

Process technology



# BEKOKAT®: catalytic technology for hydrocarbon-free compressed air

For installations where absolute air-cleanliness is a must.





“The residual oil-content was a great unknown for us – until we changed over to catalysis technology. The BEKOKAT® offers the surety of constantly oil-free air at all times.”

## Advance through performance: trend-setting catalysis technology for process and product safety

Process air cleanliness creates different requirements depending upon the application: the more sensitive the application, the more demanding the requirements for air quality – especially where air comes into direct contact with products. Contamination from hydrocarbon-residues or airborne organic agents can strongly impair process safety and compromise the quality of end-products. This is exactly the point where air-cleanliness becomes a critical control point for business success – and this is also exactly

the point where air cleanliness becomes a technical challenge. The BEKOKAT® boosts performance to a level that is barely achievable with other compressed-air processing systems. Product quality and process safety, profitability and environmental compatibility are the results of this trend-setting catalysis technology: hydrocarbons are fully converted in carbon dioxide and water through total oxidation. Thus absolute compressed air cleanliness is assured.



# BEKOKAT® - compressed air processing to the highest level

During the compression of air, cleanliness of the air becomes a critical factor since compressed air always absorbs a certain amount of hydrocarbons from the intake air, from compressor oil, and from lubricated line-mounted valves in the compressed-air system. The absence of oil needs to be systematically established in the course of downstream processing since only through constant monitoring

of air quality can the contamination of processes and products be prevented. Here, the BEKOKAT® sets new standards with its trend-setting technology: with a residual oil content down to a barely measurable 0.001mg/m<sup>3</sup> - and an absolute absence of biological contaminants – air cleanliness is taken to a new level.

## + The BEKOKAT® advantages as a glance

Germ-free compressed air

Partial-load operation without restriction from 20 % to 100 %

Environmentally friendly, no hazardous waste, clean, and oil-free condensate

Improvement of the total efficiency by using energy-saving compression methods + BEKOKAT® = direct energy savings

Independent of the ambient temperature, air humidity, and oil inlet concentration

Flexible installation in central processing or at the terminal point

Can also be retrofitted in existing plants without replacing the already available compressors

Easy-to-install set-up

Constant oil-free compressed air, better than ISO8573-1, class 1

Certified reliably oil-free compressed air in spite of oil-lubricated compression or oil-contaminated intake air

Long service life

Absolute safety through continuous process monitoring

Lower total investment costs, compared with oil-free compression = direct cost savings

Ecological. Economical. Effective. For absolutely oil-free compressed air BEKOKAT® offers performance at the highest level.





## Cost-efficient - right from the start

Compromises are often made during the planning of a compressed-air station in order to balance the needs for the best possible and safest processing with an economically justifiable investment cost. Oil-free compression is frequently shown to be disadvantageous in terms of significantly higher investment and maintenance costs, whereas oil-lubricated compression with a low-cost activated carbon solution does not guarantee constant process safety. The BEKOKAT® offers a solution that unites the advantages of both systems: low investment costs through conventional oil-lubricated compression are combined with the highest process safety through the certified absence of oil down to a value of 0.001mg/m<sup>3</sup>. This creates an unsurpassed price-performance ratio. The processing solution with BEKOKAT® offers cost-efficiency right from the start, providing top-quality compressed air – without compromises.

In conventional positive displacement compressors, such as piston or screw compressors, gaps are sealed and return flows are prevented with lubricants in the compression chamber. The result is compression that is more energy-efficient. In most cases, the combination of a BEKOKAT® with an energy-efficient and conventionally oil-lubricated screw compressor offers increased energy-efficiency when compared with an oil-free screw-compressor: this is due to the superior overall system efficiency. The air-air heat exchanger in the BEKOKAT® maintains average power consumption at a very low level - down to 0.003kWh/m<sup>3</sup>. This ensures the energy-efficient production of best quality compressed air, irrespective of the suction conditions. Therefore with BEKOKAT®, completely reliable process monitoring is available and which offers immediate competitive advantages to your production processes.

