SUNRISE

PIPENET™ NEWS

VOLUME 2 ï ISSUE 6 Winter 2009 / 2010

LEADING THE WAY IN FLUID FLOW ANALYSIS

Welcome to the PIPENET e-newsletter!

Contents:

NEWS!

PIPENET Vision 1.40 is now available!

PIPENET Vision 1.40 is now being sent to all subscribers to PIPENET Maintenance, Updates and Support.

If you would like to receive a copy, email us with your company name and contact details at:

pipenet@sunrise-sys.com

We look forward to hearing from you!

NEWS!

PIPENET Vision 1.40 *out now*

PIPENET 1.40 is now available! It contains powerful new capabilities in all of the **PIPENET** modules.

Please see page 2 for full details of the exciting new range of feature additions and enhancements now available to **PIPENET** users.

Also included in this edition is news of our work towards new demonstrations and releases, and of course, an edition of **PIPENET** News would not be complete without some examples of how to make the best of **PIPENET.**

We hope you will enjoy it!

PIPENET Vision 1.40 *includes...*

Transient Module

- A new inertial pump component has been added
- Maximum & minimum pressures are displayed for each component in both the Properties and Data Windows, upon completion of a calculation
- Velocity can now appear as a variable type when defining output tables for pipes
- Forces extrema and pipe type extrema can be displayed in the data window (Tabular Results page)
- KPa & MPa pressure units have been added
- The appearance of the forces diaglog is even more user friendly
- The two node caisson is enhanced
- The maximum pipe size in the Spray mode of the Transient module is increased. It is now 1200mm / 48inches, with 6 new nominal pipe sizes
- The improved accumulator model can simulate the effect of different gases in addition to air

Spray/Sprinkler Module

- The hydraulic graph is now NFPA styled in the GUI Data Window & NFPA output report
- The maximum number of pipes is increased to 7000
- The maximum number of nozzles is increased to 3000
- KPa & MPa pressure units have been added
- Velocity pressure, calculated to NFPA guidelines appears in the NFPA output files

Standard Module

- A new heat exchanger component has been added
- KPa & MPa pressure units have been added
- The combined maximum number of pipes and ducts is increased to 7000
- The control valve is improved

Graphical Interface

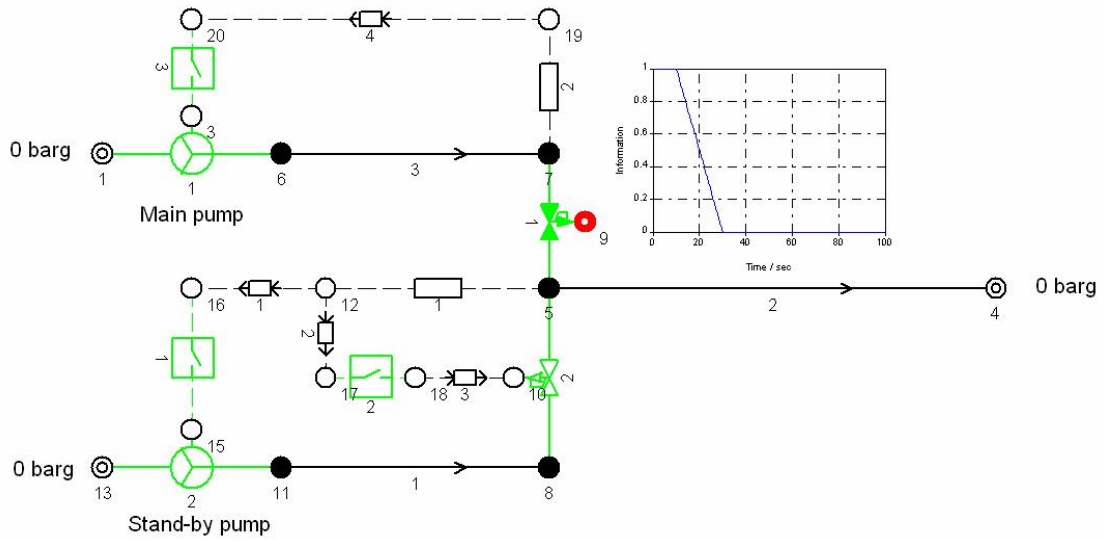
- New Explode Node facility ï right click on a node containing 2 or more attached components & the node will split into a number of different nodes each attached to just 1 link
- Change the colour by left hand clicking on a colour
- The Help Menu can now take you straight to the Sunrise Systems website
- The Restore Defaults is improved.

