Cleaning Technology
DUNOS

Cleaning

KIESELMANN
FLUID PROCESS GROUP

Our Performance for your Cleaning Process

The Right Tools for Perfect Hygiene

Just using perfect ingredients is not enough when manufacturing high quality products. Hygienic components and systems are vital for assured product quality. KIESELMANN cleaning systems take no quarter when sanitising tanks and vessels.

Matched to the different kinds of contamination and to the vessel to be cleaned, static, rotating and target jet cleaners are available. The cleaning heads excel by innovative design resulting in minimum components and a large reduction in cleaning fluid used.

The cleaning effect of the heads can be optimised by the use of customised jet geometry, number of nozzles and speed of rotation. This is further enhanced by the heads effective self cleaning. This can be verified by test and validation. The almost loss-free cross flow of the heads having a unique surface quality as well as the high-grade materials offer a high economic efficiency. They help you to maximize both the production and hygienic safety in your food production or in your process.

- **FDA compliant**
- **GMP compliant**
- **EHEDG certified**

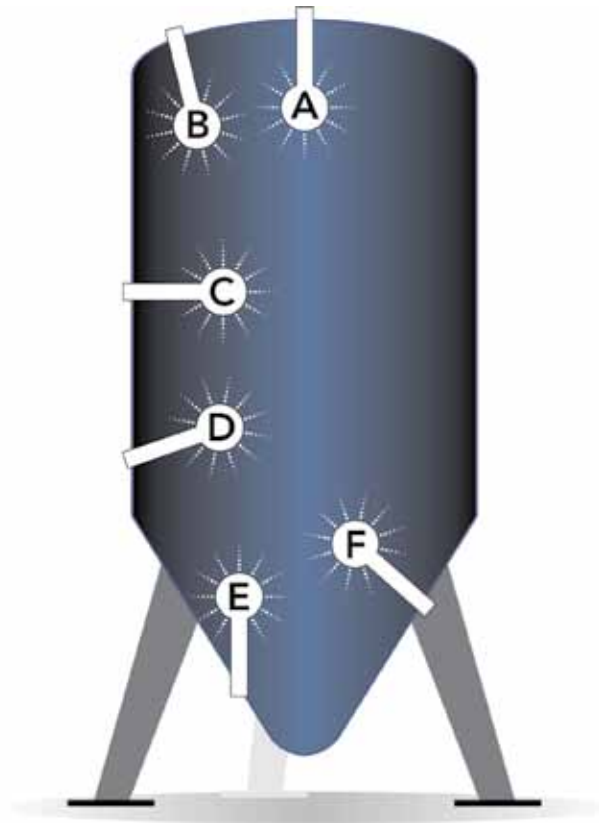
Einsatzbereiche

- Storage tanks
- Transport tanks
- Fermentation tanks
- Reactors
- Vats
- Silos
- Kettles
- Mixers
- Agitators
- Tuns
- Barrels
- Containers
- Canisters
- Basins

Selecting the Cleaner for your Process

The selection of the cleaner depends on the cleaning task. The correct nozzle arrangement as well as the correct material of the spray head are decisive for the effectiveness of cleaning. The cleaning medium is another important step to manage your cleaning task. We help you to make the right decision.

- **Definition of the cleaning task**
- **Planning of the cleaning sequence**
- **Commitment of the planned process**
- **Determination of the cleaning positions in the vessel**
- **Selection of the jet cleaners/spray heads**
- **In co-operation with suppliers of cleaning mediums, a recommendation concerning CIP chemicals which are included in the documented process, can be given.**
- **If the customer wishes it, cleaning tests are made with our mobile system.**
- **Evaluation and documentation of the results including a recommendation for your cleaning requirements**



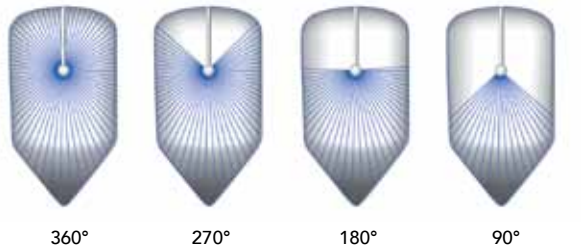
KIESELMANN spray heads can be fitted in every position into your tank.

Static Nozzles

DUNOS$_S$ produces a uniform cleaning pattern on the vessel wall. The complete surface being wetted. In order to obtain an effective cleaning, we offer both standard nozzle arrangements and custom designs to suit specific applications.

