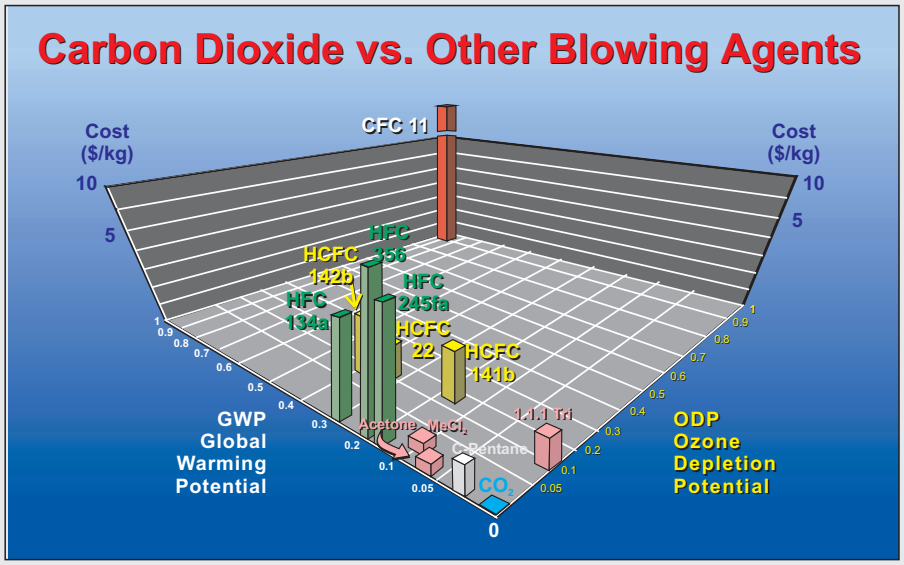
LIQUID CARBON DIOXIDE PU MOULDING TECHNOLOGY

POLYURETHANE TECHNOLOGY DIVISION

Concept

The investigation for a good substitute to CFCs as expanding agents in the Polyurethane industry has brought Cannon towards the most obvious - and most difficult to use - alternative: Carbon Dioxide, in its liquid form, added as separate component to the formulation.
"Chemically" produced CO_2 is used for the expansion of Polyurethane foams since the very beginning of their industrial application, obtaining it from the reaction between Isocyanate and a precise percentage of water added to the Polyol side.
However, due to the high price of Isocyanate, this is a very expensive way to produce CO_2 , and high amounts of water - to reach the lowest density grades - produce a lot of microcrystalline Urea, that hardens the foams and increases their brittleness.
One statement of the Cannon technology is that CO_2 has to be in liquid phase.
Liquid CO_2 can be precisely metered by dedicated system and the output can be controlled by high precision mass flow transducers.
Cannon have developed dedicated solutions to add different percentages of CO_2 in the PU blends and to control the froth during a moulding operation.
Open and closed mould CFC-free liquid CO_2 blown foam is today industrially feasible.



Advantages

The use of liquid CO_2 gives the following general advantages:

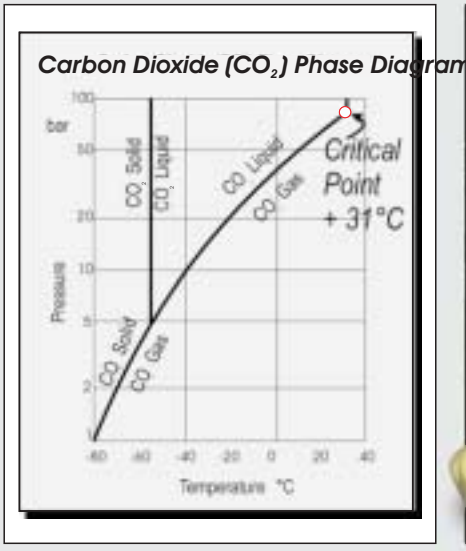
- PU foam can be expanded without CFC;
- costs saving because of less Iso is required coupled with the fact that liquid CO_2 is by far the cheapest available blowing agent;
- environment-friendly (zero Ozone Depletion Potential - ODP), safe, readily available and non-flammable blowing agent with direct benefits to health, safety and insurance costs in the workplace;
- CO_2 has a chemical and physical affinity with PU.

Flexible Foam

- Carbon Dioxide with dedicated flexible PU formulations allows to produce parts with a lower density and the same hardness of the standard products;
- foam physical properties are better than those of all water blown foams;
- the mould filling capability is improved and the demoulding time is faster.

