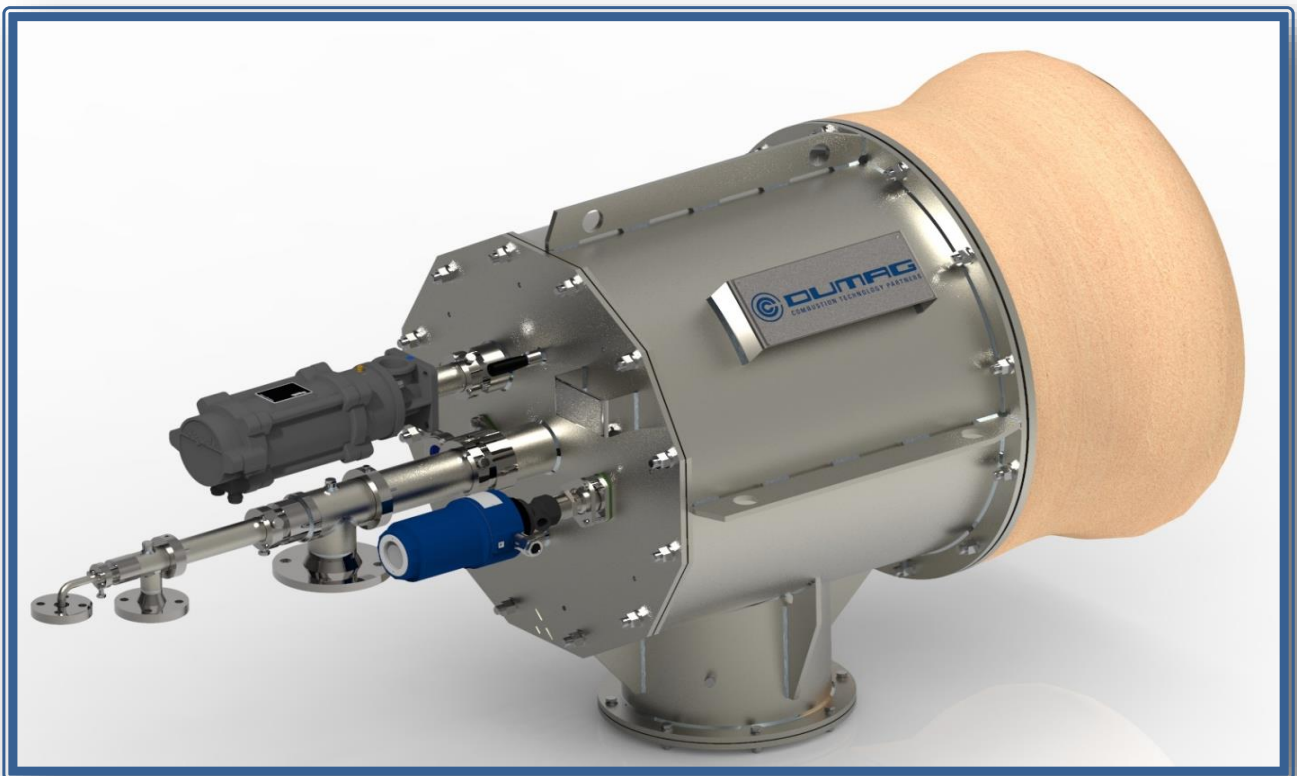


DUMAG® Industrial Burner IB-rksc

Burner with variable swirl

Multi-fuel burner for fuel gas, fuel oil, waste gas, waste oil

For rotary kiln and secondary combustion chamber



**General
Assembly
Description
Standards
Certificates
Material
Dimensions**

1. General

The DUMAG® Industrial Burner IB-rksc is a swirl burner with an easy to operate adjusting device. The combustion air is supplied via a round connection, conventional control dampers can be used. Alternatively, the square DUMAG® combustion air dampers LKK can be used.

For high control ranges, tightly closing dampers can be used. The preferred application is as a burner in the rotary kiln and in the secondary combustion chamber due to its simple design. However, it is also used in thermal oxidizers in the pharmaceutical or chemical industry, etc.

2. Assembly

The heart of the DUMAG® Industrial Burner IB-rksc is the proven design of the swirler [5]. With this device the combustion air is optimally burnt with the fuel and stabilizes the flame.

