
Nominal Diameter Connection	DN 80 (3") to DN 100 (4") DIN or ASME	DN 50 (2") to DN 800 (32") DIN or ASME	DN 25 (1") to DN 400 (16") DIN or ASME	DN 25 (1") to DN 400 (16") DIN or ASME	G 1/8" to DN 50 (2") DIN, ASME or G
Material	Carbon steel 1.0619, stainless steel 1.4408	Carbon steel 1.0619 or stainless steel 1.4571/1.4408 depending on the size	Carbon steel 1.0619, stainless steel 1.4408	Carbon steel 1.0619, stainless steel 1.4408	Steel, stainless steel 1.4571
Operational Conditions	60°C	60°C 180°C	1.2, 1.6, 2.5 or 6.0 bar abs 60, 100 or 160°C	1.2, 2.5 or 3.0 bar abs 60, 100, 160 or 250°C	1.2 or 4.5 bar abs 60°C
Accessories	–	Temperature sensor	Temperature sensor, heating sleeve	Temperature sensor, heating sleeve	Temperature sensor, heating sleeve

\*All equipment provided with EC Type Examination Certificate pursuant to Directive 2014/34/UE, ATEX and ISO 16852. Tailored design available on request.

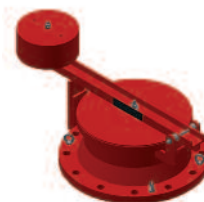
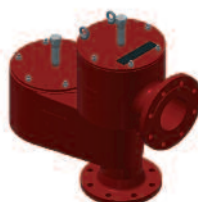


# CTION

# SAFETY

## Breather Valves

End-of-line and/or In-line Pressure and/or Vacuum Relief Valves



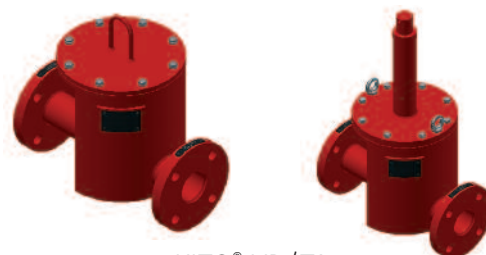
Model	VD/oG	VD/KG-PA-IIB3*	VD/oG-PA	VD/KG-BEH-6-IIB3*	EV/o
Service	Pressure and vacuum relief valve	Pressure and vacuum relief valve deflagration proof	Pressure and vacuum relief valve	Pressure and vacuum relief valve, endurance burning proof, deflagration proof	Pressure relief valve (emergency vent)
Application	Non-flammable vapour/air or gas/air mixtures	Vapour/air or gas/air mixtures of Explosion Groups IIA1, IIA, IIB1, IIB3	Non-flammable vapour/air or gas/air mixtures	Vapour/air or gas/air mixtures of Explosion Groups IIA1, IIA, IIB1, IIB3	Non-flammable vapour/air or gas/air mixtures
Nominal Diameter Connection	DN 50 (2") to DN 300 (12") DIN or ASME	DN 50 (2") to DN 300 (12") DIN or ASME	DN 50 (2") to DN 300 (12") DIN or ASME	DN 50 (2") to DN 100 (4") DIN or ASME	DN 100 (4") to DN 600 (24") DIN or ASME
Material	Carbon steel 1.0619, stainless steel 1.4408	Carbon steel 1.0619, stainless steel 1.4408	Carbon steel 1.0619, stainless steel 1.4408	Carbon steel 1.0619, stainless steel 1.4408	Steel, stainless steel 1.4301
Operational Conditions	P: 2 to 60 mbar V: 2 to 60 mbar	P: 2 to 60 mbar V: 2 to 60 mbar	P: 2 to 60 mbar V: 2 to 60 mbar	P: 2 to 60 mbar V: 2 to 60 mbar	P: 5 to 100 mbar
Accessories	Proximity switch Electrical heating	Proximity switch Electrical heating	Proximity switch Electrical heating	Proximity switch Electrical heating	Proximity switch

\* All equipment provided with EC Type Examination Certificate pursuant to Directive 2014/34/UE, ATEX and ISO 16852. Tailored design available on request.

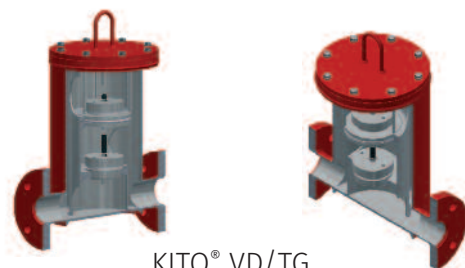
# MORE SOLUTIONS

## In-line pressure and/or vacuum relief valve

DN 50 (2") to DN 150 (6") | Weight or spring loaded  
| Also used as non-return safety device or over-flow valve.



