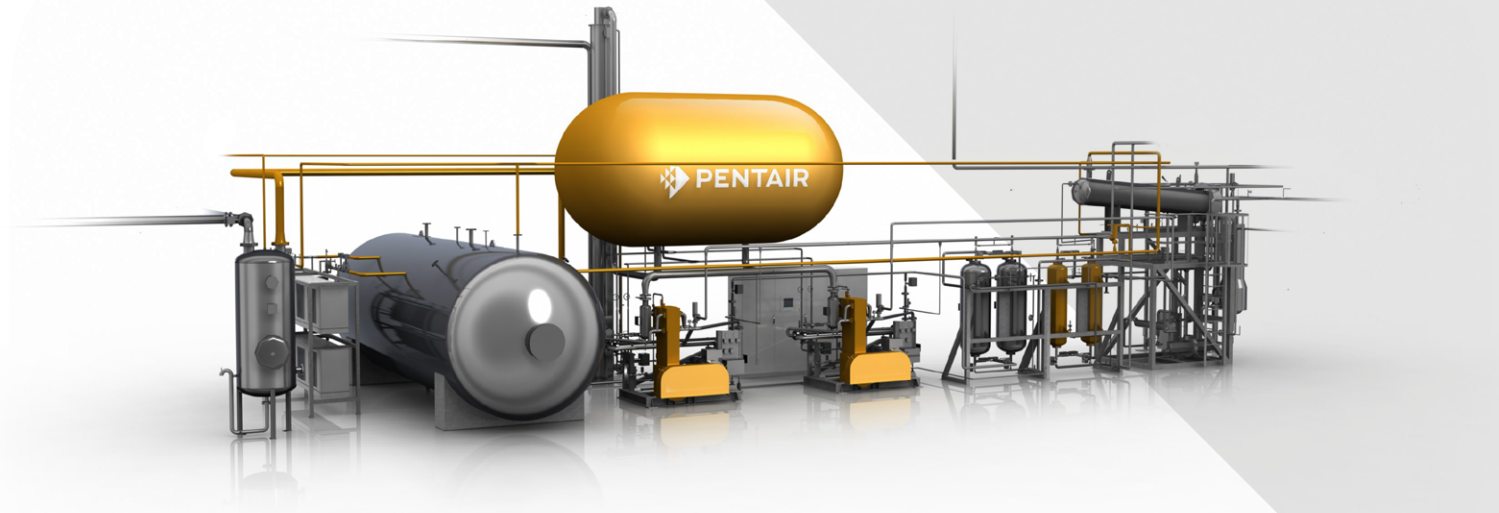
PENTAIR

HAFFMANS
CO_2 RECOVERY UNIT



BE CO_2 SELF-SUFFICIENT

CO_2 Recovery Unit (CRU) is a robust and reliable CO_2 recovery solution for a wide variety of brewery needs ranging from 300,000 to beyond 5,000,000 hl/yr. It is the benchmark CO_2 recovery plant in the global brewing industry with 25-year-old plants still running strongly.

The CRU-program comes with a range of options from cost-effective conventional CO_2 recovery plants to plants incorporating the latest technologies. Each CRU plant is an individual jewel: We listen carefully to your needs and design (y)our CRU to your specific requirements. Not much space available for a new plant or retrofit: No worries, our engineers will find a solution for the most restricted space conditions.

The purity of the liquid CO_2 end product exceeds general quality standards for food/beverage/ingredient purposes including the latest edition of the ISBT standard.

Recovering your own CO_2 lowers your site's CO_2 footprint and reduces your VOC emissions to the atmosphere. Both contribute to a more sustainable operation.

Worldwide, customer-specific solutions will be installed and commissioned by a team of experienced and well-trained service engineers. But the dedication to your CO_2 self-sufficiency continues after the commissioning. Through comprehensive lifecycle management, our technical support and service team ensures that your CRU operates optimally.

BENEFITS

- **CO_2 self-sufficiency and beyond**
- **High quality liquid CO_2 ≥ 99.998 % v/v, O_2 ≤ 5ppm v/v**
- **High recovery efficiency even at low CO_2 inlet purity with ≥ 95% v/v**
- **Robust design for reliable 24/7 operation, uptime ≥ 95%**
- **Flexible, modular setup to meet site's layout needs**
- **Natural refrigerants CO_2 (R744) and NH_3 (R717) applied**
- **Early recovery and up to 60 % energy savings with LiquiVap (optional)**
- **Access to CO_2 knowhow and technical support**

OPTIONS

- Gas boosters
- Aerosol washers
- LiquiVap – early recovery and energy-saving system
- Liquid CO_2 storage tank
- Ambient air or Glycol heated vaporizer
- Cylinder filling unit
- Road tanker pump
- Quality control equipment
- Installation and commissioning services
- Original spare parts
- After Sales Services

