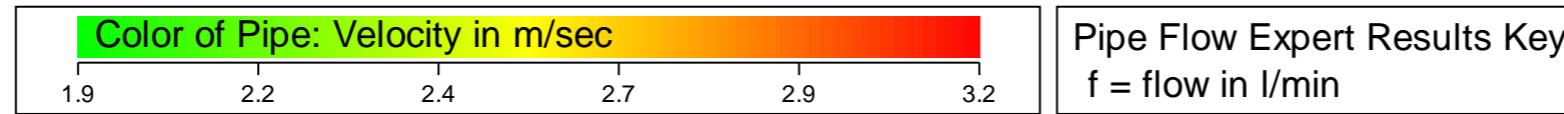


Pipe Flow Design 1

Results Data



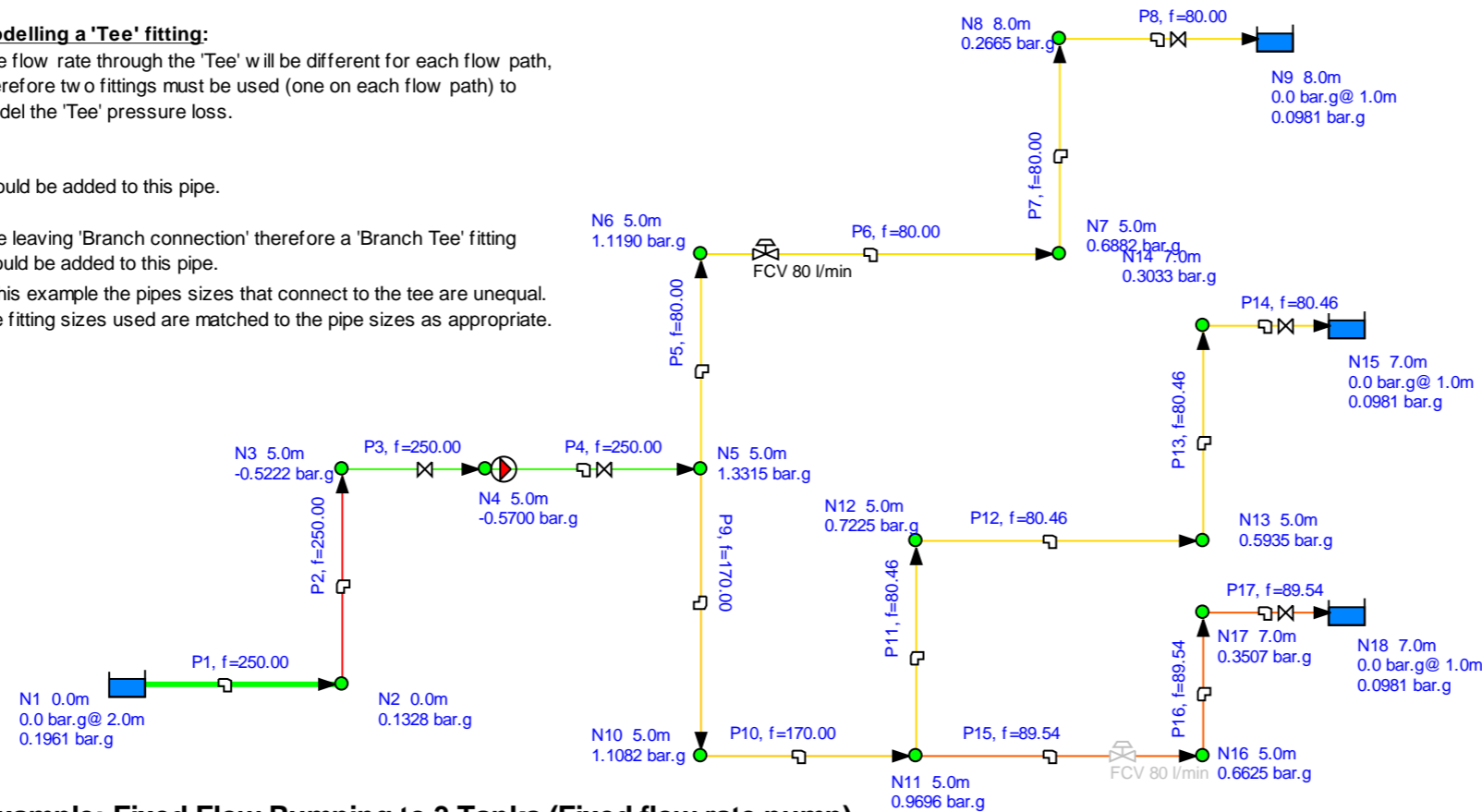
Modelling a 'Tee' fitting:

The flow rate through the 'Tee' will be different for each flow path, therefore two fittings must be used (one on each flow path) to model the 'Tee' pressure loss.

should be added to this pipe.

pipe leaving 'Branch connection' therefore a 'Branch Tee' fitting should be added to this pipe.

