

*FluidFlow3* has no limit on the size of network which can be modelled. However, limitations will arise from:

- Memory available in the particular computer
- Time of solution – mainly dependent on the level of processor
- Video card
- Navigation about a large model and identification of problems
- Compressible or incompressible flow

Networks containing up to 1000 pipes have been regularly modelled successfully on the type of PC typically available in 2008 and it is unlikely that memory capacity of such a computer would be a limitation on a 4000+ pipe model. But checking data and navigating around such a model would be difficult.

The best way to analyse large networks is to break them down into smaller sub-models. Two features of *FluidFlow3* assist in this, viz:

- The ability to copy a model from one flowsheet (or design file) to another.
- The *General Resistance Kv (Flow Coefficient)* element.

A *Kv* component comprises a known flowrate and associated pressure drop. This data may be provided by a manufacturer for a particular piece of equipment. Or it could be determined from a sub-model where an appropriate value of, say, flowrate has been entered in order to calculate the pressure drop. These values of flowrate and pressure would then be entered into the *General Resistance* dataset and used in an “overall” model of the system instead of the sub-model pipework and equipment. *FluidFlow3* has a sophisticated routine to adapt the entered values of the *Kv* component to those calculated in the actual model using the principles of dynamic similarity.

Very large models should be developed as a series of sub-models; say of a few hundred pipes each. These sub-models could represent logical divisions of the network, such as particular areas or levels or perhaps individual facilities in a process plant. Using typical flowrates or pressures the sub-models can be tested for data and network integrity and saved as separate files. They can also be represented by an appropriate *Kv* component.

Then the complete model can be developed using the *Kv* elements instead of the sub-models, and ringmain sizes, pumps etc determined. Finally the *Kv* elements could be replaced by the one or more of the sub-models used to develop them for a final, accurate, representation of the full pipe system.

For instance, suppose a district heating system comprises the main pumping system, a ringmain and a number of buildings or facilities utilising the circulated hot water. Each building pipe system could be reduced to a *Kv component* and so the actual simulation then reduces to the ringmain pumping system and a number of *Kv elements*.. The result is a smaller, more manageable model, faster solution times and very much less chance of data entry error.

*This method is particularly useful for the design of large spray/sprinkler or fixed fire protection systems. Individual deluge systems can be represented as a single Kv element.*