The objective of the present study has been to develop dynamic models for two-phase flow in pipes (evaporation and condensation). Special attention has been given to modeling evaporators for refrigeration plant particular dry-expansion evaporators. Models of different complexity have been formulated. The different models deviate with respect to the details included and calculation time in connection with simulation. The models have been implemented in a new library named ThermoTwoPhase to the programming language Modelica. A test rig has been built with an evaporator instrumented in a way that the models can be validated against experimental data. The models developed can be used in connection with intelligent control of refrigerant flow to dry-expansion evaporators.

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