CO_2 RECOVERY UNIT

PROCESS DESCRIPTION

Raw foam-free fermentation gas is fed to the plant where it is buffered in a balloon and scrubbed of water-soluble contaminants such as ethanol in the gas washer. A 2-stage dry running CO_2 compressor unit increases the gas pressure to 18barg (261psig) removing condensate in the process. The remainder of the impurities and water are then removed in the dual activated carbon filter and drier unit. Regeneration of this unit is automatic utilizing heating elements and dry $CO2_2$ purge gas. CO_2 liquefaction takes place in a refrigerant cooled condenser, and O_2 is removed in the stripper. The purified liquid CO_2 end product is transferred to the onsite storage tank.

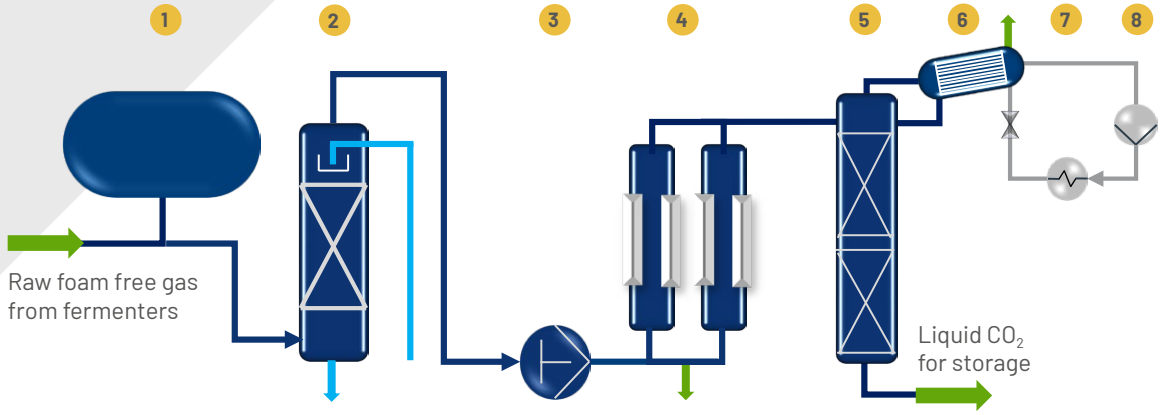
WHY HAFFMANS?

We could bore you with the mere facts of being a market leader in CO_2 recovery with an installed base of 1000+ plants in the brewing and beverage industry. But the answer is very simple: pure dedication! We are your Total CO_2 Management Partner. CO_2 is running through our business veins. Our R&D department is constantly researching new technologies to improve CO_2 quality, recovery rates, and efficiency. After all, seeing a superscript 2 in CO_2 gives us a heart attack. We don't want you to be dependent of CO_2 suppliers if you can easily recover your own CO_2 and be more independent and sustainable. And foremost: we are there for you when your system is up and running: global service hubs and dedicated technical support — we troubleshoot whenever you need us to keep your plant up and running! *That's why Haffmans!*

SCOPE OF SUPPLY

1. Gas balloon
2. Gas washer
3. 2-stage CO_2 compressor unit
4. Activated carbon filter & drier
5. Stripper-reboiler
6. Refrigerant cooled CO_2 condenser
7. Refrigerant condenser
8. Refrigerant compressor

> Main parts skid mounted and controlled by MCC



CO_2 Recovery Unit (CRU)	BREWERY CAPACITY	CO_2 CAPACITY LIQUID IN TANK	REFRIGERANT FOR CO_2 LIQUEFACTION	FOOTPRINT	WATER CONSUMPTION	COOLING CONSUMPTION	POWER CONSUMPTION
Metric	0.3 – 5.0+ Mhl/yr	285 / 500 / 750 / 1000 / 1500 / 2000 kg/h	Natural NH_3 (R717) and CO_2 (R744) refrigerants	Flexible modular set-up to meet sites layout	≤ 0.9 l/kg	70 kWh cooling water/tonne CO_2 155 kWh glycol/ tonne CO_2	145 kWh/tonne CO_2
Imperial	0.25 - 4.25+ Mbbl/yr	630 / 1100 / 1650 / 2200 / 3300 / 4400 lbs/h			≤ 0.12 gal/lbs	9 TORh cooling water/UStON CO_2 20 TORh glycol/ UStON CO_2	88 hph/UStON CO_2

Estimated values are for budgetary purposes only, based on:
Inlet CO_2 >99.7%v/v, 15 °C (59 °F) @ 150-250 mm (6-10") WC, foam free gas @ max capacity | Site ambient< 30 °C (86 °F), altitude < 100 m (328 ft), water < 20 °C (68 °F), glycol < -5 °C (23 °F)

LEARN MORE

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