

EcoCO₂ - cleaning with CO₂



Ecoclean

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EcoCO₂ – cleaning with carbon dioxide in fluid and supercritical state

Used at the appropriate temperature and pressure, CO₂ exhibits optimum oil-dissolving properties. The EcoCO₂ uses carbon dioxide in both its liquid and supercritical states. Liquid CO₂ is fed into the system and rendered supercritical – a state in which it has the density of a liquid but the viscosity of gas – by raising its temperature and pressure. The medium can thus penetrate even minuscule pores and cavities to remove foreign matter. The technique is particularly advantageous with very complex (e.g., capillary) geometries or porous part structures, e.g., implants or sintered metals.

Following the cleaning cycle, the CO₂ may be returned into the circuit or discharged from the system. Prior to this step, the foreign matter removed from the part and the CO₂ are fully separated from each other, and no cleaning agent residue remains present on the cleaned part. The parts have room temperature upon exiting the EcoCO₂. They are dry, free of any residues and ready to undergo further processing immediately.

Cleaning with high process reliability and optimum traceability

Reproducible cleaning results and process traceability are key validation criteria, especially in medical equipment manufacturing. The use of CO₂ as a cleaning medium ensures consistent results, since the cleaning agent and foreign matter will be fully separated after each cleaning process. Moreover, even in its standard configuration, the EcoCO₂ system records the entire cleaning cycle for each batch and collects and logs full data. This enables the plant operator to monitor and document all processes reliably.



Green Technology for enhanced labour safety and eco-friendliness

CO₂ is non-toxic and non-combustible, so Dürr Ecoclean's EcoCO₂ minimizes labour risks such as may be incurred with other combustible and toxic cleaning media. As a result, the operation of the system is not subject to the VOC Guideline of the 31st Federal Immission Control Ordinance. Furthermore, the EcoCO₂ system uses only existing carbon dioxide from other industrial processes. In the optional closed-circuit configuration, as much as 85% of the carbon dioxide can be re-used.

The energy balance of the EcoCO₂ system is impressive as well, since no drying of parts is required. With other processes, the drying step often consumes a lot of energy, especially when parts of complex-geometry are being treated.

Scope of supply - basic machine

- Working chamber with heating jacket
- Basket „basic“ (cylindric, mesh wire)
- components in contact with cleaning fluid are out of stainless steel
- compressor device
- exit valve (bottom of the working chamber), heated
- contamination separator
- control cabinet integrated in machine housing, incl. SPS
- Process Control System incl. process visualization
- Machine housing incl. panels

Optional

- rotary drive basket (with frequency exchanger and a combination of frequency exchanger and transmission)
- CO₂ recycling (condensor with surge tank)
- GMP package
- CO₂- inlet filter
- additional exit valve (on top of the working chamber), heated
- cooling
- additional working chamber
- Piston Membrane Pumps
- additional dirt collector with separator
- 2nd CO₂- supply with automatic switch over
- CO₂- flow regulation
- Modem
- special baskets

Possible modifications

- extended volume of working chamber
- extended temperature and pressure range
- ultrasonics

EcoCO₂ - Technical Data

Modell S

L x W x H 1.200 x 1.500 x 1.950 mm
(47.3 x 59 x 76.8")

Basket Dimensions

Length 670 mm (26.5")
Diameter 100 mm (4")

Max. weight of charge 25 kg (55 lb)

Throughput

1-2 charges/h

Supplies

Electricity 3 x 400 VAC, 50 Hz (3 x 480V, 60 Hz)
Total connected load 15 kW

Cleaning Chamber

Max. pressure 300 bar (4,400 PSI)
Max. temperature 70° C (160° F)

Options

- Rotation of working chamber
- CO₂ inlet filter (0,01 µm)
- GMP package (validation)

Modularity

max. 1 cleaning chamber (5,5 l; 1,5 GAL)

Modell M

L x B x H 2.500 x 1.850 x 1.950 mm
(98.4 x 72.8 x 76.8")

Basket Dimensions

Length 525 mm (21")
Diameter 150 mm (4")

Max. weight of charge 25 kg (55 lb)

Throughput

1-2 charges/h (1 working chamber)
up to 6 charges/h (3 working chambers)

Supplies

Electricity 3 x 400 VAC, 50 Hz (3 x 480V, 60 Hz)
Total connected load 20 kW

Cleaning Chamber

Max. pressure 300 bar (4,400 PSI)
Max. temperature 70° C (160° F)

Options

- Rotation of working chamber
- CO₂ inlet filter (0,01µm)
- CO₂ regeneration
- additional working chamber
- dirt separator
- GMP package

Modularity

max. 3 cleaning chambers (each 10 l = 2,6 GAL)

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