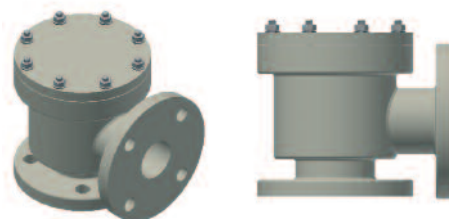
KITO® VD/TA



KITO® VD/TG

## Pressure and/or vacuum relief valve – Plastic design

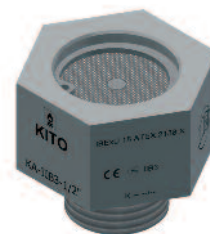
End-of-line and in-line versions DN 25 (1") to DN 200 (8") | Suitable for applications with corrosive vapours..



KITO® VD-ScS

## Condensate drain flame arrester – Deflagration flame arrester proof

Enable draining of condensates inside the housing. Approved for explosive vapour-air or gas-air mixtures of Explosion Group IIB3.



KITO® KA-IIB3-1/2"

## Sampling device – End-of-line deflagration flame arrester endurance burning proof

Multiple designs based on customer's process. Approved for explosive vapour-air or gas-air mixtures of Explosion Group IIB.



KITO® ZP/R-IIB-1/2"



# MORE SOLUTIONS

## Pressure and vacuum relief valve – Approved for deflagration and endurance burning

DN 80 (3") to DN 200 (8") | Used on fixed roof tanks to prevent inadmissible pressure and vacuum and to minimise product losses.



## Detonation flame arrester – Approved for short-time burning

DN 25 (1") to DN100 (4") | Angular Design | Approved for all substances of explosion groups IIA1 to IIB3 | Both directions of flow are possible | Uni-directional protection against detonation



## Liquid detonation flame arrester – External installation

DN 25 (1") to DN 200 (8") | Used for installation in filling and suction pipes | Mounting position is perpendicular.



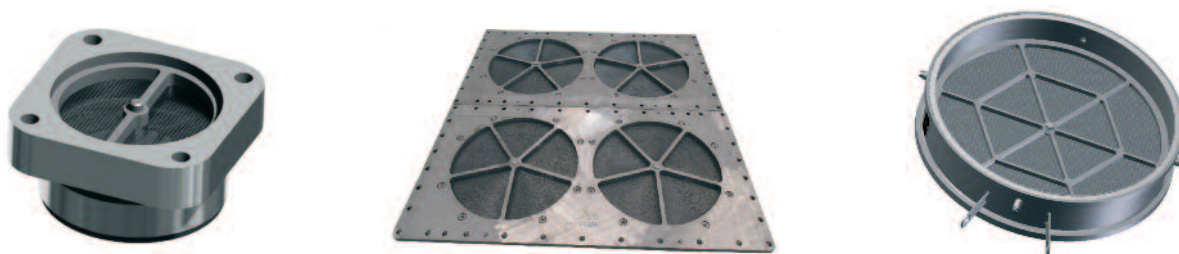
## Liquid Detonation Flame Arrester – Internal Installation

DN 25 (1") to DN 250 (10") | Used for installation in filling pipes | Mounting position is perpendicular.



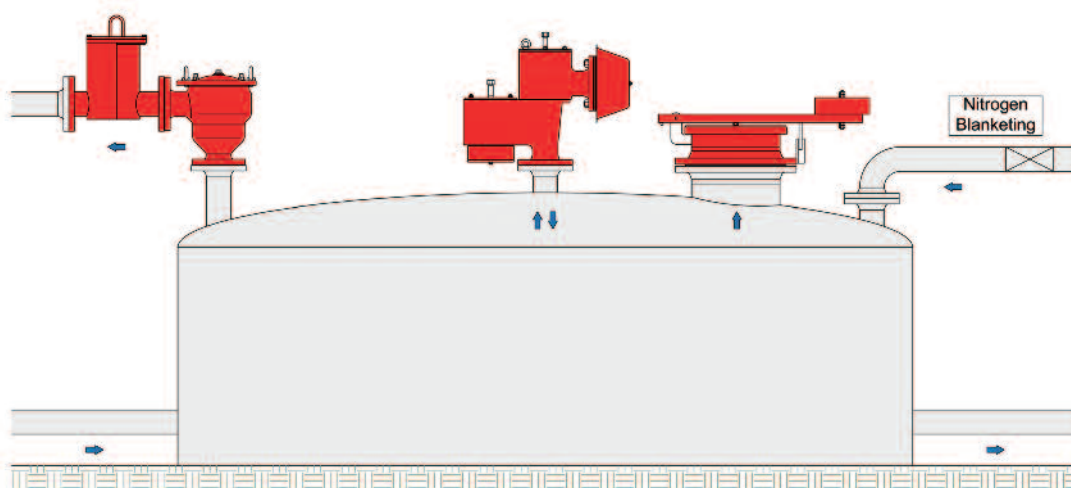
## Tailored solutions for special applications

KITO® also specializes in the development and production of special solutions for OEM customers. We can support our customers during the design phase and implementation of optimised solutions through 3D CAD systems, based on drawings, components or positions specified by the customer. With a tailored product from KITO®, our customers acquire a solid solution with cutting edge technology.