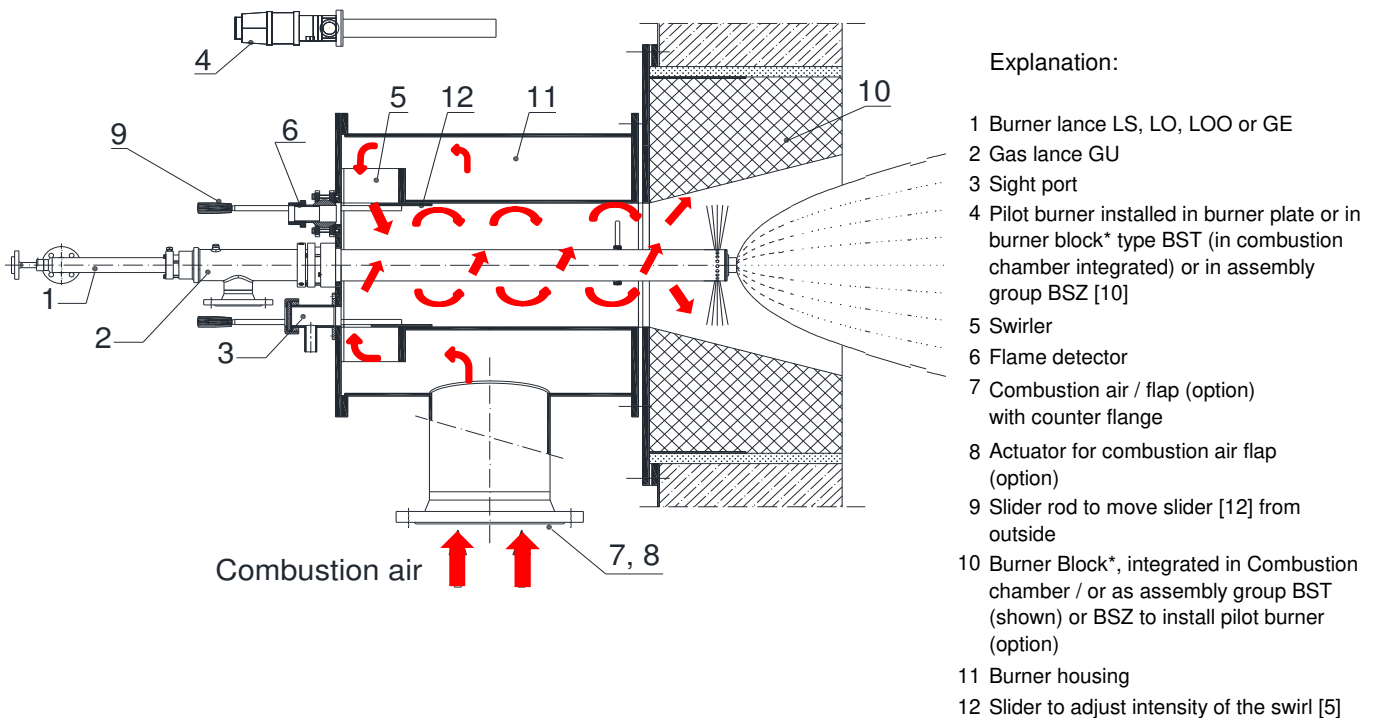
The swirl of the burner can be adjusted within a wide range with the DUMAG swirler [5]. The swirl is thus adapted to the requirements of the combustion.

This allows the burner for the rotary kiln to be set to a long flame and in the secondary combustion chamber to a short flame.

Exchangeable swirlers are available for clockwise or counterclockwise rotation. In many cases the swirl direction is predetermined. This swirl direction must be determined in the order phase.

Sight glass [3], pilot burner [4], flame monitor [6], and the rods [9] of the slider for air distribution are fitted as standard on the burner front plate.

Depending on the burner application, lances for liquid or gaseous media [1, 2] are inserted in the burner plate.



*) Burner block BST and BSZ see corresponding data sheet:

Datenblatt 45010: Brennerstein BST-t für breite Tulpenflamme (Brenner für Nachbrennkammer)

Datenblatt 45089: Brennerstein BST-j für schlanke Jetflamme (Brenner für Drehrohrofen)

3. Description

The DUMAG® Industrial Burner IB-rksc is a multi-fuel burner system for fuel gas, fuel oil, exhaust gas or waste liquid. In order to ensure universal use of the burner, special attention was paid to its functionality.

