

Foam Measurement in PVC Suspension Reactors

The technique of polymerizing vinyl chloride monomer (VCM) to PVC is carried out in a reactor with VCM suspended in water.

The typical size of PVC reactors is in the range of 60 to 90 cubic meters with some being as large as 200 cubic meters.

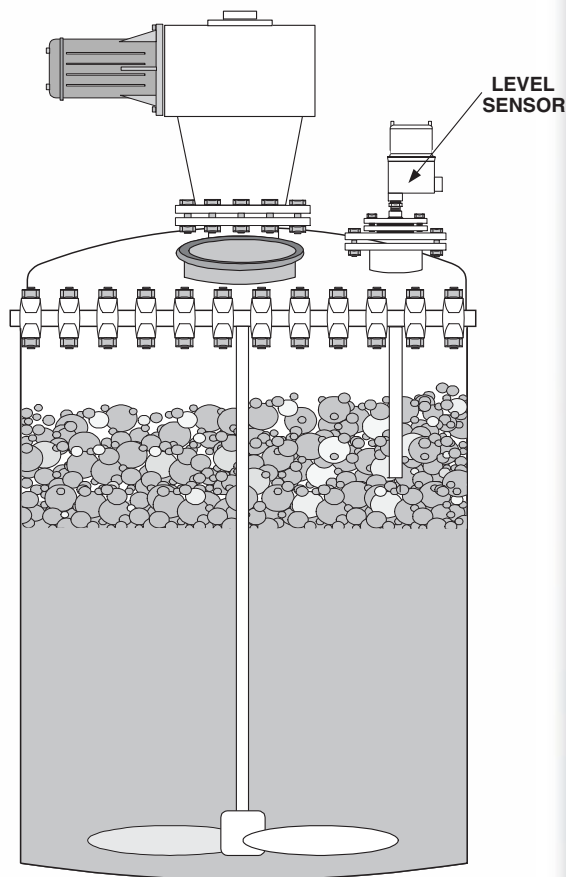
The Process:

In a typical process the reactor is charged with VCM, water, and catalyst and then heavily agitated. Temperatures are approximately 200°F (93°C) and the reaction pressures are approximately 100 psig (6.8 bar). During the polymerization reaction (typically 6 hours) the pressure remains constant until approximately 75% of the VCM is converted to PVC. From this point on, the pressure begins to decrease to approximately 50 psig (3.5 bar), which corresponds to a monomer conversion of approximately 90 percent.

Once it has been decided that the reaction is finished, vacuum pumps are used to strip out the unreacted VCM, causing the process to create heavy foam. As the foam level increases, the vacuum pumps are slowed in order to keep the foam out of the vacuum pumps. Should the foam get into the vacuum pumps, they must be disassembled and thoroughly cleaned before the next batch reaction can begin.

The PVC Foam level measurement:

An RF Admittance level transmitter that utilizes a model 700-0002-024 sensing element has successfully handled the measurement of PVC Foam. The sensing element is characterized by a cooling extension and an inactive section for its combination of strength during the heavy agitation. The application is straight forward as the PVC foam is conductive and an Admittance transmitter provides the ability to remain unaffected by the extremely thick build up on the sensor, just below the mounting. The advantage of this measurement is the VCM stripping as fast as possible, without pulling foam into the vacuum pumps, for quicker batches and shorter turn around time between batches.



RF Admittance Transmitters Available:

- RCT Series – RCT-1310-XXX-24, provides 4-20 mA, HART output signal that can be calibrated and configured via local display, PC software or HART 275 Communicator. Intrinsically Safe approvals from FM, CSA and ATEX for Class I Div. 1, Zone 0, Zone 1 hazardous locations.
- Universal III Series – 509-0075-X07, provides 4-20 mA, HART output signal that can be calibrated and configured via PC software or HART 275 Communicator. Intrinsically Safe approvals from FM and CSA for Class I Div. 1 hazardous locations.
- SLT II Series – 509-0055-X07, provides a 4-20 mA, Honeywell DE protocol output signal that can be calibrated and configured via PC software or Honeywell STS103 (or later) Communicator. Intrinsically Safe approvals from CSA for Class I Div. 1 hazardous locations.
- Universal II Series – 508-0045-X07, provides 4-20 mA output signal that can be calibrated via manual adjustments local to the transmitter. Intrinsically Safe approvals from FM and CSA for Class I Div. 1 hazardous locations.

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