

# Eco-friendly CO<sub>2</sub> foaming technology for XPS insulation boards

PLASTINUM<sup>®</sup> Foam E

# PLASTINUM® Foam E

## Extrusion foaming with carbon dioxide

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Carbon dioxide is an excellent environmentally friendly alternative to conventional foaming agents.

Building on our CO<sub>2</sub> gas offering, we deliver PLASTINUM® Foam E **CO<sub>2</sub> solutions** engineered for outstanding and efficient extrusion foaming results.

**Our complete package** – including dedicated equipment both for **pressure boosting** and **precise high-pressure metering** – enables customers to enhance their extrusion foaming processes by increasing productivity and product quality.



# Advantages of inert gas (mainly CO<sub>2</sub>) as blowing agent

## Legislation is a strong driving force

- Ozone-depleting substances (HCFCs, e.g. HCFC-22, HCFC-142b) are being phased out (Montreal Protocol) as well as substances with high global warming potential
- Inert gases are the best choice because they are environmentally friendly
  - No Ozone Depletion Potential (ODP)
  - Nearly no Global Warming Potential (GWP)

## Economical reasons

- CO<sub>2</sub> is much cheaper than other blowing agents
- Prices for HCFCs or HFCs for instance will continue to rise
- Payback on investments in new equipment or modifications is rapid

## Not flammable, non-toxic

- No effort required to protect health or prevent explosions

## Factors to take into consideration

- Initial cost and effort to switch from current blowing agents to inert gases
- Extruders with high mixing and cooling abilities required
- Suitable for specific types of foams