The swirling of the combustion air takes place via a swirler (5). The swirl factor of the swirled combustion air is adjusted by means of the slide (12).

Adjustment of the swirl by the two slide rods (9) from outside the burner during commissioning.

"The direction of the rotation of the swirl is determined by the exchangeable swirler (5)."

Inserted gas lance or burner lance for liquids (1.2):

Liquid or gaseous fuels/waste materials are injected via burner lances for one or two liquids, heating or waste gases via gas lances GU or via gas lances GE (either centrally or arranged around the centre).

Accessories:

To burn waste air, off-gases or low-calorific gases, the DUMAG® gas ring distributor RVT and the DUMAG® precombustion chamber VBK with integrated gas lances are available

Combustion air:

The special feature of this burner is the possibility of using tightly closing combustion air dampers (7) with a high control range.

Combustion air temperatures up to 200°C. In the case of control dampers provided by the client, care must be taken to ensure temperature resistance.

Sealing of the openings into the burner

The burner lances for gaseous or liquid media are sealed with stuffing boxes. The lead-throughs for the slide rod are sealed by O-rings.

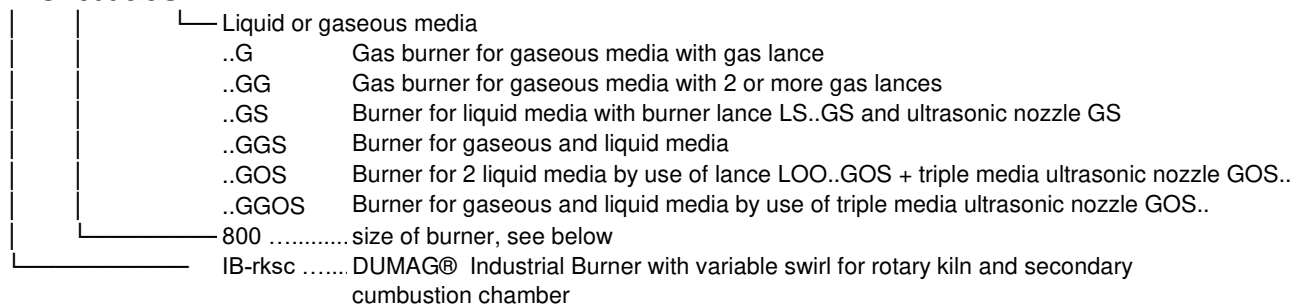
Although the same burner types DUMAG® IB-rksc are intended for use in the rotary kiln and in the secondary combustion chamber, each of these burners is equipped with different characteristics.

These are:

- Swirler with different angles of setting of the swirl flaps for predetermining the swirl intensity
- with the swirl slider additional increase or reduction of the swirl is possible
- Swirl in clockwise or anti-clockwise direction (must be specified in the order phase)
- Burner lance for liquids for jet or tulip flame (nozzle GS..J or GS..T)
- Burner block for long jet flames type BST- jet or for short flames BST-t
- Temperature monitoring above 850°C instead of monitoring with flame monitor