Rigid Foam

- The reduction of Urea enables to have a better adhesion of the foam;
- leakages are reduced thanks to the froth effect;
- the demoulding time is faster (the reaction is less exothermic);
- the density distribution is increased.



Liquid CO_2-blowing produces a pre-expanded froth instead of liquid laydown.

Available Solutions

Cannon have developed dedicated equipment for the precise metering and mixing of liquid CO_2 with conventional formulations.

CannOxide™

- For medium-high levels of CO_2;
- direct injection in the mixing head;
- CO_2 level changeable from shot to shot;
- open and closed mould pouring;
- optimised head design for high CO_2 levels.

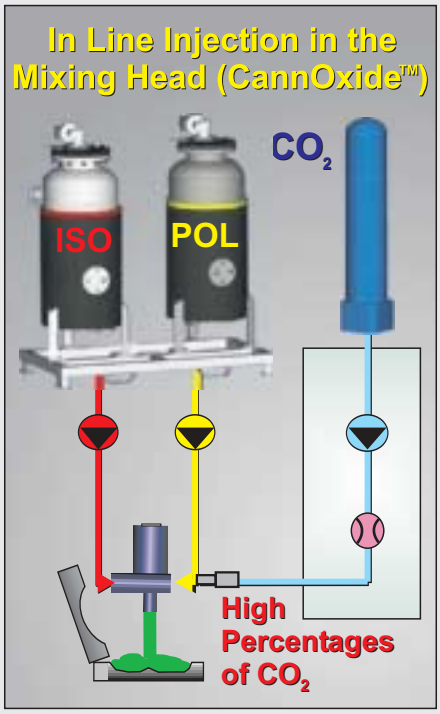
FPL optimised mixing head for liquid CO_2.

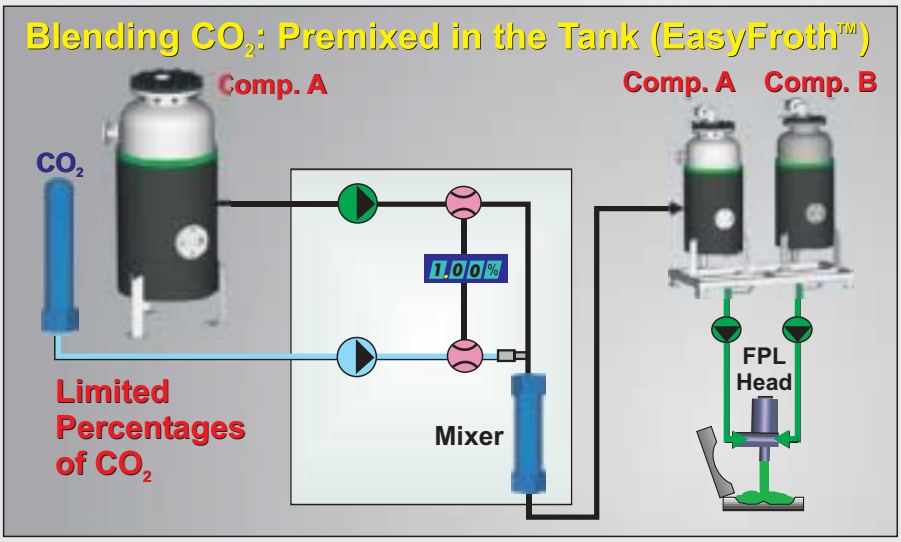
EasyFroth™

- For medium-low levels of CO_2;
- liquid CO_2 pre-mixed either in the Iso or in the Pol tanks;
- high pressure metering of Iso or Pol and CO_2 by means of pump and transfer piston;
- especially suitable for multi-mixheads plants;
- optimised head design for specific applications.

EasyFroth™ premixing unit.

CannOxide™ kit.





Applications

CannOxide™ is now in production for the following applications:

Automotive

- Headrest - foam only and foam in fabric - (reduced impregnation of the textile and less leakage problems);
- sound deadening (easier open mould pouring, higher acoustic insulation properties);
- car and bike seats.

Furniture

- cushions, armchairs, sofa (softer grades of foam and higher quality).

New applications are under the developing phase and will become realities in a short time.

POLYURETHANE TECHNOLOGY DIVISION

Afros S.p.A.
Via Galileo Ferraris, 65
21042 Caronno P.lla - VA - Italy
tel +39-0296531 - fax +39-029656897
e-mail: afros@afros.it
www.cannon.com

113/0101 Edited by: Cannon Communication - Italy.