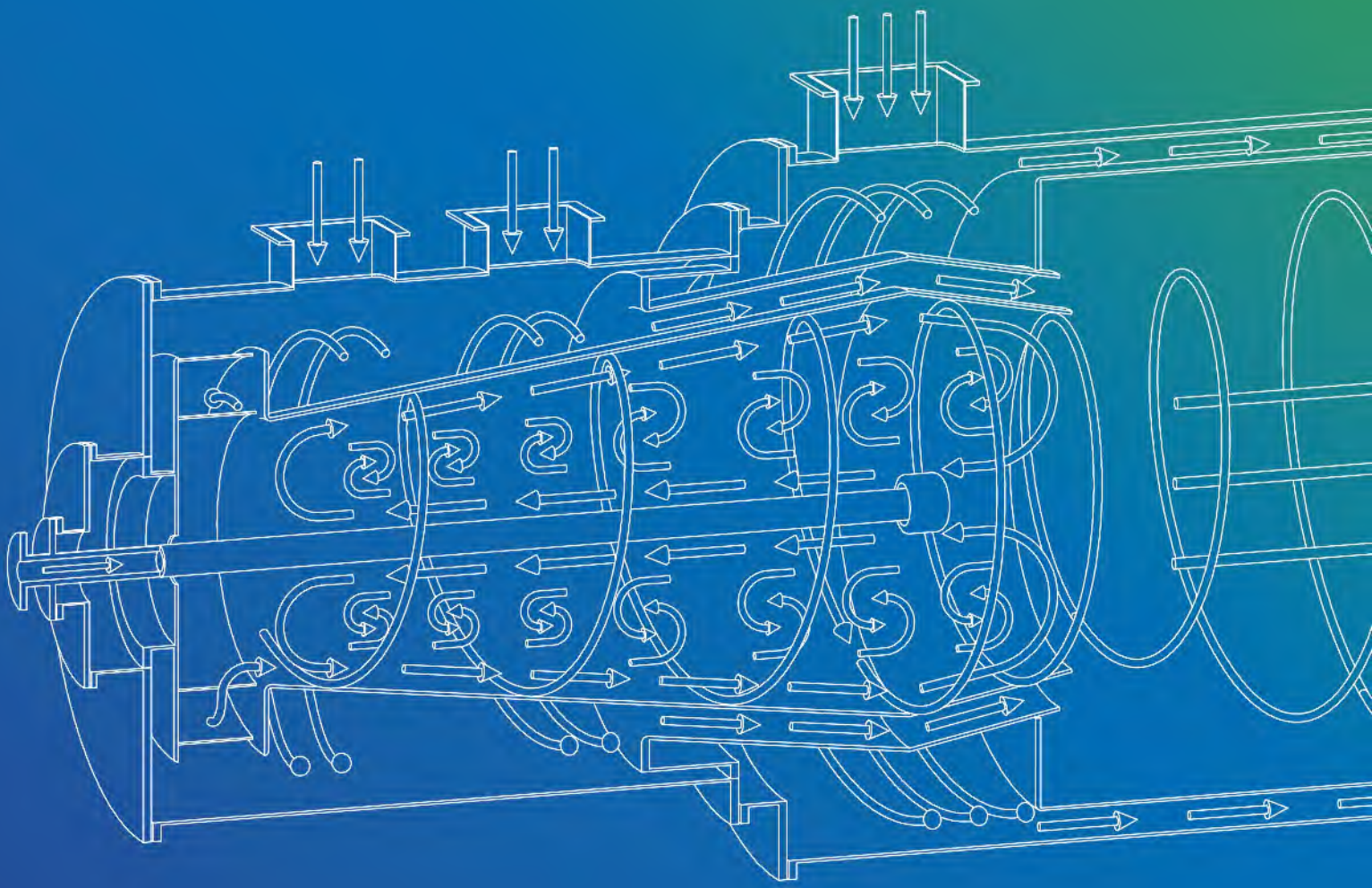
CARBOTECHNIK
Energiesysteme GmbH

HOT GAS GENERATOR

With impulse burner without a firebrick lining for dust, gaseous and liquid fuels



Areas of application

For the drying and firing processes of all kinds such as:

- Sand, lime and cement industry
- slag drying
- grinding dryings
- animal feed production
- calcination
- gasification
- inert gas

Advantages at a glance

- Free choice of fuel (atomized, gaseous, liquid) - also in combination
- Instant power demand and rapid load changes
- Compact design
- Position (horizontal/vertical) selectable
- Low-maintenance and high system availability
- Use of process air/return air for lower fuel costs and emissions
- Thermal disposal of climate-damaging waste gases
- Ensured shortfall of all emission limits

