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AL-ACE-3420-ME-DSH-CO201			AL-INN-3420-ME-DSH-CO201		

AL-INN-3420-ME-DSH-CO201

Sistema de dosagem de CO2.

01.0	20/02/2025	Documento inicial	INN	GSI	ACE
Rev.	Dados	Descrição	Criado	Revisto	Aprovado

Editado para:

Informação		Compra	
Aprovação	X	Construção	
Pedido de licitação		Conforme construído	

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1. INTRODUÇÃO

Este documento contém as especificações técnicas de Sistema de dosagem de CO₂.

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2. FOLHA DE CARACTERÍSTICA

	SISTEMA DE DOSAGEM DE CO₂	FOLHA DE CARACTERÍSTICAS N.º 86
	DOSAGEM DE CO₂	FOLHA 1 DE 4

Empreitada de Conceção-Construção e Exploração do Sistema de Dessalinização na Região do Algarve	N.º de unidades 1
<i>ÁGUAS DO ALGARVE</i> <i>Grupo Águas de Portugal</i>	Posição da Lista de Preços Unitários a que respeita EQ145.A0

REFERÊNCIAS

Número de unidades:	1.
Local de instalação:	Zona de CO ₂ .
Fabricante / Marca:	ASCO ou equivalente.
Catálogo Técnico:	Anexo.

CARACTERÍSTICAS

Número de tanques de armazenamento:	1 uds.
Volume unitário:	60 Ton.
Pressão de projeto:	24 barg.
Temperatura de projeto do tanque interior:	-40°C / +50 °C.
Temp. de projeto do tanque exterior:	-20 °C / +50 °C.
Material do recipiente interior:	Aço-carbono P460NL2 ou P355NL2.
Material do reservatório exterior:	Aço carbono S235JR.
Material da tubagem do recipiente:	Aço inoxidável 304 / 304L.
Pressão de ensaio hidráulico:	34,32 barg.
NDT:	100% RT em juntas L-T de acordo com o código.
Isolamento:	Perlite + Isolamento a vácuo.

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	SISTEMA DE DOSAGEM DE CO₂	FOLHA DE CARACTERÍSTICAS Nº 86
	DOSAGEM DE CO₂	FOLHA 2 DE 4

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Vaporizador PBU:	PBU integrado.
Bloco de nível:	Medidor de nível digital Samson Media 7 com LT – PT.
Válvulas manuais:	Válvulas de esfera da marca Meca-Inox.
Serpentinas de arrefecimento:	Serpentina integrada para futura montagem da unidade de arrefecimento.
Pintura:	Jato de areia SA 2.5 + limpeza mecânica, seguida de primário, pintura intermédia e pintura final. O DFT final total é de 200 micrones. A cor da tinta deve ser RAL 9003 Branco brilhante.

VAPORIZADORES

Número de vaporizadores:	2 Uds.
Caudal unitário do vaporizador:	200 kg/h.

O vaporizador de CO₂ atmosférico da utilizando o ar ambiente disponível, proporciona 95% de economia de energia em relação aos vaporizadores eléctricos. Este vaporizador de CO₂ está equipado com uma função automática de ligar/desligar com controlo de temperatura para o funcionamento dos ventiladores, de modo a que a energia só seja consumida quando absolutamente necessário. Esta versão fornece 200 kg por hora, está equipada com um circuito de refrigeração em aço inoxidável e uma caixa de controlo externa com um cabo de 10 m.

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	SISTEMA DE DOSAGEM DE CO₂	FOLHA DE CARACTERÍSTICAS N.º 86
	DOSAGEM DE CO₂	FOLHA 3 DE 4

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SISTEMA DE DOSAGEM:

Número de sistemas de dosagem: 2 Uds.

Caudal unitário do sistema de dosagem: 12-100 kg/h.

Sistema de dosagem de gás constituído por:

Unidade de filtração.

Válvula reguladora de caudal.

Válvula de fecho automático.

Válvula redutora de pressão.

Válvula de fecho manual.

Válvulas de segurança.

Válvula de descarga.

Armário de controlo, pré-cabado.

Tudo montado numa estrutura de base em aço inoxidável.

Medidor de caudal com visor digital.

PID/DIN/CE Norma.

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	SISTEMA DE DOSAGEM DE CO₂	FOLHA DE CARACTERÍSTICAS Nº 86
	DOSAGEM DE CO₂	FOLHA 4 DE 4

Empreitada de Conceção-Construção e Exploração do Sistema de Dessalinização na Região do Algarve	Nº de unidades 1
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Inclui:

Unidade de refrigeração para tanque armazenamento

Sistema do control:

O valor definido para a quantidade de CO₂ (da quantidade máxima de dosagem) pode ser introduzido manualmente no regulador ou através de um sistema superior com um sinal de 4-20 mA.

As falhas são apresentadas no quadro de comando através de uma lâmpada de sinalização.

- Alimentação eléctrica: 400V 3Ph 50Hz.

- Cabos de 15 m incluídos entre:

- . Armário de controlo e depósito
- . Armário de controlo e vaporizador
- . Armário de controlo e sistema de dosagem

20 m Tubagem em aço inoxidável entre o tanque de armazenamento, o vaporizador e o sistema de dosagem.

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3. CATÁLOGO TÉCNICO

CO₂ Gas Dosing for Water Neutralisation

ASCO CO₂ Gas Dosing Systems



ASCO CO₂ Dosing System (single line)

Wherever you need to have an exact quantity of CO₂ gas to be dosed, the **ASCO** CO₂ Gas Dosing System is ideal! Typically, the **ASCO** CO₂ Gas Dosing System is used together with water desalination plants.

The system is equipped with a CO₂ pressure reducing valve, filtration unit, CO₂ gas flowmeter, CO₂ regulating valve, pressure gauges, safety valves and a completely pre-wired control cabinet.

In case of maintenance the system provides a manual by-pass line, which also can be monitored by the flowmeter. Herefore, changing a filter cartridge or doing any other service work on the system is quick and easy!

As raw and fitting material **ASCO** uses mainly stainless steel. This makes the system very resistant and extends the products life cycle.

Advantages of an ASCO CO₂ Gas Dosing System:

- easy to install
- very accurate
- 4-20mA output signal
- robust stainless steel construction
- no auxiliary equipment like air compressor needed, only power supply is required

Site conditions

Min. ambient air temperature:	10 °C, optional with heater for vaporiser down to 4 °C
Max. ambient air temperature:	38 °C, optional with air conditioned cabinet up to 50 °C
Humidity:	34 % to 99 %
Wind speed max:	19.03 m/s (62 ft/s), tank foundation must be recalculated by local civil engineer
Uniform building code:	seismic zone 2A
Temperature treated water:	15 to 35 °C
Side stream water pressure:	4 bar (58 psi) max.