PIPENET Vision 1.40 includes a new inertial pump component

Inertial Pump and the Applications

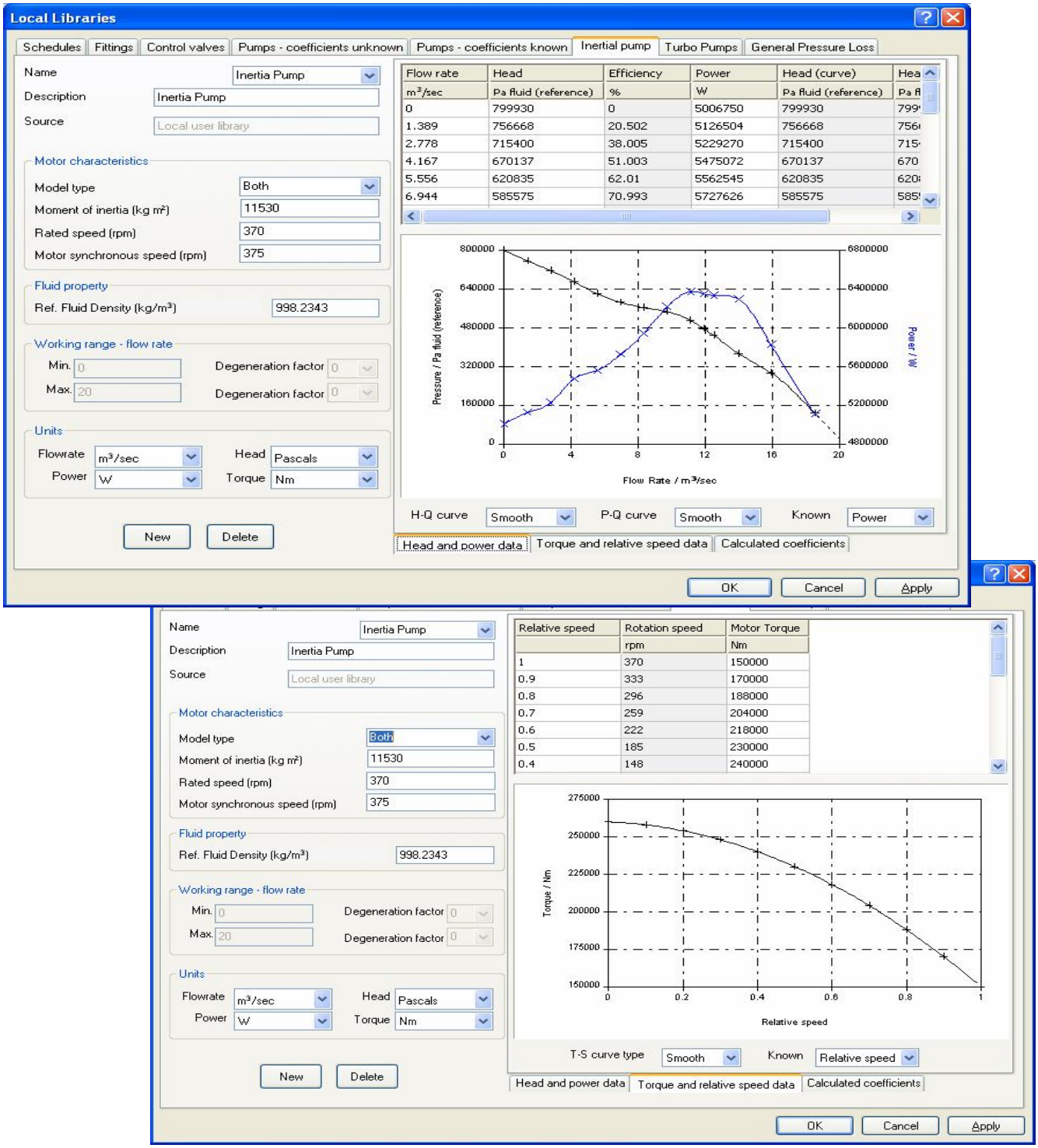
Pumpôs start-up and stoppage are two important transient sources in pipeline network. Turbo pump model can predict transient behaviour during pump trip for all four quadrants but Suter curves are not available for most pumps. On the contrary, simple pump model requires pumpôs performance curve (H-Q curve) only but the start-up/trip time has to be estimated arbitrarily so that it may be inaccurate and unreliable. The newly developed inertial pump model is designed to predict pumpôs steady/transient behaviour in the working region. The required parameters are fewer and feasible comparing with turbo pump. It works like a simple pump at steady state but can simulate transient behaviour during start-up or stoppage.

The transient flow during pump switch is studied in the example below. In this scenario, the valve 1 is closed manually in 20 seconds. The main pump 1 will be shut off automatically when the outlet pressure exceeds 8 bars to protect the pump and pipes. The pressure in the main supply pipe 2 will drop continually after the main pump trips until below 4 barg when the stand-by pump 2 is triggered to start up automatically.