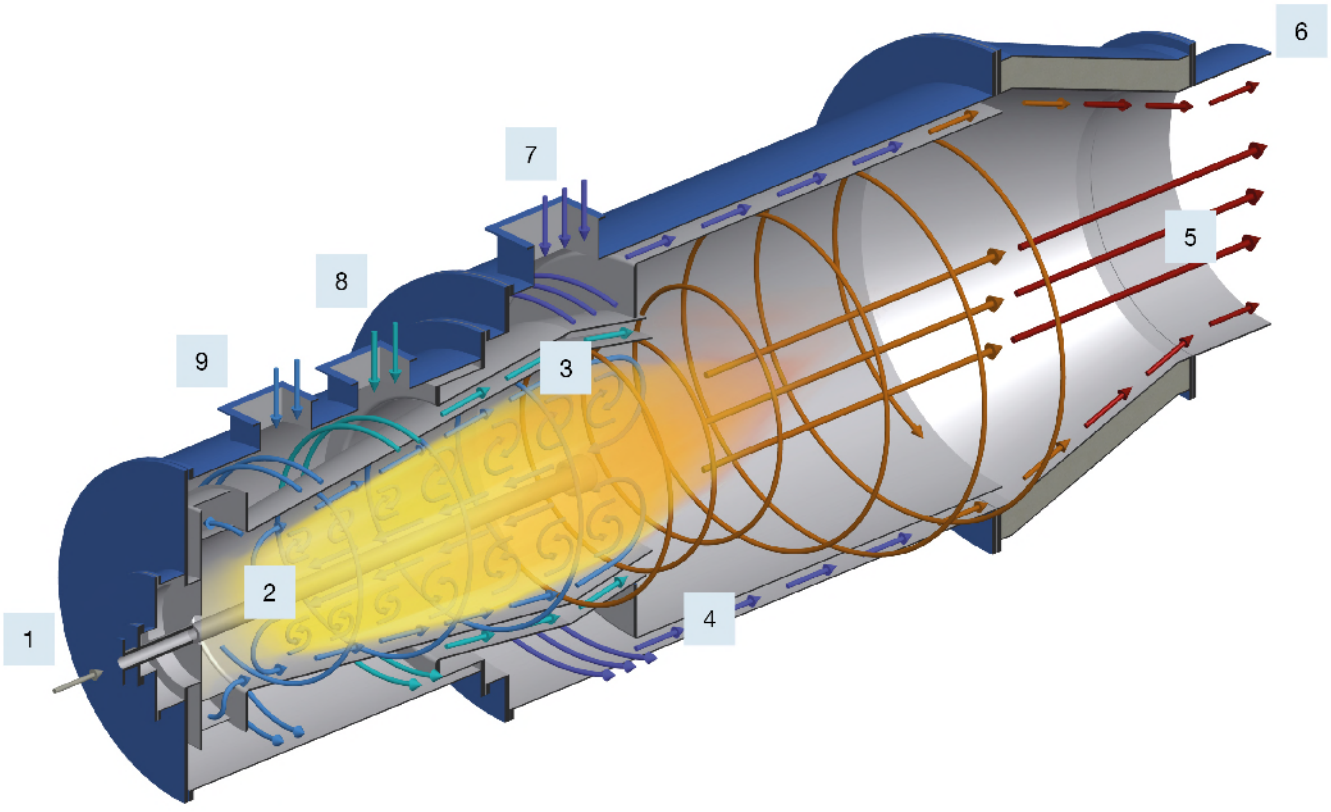
Design

- patented pulse heaters, and feeding and conveying system
- High efficiency due to very good mixing of air and fuel
- Construction without firebrick lining
- Operating without a supporting flame
- Combustion plant with silo, fuel dosage and conveying as a complete turnkey solution.
- Self-contained PLC control with data interface for BUS connection in an existing process control system

Functional description

The combustion air flows through a radial blade cascade helically towards the exit. Here, the combustion air returns about one half of the flow radially inwardly back to the inlet. The backflow juts to the faceplate outwards and flows with the fresh air further to the exit. By backflow an intense tubular turbulence forms, in which the fuel is introduced. The central backflow constantly brings hot flame gas to the fuel inlet and ensures constant post ignition. The flame is separated by a very stable cold air layer of the conical wall, whereby the outer wall remains cool. The combustion chamber is additionally cooled from the outside by the cool air blower. The system requires no firebrick lining.
The impulse burner used, because of its structure and its flow pattern, ensures reliable combustion and high burnout already in the combustion chamber.

The downstream mixing chamber serves to increase the retention time and for setting the discharge temperature. The mixed air is fed via an annular gap to cool the mixing chamber and is first fed to the hot gas at the end. In combination with the burner and the design of the mixing chamber compliance with the Clean Air Act is ensured without secondary measures.



1 Fuel entry
2 Burner
3 Flow pattern
4 Mixing chamber
5 Hot gas
6 Feed for connection to channel, drum etc.
7 Mixed air
8 Cool air
9 Combustion air

Selection of possible fuels

- Lignite dust
- coal dust
- petroleum coke
- renewable fuels
- biogenic dusts
- gases
- oils

Technical details

The machines are designed and dimensioned according to the customer's requirements, so the following basic data is only intended as a guide.