Example. to designate a burner

IB-sw800GGS

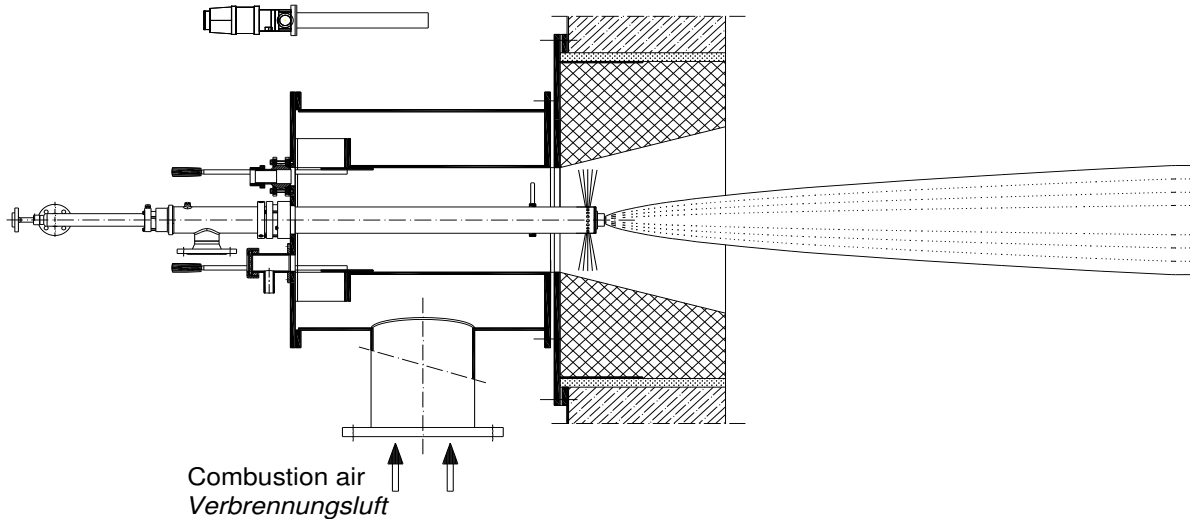


3.1 Inserting the Burner IB-rksc in the rotary kiln (RK):

Required version of the DUMAG® Burner IB-rksc for operation in the rotary kiln RK:
The burners are preferably set to burn the waste media with a long flame:

Typical design

- Swirl flaps with a small angle of inclination to the radial jet
- Swirl slide wide open
- Burner lance with nozzle for slim jet shape, for large solid impurities nozzle in C-design
- Burner stone for long jet flames, type BST- jet
- Temperature monitoring above 850°C instead of flame monitoring with flame detector
- Up to a brick lining temperature of 750°C the pilot burner must be in continuous operation.



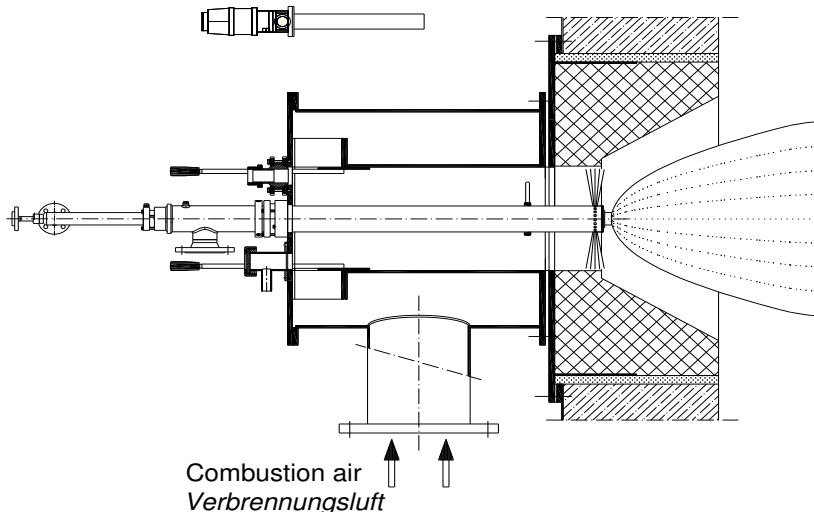
3.2 Inserting the Burner IB-rksc in the secondary combustion chamber SCC of the rotary kiln:

Required version of the DUMAG® Burner IB-rksc for operation in the secondary combustion chamber SCC of the rotary kiln:

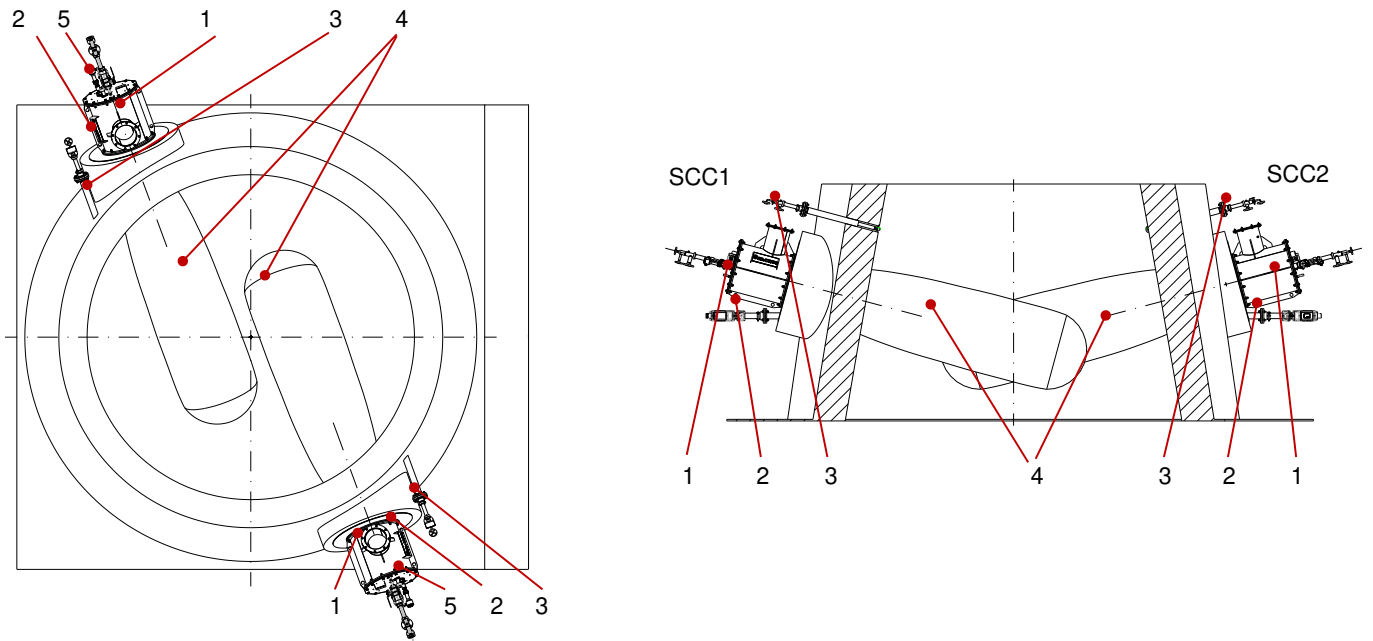
The burners are preferably set to burn the waste media with a short flame:

Typical design

- Swirl flaps with large angle of inclination to the radial jet
- Swirl slide retracted
- Burner lance with nozzle for wide tulip shape
- Burner block for short tulip flames, type BST-t
- Temperature monitoring above 850°C instead of flame monitoring with flame detector



Example of an arrangement of the burners IB-rksc in the secondary combustion chamber SCC

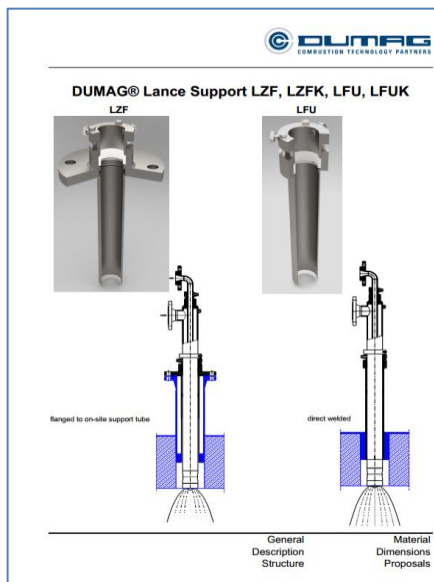


- 1 DUMAG® burner IB-rksc with the necessary burner lances for liquids and gases
- 2 Pilot burners. Either located in the burner. If there is a lack of space, it is placed in the burner brick.
- 3 Additional lances for gas or liquid. When introducing media without calorific value, a lance holder LZF or LFU is sufficient. For gas lances: Lance holder version LZH with cooling air. For media with calorific value the Lance Burner LZB is used. Burner start at >750°C, monitoring via brick lining temperature
- 4 Burner flame. Flame length is calculated by DUMAG. Distance between the two burners is designed by DUMAG.
- 5 Flame detector: Must always be mounted on the outer edge of the burner arrangement. Reason: The flame detector must not detect the opposite flame. See also EN746-2

DUMAG products for lance fixing to the combustion chamber:

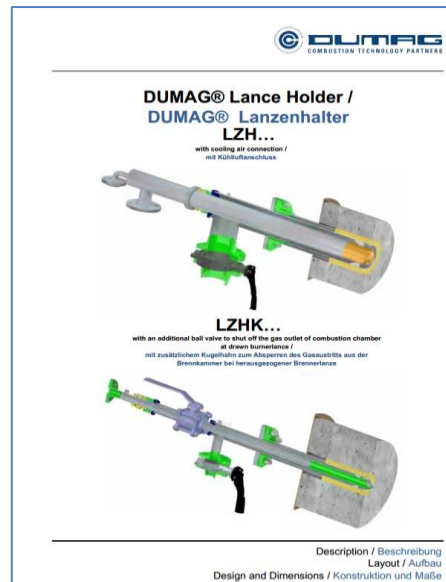
Data sheet 45032.