Unequaled: the BEKOKAT® combines efficiency and process safety

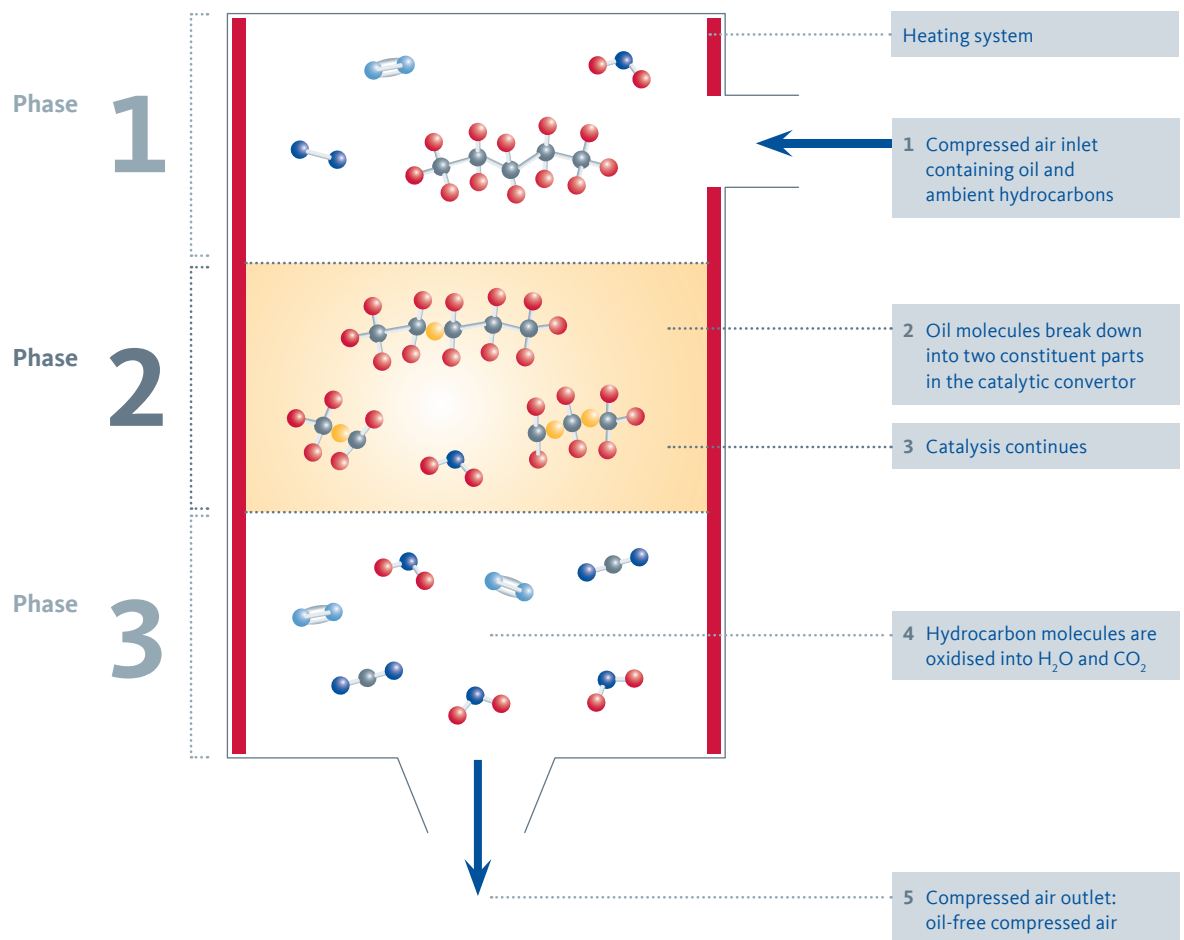




## Constantly oil-free compressed air through catalysis: the operating principle of BEKOKAT®

For compressed air processing with the BEKOKAT® the specially developed granular material is heated in the pressurised reaction chamber to a temperature of 150 degrees C. Any oil and hydrocarbons in the compressed air **(1)** that is flowing through the heated vessel are then fully converted into water and carbon dioxide **(3)** during surface contact inside the pores of the catalytic convertor's granular material **(2)**. Fully conditioned compressed air where hydrocarbon, oil and organic compounds

have been removed leaves the reaction chamber. The condensate that accumulates during the cooling of the compressed air is also free of oily residues and can be introduced into the sewerage system without further processing. As regards the design of the BEKOKAT®, the relevant parts are arranged outside the vessel offering easy access for maintenance. Additionally, the design of the vessel also benefits from the absence of internal fitting which otherwise could have a negative effect on flow conditions.



