

POLYURETHANE FOAM INSULATION MANUFACTURING

For thermal insulation needs, rigid low-density polyurethane foam is the ideal insulator. It comes pre-manufactured in forms such as wall boards for the construction industry or can be sprayed in place in appliances such as refrigerators, where it fills the gap between inner and outer shell.



Rigid foam is manufactured through the combination of two components (polyol and isocyanate). The density and quality of the finished product is determined by the mass ratios of each component, meaning that accurate mass ratio metering is critical. Mass ratio metering is generally preferred over volumetric ratio metering. In volumetric metering, variations in component density alongside the existence of bubbles entrained in the various streams (particularly materials like polyol that are viscous in nature) can cause inaccuracies in component ratios. This can lead to poor product quality and, importantly, product that does not meet “spec” must be scrapped as it is not possible to recycle/rework it once the foam is produced. Mass ratio metering offers increased production efficiency and cost savings.

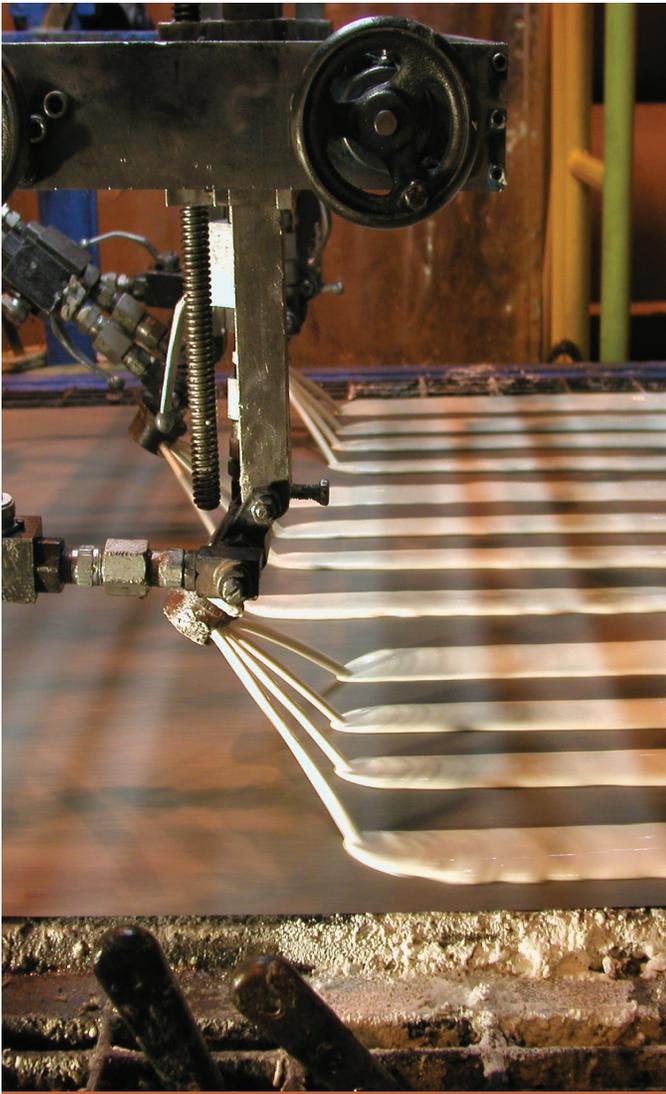
INSULATION BOARD

Rigid foam laminate insulation panels, known as board stock, are formed through a continuous lamination process. In this process, polyol and isocyanate are pumped to a mixing head where they are combined. Then, they are immediately deposited between card stock which forms the

RHEONIK CORIOLIS FEATURES:

- > Pressure ratings up to 1,400 bar/20,000 psi
- > Wide range of sizes/flow capacities
- > Resilient to vibration and pulsation
- > No moving parts
- > Built-in PID controller
- > Built-in batch controller

outside layer of the insulation board, creating a continuous slab of insulation board on a conveyor. The conveyor runs through forming machinery to ensure the board conforms to required thickness. Upon exit, the board is cut into standard size sheets and packaged for shipment. The overall (ratioed) feed rate of the components to the mixing head, in relation to the speed of the conveyor as well as the required thickness of the board to be produced, must be carefully monitored. A low feed rate can result in potentially mis-formed “underweight board” with poor insulation properties, while a high one will increase cost of production unnecessarily.



**RHEONIK CORIOLIS FLOW METERS
ARE THE SMART CHOICE FOR
POLYURETHANE RATIO METERING.**

THEY FEATURE:

- > Small footprint
- > High pressure rating
- > Low maintenance – no moving parts
- > Wide measurement turndown capability
- > Hazardous area suitability
- > Built-in detailed diagnostic capabilities

APPLIANCE INSULATION

Foam insulation is applied differently in appliances. For these, liquid chemicals are injected between the inner and outer walls of the appliance cabinet, where they react together and create a foam which fills the void. It is vital that the correct amount of chemical is injected into each appliance: too much will cause the appliance cabinet to “bulge” while too little may leave voids and create “hot-spots” once the appliance is switched on. Most appliance foaming operations are carried out by robotic dispensing arms to ensure consistency in material placement.

WHY RHEONIK CORIOLIS FLOW METERS?

Polyols used in polyurethane production are high viscosity materials (usually several thousand centipoise), meaning that high pressure pumps are necessary for polyol delivery to the mixing heads where they are combined with isocyanate. Rheonik Omega Coriolis meters are designed to withstand both the high pressures and the pulsations these pumps create when in operation while still providing accurate and reliable measurement performance.

Rheonik Coriolis flowmeters have been used for many years in polyurethane production equipment to monitor the flow of foaming components to the mixing head. They measure mass flow directly, making them insensitive to density and other variabilities in the flow stream. A built-in mass flow controller feature in each meter drives a component feed pump directly, ensuring that real time adjustment of component ratio is maintained and making control implementation a low-cost option for improving existing (volumetric) systems. Installing Rheonik Coriolis meters can dramatically increase productivity by reducing scrap due to off spec product.

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