In this example the pipes sizes that connect to the tee are unequal. The fitting sizes used are matched to the pipe sizes as appropriate.



Example: Fixed Flow Pumping to 3 Tanks (Fixed flow rate pump)

This system models a fixed flow rate pump transferring 250 l/min of fluid from a supply container to 3 holding tanks. The flow to the top tank is controlled by a FCV set at 80 l/min. The centre tank has been isolated by closing pipe P14. The balance of the flow, 170 l/min is forced along the path to the bottom tank. Click the Calculate button to solve the system.

NOTE: When a fixed flow rate pump is used there must always be at least one path through the system where the flow rate is not controlled. If a Flow Control Valve was fitted to pipe P15 the total outlet flow would not equal the total pump flow rate and hence it would not be possible to find a balanced solution for the system.

Pipe Flow Expert can be configured to display the flow rates, fluid velocity or total pressure drop on the drawing. View the results table to see all information, or use the mouse to hover over a pipe, a node or a component to display individual details in the hint pane.

Fluid Data

Zone	Fluid Name	Chemical Formula	Temperature °C	Pressure bar.g	Density kg/m ³	Centistokes	Centipoise	Vapour Pressure bar.a	State
1	Water	H ₂ O	20.000	0.0000	1000.000	1.000	1.000	0.024000	Liquid

Pump Data

Pipe Id	Pipe Name	Pump Name	Speed rpm	Pref. Op From l/min	Pref. Op To l/min	Flow In/Out l/min	Velocity m/sec	Suction Pressure bar.g	Discharge Pressure bar.g	Pump Head (+) m.hd Fluid	Pump NPSHr m.hd (absolute)	Pump NPSHa m.hd (absolute)	Pump Efficiency Percentage	Pump Power Kilowatts
4	P4	Pump	Set Flow Rate			250.00	2.056	-0.5756	1.4202	20.352	Not known	4.218	Not known	Not Known

Pipe Data

Pipe Id	Pipe Name and Notes	Material	Inner Diameter mm	Roughness mm	Length m	Total K	Mass Flow kg/min	Flow l/min	Velocity m/sec	Entry Pressure bar.g	Exit Pressure bar.g
1	P1	2" Steel (ANSI) Sch. 40	52.502	0.046	5.000	1.3500	250.0000	250.00	1.925	0.1961	0.1328
2	P2	1-1/2" Steel (ANSI) Sch. 40	40.894	0.046	5.000	0.5700	250.0000	250.00	3.172	0.1328	-0.5222
3	P3	2" PVC (flexible)	50.800	0.140	4.000	0.1500	250.0000	250.00	2.056	-0.5222	-0.5700
4	P4	2" PVC (flexible)	50.800	0.140	6.000	1.2900	250.0000	250.00	2.056	-0.5700	1.3315
5	P5	1" Steel	25.400	0.046	5.000	1.1500	80.0000	80.00	2.631	1.3315	1.1190
6	P6	1" Steel	25.400	0.046	5.000	0.6900	80.0000	80.00	2.631	1.1190	0.6882
7	P7	1" Steel	25.400	0.046	3.000	0.6900	80.0000	80.00	2.631	0.6882	0.2665
8	P8	1" Steel	25.400	0.046	3.000	1.8700	80.0000	80.00	2.631	0.2665	0.0981
9	P9	1-1/4" Steel	36.628	0.046	8.000	1.1500	170.0000	170.00	2.689	1.3315	1.1082
10	P10	1-1/4" Steel	36.628	0.046	5.000	0.6900	170.0000	170.00	2.689	1.1082	0.9696
11	P11	1" Steel	25.400	0.046	5.000	2.0700	80.4627	80.46	2.647	0.9696	0.7225
12	P12	1" Steel	25.400	0.046	3.000	0.6900	80.4627	80.46	2.647	0.7225	0.5935
13	P13	1" Steel	25.400	0.046	2.000	0.6900	80.4627	80.46	2.647	0.5935	0.3033
14	P14	1" Steel	25.400	0.046	4.000	1.8700	80.4627	80.46	2.647	0.3033	0.0981
15	P15	1" Steel	25.400	0.046	6.000	1.1500	89.5373	89.54	2.945	0.9696	0.6625
16	P16	1" Steel	25.400	0.046	2.000	0.6900	89.5373	89.54	2.945	0.6625	0.3507
17	P17	1" Steel	25.400	0.046	4.000	1.8700	89.5373	89.54	2.945	0.3507	0.0981