Oil molecule (carbon and hydrogen)	Catalytic converter	N-nitrogen	O <sub>2</sub> -oxygen	CO <sub>2</sub> -carbon dioxide	H <sub>2</sub> O-water



“We all need to understand that the employment of oil-free compressors is not a guarantor of oil-free compressed air. With the BEKOKAT® from **BEKO TECHNOLOGIES** has given us the optimum solution for supplementary processing.”

## Oil-free compression is a guarantor of oil-free compressed air? Not necessarily.

The main source for oil in compressed air is the compressor: some of the lubricating oil from oil-lubricated machines always enters the compressed air. In order to prevent this, the installation of compressors with oil-free compression is often favoured. But in doing so, compressed air users may be lulling themselves into a false sense of security: the compression method prevents additional lubricating oil from entering the compressed air. However, this is by no means a guarantee that the compressed air is free from oil. Contaminants in the ambient air are the reason for this.

In combustion processes in motor vehicles, in industrial production, and from natural sources such as bogs and forests, hydrocarbons are released. Most of these chemical compounds are classified as non-hazardous, and because of the varying effect potential of the various components, guide values rarely exist. However, measurements have shown that even in rural

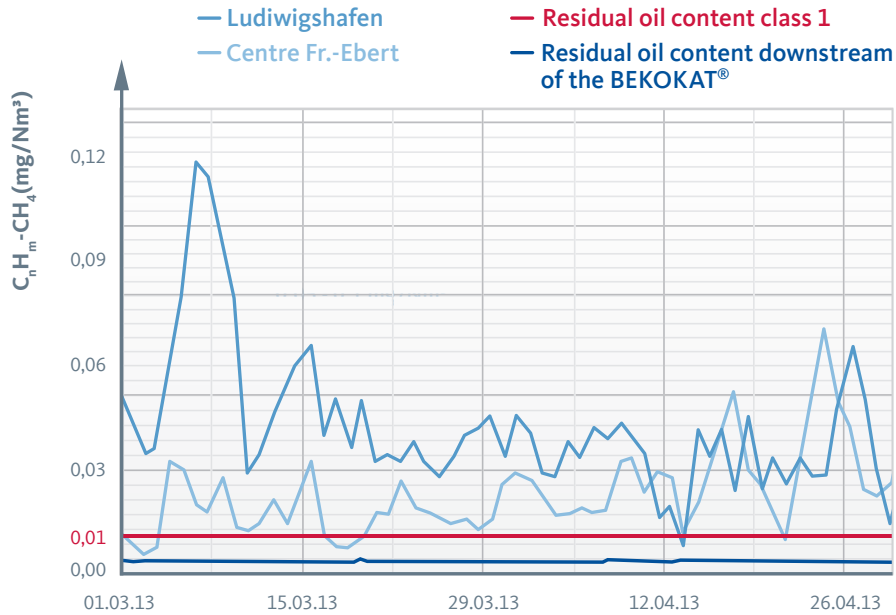
regions with a low motor vehicle and industrial density, the share of hydrocarbons in the air far exceeds the limit value of Class 1 (0.01mg/m<sup>3</sup> total oil content). This means: those who exclusively rely on using oil-free compression cannot prevent hydrocarbons in the intake air from entering the compressed air system and accumulating there to higher concentrations.

Hence, compressed air of the highest quality according to ISO 8573-1 can only be guaranteed with oil-free compression when supplementary processing is also installed. The BEKOKAT® offers an ideal system solution for this: in a single process step, the BEKOKAT® breaks down hydrocarbons inside the compressed air into water and a very small amount of carbon dioxide. Thereafter, the residual oil content significantly outperforms the requirements of Class 1 according to ISO 8573-1.





## Constant oil and germ-free compressed air, oil-free condensate



The intake air for compressed-air generation is usually contaminated with hydrocarbons. Therefore, a processing solution is required even for oil-free compressed-air generation.