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ASCO CO₂ Gas Dosing System: Components



- flanged inlet incl. counter flange
- control cabinet
- all equipment mounted on robust stainless steel frame



- pressure reducing valve for easy adjustment of inlet pressure



- **ASCO CO₂ Gas Flowmeter** for accurate measuring of the flow rate
- provides a 4-20 mA output signal which can be processed on the customer's main control



- actuating valve to adjust flow of CO₂ gas



- by-pass-line for manual operation



- filtration unit

Static mixer / Gas dispersion system

As per customer's requirement, **ASCO** includes static mixers or a complete gas dispersion system in order to ensure a reliable solubility of the CO₂ gas in the customer's main stream water. The used components feature the following key benefits:

- highly efficient mixing
- low energy consumption
- no moving parts for maintenance free operation
- no direct motive power required



CO₂ feeding via side stream into the main water stream

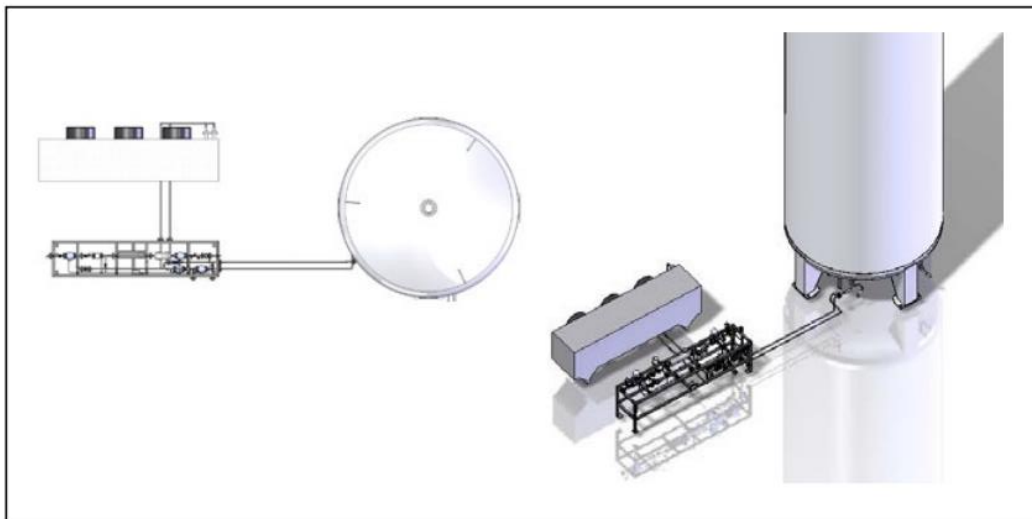


Reliable solubility of the CO₂ gas thanks to special design of the static mixer

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ASCO CO₂ Gas Dosing System: Example layout of a single line

Please note that all systems in this catalogue are only examples. Each system is customised and requires detailed engineering.



Example layout of a complete **ASCO** CO₂ Gas Dosing System (single line) with CO₂ tank and vaporiser

ASCO supplies a fully preinstalled and pretested system consisting of one storage tank, one vaporiser, one dosing system and, if desired, static mixers or a complete gas dispersion system.

The pipework of the **ASCO** CO₂ Gas Dosing System is completely welded to minimise installation works on site. Only the connection between storage tank and vaporiser has to be welded directly on site.

All civil related works, like site planning, foundations, electrical supply, installation material, water side stream and installation on site are customer's responsibility.

ASCO CO₂ Gas Dosing System: Standard scope of supply (single line)

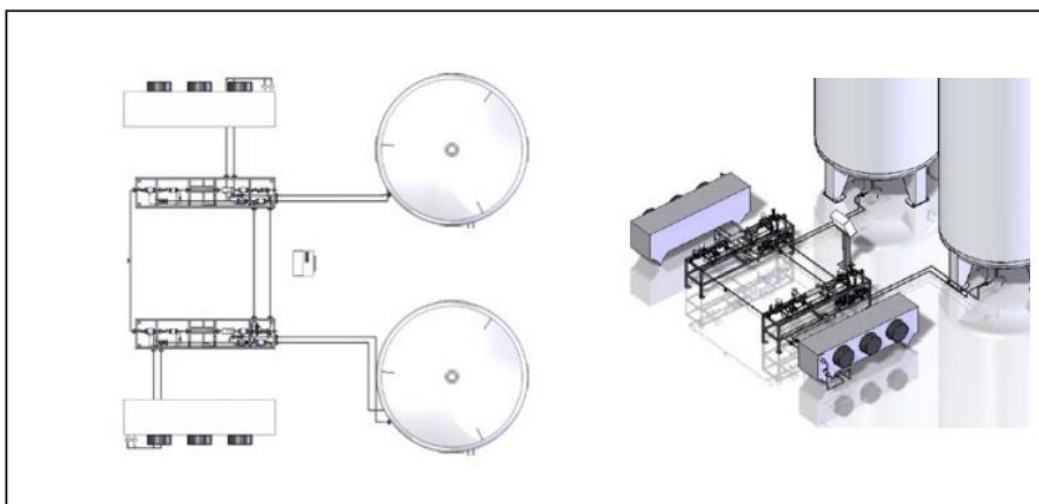
ASCO supplies a fully preinstalled and pretested system consisting of:

- 1 × **ASCO** CO₂ Gas Dosing System line consisting of
 - filtration unit
 - flow regulating valve
 - automatic shut off valve
 - pressure reducing valve
 - manual shut off valve
 - safety valves
 - discharge valve
 - control cabinet, prewired
 - all mounted on a stainless steel base frame
- 1 × CO₂ flowmeter including digital display
- 1 × CO₂ storage tank (capacity has to be specified at time of order)
- 1 × atmospheric CO₂ vaporiser (capacity has to be specified at time of order)
- 1 × static mixer or gas dispersion system (capacity has to be specified at time of order)

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ASCO CO₂ Gas Dosing System: Example Layout of a redundant dosing system

Please note that all systems in this catalogue are only examples. Each system is customised and requires detailed engineering.



Example layout of a complete redundant **ASCO** CO₂ Gas Dosing System with CO₂ tanks and vaporisers

ASCO provides a completely redundant system which automatically controls and regulates the CO₂ flow depending on a set point coming from the LCP with integrated HMI.

Depending on the condition of the storage tanks, vaporisers and the dosing systems, the system will detect and decide what parts need to take over the load to guarantee a continuous CO₂ injection into the side stream water. All operating conditions and status information are displayed on the touch panel and are available as data bloc for customers main control.