Node Data

Node Id	Node Type	Node	Elevation m	Liquid Level m	Surface Press. bar.g	Press. at Node bar.g	HGL at Node m.hd Fluid	Demand In l/min	Demand Out l/min	Total Flow In l/min	Total Flow Out l/min
1	Tank	N1	0.000	2.000	0.0000	0.1961	2.000	N/A	N/A	0.00	250.00
2	Join Point	N2	0.000	N/A	N/A	0.1328	1.354	0.00	0.00	250.00	250.00
3	Join Point	N3	5.000	N/A	N/A	-0.5222	-0.325	0.00	0.00	250.00	250.00
4	Join Point	N4	5.000	N/A	N/A	-0.5700	-0.813	0.00	0.00	250.00	250.00
5	Join Point	N5	5.000	N/A	N/A	1.3315	18.578	0.00	0.00	250.00	250.00
6	Join Point	N6	5.000	N/A	N/A	1.1190	16.410	0.00	0.00	80.00	80.00
7	Join Point	N7	5.000	N/A	N/A	0.6882	12.018	0.00	0.00	80.00	80.00
8	Join Point	N8	8.000	N/A	N/A	0.2665	10.717	0.00	0.00	80.00	80.00
9	Tank	N9	8.000	1.000	0.0000	0.0981	9.000	N/A	N/A	80.00	0.00
10	Join Point	N10	5.000	N/A	N/A	1.1082	16.300	0.00	0.00	170.00	170.00
11	Join Point	N11	5.000	N/A	N/A	0.9696	14.888	0.00	0.00	170.00	170.00
12	Join Point	N12	5.000	N/A	N/A	0.7225	12.367	0.00	0.00	80.46	80.46
13	Join Point	N13	5.000	N/A	N/A	0.5935	11.052	0.00	0.00	80.46	80.46
14	Join Point	N14	7.000	N/A	N/A	0.3033	10.093	0.00	0.00	80.46	80.46
15	Tank	N15	7.000	1.000	0.0000	0.0981	8.000	N/A	N/A	80.46	0.00
16	Join Point	N16	5.000	N/A	N/A	0.6625	11.756	0.00	0.00	89.54	89.54
17	Join Point	N17	7.000	N/A	N/A	0.3507	10.576	0.00	0.00	89.54	89.54
18	Tank	N18	7.000	1.000	0.0000	0.0981	8.000	N/A	N/A	89.54	0.00

Energy Data

Pipe Id	Pipe Name	Energy Loss To Pipe Friction	Energy Loss To Pipe Fittings	Energy Loss To Pipe Components	Energy Loss To Pipe Control Valves	Energy Loss To Pump Inefficiency	SUBTOTAL Loss Pipe Items + Pump	Energy Loss To Discharge Pressure	Energy Loss To Change in Elevation	TOTAL USED Sum of All Items
		Kilowatts	Kilowatts	Kilowatts	Kilowatts	Kilowatts	Kilowatts	Kilowatts	Kilowatts	Kilowatts
1	P1	0.015962	0.010418	0.000000	0.000000	N/A	0.026380	0.000000	0.000000	0.026380
2	P2	0.056656	0.011951	0.000000	0.000000	N/A	0.068607	0.000000	0.204305	0.272912
3	P3	0.018617	0.001321	0.000000	0.000000	N/A	0.019937	0.000000	0.000000	0.019937
4	P4	0.027925	0.011358	0.000000	0.000000	Efficiency Not Specified	0.039283	0.000000	0.000000	0.039283
5	P5	0.023036	0.005308	0.000000	0.000000	N/A	0.028344	0.000000	0.000000	0.028344
6	P6	0.023036	0.003185	0.000000	0.031210	N/A	0.057431	0.000000	0.000000	0.057431
7	P7	0.013821	0.003185	0.000000	0.000000	N/A	0.017007	0.000000	0.039227	0.056233
8	P8	0.013821	0.008632	0.000000	0.000000	N/A	0.022454	0.013076	0.000000	0.035529
9	P9	0.051500	0.011780	0.000000	0.000000	N/A	0.063280	0.000000	0.000000	0.063280
10	P10	0.032188	0.007068	0.000000	0.000000	N/A	0.039255	0.000000	0.000000	0.039255
11	P11	0.023426	0.009722	0.000000	0.000000	N/A	0.033148	0.000000	0.000000	0.033148
12	P12	0.014056	0.003241	0.000000	0.000000	N/A	0.017296	0.000000	0.000000	0.017296
13	P13	0.009370	0.003241	0.000000	0.000000	N/A	0.012611	0.000000	0.026302	0.038913
14	P14	0.018741	0.008783	0.000000	0.000000	N/A	0.027524	0.013151	0.000000	0.040675
15	P15	0.038393	0.007442	0.000000	0.000000	N/A	0.045835	0.000000	0.000000	0.045835
16	P16	0.012798	0.004465	0.000000	0.000000	N/A	0.017263	0.000000	0.029269	0.046532
17	P17	0.025595	0.012102	0.000000	0.000000	N/A	0.037697	0.014634	0.000000	0.052332