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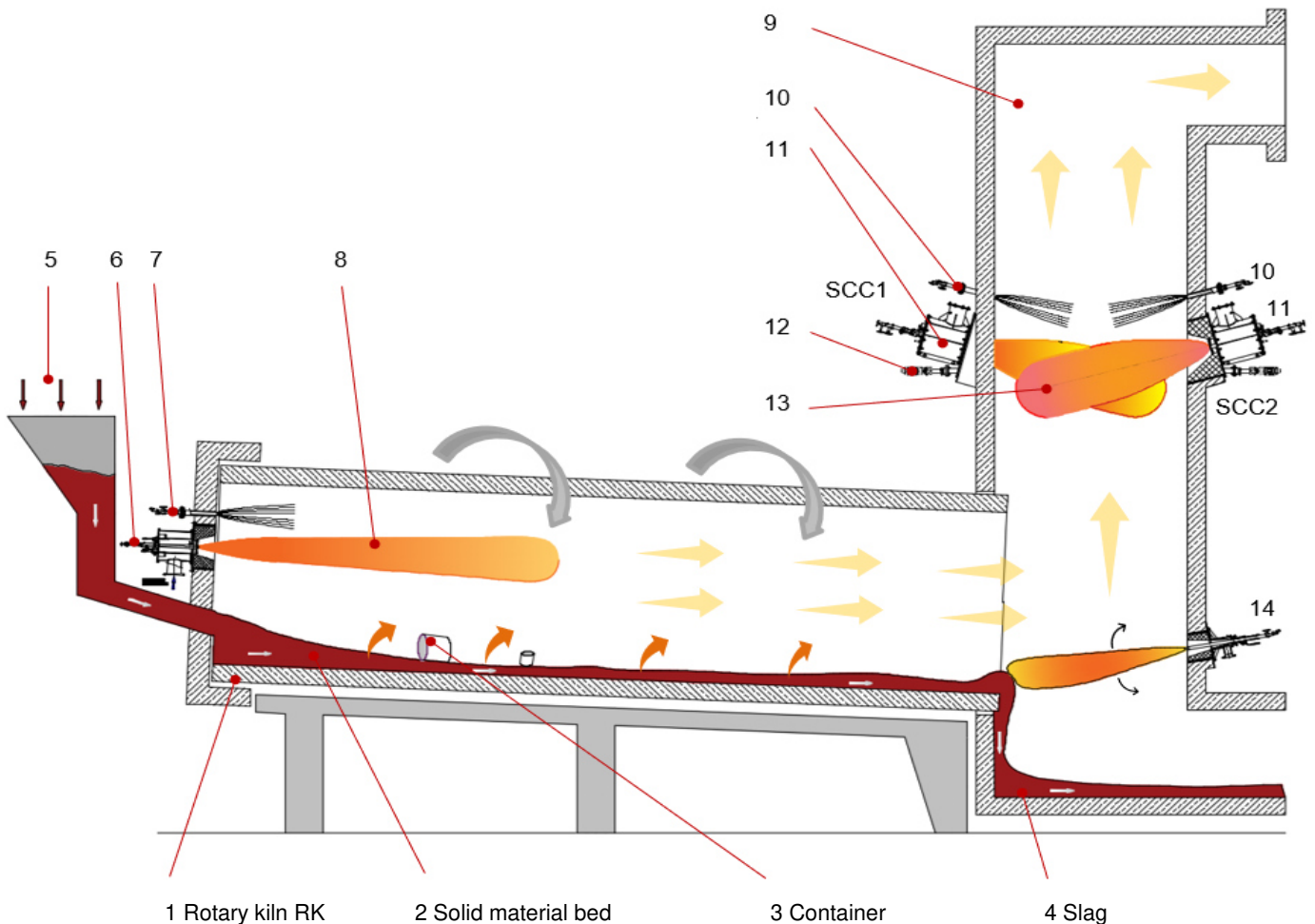


Data sheet 45008

File name: 45008_Lance holder LZH_LZHK_en_de



Example burner arrangement IB-rksc in the rotary kiln and in the secondary combustion chamber:



- 5 Feeding of solids and containers
- 6 Rotary kiln - Burner IB-rksc for gaseous or liquid fuels and gaseous or liquid hazardous waste. In this case the pilot burner is installed directly in the burner. For burner equipment see chapter 3.1
- 7 Burner lances for low calorific (or no calorific) gaseous or liquid waste materials mounted in the LZH lance holder with cooling air for the lance. Higher calorific waste materials are injected via the DUMAG® Lance Burner LZB. The necessary combustion air is supplied via this burner.
- 8 Flame of the DUMAG® burner IB-rksc, equipped with the requirements for the burner for the rotary kiln, see chapter 3.1. Essential is the long flame, which is achieved with the appropriate burner block and the DUMAG® ultrasonic nozzle GS..J.
- 9 Secondary combustion chamber SCC
- 10 Burner lances for low calorific (or no calorific) gaseous or liquid waste materials mounted in the LZH lance holder with cooling air for the lance. Higher calorific waste materials are injected via the DUMAG® Lance Burner LZB. The necessary combustion air is supplied via this burner.
- 11 Secondary combustion chamber - Burner IB-rksc for gaseous or liquid fuels and gaseous or liquid hazardous waste. In this case the pilot burner is installed directly in the burner block. Equipment of the burner see chapter 3.2
- 12 Pilot burner, installed directly in the burner block. (Alternative: installation in the burner).
- 13 Flame of the DUMAG® Burner IB-rksc, equipped with the requirements for the burner for the secondary combustion chamber SCC, see chapter 3.2. Essential is the short flame, which is achieved with the appropriate burner block and the DUMAG® ultrasonic nozzle GS..T.
- 14 DUMAG® Melt Off Burner ASB for melting solidified slag at the end of the rotary kiln (slag bear). Since this solidified slag occurs only occasionally, the burner lance is retracted into the burner during standstill. The burner lance can be moved due to its arrangement in the ball joint.

4. Applied standards, regulations and rules, depending on the design of the burner

EN 746-1	Industrial thermo processing equipment – Common safety requirements for industrial thermo processing equipment
EN 746-2	Industrial thermo processing equipment – Safety requirements for combustion and fuel handling systems
EN 12952-8	Water-tube boilers and auxiliary installations – Part 8: Requirements for firing systems for liquid and gaseous fuels for the boiler
EN 12952-16	Water tube boilers and auxiliary installations – Part 16: Requirements for grate and fluidized bed firing systems for solid fuels for the boiler
EN 50156-1	Electrical equipment for furnaces and ancillary equipment. (VDE 0116)
TRG	Technical Rules for Pressurized Gases
TRbF	Technical Rules for flammable liquids
2014/68/EU	Pressure Equipment Directive
2006/42/EC	Machinery directive
API 535	Standard for burners for fired heaters in General Refinery Services
API 560	Standard for design and manufacture of fired heaters
API 660	Shell and Tube Heat exchangers for General Refinery Services.
ASME VIII/Div.1	American Boiler and Pressure Vessel Code. Regulation for Design and Construction
API RP 582	Recommended Practice and Supplementary Welding Guidelines for the Chemical, Oil, and Gas Industries
ASME B31.2 (NFPAZ223.1)	Regulation of Fuel Gas Piping
ASME B31.3	Regulation of Process Piping
ASME IX	Welding Qualifications
ASTM	Material Specifications
EAC	Euroasian Conformity

5. Certificates

certified according to ISO9001, EAC (Euroasian Conformity)
 Produced according to European and American standards, regulations and quality certificates

6. Materials

- Burner housing: standard 1.4571 or 1.4404 (AISI316L/AISI316Ti), on request P265GH or other materials.
 Turned parts of stainless steel, at least the same quality as the burner.
 - Burner lance: standard 1.4571 or 1.4404 (AISI316L/AISI316Ti), upon request Hastelloy or others.
 - Nozzle: standard 1.4841 (AISI314 or AISI310), on request 1.4571 or 1.4404 (AISI316L/AISI316Ti), Hastelloy
- Components exposed to the radiation of the combustion chamber may also be made of 1.4841 (AISI314 oder AISI310).

Further DUMAG products for use in rotary kilns

Data sheet 45030, file name:
 45030_Data sheet Lance Burner LZB_en

Data sheet 435470, file name:
 43547 Melt Off Burner ASB_en

Data sheet 45072, file name:
 45072_Datenblatt_DSL_de