Redundant ASCO CO₂ Gas Dosing System: Standard scope of supply

ASCO supplies a fully preinstalled and pretested system consisting of:

- 2 x **ASCO** CO₂ Gas Dosing System lines consisting of
 - filtration unit
 - flow regulating valve
 - automatic shut off valve
 - pressure reducing valve
 - manual shut off valve
 - safety valves
 - discharge valve
 - all mounted on a stainless steel base frame
- 2 x CO₂ flowmeters including digital display
- 1 x control cabinet (PLC)
- 2 x CO₂ storage tanks (capacity has to be specified at time of order)
- 2 x atmospheric CO₂ vaporisers (capacity has to be specified at time of order)
- 1 x static mixer or gas dispersion system (capacity has to be specified at time of order)
- 1 x automatic change over system

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ASCO CO₂ Gas Dosing System: Available standard capacities

Pos. 001

CO₂ Gas Dosing System 5-50 kg/h (11.02-110.23 lb/h) (single line)

part no. 900135

- 1 × ASCO CO₂ Gas Dosing System consisting of
 - filtration unit
 - flow regulating valve
 - automatic shut off valve
 - pressure reducing valve
 - manual shut off valve
 - safety valves
 - discharge valve
 - control cabinet, prewired
 - all mounted on a stainless steel base frame
- 1 × CO₂ flowmeter including digital display



For a running ASCO CO₂ Gas Dosing System following equipment is necessary:

- 1 × CO₂ storage tank (capacity has to be specified at time of order)
- 1 × atmospheric CO₂ vaporiser (capacity has to be specified at time of order)
- 1 × static mixer or gas dispersion system (capacity has to be specified at time of order)

Pos. 002

CO₂ Gas Dosing System 30-300 kg/h (66.14-661.39 lb/h) (single line)

part no. 900136

- 1 × ASCO CO₂ Gas Dosing System consisting of
 - filtration unit
 - flow regulating valve
 - automatic shut off valve
 - pressure reducing valve
 - manual shut off valve
 - safety valves
 - discharge valve
 - control cabinet, prewired
 - all mounted on a stainless steel base frame
- 1 × CO₂ flowmeter including digital display



For a running ASCO CO₂ Gas Dosing System following equipment is necessary:

- 1 × CO₂ storage tank (capacity has to be specified at time of order)
- 1 × atmospheric CO₂ vaporiser (capacity has to be specified at time of order)
- 1 × static mixer or gas dispersion system (capacity has to be specified at time of order)

Pos. 003

CO₂ Gas Dosing System 100-800 kg/h (220.46-1'769.70 lb/h) (single line)

part no. 900137

- 1 × ASCO CO₂ Gas Dosing System consisting of
 - filtration unit
 - flow regulating valve
 - automatic shut off valve
 - pressure reducing valve
 - manual shut off valve
 - safety valves
 - discharge valve
 - control cabinet, prewired
 - all mounted on a stainless steel base frame
- 1 × CO₂ flowmeter including digital display



For a running ASCO CO₂ Gas Dosing System following equipment is necessary:

- 1 × CO₂ storage tank (capacity has to be specified at time of order)
- 1 × atmospheric CO₂ vaporiser (capacity has to be specified at time of order)
- 1 × static mixer or gas dispersion system (capacity has to be specified at time of order)

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CO₂ Vaporising

Atmospheric ASCO CO₂ Vaporiser



The atmospheric **ASCO** CO₂ Vaporiser has been developed to drastically reduce CO₂ vaporisation costs. Available ambient air is used to achieve energy savings of over 95 % compared to standard electric vaporisers. The fans are automatically controlled temperature-dependent and only work if a consumer equipment is in operation.

As each vaporiser is supplied prepiped and prewired, installation can be made within minutes. Bases for floor mounting are included.

In addition to our standard models, we offer **individual solutions** of modern and easy to maintain CO₂ vaporisers. In accordance with your requirements, we provide you with a suitable CO₂ vaporiser.

Advantages of an atmospheric ASCO CO₂ vaporiser:

- **NEW:** External control cabinet with 10 m connection cable for flexible installation and operation
- 25 times less energy compared with electrically heated vaporisers
- Designed for continuous and automatic operation (no attendance required)
- Built-in temperature sensors PT1000 to prevent liquid CO₂ from flowing through
- 2 coil system to ensure safe defrosting with built in solenoid valves
- With temperature-controlled start/stop device for intelligent power control
- Simple and fast installation, only electric power and CO₂ required
- Vaporisers with tubes in stainless steel or copper available

Specifications

Vaporising capacity (approx.) from liquid CO ₂ at 17 bar (247 psi)	length/width/height mm without control box	in/out connections outer Ø	net weight kg approx.	power consumption	max. operating pressure
200 kg/h SS (440 lb/h)	2'200 × 900 × 1'000 (87 × 35 × 39 in)	1" PN 40	243 kg (536 lb)	1.6 kW (2.1 HP)	25 bar (363 psi)
300 kg/h SS (660 lb)	3'000 × 900 × 1'000 (118 × 35 × 39 in)	1" PN 40	308 kg (679 lb)	2.4 kW (3.2 HP)	25 bar (363 psi)
500 kg/h SS (1100 lb/h)	3'000 × 900 × 1'200 (118 × 35 × 47 in)	1" PN 40	342 kg (754 lb)	2.4 kW (3.2 HP)	25 bar (363 psi)
1'000 kg/h SS (2200 lb/h)	4'200 × 1'000 × 1'450 (165 × 39 × 57 in)	1" PN 40	595 kg (1311 lb)	5.4 kW (7.2 HP)	25 bar (363 psi)

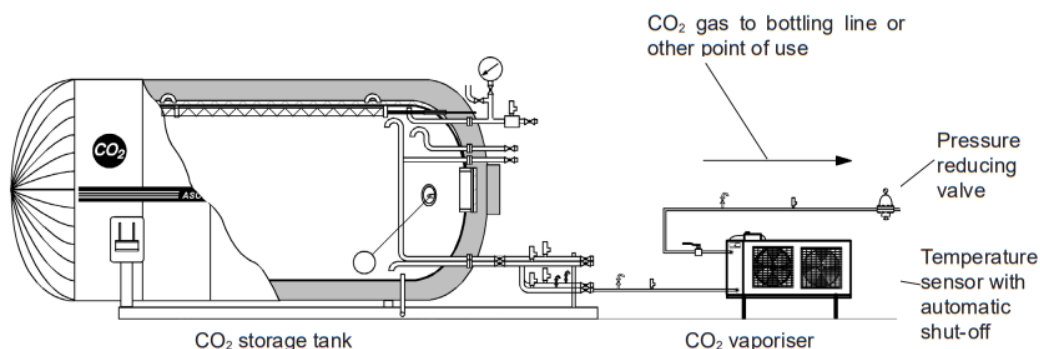
SS = with stainless steel tubes EN 1.4301 / AISI 304

Dimensions external control cabinet (L x W x H): 600 x 250 x 600 mm (24 x 9.8 x 24 in)