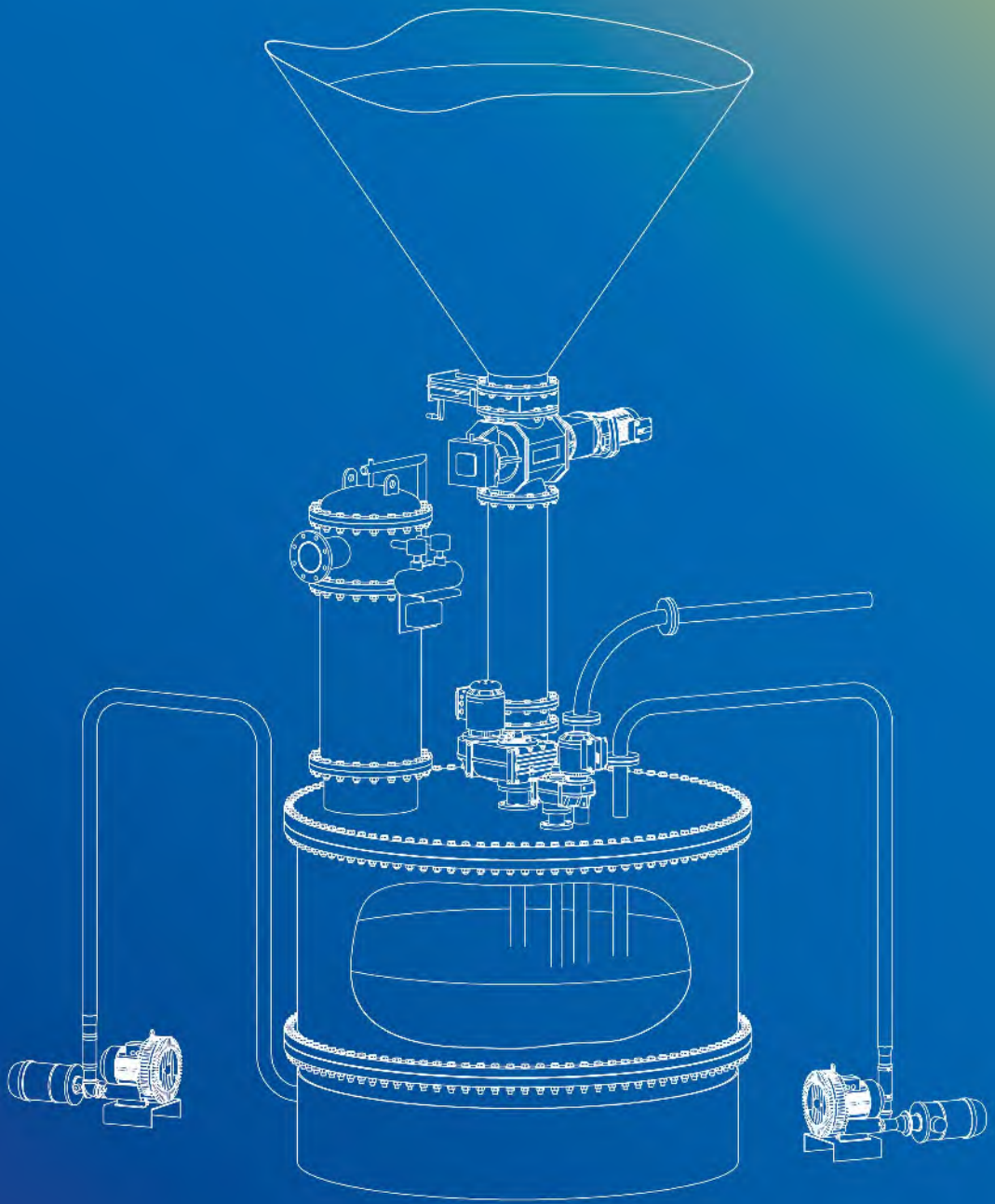
Full load from a cold start:	approx. 1-2 min.
Hot gas temperature:	fuel and process-dependent
Performance range:	0.1 MW ≤ 50 MW
Control range:	1 : 3 ... 1 : 20
Under or over pressure:	-20 Mbar ≤ 1000 mbar Experiences up to 6 bar backpressure

CARBOTECHNIK

CARBOTECHNIK
Energiesysteme GmbH

DOSAGE AND CONVEYOR SYSTEM

Infinitely variable, continuous and highly accurate dosing to convey dusty materials



Areas of application

- Fuel dosage for rotary furnaces (e.g. in the cement industry)
- Defined fuel entry in lime kilns and furnaces such as hot gas generators or boilers
- Material dosage and transportation during processes