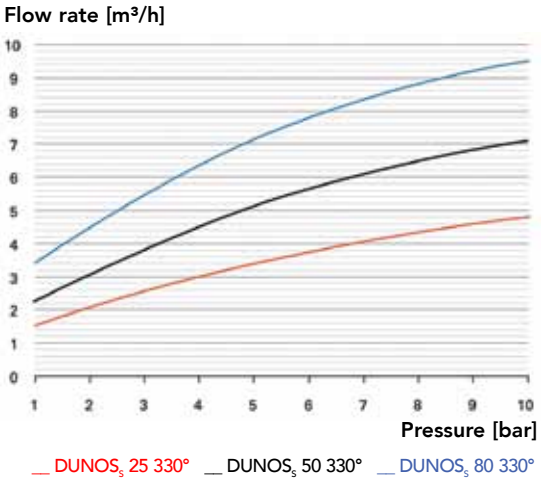
- **Hygienic internal and external design**
- **Cross flow optimized**
- **Stereoscopic cleaning image**
  90°, 180°, 270°, 330° (theoretically 60°)
  Special images optional
- **61 nozzles standard**
  Option: application-specific
- **Any fitting position**
  fix or mobile operation possible
- **Maintenance free**
- **Nozzle design reduces fluid consumption**

Jet pattern examples for the cleaner



Depending on the type of DUNOS$_S$, a different jet image is produced on the vessel surface.

Pressure-/Performance data DUNOS$_s$



Spray-angle [°]	Cleaning-diameter [m]	Flow rate 6 bar [m³/h]
DUNOS$_s$ 25		
90°	0.5 - 1.0	on request
180°	0.8 - 1.5	on request
270°	0.8 - 1.5	on request
330 °	0.8 - 1.5	3.6
DUNOS$_s$ 50		
90°	0.8 - 1.5	on request
180°	1.5 - 2.8	on request
270°	1.5 - 2.8	on request
330 °	1.5 - 2.8	5.5
DUNOS$_s$ 80		
90°	2.0 - 3.5	on request
180°	2.8 - 4.5	on request
270°	2.8 - 4.5	on request
330 °	2.0 - 3.5	7.5

TECHNICAL DATA DUNOS$_s$

Effective range:	500 - 4500 mm diameter depending on the equip-ment
Flow at 6 bar:	D$_s$ 25 ca. 3.6 m³/h D$_s$ 50 ca. 5.5 m³/h D$_s$ 80 ca. 7.5 m³/h
recommended operating pressure:	up to 50 bar
Operating temperature:	5 - 150° C
Standard connection Versions:	Thread Split-pint Weld-on end Custom-designed
Materials:	1.4404 1.4435 (optional) PTFE Special materials (optional)
Surfaces:	Industry (verison I) Ra < 1.6 µm Pharmacy (version P) Ra < 0.8 µm
Certificate:	ATEX CE Material certification

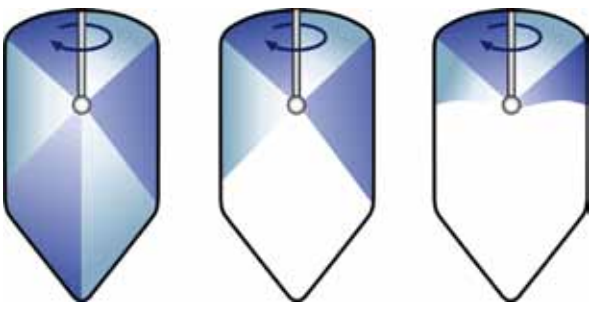
Rotating surge cleaners

The surge cleaner DUNOS$_R$ is an internal cleaning nozzle with a rotating spraying body. Rotation is derived from the jet action of the spray and guarantees self cleaning as well as effective wetting of the whole vessel surface. In order to obtain an effective cleaning, the arrangement of the respective jet patterns can be matched to the existing contamination and vessel geometry depending on the requirement. Beyond this, standards are available, of course.

- **Hygienic internal and external design**
- **Loss-reduced cross flow**
- **Optimized flow rates**
- **High performance with compact design**
- **Stereoscopic cleaning image**
  180°, 270°, 360°
  Special images optional
- **Nozzles depending on type, slotted**
  Option: application-specific optimization
- **Any fitting position**
  fixed or mobile operation possible