Ambient air temperature: min. +10°C, max. +45°C

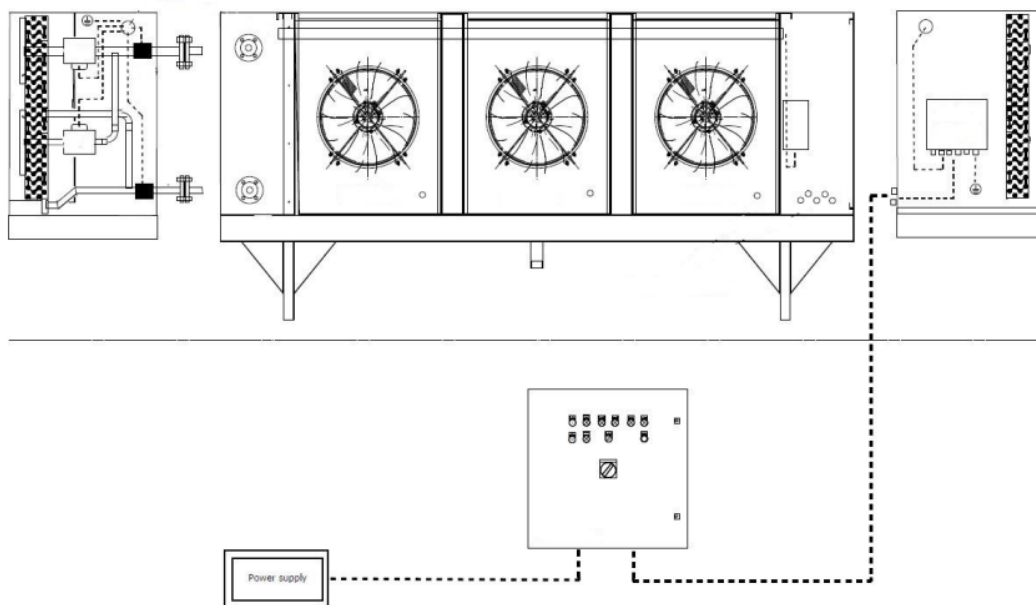
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Atmospheric ASCO CO₂ Vaporisers: Description



Liquid carbon dioxide is taken from a tank, completely evaporated in the vaporiser and fed to the point of use. In order to ensure safe defrosting of the vaporiser, it is equipped with two autonomous coils, which are controlled by a solenoid valve each. While one vaporiser coil is in service, the other is being defrosted. The fans only operate if a consumer equipment is obtaining CO₂ gas and the difference between inlet and outlet in the vaporiser reaches a defined level. This is monitored continuously.

The arrangement shown above permits operation of the vaporiser at air temperatures of max. +45°C, at least +10 °C and, at reduced capacity as low as +5°C in order to be able to utilise the vaporiser throughout the year, the unit should be installed inside a building away from the most inclement weather, for example in a boiler room or similar.



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Atmospheric ASCO CO₂ Vaporisers: Description and installation

Description

ASCO Atmospheric CO₂ Vaporisers are supplied as one unit, prewired, pretested (incl. pressure test to 35.4 bar) (513.4 psi) and ready for immediate use.

They consist of a special heat exchanger unit with stainless steel tubes and aluminium fins.

Air is forced through the heat exchanger by fans. Any condensate dropping from the tubes is collected by an aluminium tray mounted on the bottom of the unit, and an outlet pipe can be connected to drain. The unit also includes solenoid valves and a complete control box. A temperature sensor is also incorporated to ensure no liquid CO₂ can pass through the vaporiser.

Installation

ASCO Vaporisers should ideally be installed in areas such as boiler houses and similar warm rooms (max. temperature of +45°C). External installation is only recommended where ambient air temperature is above +10°C and max. +45°C. They also operate at +5°C but at reduced capacity.



Terminal box for external control cabinet



External control cabinet with 10 m connecting cable, temperature sensors and cabinet heating



1'000 kg/h (2'200 lb/h) Atmospheric ASCO CO₂ Vaporiser: Air intake side



Two independent coils

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Atmospheric ASCO CO₂ Vaporiser: Available standard capacities

Pos. 001

200 kg/n (440 lb/h) atmospheric ASCO CO₂ SS Vaporiser
200 kg/h (440 lb/h) atmospheric ASCO CO₂ SS Vaporiser with defrost

part no. 901420
part no. 901491

With temperature dependent start/stop device
 Cooling circuit made of stainless steel tubes EN 1.4301 / AISI 304
 400VAC ± 5 %/50 Hz/3Ph + PE +N
 (other voltages and frequencies on request)

air flow total: 3.4 m³/sec (120 ft³/sec)
 coil volume: 15 l (4 gal)
 net weight: 243 kg (536 lb)
 fan speed: 1'330 rpm
 no. of fans: 2
 power cons. per fan: 0.8 kW (1.1 HP)
 flange connection: 1" PN40



Minimum ambient air temperature required +10 °C, max. +45 °C

Pos. 002

300 kg/n (660 lb/h) atmospheric ASCO CO₂ SS Vaporiser
300 kg/h 660 lb/h atmospheric ASCO CO₂ SS Vaporiser with defrost

part no. 901421
part no. 901491

With temperature dependent start/stop device
 Cooling circuit made of stainless steel tubes EN 1.4301 / AISI 304
 400VAC ± 5 %/50 Hz/3Ph + PE +N
 (other voltages and frequencies on request)

air flow total: 5.1 m³/sec (180 ft³/sec)
 coil volume: 22 l (6 gal)
 net weight: 308 kg (679 lb)
 fan speed: 1'330 rpm
 no. of fans: 3
 power cons. per fan: 0.8 kW (1.1 HP)
 flange connection: 1" PN40



Minimum ambient air temperature required +10 °C, max. +45 °C

Pos. 003

500 kg/n (1100 lb/h) atmospheric ASCO CO₂ SS Vaporiser
500 kg/h (1100 lb/h) atmospheric ASCO CO₂ SS Vaporiser with defrost

part no. 901422
part no. 901493

With temperature dependent start/stop device
 Cooling circuit made of stainless steel tubes EN 1.4301 / AISI 304
 400VAC ± 5 %/50 Hz/3Ph + PE +N
 (other voltages and frequencies on request)

air flow total: 5.1 m³/sec (180 ft³/sec)
 coil volume: 41 l (11 gal)
 net weight: 342 kg (754 lb)
 fan speed: 1'330 rpm
 no. of fans: 3
 power cons. per fan: 0.8 kW (1.1 HP)
 flange connection: 1" PN40



Minimum ambient air temperature required +10 °C, max. +45 °C

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Atmospheric ASCO CO₂ Vaporiser: Available standard capacities

Pos. 004

1000 kg/n (2200 lb/h) atmospheric ASCO CO₂ SS Vaporiser
1000 kg/h (2200 lb/h) atmospheric ASCO CO₂ SS Vaporiser with defrost

part no. 901423

part no. 901494

With temperature dependent start/stop device
 Cooling circuit made of stainless steel tubes EN 1.4301 / AISI 304
 400 VAC ± 5 % / 50 Hz / 3 Ph + PE + N
 (other voltages and frequencies on request)

air flow total: 9.9 m³/sec (350 ft³/sec)
 coil volume: 78 l (21 gal)
 net weight: 595 kg (1'311 lb)
 fan speed: 890 rpm
 no. of fans: 3
 power cons. per fan: 1.8 kW (2.4 HP)
 flange connection: 1" PN40

Minimum ambient air temperature required +10 °C, max. +45 °C



Atmospheric CO₂ Vaporisers: Options

Pos. 001

Dome loaded pressure reducing valve C31

part no. 4046817

for gaseous and liquid CO₂
 incl. repair kit (diaphragm and O-ring)



Pos. 002

Dome loaded pressure reducing valve C2-K32

part no. 4046644

for gaseous and liquid CO₂
 incl. repair kit (diaphragm and O-ring)



Pos. 003

Line safety assembly 1" - 25 bar (363 psi) welding connection

part no. 4070042

Consisting of:

- stainless steel pipe 1" / DN25
- safety valve 25 bar (363 psi)
- vent ball valve stainless steel 1/4"



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Atmospheric CO₂ Vaporisers: Options

Pos. 004

CO₂ flowmeter MF15

part no. 4062504

Mass flow sensor Type MF15 (fully calibrated) assembled to process pipe DN 15, PN 40 with flange connection DIN 2635.
 Measuring range 0-1'000 kg/h (0-2200 lb/h) at 22 bar (319 psi)
 The flow computer (on wall bracket) is equipped with digital display of current CO₂ flow rate in kg/h as well as totalizer and integrated keyboard.
 10 meter connection cable with plug is prewired and connected.
 Voltage 115-230 V, 50/60 Hz



Accessories included:

- 2 pcs counterflange DN 15/PN40 welding (item no. 910101)
- 8 pcs screw M12 x 45, hex., inox (item no. 100020)
- 8 pcs nut M12, inox (item no. 100022)
- 2 pcsgasket DN15, 2 x 51 x 22mm (item no. 110150)

Pos. 005

CO₂ flowmeter MF25

part no. 4062505

Mass flow sensor Type MF25 (fully calibrated) assembled to process pipe DN 25, PN 40 with flange connection DIN 2635.
 Measuring range 0-2'700 kg/h (0-5'940 lb/h) at 22 bar (319 psi)
 The flow computer (on wall bracket) is equipped with digital display of current CO₂ flow rate in kg/h as well as totalizer and integrated keyboard.
 10 meter connection cable with plug is prewired and connected.
 Voltage 115-230 V, 50/60 Hz



Accessories included:

- 2 pcs counterflange DN 25/PN40 welding (item no. 910301)
- 8 pcs screw M12 x 45, hex., inox (item no. 100020)
- 8 pcs Nut M12, inox (item no. 100022)
- 2 pcsgasket DN25, 2 x 71 x 35mm (0.08 x 2.80 x 1.38in) (item no. 110151)

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CO₂ Storage

ASCO CO₂ Storage Tanks Vacuum Insulated



ASCO CO₂ Storage Tanks include a high quality perlite vacuum insulation and are supplied complete with all pipework, valves, safety devices, liquid level indicator, pressure gauge, automatic pressure build up and pressure reducing systems allowing fast and easy installation on site.

The inner tank is made of stainless steel or carbon steel. The outer vessel has a durable protective coating to guard against corrosion.

All interconnecting pipework is made of stainless steel. Special connections are included to allow easy installation of any ancillary equipment such as vaporisers, cylinder filling systems, transfer pumps and dry ice machines etc.

- compact
- simple and safe to operate
- easily installed

Horizontal and vertical tanks

ASCO Storage Tanks are available as horizontal or vertical versions.

Cryogenic gases

Vertical ASCO Storage Tanks can also be configured for other liquefied cryogenic gases (N₂, O₂, Ar).

Specifications

Inner vessel:	Stainless or carbon steel	Piping:	Stainless steel
Outer vessel:	Carbon steel	Level indication:	Differential pressure measuring device (outlet 4 - 20 mA)
Max. working pressure (CO₂ Tanks):	22 bar (319 psi)	Filling connections:	According to ASCO flow diagram
Insulation:	High quality vacuum perlite	Approval:	PED 2014/68/EU or AD2000 and other international codes

ASCO reserves the right to modify all specifications without prior notice.

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ASCO CO₂ Storage Tanks: Special features

Advantages of ASCO vacuum insulated CO₂ Storage Tanks:

- Low maintenance
- Installation is straightforward
- All pipework on vacuum insulated tanks are made of stainless steel
- Vacuum insulated tanks include automatic pressure build up and pressure reducing systems
- Special connections are included to allow easy installation of vaporisers, cylinder filling systems, transfer pumps and dry ice machines
- Tanks can be ordered with different pipework arrangement for other liquefied cryogenic gases (Nitrogen, Oxygen, Argon)



Easy Handling and easy Installation on Site:



ASCO's vacuum insulated Storage Tanks are designed for easy handling and installation on site.

The stainless steel pipework offers the possibility to connect the following equipment to the tank:

- CO₂ cylinder filling systems
- Atmospheric CO₂ vaporisers
- Dry ice pelletizers / block machines
- CO₂ production plants
- CO₂ recovery systems
- CO₂ transfer pumps

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Typical ASCO CO₂ Pipework: Arrangement

All pipework and valves are made of stainless steel. Automatic pressure build up and pressure reducing systems are standardly included to provide stable tank pressure condition.

Optional:

If a tank is used for storing CO₂ without regular withdrawal, a refrigeration unit can be supplied.



Pressure and Level Indicator:



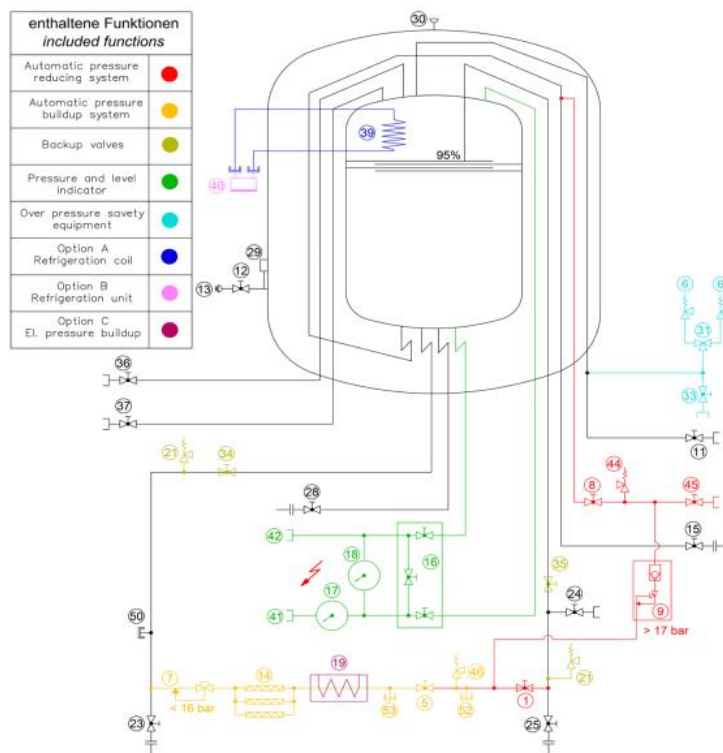
Differential pressure indicator Media 7 for liquid level indication

- Microprocessor-controlled transmitter with interface for configuration and programming on site
- Digital display (LCD) for temperatures down to -40 °C with 100 % bar graph as well as alarm and warning markers
- Two-wire connection for 4-20 mA signal

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Vertical vacuum insulated ASCO CO₂ Tanks