Applicability

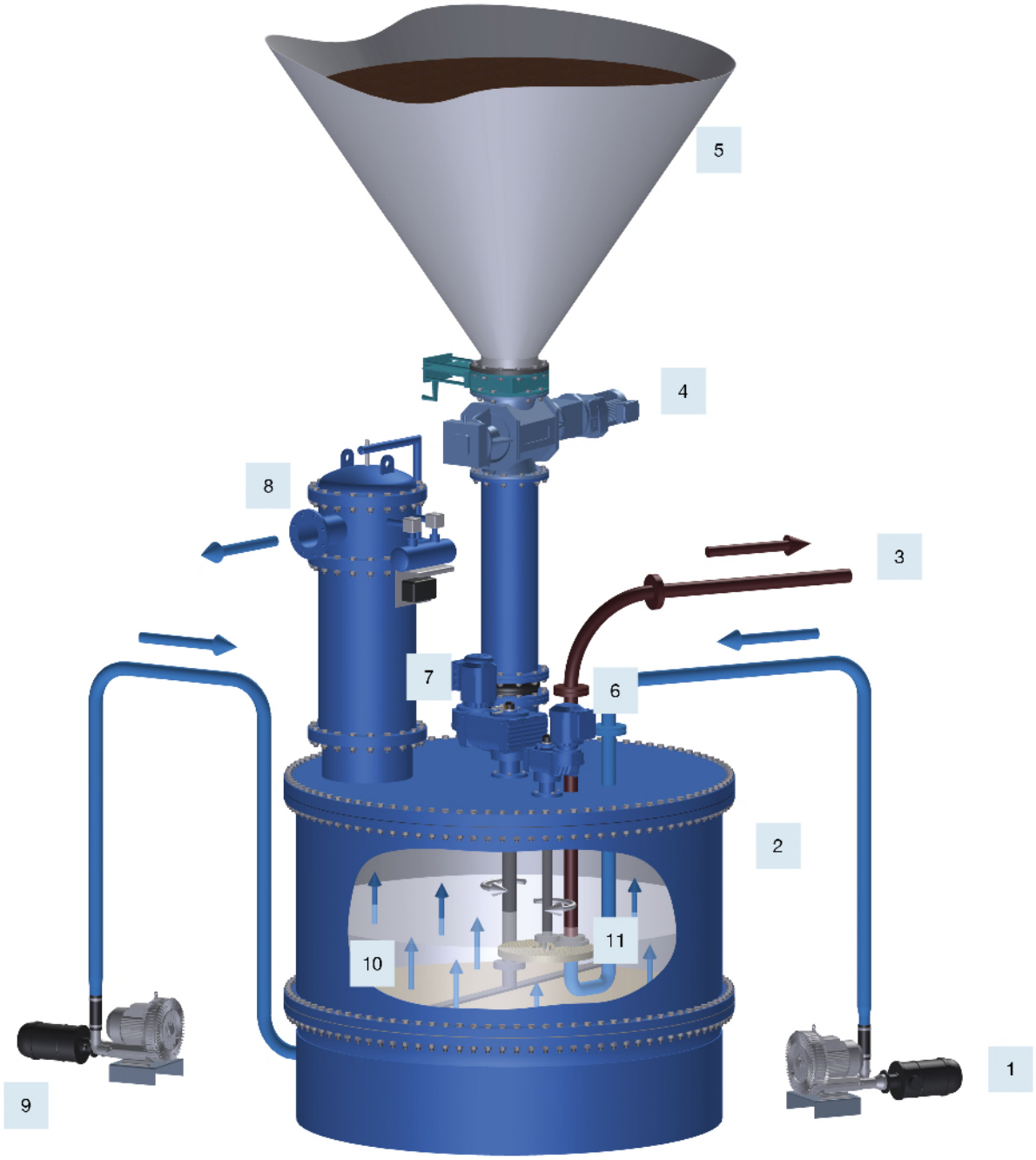
Dosage and conveying of dusty materials such as:

- coal dust
- petroleum coke
- lime
- fine lime
- hydrated lime
- kaolin
- wood dust
- Plastic dust
- biomass dust

Advantages at a glance

- highly accurate dosage and wide range of dosage
- uniform and pulsation-free transportation
- reliable and low-maintenance operation
- Flexible quantity and capacity of the built-in dosage unit in a dosage machine
- Self-contained PLC control with a data interface for BUS connection in an existing process control system.

Overview



1 Conveying air blower
2 Dosage container
3 Product discharge
4 Rotary valve with manual slide
5 Storage silo
6 Dosage disk drive
7 Stirrer drive
8 Top filter
9 Fluidiser air blower
10 Fluidised bulk material
11 Dosage disk

Functional description

The material to be dosed is entered by means of rotary valve from an upstream silo. In the dosage machine the material is transformed into a fluidized, i.e. liquid-like state by an air blower.

For dosing, a horizontally arranged perforated disc is located in the material as a dosing unit. This is driven by a speed-regulated motor. The fluidised material flows evenly into the cavities of the perforated disc and is discharged via a conveying line out of the perforated disc via a carrier air stream. The dosage is always directly proportional to the engine speed.

Technical details

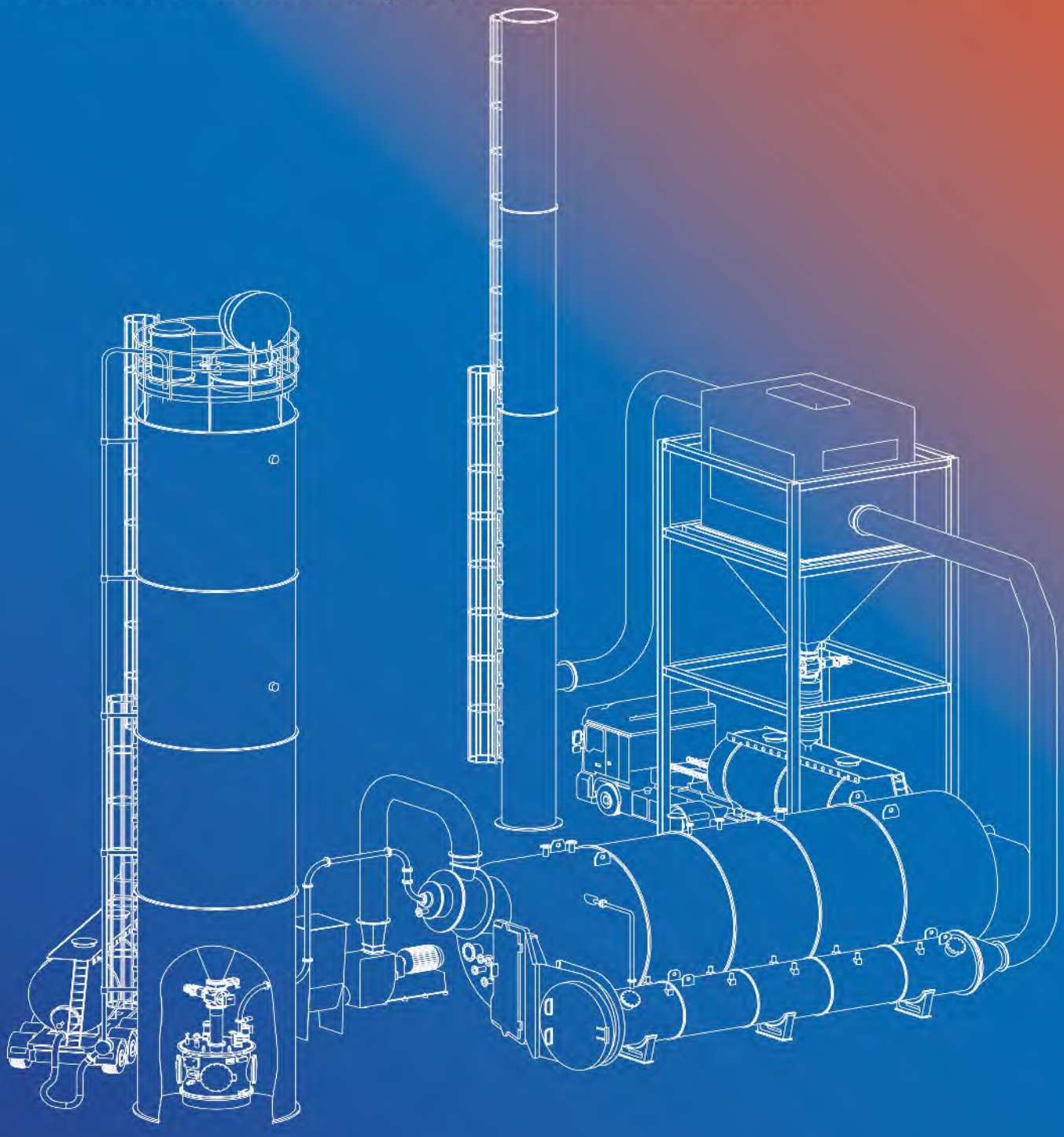
The machines are designed and dimensioned according to the customer's requirements, so the following basic data is only intended as a guide.