The BEKOKAT® offers constantly oil-free compressed air that is better than class 1 according to ISO 8573-1. The catalytic compressed-air processing breaks down all the hydrocarbons in the air into carbon dioxide and water. In this respect, it is irrelevant as to where they derive from.

*Data source : Rheinland-pfälzisches Landesamt für Umwelt, Wasserwirtschaft und Gewerbe*

The condensate from the process is oil-free and can be introduced into the sewerage system without needing to be processed.



# The solution for highly sensitive processes

The purity of compressed air dictates final product quality – particularly where compressed air comes into direct contact with the products during processing and production. The manufacture of highly sensitive products such as food or pharmaceutical pro-

ducts makes the highest demands on cleanliness: the oil introduced via compressed air could have severe consequences. Here, the BEKOKAT® offers the safety of oil and germ-free compressed air.



## Food industry

### Perfect consistency: compressed air makes ice cream enjoyable

In ice cream production, the “overrun” designates the injection of compressed air into the base mass of the ice cream. In this decisive production process, the ice cream receives its rich and creamy consistency and becomes enjoyable.

Here, the compressed air comes very intensively into contact with the ice cream. The lowest oil shares or only a few germs make the ice cream inedible. Only the BEKOKAT® is capable of realising oil and germ-free processing in a single step.

The catalysis technology of the BEKOKAT® provides an even overrun with guaranteed oil-and germ-free compressed air – for the safe enjoyment of your products.



## Pharmaceutical industry



### Absence of oil: for constant recovery

In the production of pharmaceutical preparations, the strictest hygiene standards apply. This also applies, of course, to the necessary compressed air. The latter is applied during the fabrication of tablets: downstream of the tablet press, dust is removed by means of compressed air.

Here, oil in compressed air is not only a hygienic problem but can also lead to the swelling of the pressed tablets. Expensive rejects would be the consequence. At this point, the BEKOKAT® assures the quality of the products.



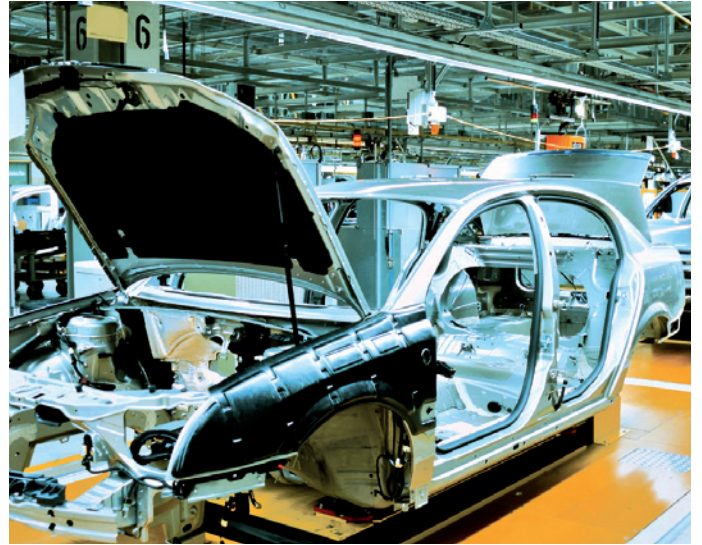


## Automotive industry

### Absence of oil: for perfect paintwork

There is no other field in the automotive industry where the demands on compressed air quality are as high as in paint coating. The process air comes into extensive contact with the varnish and surface. Every minor contamination leads to imperfections in the paintwork. In this manner enormous extra costs arise during the manufacturing process.

With its process conditioning, the BEKOKAT® safely ensures oil-free compressed air, independent of any inlet concentration. It is a very comforting feeling to be on the safe side with the BEKOKAT®



## Electronics industry



### Absence of oil: for technology that works

In the electronics industry, compressed air is applied in many ways: as a transport and cleaning medium, or as an energy carrier for pneumatic tools. In each application, the demands on compressed air are enormous. Even the slightest contamination can lead to defective products during the exposure of printed circuit boards. Absolutely oil-free compressed air ranks among the most important requirements for trouble-free production.

Here, the BEKOKAT® offers the safety of constantly oil-free compressed air.