Flow diagram No. 700



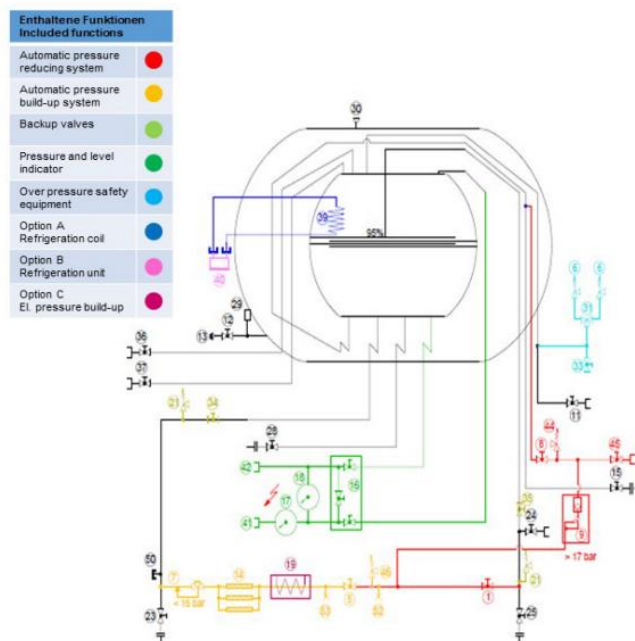
All pipework is aligned inside the tank and the connections are at the bottom of the tank.

- | | |
|--|--|
| 1 Shut-off valve pressure reducing system | 28 Valve for liquid withdrawal |
| 5 Shut-off valve pressure building system | 29 Evacuation connection outer casting |
| 6 Main safety valve | 30 Bursting disk for outer tank |
| 7 Pressure building regulator | 31 Change over valve |
| 8 Shut-off valve pressure reducing system | 33 Vent valve |
| 9 Pressure reducing regulator | 34 Back-up valve liquid line |
| 11 Vent valve | 35 Back-up valve gas line |
| 12 Valve for vacuum probe | 36 Valve for gas withdrawal |
| 13 Vacuum probe | 37 Valve for gas withdrawal |
| 14 Vaporiser for pressure building system | 39 Refrigeration coil |
| 15 Valve for liquid withdrawal (vaporiser) | 40 Refrigeration unit |
| 16 Three valve manifold | 41 Connection for pressure measuring |
| 17 Pressure gauge | 42 Connection for pressure measuring |
| 18 Liquid level indicator | 44 Line safety valve |
| 19 Electrical pressure building heater | 45 Valve for plant |
| 21 Line safety valve | 46 Line safety valve |
| 23 Valve for liquid fill connection | 50 Connection for liquid withdrawal |
| 24 Overflow valve | 52 Connection for liquid withdrawal |
| 25 Valve for gas fill connection | 53 Connection for liquid withdrawal |

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Horizontal vacuum insulated ASCO CO₂ Tanks

Flow diagram No. 750



All pipework is aligned inside the tank and the connections are at the bottom of the tank.

- | | |
|--|--|
| 1 Shut-off valve pressure reducing system | 28 Valve for liquid withdrawal |
| 5 Shut-off valve pressure build-up system | 29 Evacuation connection outer casting |
| 6 Main safety valve | 30 Bursting disk for outer tank |
| 7 Pressure build-up regulator | 31 Change over valve |
| 8 Shut-off valve pressure reducing system | 33 Vent valve |
| 9 Pressure reducing regulator | 34 Back-up valve liquid line |
| 11 Vent valve | 35 Back-up valve gas line |
| 12 Valve for vacuum probe | 36 Valve for gas withdrawal |
| 13 Vacuum probe | 37 Valve for gas withdrawal |
| 14 Vaporiser for pressure build-up system | 39 Refrigeration coil |
| 15 Valve for liquid withdrawal (vaporiser) | 40 Refrigeration unit |
| 16 Three valve manifold | 41 Connection for pressure measuring |
| 17 Pressure gauge | 42 Connection for pressure measuring |
| 18 Liquid level indicator | 44 Line safety valve |
| 19 Electrical pressure build-up heater | 45 Valve for plant |
| 21 Line safety valve | 46 Line safety valve |
| 23 Valve for liquid fill connection | 50 Connection for liquid withdrawal |
| 24 Overflow valve | 52 Connection for liquid withdrawal |
| 25 Valve for gas fill connection | 53 Connection for liquid withdrawal |

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Vertical vacuum insulated ASCO Storage Tanks: Available standard capacities

Pos. 001

6.4 t (14'110 lb) / 6'400 l vertical, vacuum insulated storage tank

Tank to be supplied complete with all pipework in stainless steel, valves, safety devices, differential pressure liquid level indicator, vacuum insulated

- diameter: 1'600 mm (63 in) / height: 7'500 mm (295 in)
- including registration by German TÜV according to PED 2014/68/EU and AD2000 (also for CH)

CO₂: (available options please see flow diagram no. 700)

- maximum filling weight of **6'100 kg (13'448 lb)**
- safety valve setting 22 bar (319 psi)
- inner vessel made of stainless steel

part no.

CO₂ **900800**



Pos. 002

11.0 t (24'251 lb) / 11'000 l vertical, vacuum insulated storage tank

Tank to be supplied complete with all pipework in stainless steel, valves, safety devices, differential pressure liquid level indicator, vacuum insulated.

- diameter: 2'200 mm (87 in) / height: 6'400 mm (252 in)
- including registration by German TÜV according to PED 2014/68/EU and AD2000 (also for CH)

CO₂: (available options please see flow diagram no. 700)

- maximum filling weight of **10'540 kg (23'237 lb)**
- safety valve setting 22 bar (319 psi)
- inner vessel standardly made of carbon steel, also available in stainless steel

LIN, LOX, LAR:

- maximum net capacity of **10'450 litres (2'761 gal)**
- MAWP 18.5 bar (268 psi)
- inner vessel made of stainless steel

part no.

CO₂ **900737**
LIN, LOX, LAR **4046463**



Pos. 003

17.0 t (37'479 lb) / 17'000 l vertical, vacuum insulated storage tank

Tank to be supplied complete with all pipework in stainless steel, valves, safety devices, differential pressure liquid level indicator, vacuum insulated.

- diameter: 2'200 mm (87 in) / height: 8'950 mm (352 in)
- including registration by German TÜV according to PED 2014/68/EU and AD2000 (also for CH)

CO₂: (available options please see flow diagram no. 700)

- maximum filling weight of **16'290 kg (35'913 lb)**
- safety valve setting 22 bar (319 psi)
- inner vessel standardly made of carbon steel, also available in stainless steel

LIN, LOX, LAR:

- maximum net capacity of **16'150 litres (4'266 gal)**
- MAWP 18.5 bar (268 psi)
- inner vessel made of stainless steel

part no.

CO₂ **900741**
LIN, LOX, LAR **4046463**



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Vertical vacuum insulated ASCO Storage Tanks: Available standard capacities

Pos. 004

20.0 t (44'093 lb) / 20'000 l vertical, vacuum insulated storage tank

Tank to be supplied complete with all pipework in stainless steel, valves, safety devices, differential pressure liquid level indicator, vacuum insulated.