DUNOS$_R$ is available in different plastics for aggressive mediums

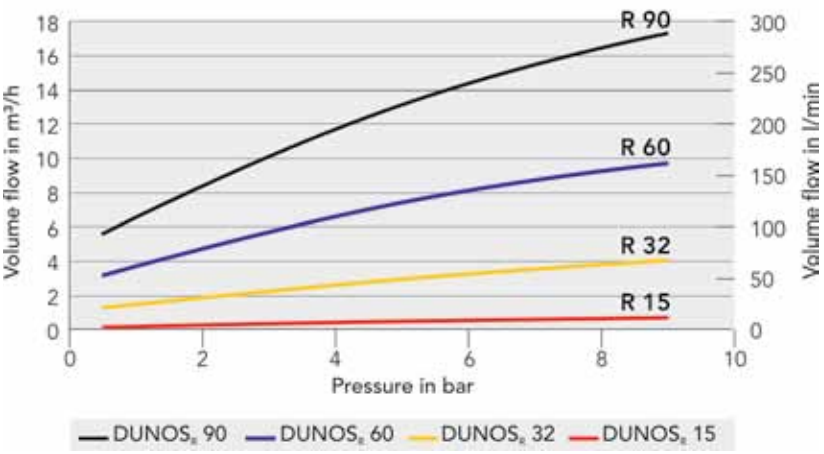
Jet pattern examples of the cleaner



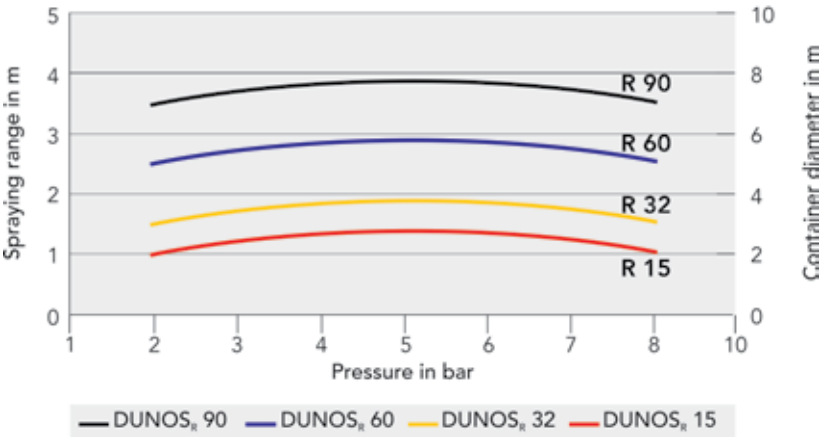
Depending on the type of DUNOS$_R$, a different jet image is produced on the vessel surface.

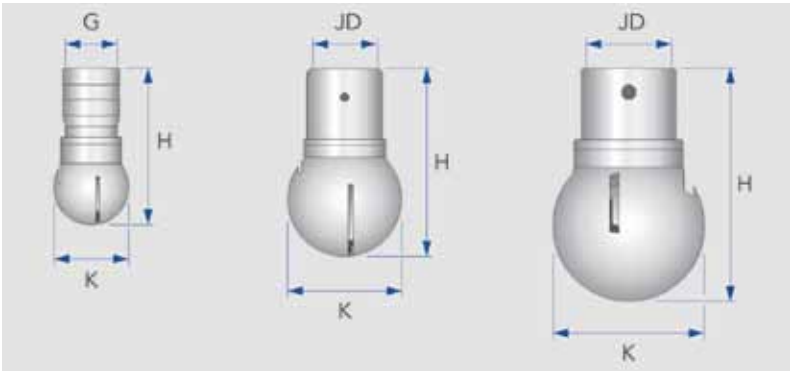
TECHNICAL DATA DUNOS$_R$	
Operating Pressure:	2 - 8 bar
Operating temperature:	5 - 95° C
Standard connection versions:	Thread Split-pint Special connections on request
Materials:	1.4404 Special materials on request
Surface:	Ra ≤ 0.8 µm
Certificate:	ATEX CE Material certification

Pressure-/Performance data DUNOS$_R$



Spray range DUNOS$_R$





Dunos$_R$	15	32	60	90
G (alternative)	1/8″	3/8″	3/4″ / 1″	2″
JD (alternative)	10.1	18.2	28.2/29.2/34.2	52.2
H	28 -33	49	86 -100	125 -140
K	15.8	31.8	59.8	94.8

Rotating nozzle spray head

The cleaners DUNOS$_{RB}$ are turbine driven rotating cleaners. The nozzle covers the whole surface, that has to be wetted. The jet pattern shape is individual. The strength of the cleaner is its slow and continuous jet execution on the tanks' surface. The high retention period on the cleaned point results in the reliable cleaning of the surface.

