Carbon dioxide (CO₂) as a physical blowing agent for extrusion-foamed plastics like XPS insulation boards is an established, excellent alternative to conventional foaming agents (such as HCFCs, HFCs or hydrocarbons). It offers performance, cost, environmental and climate mitigation benefits.

The production of particularly low density foams of high quality using CO₂ hinges on the accurate metering of CO₂ against fluctuating counterpressure. Due to its unique physical properties, CO₂ is more challenging to dose into extruders than traditional liquid foaming agents.

Linde offers a range of premium CO₂ solutions for plastic foaming applications. This includes PLASTINUM® Foam E, designed specifically to meet the metering challenges of CO₂ extrusion foaming systems. This proven high-pressure CO₂ supply and metering system is highly reliable and ensures excellent foaming results of consistently high quality. Reaching beyond innovative hardware and gas supply concepts, we also support our customers with leading-edge process consulting for maximum quality, capacity and profitability gains.

The DSD 400 inert gas metering unit – the heart of our PLASTINUM Foam E technology suite – ensures a stable flow of CO₂ irrespective of pressure and temperature. The DSD 400 basically consists of one CO₂-tuned, high-performance booster operated by compressed air, a mass-flow meter and a flexible control valve, which adjusts the flow to the pressure conditions in the extruder. A state-of-the-art flow regulation concept ensures a stable flow rate even in the event of strong counterpressure fluctuations. Unlike standard metering pumps, the DSD 400 does not require pre-cooled CO₂.

### Challenge
Carbon dioxide (CO₂) as a physical blowing agent for extrusion-foamed plastics like XPS insulation boards is an established, excellent alternative to conventional foaming agents (such as HCFCs, HFCs or hydrocarbons). It offers performance, cost, environmental and climate mitigation benefits.

The production of particularly low density foams of high quality using CO₂ hinges on the accurate metering of CO₂ against fluctuating counterpressure. Due to its unique physical properties, CO₂ is more challenging to dose into extruders than traditional liquid foaming agents.

### Solution
Linde offers a range of premium CO₂ solutions for plastic foaming applications. This includes PLASTINUM® Foam E, designed specifically to meet the metering challenges of CO₂ extrusion foaming systems. This proven high-pressure CO₂ supply and metering system is highly reliable and ensures excellent foaming results of consistently high quality. Reaching beyond innovative hardware and gas supply concepts, we also support our customers with leading-edge process consulting for maximum quality, capacity and profitability gains.

The DSD 400 inert gas metering unit – the heart of our PLASTINUM Foam E technology suite – ensures a stable flow of CO₂ irrespective of pressure and temperature. The DSD 400 basically consists of one CO₂-tuned, high-performance booster operated by compressed air, a mass-flow meter and a flexible control valve, which adjusts the flow to the pressure conditions in the extruder. A state-of-the-art flow regulation concept ensures a stable flow rate even in the event of strong counterpressure fluctuations. Unlike standard metering pumps, the DSD 400 does not require pre-cooled CO₂.

### Benefits
- Accurate mass flow control based on pneumatic feedback control system
- Also suitable for other inert gaseous or fluid blowing agents, e.g. nitrogen or argon
- Reliable and stable metering even in extreme climate conditions
- No additional cooling devices required
- Compact design enabling easy and inexpensive installation
- Simple operation via operator panel and PLC
Overview of one-stop CO₂ foaming solution

Technical data

- **Min. – max. flow rates (model-specific)**
  - 0.7–7.0 kg/h CO₂
  - 1.1–13 kg/h CO₂
  - 4.0–30 kg/h CO₂

- **Booster**
  - DLE30-75-2-GU-C

- **Extruder pressure**
  - Max. 350 bar

- **Agent**
  - Nitrogen (N₂)/carbon dioxide (CO₂)

- **CO₂ feed with dip tube (cylinder)**
  - Max. 20 kg/h

- **CO₂ feed with liquid (tank)**
  - Max. 30 kg/h

- **N₂ feed with standard cylinder, inlet pressure**
  - Max. 2.0 kg/h

- **Compressed air pressure**
  - 4–10 bar

- **Gas inlet connection**
  - Ermeto 8S

- **Gas outlet connection**
  - 1/8” Swagelok

- **PLC**
  - Siemens S 7

- **Display**
  - 6”, 320x240 colour display

- **Power supply**
  - 230 V/50 Hz

- **Weight**
  - Approx. 206 kg

- **Size of housing (WxDxH)**
  - 670 mm x 700 mm x 1750 mm

Know-how and complementary services

- One-stop supply concept including storage tank, pressure booster (e.g. PRESUS® C liquid CO₂ compressor station) and DSD 400

- Expert advice on customisation of PLASTINUM Foam E technologies to individual application challenges

- Gas management services such as SECCURA® automated delivery and ACCURA® remote gas monitoring

- On-site demonstration and trials

Safety

We provide safety information and safety data sheets on the safe handling and usage of CO₂. You will find these on our website.

Linde AG
Gases Division, Seitnerstrasse 70, 82049 Pullach, Germany
Phone +49 89 7446-0, Fax +49 89 7446-1230, plastics.rubber.team@linde.com, www.linde-gas.com/plastinum