Dosage and conveying medium:	Powdered fluidisable fuels and bulk materials
Equipment:	In accordance with ATEX directives
Construction type:	Pressure shock resistant
Quantity of dosage points:	1 to 26
Flow rate:	up to 20,000 kg/h

CARBOTECHNIK
Energiesysteme GmbH

DUST FIRED STEAM AND HOT WATER BOILER SYSTEMS

The most economical way to get hot water and steam



Areas of application

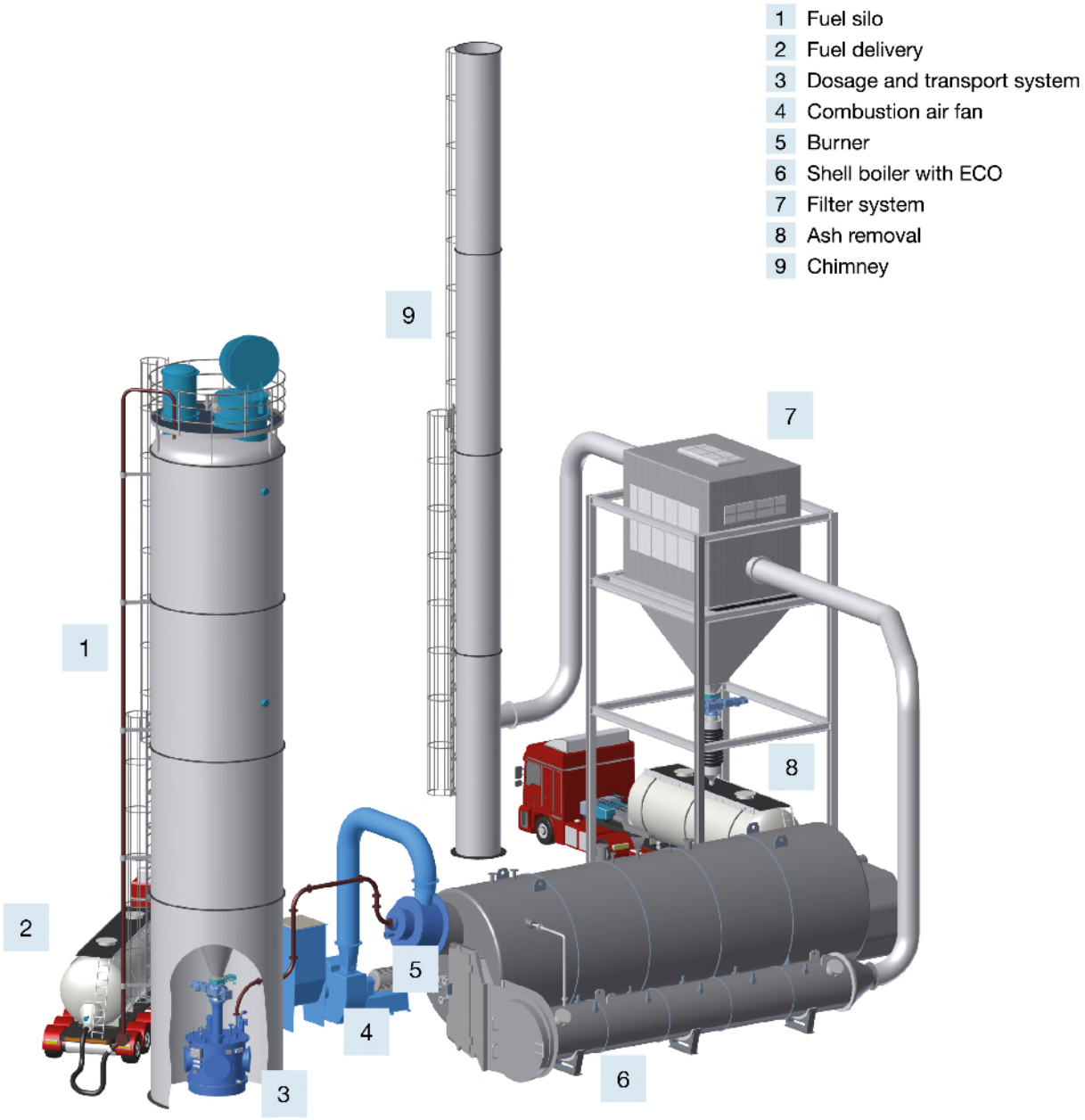
- Production of hot water, steam and electricity
- Thermal utilisation of waste gases