- diameter: 2'200 mm (87 in) / height: 10'250 mm (404 in)
- including registration by German TÜV according to PED 2014/68/EU and AD2000 (also for CH)

CO₂: (available options please see flow diagram no. 700)

- maximum filling weight of **19'160 kg (42'241 lb)**
- safety valve setting 22 bar (319 psi)
- inner vessel standardly made of carbon steel, also available in stainless steel

LIN, LOX, LAR:

- maximum net capacity of **19'000 litres (5'019 gal)**
- MAWP 18.5 bar (268 psi)
- inner vessel made of stainless steel

part no.

CO₂ **900743**
LIN, LOX, LAR **4046465**



Pos. 005

23.0 t (50'706 lb) / 23'000 l vertical, vacuum insulated storage tank

Only available for CO₂ storage

Tank to be supplied complete with all pipework in stainless steel, valves, safety devices, differential pressure liquid level indicator, vacuum insulated.

- diameter: 2'200 mm (87 in) / height: 11'600 mm (457 in)
- including registration by German TÜV according to PED 2014/68/EU and AD2000 (also for CH)

CO₂: (available options please see flow diagram no. 700)

- maximum filling weight of **22'110 kg (48'744 lb)**
- safety valve setting 22 bar (319 psi)
- inner vessel standardly made of carbon steel, also available in stainless steel

part no.

CO₂ **900744**



Pos. 006

28.0 t (61'729 lb) / 28'000 l vertical, vacuum insulated storage tank

Tank to be supplied complete with all pipework in stainless steel, valves, safety devices, differential pressure liquid level indicator, vacuum insulated.

- diameter: 2'500 mm (98 in) / height: 10'350 mm (407 in)
- including registration by German TÜV according to PED 2014/68/EU and AD2000 (also for CH)

CO₂: (available options please see flow diagram no. 700)

- maximum filling weight of **26'820 kg (59'128 lb)**
- safety valve setting 22 bar (319 psi)
- inner vessel standardly made of carbon steel, also available in stainless steel

LIN, LOX, LAR:

- maximum net capacity of **26'600 litres (7'027 gal)**
- MAWP 18.5 bar (268 psi)
- inner vessel made of stainless steel

part no.

CO₂ **900745**
LIN, LOX, LAR **4046466**



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Vertical vacuum insulated ASCO Storage Tanks: Available standard capacities

Pos. 007

32.0 t (70'548 lb) / 32'300 l vertical, vacuum insulated storage tank

Tank to be supplied complete with all pipework in stainless steel, valves, safety devices, differential pressure liquid level indicator, vacuum insulated.

- diameter: 2'500 mm (98 in) / height: 11'600 mm (457 in)
- including registration by German TÜV according to PED 2014/68/EU and AD2000 (also for CH)

CO₂: (available options please see flow diagram no. 700)

- maximum filling weight of **30'660 kg (67'594 lb)**
- safety valve setting 22 bar (319 psi)
- inner vessel standardly made of carbon steel, also available in stainless steel

LIN, LOX, LAR:

- maximum net capacity of **30'690 litres (8'107 gal)**
- MAWP 18.5 bar (268 psi)
- inner vessel made of stainless steel

part no.

CO₂ **900746**
LIN, LOX, LAR **4046467**



Pos. 008

37.0 t (81'571 lb) / 36'600 l vertical, vacuum insulated storage tank

Tank to be supplied complete with all pipework in stainless steel, valves, safety devices, differential pressure liquid level indicator, vacuum insulated.

- diameter: 2'500 mm (98 in) / height: 12'900 mm (508 in)
- including registration by German TÜV according to PED 2014/68/EU and AD2000 (also for CH)

CO₂: (available options please see flow diagram no. 700)

- maximum filling weight of **35'450 kg (78'154 lb)**
- safety valve setting 22 bar (319 psi)
- inner vessel standardly made of carbon steel, also available in stainless steel

LIN, LOX, LAR:

- maximum net capacity of **34'770 litres (9'185 gal)**
- MAWP 18.5 bar (268 psi)
- inner vessel made of stainless steel

part no.

CO₂ **900747**
LIN, LOX, LAR **4046468**



Pos. 009

41.0 t (90'390 lb) / 41'000 l vertical, vacuum insulated storage tank

Tank to be supplied complete with all pipework in stainless steel, valves, safety devices, differential pressure liquid level indicator, vacuum insulated.

- diameter: 2'500 mm (98 in) / height: 14'200 mm (557 in)
- including registration by German TÜV according to PED 2014/68/EU and AD2000 (also for CH)

CO₂: (available options please see flow diagram no. 700)

- maximum filling weight of **39'280 kg (86'598 lb)**
- safety valve setting 22 bar (319 psi)
- inner vessel standardly made of carbon steel, also available in stainless steel

LIN, LOX, LAR:

- maximum net capacity of **38'950 litres (10'290 gal)**
- MAWP 18.5 bar (268 psi)
- inner vessel made of stainless steel

part no.

CO₂ **900748**
LIN, LOX, LAR **4046469**



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Vertical vacuum insulated ASCO Storage Tanks: Available standard capacities

Pos. 010

50.0 t (110'231 lb) / 50'000 l vertical, vacuum insulated storage tank

Tank to be supplied complete with all pipework in stainless steel, valves, safety devices, differential pressure liquid level indicator, vacuum insulated.

- diameter: 3'000 mm (118 in) / height: 12'000 mm (472 in)
- including registration by German TÜV according to PED 2014/68/EU and AD2000 (also for CH)

CO₂: (available options please see flow diagram no. 700)

- maximum filling weight of **47'900 kg (105'601 lb)**
- safety valve setting 22 bar (319 psi)
- inner vessel standardly made of carbon steel, also available in stainless steel

LIN, LOX, LAR:

- maximum net capacity of **47'500 litres (12'548 gal)**
- MAWP 18.5 bar (268 psi)
- inner vessel made of stainless steel

part no.

CO₂ **900750**
LIN, LOX, LAR **4046471**



Pos. 011

60.0 t (132'277 lb) / 61'000 l vertical, vacuum insulated storage tank

Only available for LIN, LOX, LAR storage

Tank to be supplied complete with all pipework in stainless steel, valves, safety devices, differential pressure liquid level indicator, vacuum insulated.

- diameter: 3'000 mm (118 in) / height: 13'900 mm (472 in)
- including registration by German TÜV according to PED 2014/68/EU and AD2000 (also for CH)

CO₂: (available options please see flow diagram no. 700)

- maximum filling weight of **59'500 kg (131'175 lb)**
- safety valve setting 22 bar (319 psi)
- inner vessel standardly made of carbon steel, also available in stainless steel

LIN, LOX, LAR:

- maximum net capacity of **57'950 litres (15'309 gal)**
- MAWP 18.5 bar (268 psi)
- inner vessel made of stainless steel

part no.

CO₂ **900830**
LIN, LOX, LAR **4046471**



Pos. 012

73.0 t (160'938 lb) / 73'000 l vertical, vacuum insulated storage tank

Only available for CO₂ storage.

Tank to be supplied complete with all pipework in stainless steel, valves, safety devices, differential pressure liquid level indicator, vacuum insulated.

