



23/05/2007 - Carbon dioxide - A simple way to solve a complex problem

The use of chemically generated Carbon Dioxide produced by water and isocyanate reaction is long established as a blowing agent for polyurethane foams, usually in conjunction with other ancillary blowing agents.



Natural progression of this method to the idea of using Carbon Dioxide as the sole blowing agent and consequently to the development of a technology whose objective is to utilise added, not chemically produced, Carbon Dioxide to substitute traditional blowing agents.

Two alternative processes have developed, the first utilising Carbon Dioxide which is handled in a liquid state throughout the process and the second whereby Carbon Dioxide is metered and blended in a gaseous state.

From the start of our activity in 1969 OMS Group's philosophy has centred around the development of solutions which are technically and practically robust to ensure the maximum reliability and repeatability in production conditions. Having developed and evaluated systems for both liquid and gaseous addition, we concluded that the pre-blending of gaseous Carbon Dioxide offered customers the best combination of benefits since it is costeffective, can be retro-fitted to existing equipment and is reliable and accurate in service.



The OMS system comprises a pre mixing device incorporating a 12 bar rated pressure and temperature controlled tank, static mixing unit, Carbon Dioxide flow control and a special system to measure precisely the total quantity of CO2 dissolved in the material.

Depending on the temperature and pressure in the tank, significant quantities of Carbon Dioxide can be dissolved, a typical value of 2% dissolved in Isocyanate (with 10bar tank pressure and at room temperature) gives better than 12% density reductions in flexible foam formulations used typically in the automotive industry.

It is possible to introduce Carbon Dioxide into both Polyol and Isocyanate but possible corrosion and catalyst degradation problems can occur with some Polyols. Standard high pressure foaming machines require some modification involving the replacement of working tanks with suitably rated pressurised types and the means to pressurise the tanks with CO2.

Since the OMS solution is independent of individual metering units it is possible to feed several mixing heads or machines from a single pre mixing unit.

The advantages of the system are:-

- Low investment cost.
- Good production reliability.
- Different mixing heads can be operated at various outputs.
- Low equipment and control complexity.