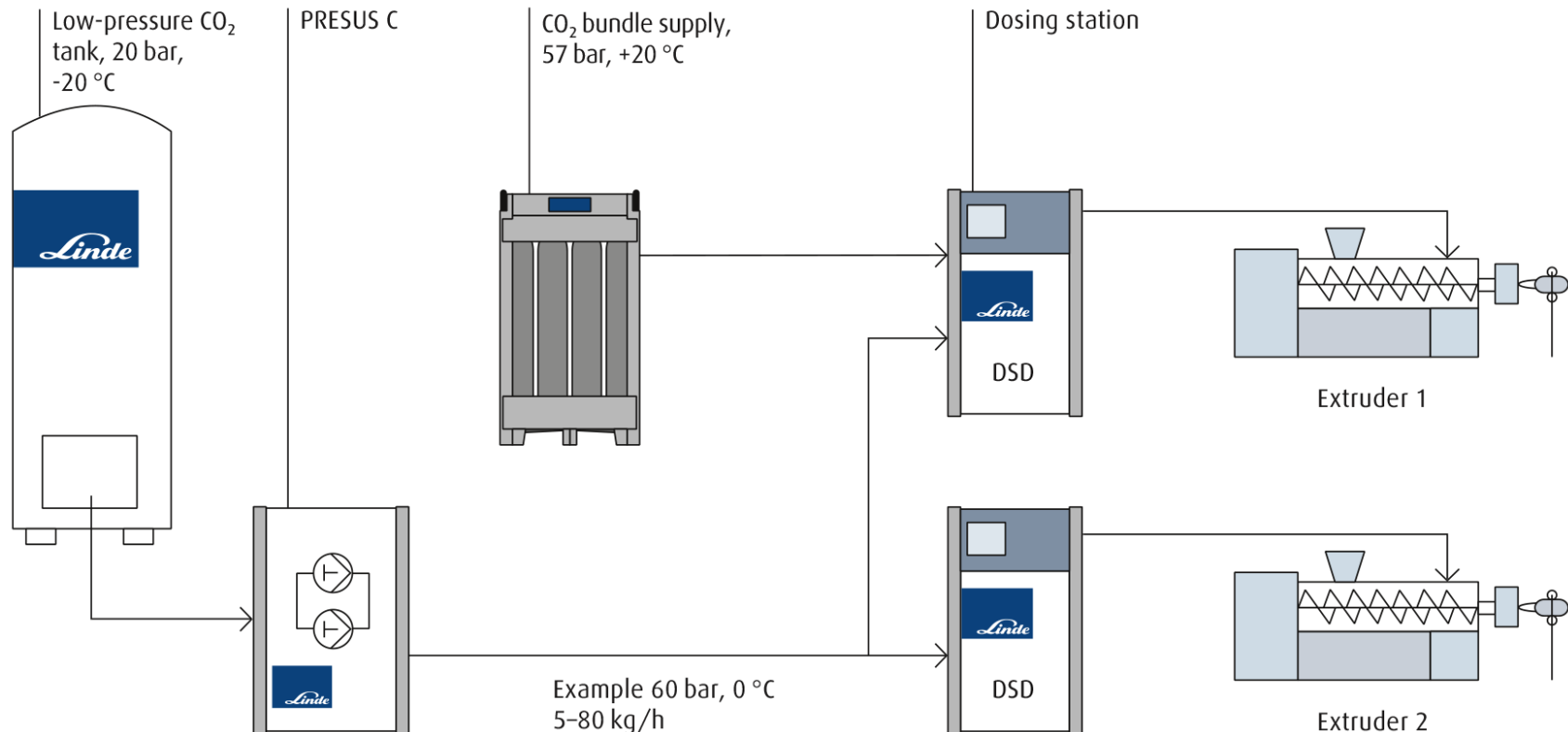
# PLASTINUM<sup>®</sup> Foam E

## One-stop Supply and Metering of liquid CO<sub>2</sub>

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### Schematic of one-stop CO<sub>2</sub> foaming solution



**Bulk supply**  
Liquid CO<sub>2</sub>

**PRESUS<sup>®</sup> C pump system**  
First stage pressure boosting

**DSD metering unit**  
High-pressure mass flow metering unit

# PLASTINUM<sup>®</sup> Foam E

## One-stop Supply and Metering of liquid CO<sub>2</sub>

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### Customer benefits

- **Complete solution from one supplier**
  - no need to integrate several pieces of equipment from several suppliers
  - no risk of not defined interfaces and delivery limits
- **Highly reliable equipment**, proven at many reference customers all over the world
- **Very precise metering** independent of ambient temperature and climate
- **Easy and inexpensive installation**

# First stage

## PRESUS<sup>®</sup> C – Pressure boosting system for liquid CO<sub>2</sub>

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Used to increase liquid CO<sub>2</sub> pressure from a low-pressure tank (approx. 20 bar) up to 100 bar  
PRESUS<sup>®</sup> C delivers absolutely bubble-free liquid CO<sub>2</sub>.

## First stage

### PRESUS<sup>®</sup> C – Pressure boosting system for liquid CO<sub>2</sub>

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#### How it works - Properties

- The CO<sub>2</sub> is pressurized with **compressed air-driven boosters**
- High supply safety / reliability due to **redundancy** (2 boosters)
- **Flexible** alignment of pressure and output with changing demand

#### Advantages PRESUS C System

- **Low investment costs**  
Only a low-pressure tank in combination with the LIC compressor station is necessary
- **Low installation costs**  
No circulation piping, no high-quality insulation and no cooling device required
- The liquid CO<sub>2</sub> is supplied at a temperature significantly below its boiling point and **free of bubbles**
- Absolute **supply reliability**, also during filling of the tank
- The output of CO<sub>2</sub> adjusts **automatically** in synch with demand (even with strong fluctuations)

## Second stage – High pressure metering Inert gas metering unit DSD

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Both the DSD 400 and DSD 500 units offer **highly precise metering** of inert gases (mainly liquid CO<sub>2</sub>) under high and fluctuating pressures into an extruder.

Depending on the application and requirements customers can select between the DSD 500 and the DSD 400.

### Advantages compared with alternative metering pumps

- **Maximum tolerance** regarding **gas bubbles** in the liquid CO<sub>2</sub>
  - High process stability
  - High metering accuracy even at high ambient temperatures
  - No cooling devices required upstream even in hot climates
  - Quick start up
- Can be easily supplied with CO<sub>2</sub> from cylinders/bundles
- It is also suitable for the metering of **gaseous blowing agents** (e.g. nitrogen)





# Second stage – High pressure metering

## DSD 500

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The DSD 500 is suitable for

- continuous (Extrusion foaming)
- discontinuous (discontinuous PUR foaming) operations.
- Wide dosing and pressure range: Metering of liquid CO<sub>2</sub> up to 60 kg/h and 400 bar
- Patented metering concept allows fast reaction on variations of counter pressure and keeps the flow rate constant
- Automatic and fast adjustment to the extruder pressure saves time during start-up or product change
- Integrated ready-to-go solution with full ability for remote control



# Second stage – High pressure metering

## DSD 400

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- Developed for **Extrusion Foaming** and **especially XPS boards**
- Cost improved unit with less standard features than DSD 500
- Metering of liquid CO<sub>2</sub> up to 30 kg/h and 400 bar
- Dosing range adjustable with minor modifications
- Several options available



# Reference customers (Extract)

## XPS insulation boards

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Dow Building Solutions



# References

## Other thermoplastics foamed with CO<sub>2</sub> (or nitrogen)

The PLASTINUM<sup>®</sup> Foam E technology is also used to produce other thermoplastic foams

### Polystyrene (PS)

- Profiles
- Food packaging (trays)



### Polyethylene (PE)

- Films/sheets with higher densities (> 250 kg/m<sup>3</sup>)
- Cable insulation



### Polypropylene (PP)

- Sheets

### PET

- Boards with higher densities (> 200 kg/m<sup>3</sup>)
- Sheets

# Contact

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