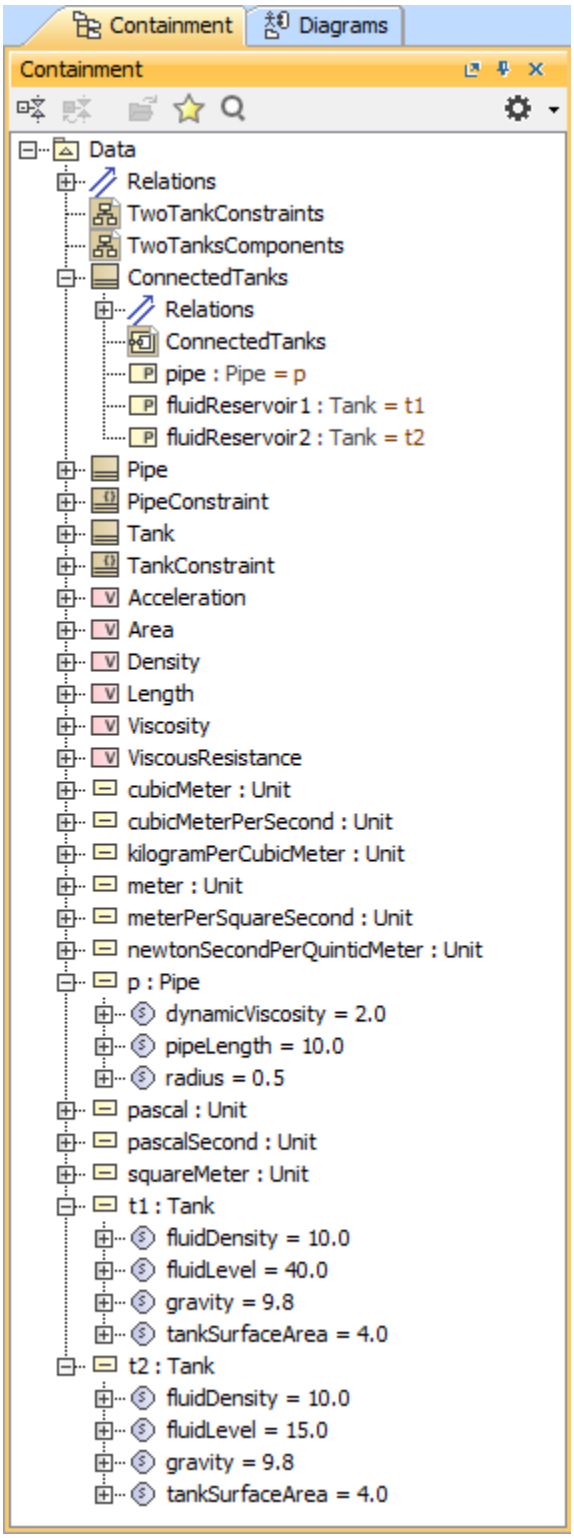
Default SysML values and instance specifications

1. Three initial values required for the simulations are determined by instance specifications that are set in the fluidReservoir1, fluidReservoir2 and *pipe* part properties in the *ConnectedTanks* internal block diagram. Instance specifications *t1*, *t2* and *p* are assigned as the default values to each of these part properties *fluidReservoir1*, *fluidReservoir2*, *pipe* respectively. These specifications assign an initial values to the value properties that are constant throughout each simulation run and are required to solve the constraints.
2. The *Tank* block is a classifier of t1 and t2 instance specifications with default numeric values specified. The slots assigned default values are:
    a. **tanksufaceArea**: This slot determines the surface area of the tank, and is required to determine the amount of pressure in the tank as the fluid level changes. The unit is m2.
    b. **gravity**: This slot is the gravity constant assumed to be 9.8 m/s2. It is is also required to determine the amount of pressure in the tank as the fluid level changes.
    c. **fluidDensity**: This is a slot of the fluid in the tank itself that is coupled with and assigned to the tank. It is required for the constraints that determine the amount of fluid pressure in the tank. The unit for this property is kg/m3.
    d. **fluidLevel**: This slot determines the height of the fluid level in each tank at the start of the simulation but will change as the simulation runs and the fluid level height changes with the flow of fluid from one tank to the other. Their units are m.
3. The *Pipe* block is a classifier of *p* instance specification with default numeric values specified. The slots assigned default values are:
    a. **pipeLength**: This is a slot of the pipe that determines the resistance of the pipe to the flow of fluid through the pipe. The longer the pipe, the more resistance the fluid has to face to flow through the pipe. The unit is m.
    b. **radius**: Assuming the pipe has a circular cross-section, the radius is required to determine the cross-sectional area of the pipe. This is in turn required to determine the resistance of the pipe to the flow fluid through the pipe. The smaller the radius, the more resistance the fluid has to face to flow through the pipe. The unit is m.
    c. **dynamicViscosity**: This is a slot of the fluid in the pipe itself that is coupled with and assigned to the pipe. It is required for the constraints that determine the amount of resistance to fluid flow in the pipe. The unit for this property is kg/(s*m).


Containment
Diagrams
Containment
Data
Relations
TwoTankConstraints
TwoTanksComponents
ConnectedTanks
Relations
ConnectedTanks
pipe : Pipe = p
fluidReservoir1 : Tank = t1
fluidReservoir2 : Tank = t2
Pipe
PipeConstraint
Tank
TankConstraint
Acceleration
Area
Density
Length
Viscosity
ViscousResistance
cubicMeter : Unit
cubicMeterPerSecond : Unit
kilogramPerCubicMeter : Unit
meter : Unit
meterPerSquareSecond : Unit
newtonSecondPerQuinticMeter : Unit
p : Pipe
dynamicViscosity = 2.0
pipeLength = 10.0
radius = 0.5
pascal : Unit
pascalSecond : Unit
squareMeter : Unit
t1 : Tank
fluidDensity = 10.0
fluidLevel = 40.0
gravity = 9.8
tankSurfaceArea = 4.0
t2 : Tank
fluidDensity = 10.0
fluidLevel = 15.0
gravity = 9.8
tankSurfaceArea = 4.0