

Water local volume fraction on oil in water dispersion.

ABSTRACT

The phase distribution of water-oil flows was studied experimentally from a separated flow without mixer to a oil in water or water in oil dispersed in horizontal tubes. Under most conditions the pattern was oil continuous in water dispersed or water continuous in oil dispersed flow continuously and there is entrainment in the form of drops of phase into the other. The investigations were carried out through the cross-sectional phase distribution in the flow of mixtures of water and kerosene such as EXXSOL-D80 in a horizontal 25.4 mm bore stainless steel section. The phase fraction distribution was determined using a traversing beam gamma densitometer, with the beam being traversed in three directions (0°, 45° and 90° of the vertical line passing through the axis of the tube). Measurements were made at three positions spaced along the 9.7 m test section length (1.0 m, 5.85 m and 7.72 m along the horizontal tube). The measurements were done in the Two-phase Oil Water Experimental Rig (TOWER) facility. This facility allows the two fluids to be fed to the test section before they are separated and returned once more to the test line. The flow developed naturally from an initial stratified flow in which the oil and water were introduced separately at the top and the bottom of the test section respectively. It was found that the liquids were fully inter-dispersed by the end of the test section. The results were also used to define the flow patterns in water-oil liquid-liquid flow system. The phase fraction distribution was shown to be homogeneously mixed near to the outlet of the test section.

Keyword: Water-oil; Dispersed; Phase fraction; Homogeneously.