Advantages at a glance

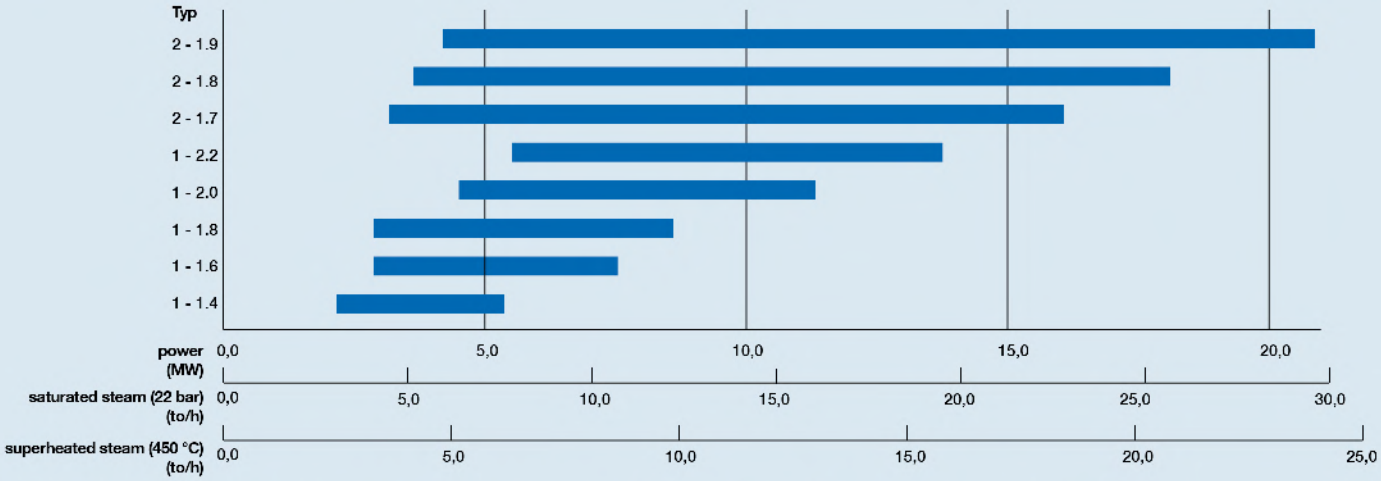
- long-term security of low fuel costs
- Boiler efficiency ≥ 93%
- Low-maintenance and high system availability
- Economical operation without constant supervision (BOB according to TRD 604)
- Clean and dust-free operation
- Environmentally sound standard fuel (lignite dust) in accordance with the "Technical Manual for Clean Air" (TA - Luft)
- Thermal disposal of harmful waste gases
- Turnkey deployment
- Optional contracting model for cheap energy without high investment costs

Functional description

After delivery by silo truck or railway wagon, the fuel is discharged into the silo via a closed pipeline system. The discharge of the fuel is carried out by a rotary valve in the dosage machine. The dosage and transport to the burners takes place absolutely evenly and without pulsation. The burner produces a flame jet of up to 100 m/s whereby the ash is blown out and the combustion chamber stays clean. The emission limits will certainly not be reached through the optimum combustion. The ash extracted from the flue gas can be collected again in the course of a fuel delivery.



Performance details



Within the specified performance limits, the exhaust emission limits are fulfilled with lignite dust.

Technical details

The systems are designed and dimensioned according to the customer's requirements, so the following basic data is only intended as a guide.

