

**Experimental Study of Foam Formation During Refrigerant Desorption from a R134a/Polyolester Lubricating Oil Mixture**

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Foam formation is an important issue affecting hermetic compressors during start-up. In such conditions, liquid oil can be drawn into the cylinder, causing a deterioration in the performance. Information on the phenomenon is scarce, which led to an effort of reproducing it at laboratory conditions. A saturated mixture of R134a and polyolester oil, at a given pressure, was submitted to controlled depressurization. The foam formation process (rate, height and bubble size) was measured with the help of a digital video camera. A frame taken from a typical run is shown in figure 1. A number of runs were carried out, for different pressure drop rates and initial refrigerant concentrations. The experimental data was employed to adapt an existing model of foam formation (Jeelani et al., 1990). A new function for the volume rate of coalescence of gas bubbles was empirically determined. The resulting semi-empirical model has shown to agree well to experimental data and is suitable to be included in simulation models of hermetic compressors.

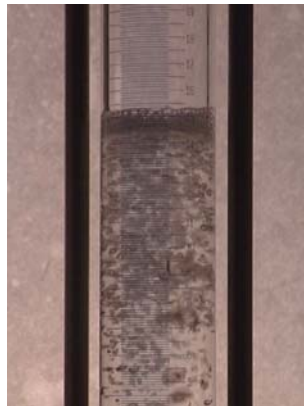


Figure 1 – Foam formation from depressurization of a R134a/polyolester mixture.

**Reference**

Jeelani, S.A.K., Fidi, N., Hartland, S., Foam Formation During CO<sub>2</sub> Desorption from Agitated Supersaturated Aqueous Surfactant Solutions, *Chemical Engineering Science*, 45(4), 1043-1048, 1990.