- diameter: 3'000 mm (118 in) / height: 16'400 mm (646 in)
- including registration by German TÜV according to PED 2014/68/EU and AD2000 (also for CH)

CO₂: (available options please see flow diagram no. 700)

- maximum filling weight of **69'930 kg (154'169 lb)**
- safety valve setting 22 bar (319 psi)
- inner vessel standardly made of carbon steel, also available in stainless steel

part no.

CO₂ **900751**



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Vertical vacuum insulated ASCO Storage Tanks: Available standard capacities

Pos. 013

100.0 t (220'462 lb) / 100'000 l vertical, vacuum insulated storage tank

part no.

Only available for CO₂ storage

CO₂

900752

Tank to be supplied complete with all pipework in stainless steel, valves, safety devices, differential pressure liquid level indicator, vacuum insulated.

- diameter: 3'600 mm (142 in) / height: 15'350 mm (604 in)
- including registration by German TÜV according to PED 2014/68/EU and AD2000 (also for CH)

CO₂: (available options please see flow diagram no. 700)

- maximum filling weight of **95'800 kg (211'203 lb)**
- safety valve setting 22 bar (319 psi)
- inner vessel standardly made of carbon steel, also available in stainless steel
- available options please see flow diagram no. 700



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Horizontal vacuum insulated CO₂ Storage Tanks: Available standard capacities

Pos. 014

11.0 t (24'251 lb) / 11'000 l horizontal, vacuum insulated CO₂ storage tank

part no. 900804

Tank to be supplied complete with all pipework in stainless steel, valves, safety devices, differential pressure liquid level indicator, vacuum insulated.

- diameter: 2'200 mm (86.61 in) / length: 6'400 mm (252 in)
- including registration by German TÜV according to PED 2014/68/EU and AD2000 (also for CH)
- maximum filling weight of **10'540 kg (23'237 lb)**
- safety valve setting 24 bar (348 psi) (if stainless steel upgrade 22 bar) (319 psi)
- inner vessel standardly made of carbon steel, also available in stainless steel
- available options please see flow diagram no. 750



Pos. 015

17.0 t (37'478.6 lb) / 17'000 l horizontal, vacuum insulated CO₂ storage tank

part no. 900805

Tank to be supplied complete with all pipework in stainless steel, valves, safety devices, differential pressure liquid level indicator, vacuum insulated.

- diameter: 2'200 mm (87 in) / length: 9'000 mm (352 in)
- including registration by German TÜV according to PED 2014/68/EU and AD2000 (also for CH)
- maximum filling weight of **16'290 kg (35'919 lb)**
- safety valve setting 24 bar (348 psi) (if stainless steel upgrade 22 bar) (319 psi)
- inner vessel standardly made of carbon steel, also available in stainless steel
- available options please see flow diagram no. 750



Pos. 016

20.0 t (44'093 lb) / 20'000 l horizontal, vacuum insulated CO₂ storage tank

part no. 900906

Tank to be supplied complete with all pipework in stainless steel, valves, safety devices, differential pressure liquid level indicator, vacuum insulated.

- diameter: 2'200 mm (87 in) / length: 10'250 mm (404 in)
- including registration by German TÜV according to PED 2014/68/EU and AD2000 (also for CH)
- maximum filling weight of **19'160 kg (42'241 lb)**
- safety valve setting 24 bar (348 psi) (if stainless steel upgrade 22 bar) (319 psi)
- inner vessel standardly made of carbon steel, also available in stainless steel
- available options please see flow diagram no. 750



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Horizontal vacuum insulated CO₂ Storage Tanks: Available standard capacities

Pos. 017

28.0 t (61'729 lb) / 28'000 l horizontal, vacuum insulated CO₂ storage tank

part no. 900807

Tank to be supplied complete with all pipework in stainless steel, valves, safety devices, differential pressure liquid level indicator, vacuum insulated.

- diameter: 2'500 mm (98 in) / length: 10'400 mm (407 in)
- including registration by German TÜV according to PED 2014/68/EU and AD2000 (also for CH)
- maximum filling weight of **26'820 kg (59'128 lb)**
- safety valve setting 24 bar (348 psi) (if stainless steel upgrade 22 bar) (319 psi)
- inner vessel standardly made of carbon steel, also available in stainless steel
- available options please see flow diagram no. 750



Pos. 018

32.0 t (70'548 lb) / 32'300 l horizontal, vacuum insulated CO₂ storage tank

part no. 900808

Tank to be supplied complete with all pipework in stainless steel, valves, safety devices, differential pressure liquid level indicator, vacuum insulated.

- diameter: 2'500 mm (98 in) / length: 11'600 mm (457 in)
- including registration by German TÜV according to PED 2014/68/EU and AD2000 (also for CH)
- maximum filling weight of **30'660 kg (67'594 lb)**
- safety valve setting 24 bar (348 psi) (if stainless steel upgrade 22 bar) 319 psi
- inner vessel standardly made of carbon steel, also available in stainless steel
- available options please see flow diagram no. 750



Pos. 019

37.0 t (81'571 lb) / 36'600 l horizontal, vacuum insulated CO₂ storage tank

part no. 900809

Tank to be supplied complete with all pipework in stainless steel, valves, safety devices, differential pressure liquid level indicator, vacuum insulated.

- diameter: 2'500 mm (98 in) / length: 12'900 mm (508 in)
- including registration by German TÜV according to PED 2014/68/EU and AD2000 (also for CH)
- maximum filling weight of **35'450 kg (78'154 lb)**
- safety valve setting 24 bar (348 psi) (if stainless steel upgrade 22 bar) (319 psi)
- inner vessel standardly made of carbon steel, also available in stainless steel
- available options please see flow diagram no. 750



Cliente 		Empreiteiro EPC   		
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Horizontal vacuum insulated CO₂ Storage Tanks: Available standard capacities

Pos. 020

41.0 t (90'390 lb) / 41'000 l horizontal, vacuum insulated CO₂ storage tank

part no. 900810

Tank to be supplied complete with all pipework in stainless steel, valves, safety devices, differential pressure liquid level indicator, vacuum insulated.

- diameter: 2'500 mm (98 in) / length 14'150 mm (557 in)
- including registration by German TÜV according to PED 2014/68/EU and AD2000 (also for CH)
- maximum filling weight of **39'280 kg (86'598 lb)**
- safety valve setting 24 bar (348 psi) (if stainless steel upgrade 22 bar) (319 psi)
- inner vessel standardly made of carbon steel, also available in stainless steel
- available options please see flow diagram no. 750



Pos. 021

50.0 t (110'231 lb) / 50'000 l horizontal, vacuum insulated CO₂ storage tank

part no. 900811

Tank to be supplied complete with all pipework in stainless steel, valves, safety devices, differential pressure liquid level indicator, vacuum insulated.

- diameter: 3'000 mm (118 in) / length: 11'990 mm (472 in)
- including registration by German TÜV according to PED 2014/68/EU and AD2000 (also for CH)
- maximum filling weight of **47'900 kg (105'601 lb)**
- safety valve setting 24 bar (348 psi) (if stainless steel upgrade 22 bar) (319 psi)
- inner vessel standardly made of carbon steel, also available in stainless steel
- available options please see flow diagram no. 750