## The classified directory of our expertise

	Food industry		Pharmaceutical industry		Chemical industry		Petrochemistry		Construction material industry
	Metalworking industry		Automobile industry		Surface technology		Electronics industry		Glas
	Paper industry		Packaging industry		Energy		Environment		Gas



Evidence furnished and validated by a complex test series: the BEKOKAT® produces absolutely germ-free compressed air.

## Oil and germ-free compressed air Certified safety for your processes

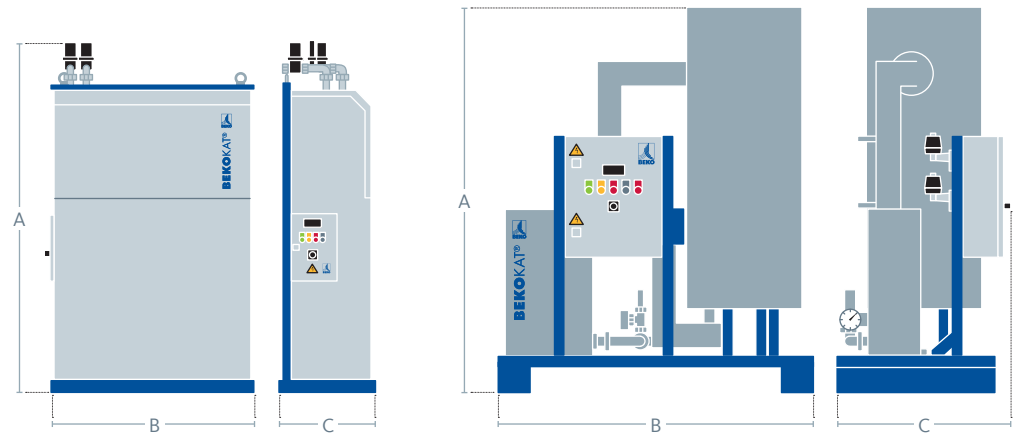
The higher the demands for compressed air quality, the higher the requirements for documentary proof. Quality Management systems require the employment of specifically suitable devices with independently verified quality certification. This can be problematic for many devices since they can only prove their suitability after the fact.

In contrast, **BEKO TECHNOLOGIES** furnishes the required evidence in the run-up. We have undergone complex tests with independent institutes which have confirmed and certified the effectiveness of the BEKOKAT®. Together with TÜV Nord, it was proved under actual operating conditions that compressed air which is processed with the

BEKOKAT®, outperforms the specification for class 1 of ISO 8573-1. In a second test series with the Gesellschaft für Produktions- und Sterilitätssicherung mbH (GfPS), it was confirmed that even compressed air which was intentionally contaminated with bacteria, is processed in a germ-free manner in the BEKOKAT®. Subsequent to the treatment, living bacteria could no longer be detected in the compressed-air flow. With this, the test results from two well-respected test institutes prove, independently of one another, the high efficiency of the innovative catalysis technology. The two certificates give you security regarding the decision for compressed-air processing with the BEKOKAT®.



## BEKOKAT® catalytic converter



BEKOKAT®	CC - 060	CC - 120	CC - 180	CC - 360	CC - 720	CC - 1200
Volume flow (m <sup>3</sup> /min)*	1	2	3	6	12	20
Pressure (bar[g])	16	16	16	16	16	11 **
Power supply (ph/V/Hz)	1/230/50	1/230/50	3/400/50	3/400/50	3/400/50	3/400/50
Inst. performance (kW)	1	1,64	2,6	5,1	8,7	13,8
Connection	1"	1"	1"	1½"	2"	2½"
<b>Dimension</b>						
A (mm)	1734	1719	1440	1578	1747	2166
B (mm)	800	950	950	1300	1550	1650
C (mm)	420	450	525	715	850	1050
Weight (kg)	130	200	275	315	525	805

### Flexible employment

The technical data are indicated for an operating pressure of 7 bar(g). Deviating pressures are possible without problems. We will be happy to individually design a plant for your case of application. Feel free to contact us.