- **High retention period on the cleaning point**
- **Complete coating of the vessel per revolution**
- **14 r.p.m.**
- **custom nozzle location**
- **Individual scheduable discharge**
- **High production quality**
- **Clearance room reduced**
- **Optional rotation monitoring**
- **Optional cleaning head tube with flange connection**

TECHNICAL DATA DUNOS$_{RB}$	
Operating pressure:	2 - 12 bar
Operating temperature:	5 - 95° C
Standard connection versions:	Thread Special connections on request
Materials:	1.4404 Special steel on request Peek PTFE
Surface:	Ra ≤ 0.8 µm
Certificate:	ATEX CE Material certification

Rotating surge cleaners can be validated

The cleaners DUNOS$_{R\ val}$ are surge cleaners whose function can be monitored from outside. The rotating nozzle head gives a signal directly to the monitoring electronics. Not only rotation is monitored, but also the adjustable minimum number of revolutions. The display directly at the device indicates the due function during cleaning by means of a green LED. A 24 V signal is produced between minimum number of revolutions and desired number of revolutions, which can be monitored by a higher-level control owing to the integrated interface.

- **Proof of function visible from outside**
- **LED display**
- **Interface for higher-level control**
- **Programmable monitoring of the minimum and desired number of revolutions**
- **Non-contact collection of the function directly at the rotating nozzle head**

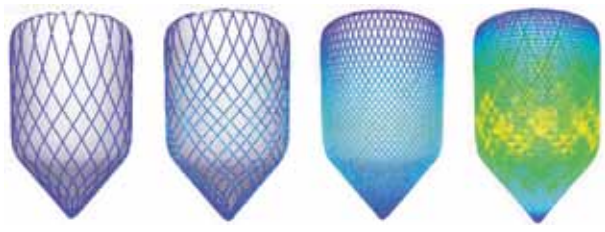
TECHNICAL DATA DUNOS$_{R\ val}$	
Operating pressure:	2 - 8 bar
Operating temperature:	5 - 95° C
Standard connection versions:	Thread Split-pint Special connections on request
Material:	1.4404 Special materials on request
Surface:	Ra ≤ 0.8 µm
Certificate:	ATEX CE Material certification

Three-dimensional cleaning

DUNOS$_O$ produces an orbital (spatial) cleaning pattern based on the rotating motion of the head with simultaneous rotation of the nozzles. Owing to this, it is guaranteed that the vessel to be cleaned is mechanically cleaned in a comprehensive way. Both the high residence time and the possible high pressures assure a strong mechanical cleaning of the vessel wall. The liquid-saving functioning is ecologically friendly and provides a safe result, even in case of low pressures.

- **Cross flow almost 100%**
- **Stereoscopic cleaning image, close meshed 360°**
- **Water-hydraulic actuation for very intensive cleaning**
- **Position of the hydraulic actuation at the head or outside of the vessel**
- **Any fitting position fix or mobile operation possible**
- **Long-life design**
- **High-grade materials**
- **Improved self-cleaning of the machine head**
- **Machine design reduces clearance volume**
- **Ecologically friendly**

Jet pattern examples of the cleaner

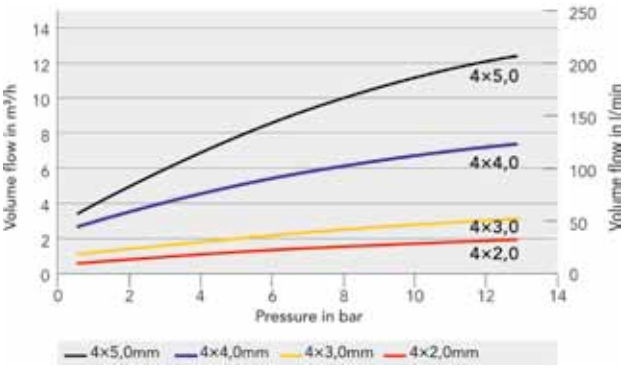


cycle 1 cycle 2 cycle 3 cycle 4

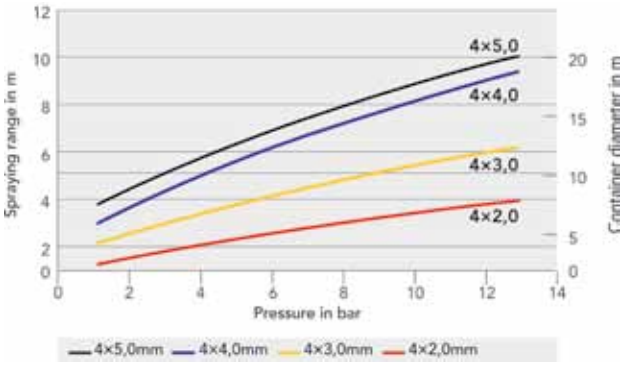
TECHNICAL DATA DUNOS$_O$	
Operating pressure:	2 - 12 bar
Operating temperature:	5 - 95° C
Standard connection versions:	Thread Special connections on request
Materials:	1.4404 Special materials on request
Surface:	Ra ≤ 0.8 µm
Certificate:	CE Material certification further certifications on request

The complete inner surface is comprehensively cleaned already after the first cycle. Each further cycle produces a closer meshed cleaning image and thus a more intensive cleaning.