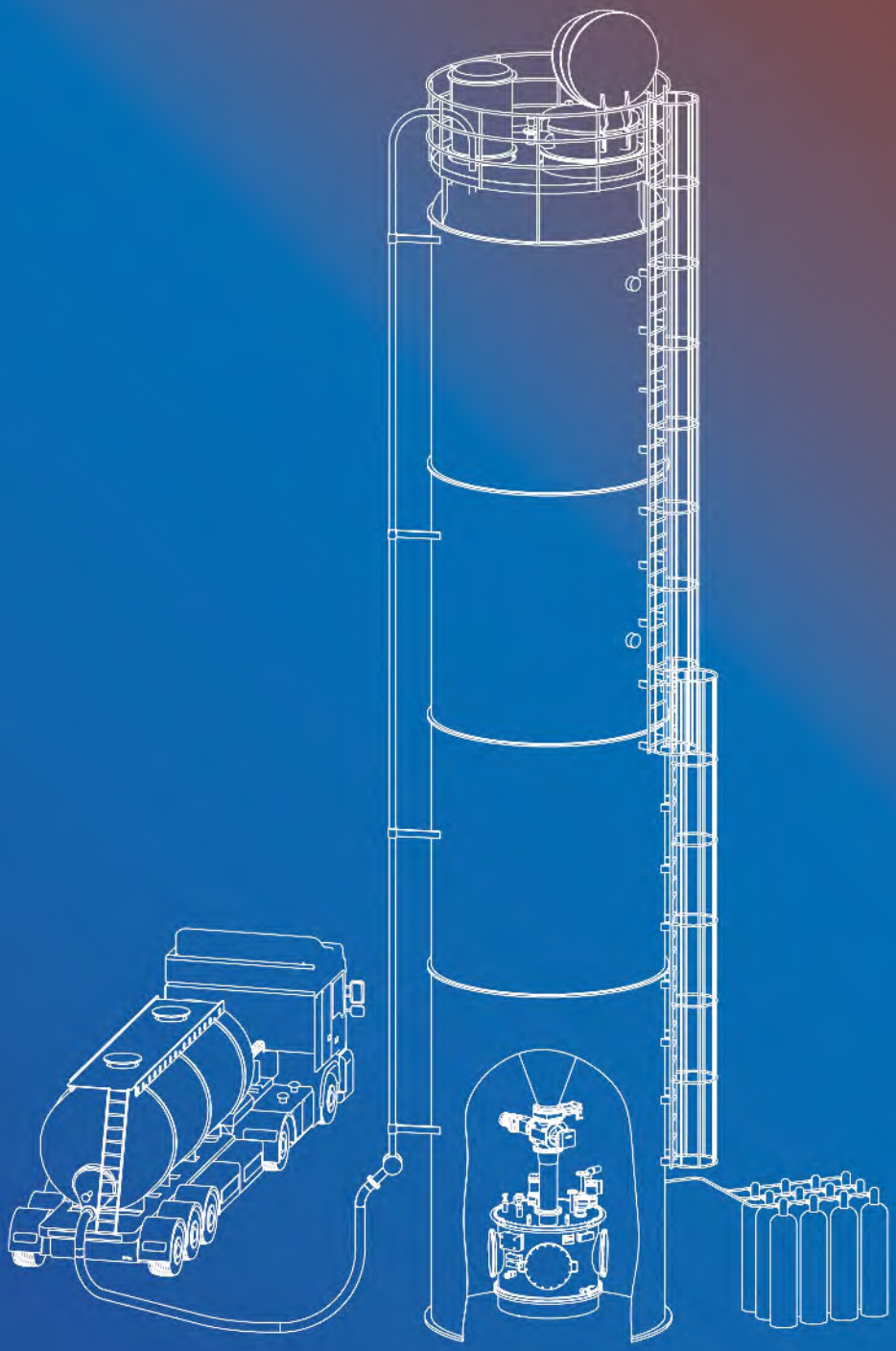
Designation data	Unit	Type 1 - 1.4	Type 1 - 1.6	Type 1 - 1.8	Type 1 - 2.0	Type 1 - 2.2	Type 2 - 1.7	Type 2 - 1.8	Type 2 - 1.9
Boiler performance	MW	5.32	7.04	9.0	11.20	13.64	15.96	18.00	20.71
Coal dust *1	kg/h	928	1,228	1,570	1,954	2,380	2,788	3,141	3,614
Air to the burner	m_n^3/h	6,316	8,219	10,682	13,178	16,245	20,076	22,614	26,023
Exhaust gas quantity	m_n^3/h	7,741	10,243	13,096	16,298	19,852	23,255	26,190	30,145
Ash amount	kg/h	35	45	55	68	84	98	110	127
electric power consumption (approx. value) partially not constantly running	kW	approx. 90	approx. 110	approx. 140	approx. 180	approx. 210	approx. 240	approx. 270	approx. 320
Largest single consumer (burner fan)	kW	30	40	55	65	80	2 x 48	2 x 55	2 x 65
BKS - silo (content)	m^3	120	180	220	280	280	2 x 180	2 x 220	2 x 280
BKS - Silo (Maximum limit at full capacity)	Hrs.	72	81	77	79	65	71	77	85
Length overall	mm	10,100	11,400	12,500	13,600	14,600	12,900	13,700	14,700
Length boiler drum	mm	7,400	8,300	9,100	9,800	10,600	9,100	9,500	10,200
Height (without fittings)	mm	4,100	4,400	4,700	5,000	5,250	4,600	4,900	5,200
Ø boiler drum (without insulation)	mm	3,000	3,300	3,600	3,900	4,200	3,900	4,100	4,300
Ø ECO	mm	1,000	1,100	1,200	1,300	1,400	2 x 1,200	2 x 1,300	2 x 1,400

* 1: Assumed calorific value: 20.6 MJ/kg

CARBOTECHNIK
Energiesysteme GmbH

SILO FACILITY

Storage silos for potentially explosive
bulk material according to ATEX directives



Areas of application

- Storage of hazardous bulk materials such as lignite dust
- Product promotion with Carbotechnik dosage and conveying system