### Economical operation

The installed performance is needed mainly in the heating phase subsequent to the activation of the BEKOKAT®. During operation, the BEKOKAT® functions economically and efficiently in a heat exchange: with low energy consumption of up to 0.003 kW/m<sup>3</sup> on average.

Other voltages upon request. Other models upon request. From model CC-180 onwards without housing.

\* related to +20°C and 1 bar(a)

\*\* 16 bar(g) version upon request.

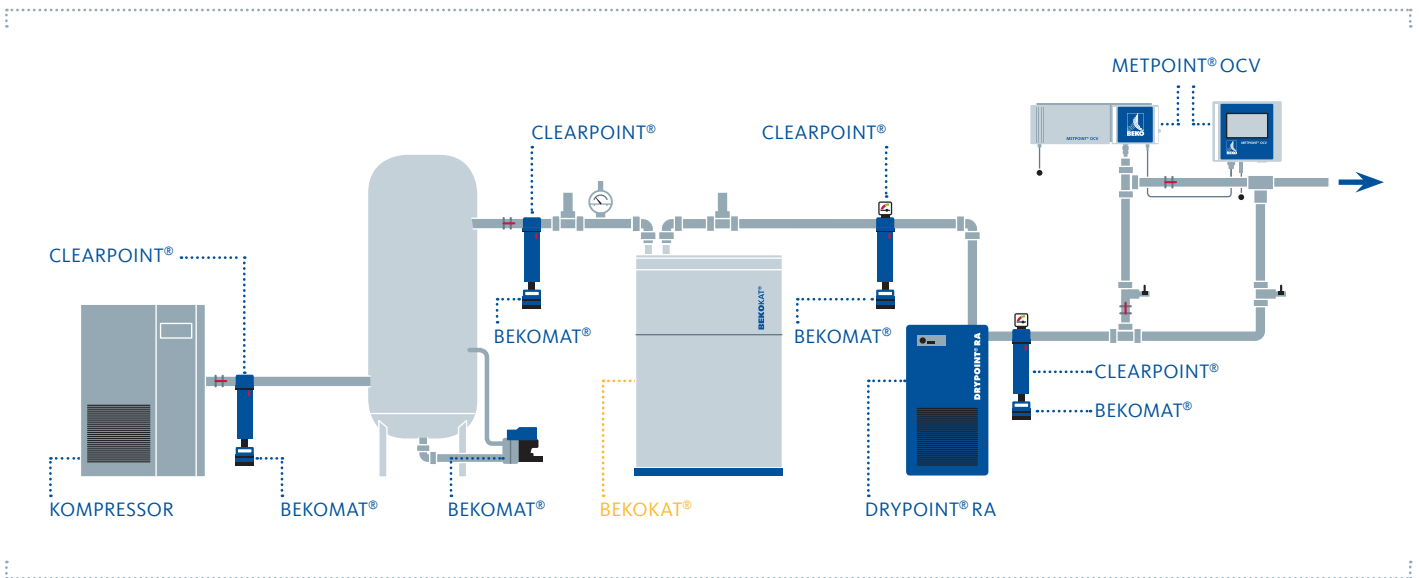




## Systematic quality: worldwide

We at **BEKO TECHNOLOGIES** develop, manufacture, and distribute products and systems for an optimised compressed-air and compressed gas quality throughout the world. From the processing of compressed air and compressed gases through filtration and drying, via proven condensate technology, to instruments for quality supervision and measurement. From the small compressed-air application to demanding process technologies.

Since its founding in 1982, **BEKO TECHNOLOGIES** has continuously given decisive impulses to compressed-air technology. Our pathbreaking ideas have exerted considerable influence on the development. With this expertise and with our personal commitment, we at **BEKO TECHNOLOGIES** stand for trend-setting technologies, products, and services.



## The product and system categories

<b>Condensate drainage</b>   BEKOMAT®	<b>Filtration</b>   CLEARPOINT®	<b>Measurement instrumentation</b>   METPOINT®
<b>Condensate processing</b>   ÖWAMAT®   BEKOSPLIT®	<b>Drying</b>   DRYPOINT®   EVERDRY®	<b>Process technology</b>   BEKOBLIZZ®   BEKOKAT®

**BEKOKAT®** – catalytic compressed-air processing for reliably oil-free compressed air



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