Examples of flame arresters for special solutions

## Examples of applications



Fixed-roof storage tank containing flammable liquids, where the flashpoint of the liquid is lower than 60°C (140°F).

- For normal atmospheric in-and outbreathing KITO® recommends:  
**KITO® VD/KG-PA-...-IIB3** (pressure and vacuum relief valve with integrated flame arrester approved for atmospheric deflagration)
- For emergency venting KITO® recommends:  
**KITO® EV/o-...** (emergency relief valve)
- For cases where the gas/vapour-air mixture is vented into a vapour recovery line, KITO® recommends:  
**KITO® FDN-Det4-...** (uni-directional, in-line detonation flame arrester, angled design with shock absorber)  
**KITO® VD/TA-...** (in-line pressure or vacuum relief valve) In case of inert gas blanketing, Annex F of ISO 28300 or API 2000 7th can be used as guidance.

Would you like to know more about our products? Then please visit our website at [www.kito.de](http://www.kito.de). You will find our catalogue, application flyer and product flyer in the download area, with a selection of different languages.

**Scan the QR code for direct downloading of the catalogue!**



## KITO Sizing Program (KISS)

KISS is a valve sizing program that assists you quickly and accurately to calculate your tank requirements so that you can choose the KITO valve suitable for your application.

KISS is an online program that requires no admin permissions. You can find a direct link to KISS on our website.

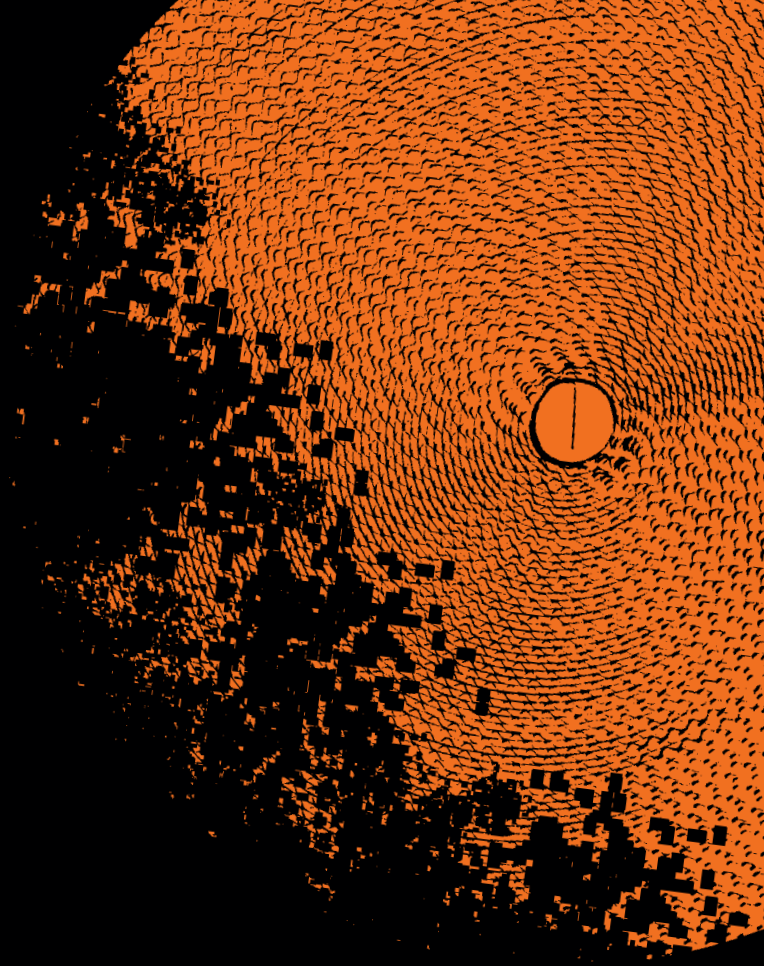


## KITO Worldwide

In addition to our headquarters in Braunschweig, Germany, there are KITO sales partners around the world. More than 50 sales partners worldwide are available for personal consultation and ready to help you improve your business with regard to productivity, efficiency and profitability. Find our sales partners near your location on our website.







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