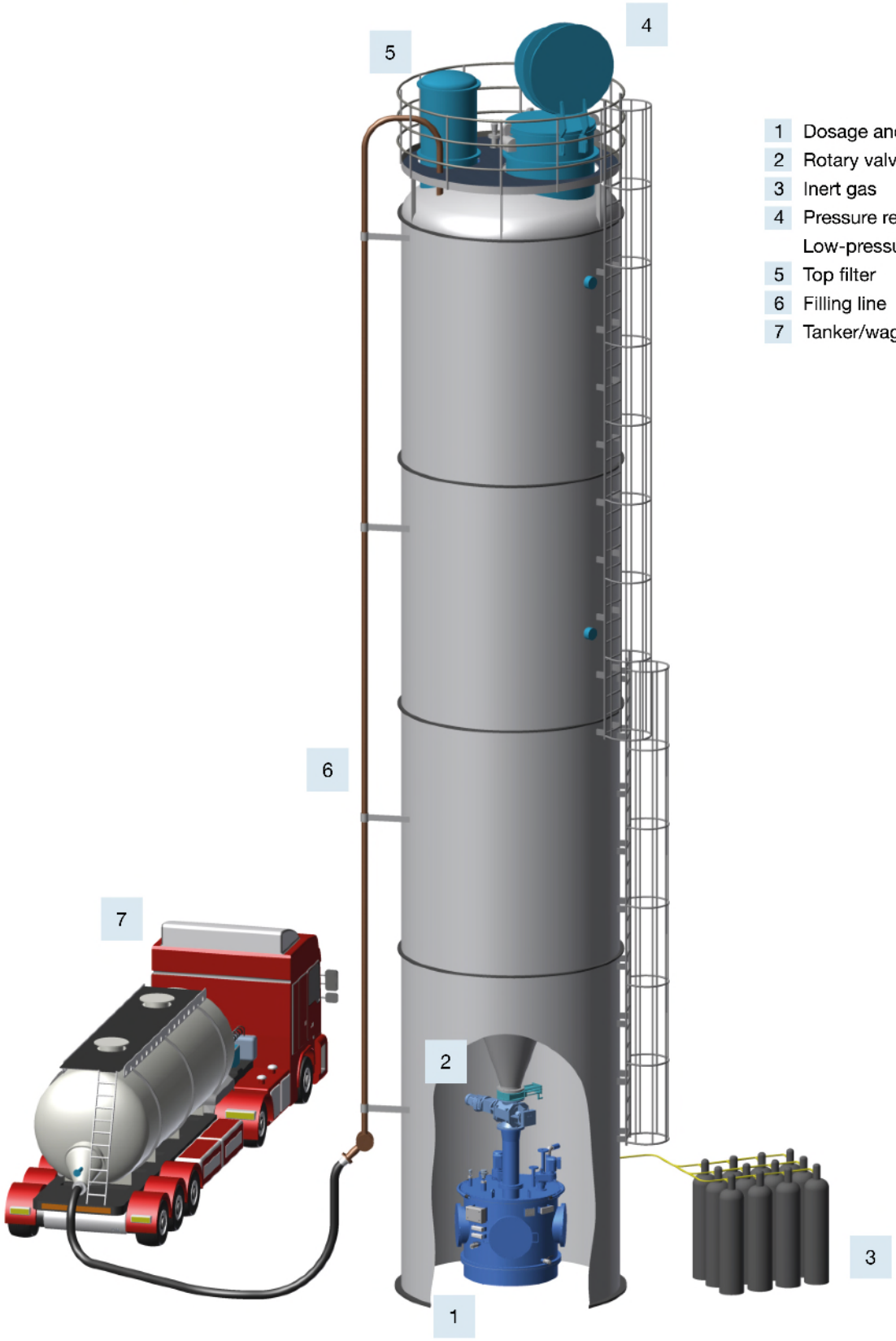
Advantages at a glance

- Individual planning
- Turnkey delivery and supervised commissioning
- Planning reliability through professional project management

Design

- Compliance with all the ATEX directives
- Pressure shock resistant design
- Safety equipment depending on the storage material
- variable construction of silos according to site requirements
- Individual silo sizes possible, (standard size 120 m^3)
- Measurement of the contents of the silo on fill level or weight
- Autonomous PLC with data interface for BUS connection in an existing process control system.

Silo overview



1 Dosage and conveying system
2 Rotary valve
3 Inert gas
4 Pressure relief flap
Low-pressure safeguard
5 Top filter
6 Filling line
7 Tanker/wagon

Functional description

The bulk material is pneumatically blown into the silo by the silo vehicle (road or rail transport). During the filling, the extraction from the silo is not impaired. The silo outlet is geometrically optimally designed and equipped with compressed air nozzles to also discharge poorly flowing materials easily.

Using a rotary valve, the material is withdrawn and can be conveyed pneumatically through the dosage and conveying system to the desired part of the plant. We recommend the dosage and conveying systems of Carbotechnik.

Maintenance and check

- Carbotechnik service by trained and certified personnel for the whole silo facility
- Implementation of the mandatory regular silo check

Technical details

Carbotechnik silo facilities are designed and dimensioned according to the customer's requirements, so the following basic data is only intended as a guide.

Equipment:	In accordance with ATEX directives
Construction type:	Pressure shock resistant
Suitable goods:	Bulk materials, in particular potentially explosive materials
Loading station:	Truck or railcar
Extraction:	Rotary valve
Products conveyed:	Carbotechnik dosage and conveying system

CARBOTECHNIK

The company

Burner and dosage systems for powdery fuels/goods of CARBOTECHNIK are characteristic of mature and proven applications.

CARBOTECHNIK uses the high-grade development of a patented technology comprised of fuel preparation, fuel transport and combustion in co-ordinated proportions.

Our team develops the specially tailored approach for our customers. Manufactures, delivers and erects the plant.
Competent engineering services under strict compliance with our quality assurance system; optimal work preparation and modern manufacturing methods guarantee highest quality technical products.

© Stand August 2016
Amendments and errors reserved
Design: Katharina Holzer Brand Design

Carbotechnik Energiesysteme GmbH

Lauterbachstraße 12
D-82538 Geretsried-Gelting

Phone +49 8171 92 82 - 0
Fax +49 8171 92 82 - 79
Website www.carbotechnik.de
Email info@carbotechnik.de