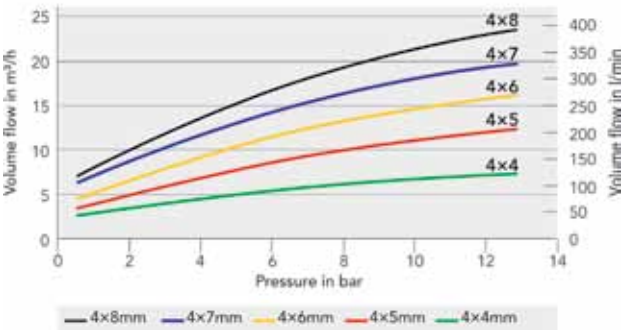
Pressure-/Performance dataDUNOS$_o$ 50q F VB



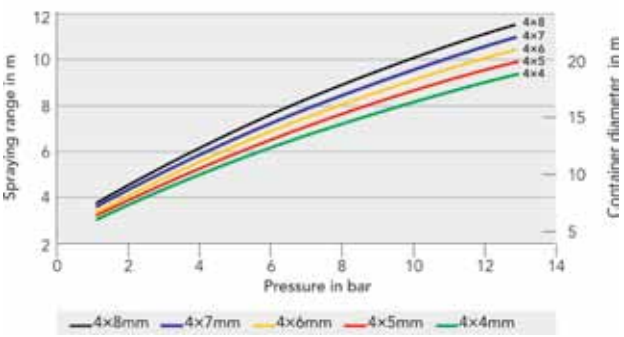
Spray range DUNOS$_o$ 50q F VB

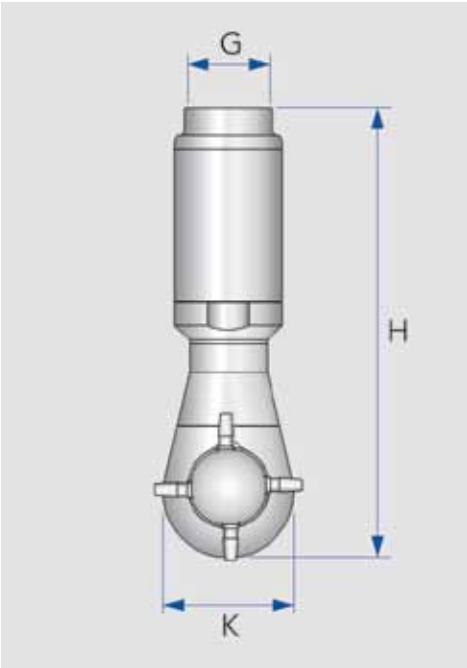


Pressure-/Performance data DUNOS$_o$ 90q F



Spray range DUNOS$_o$ 90q F





Dunos$_o$	50	90
G	3/4"	11/2"
H	162	247
K	47	92

Our Product Programme

- **Sanitary pipes**
- **Fittings and tube accessories**
- **Valves and process components**
  - Butterfly valves
  - Leakage butterfly valves
  - Ball valves
  - Single seat valves
  - Double seat valves
  - Safety valves
  - Tank top units
  - Sample valves
  - Aseptic valves
- **Cleaning units**
  - Sprayballs
  - Rotating cleaning heads
- **Planning and construction of plants**
  - CIP plants
  - Pigging technology
  - Thermal systems
  - Turnkey projects

We hope that this small glimpse at our capabilities has been interesting.

If you would like any further information then please do not hesitate to get in touch with us and we will be pleased to answer any questions you may have.

Just call us or send us an e-mail.

KIESELMANN
FLUID PROCESS GROUP

KIESELMANN GmbH · Paul-Kieselmann-Str. 4 -10 · 75438 Knittlingen · Germany
Phone +49 (0)7043 371- 0 · Fax +49 (0)7043 371-125
KIESELMANN Anlagenbau GmbH · Paul-Kieselmann-Str. 6 · 75438 Knittlingen · Germany
Phone +49 (0)7043 371- 0 · Fax +49 (0)7043 371-289
www.kieselmann.com · info@kieselmann.de