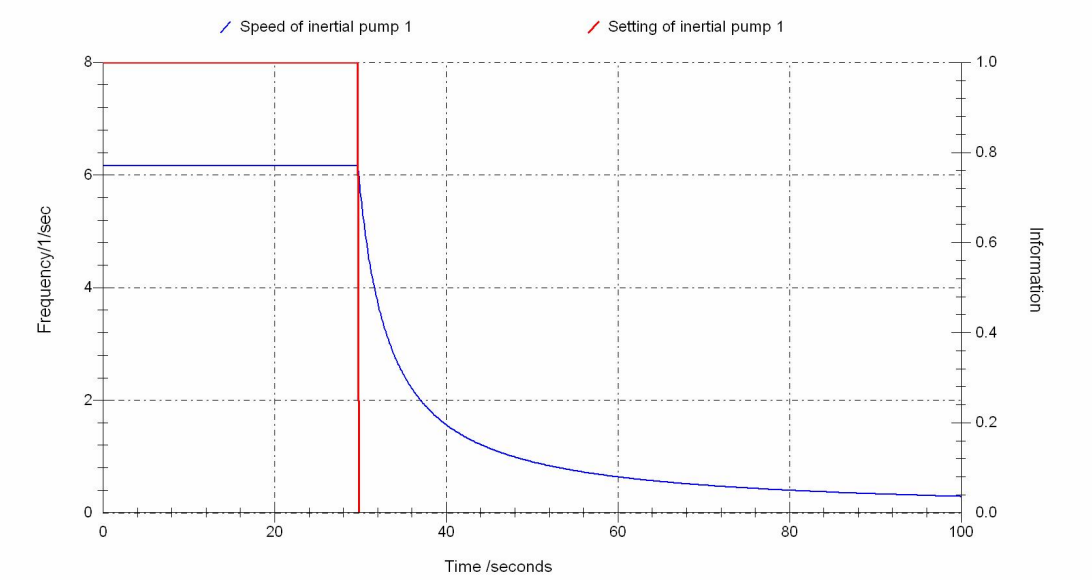
Pump library

Inertial pump is defined in the pump library just like other pumps. The input parameters and curves are quite feasible from manufacturers. The basic input parameters and pump curves include reference fluid density, rated speed, moment of inertia, and Flowrate ï Head and Flowrate ï Power or Efficiency curves. The above information is enough for pump trip simulation. If pump start-up is simulated, extra data is required, including motor synchronous speed and motor Speed ï Torque curve. If the manufacturer cannot provide the moment of inertia, it can be estimated based on the pump size, the rated speed and the rated power. The details refer to the user manual.



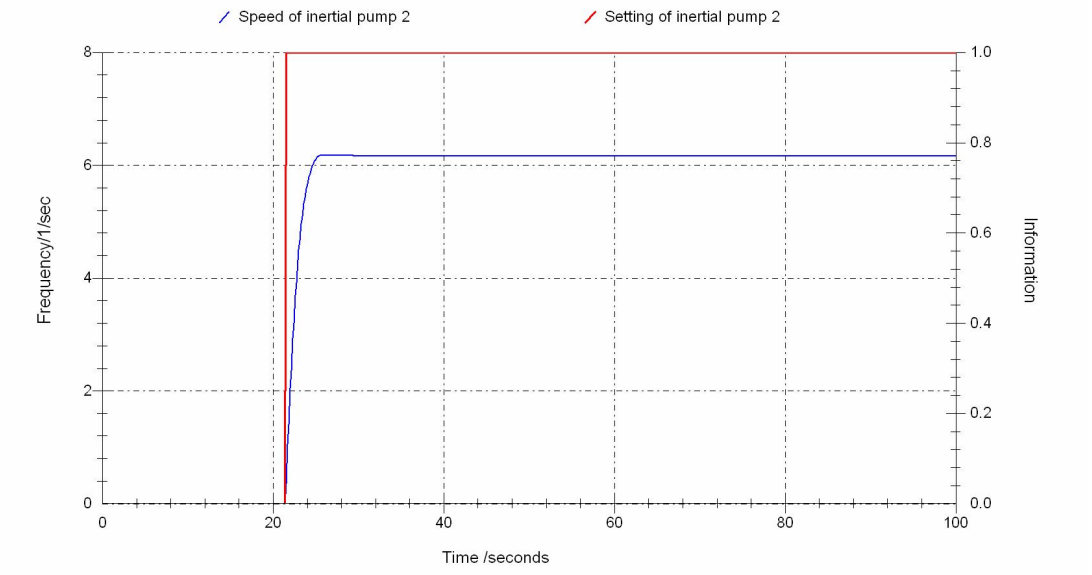
Pump trip

The figure below show the input control signal and the pump speed of the main pump 1 during pump trip. The pump speed decreases quite fast at the beginning when the control signal switch and tends to flat as the time going.



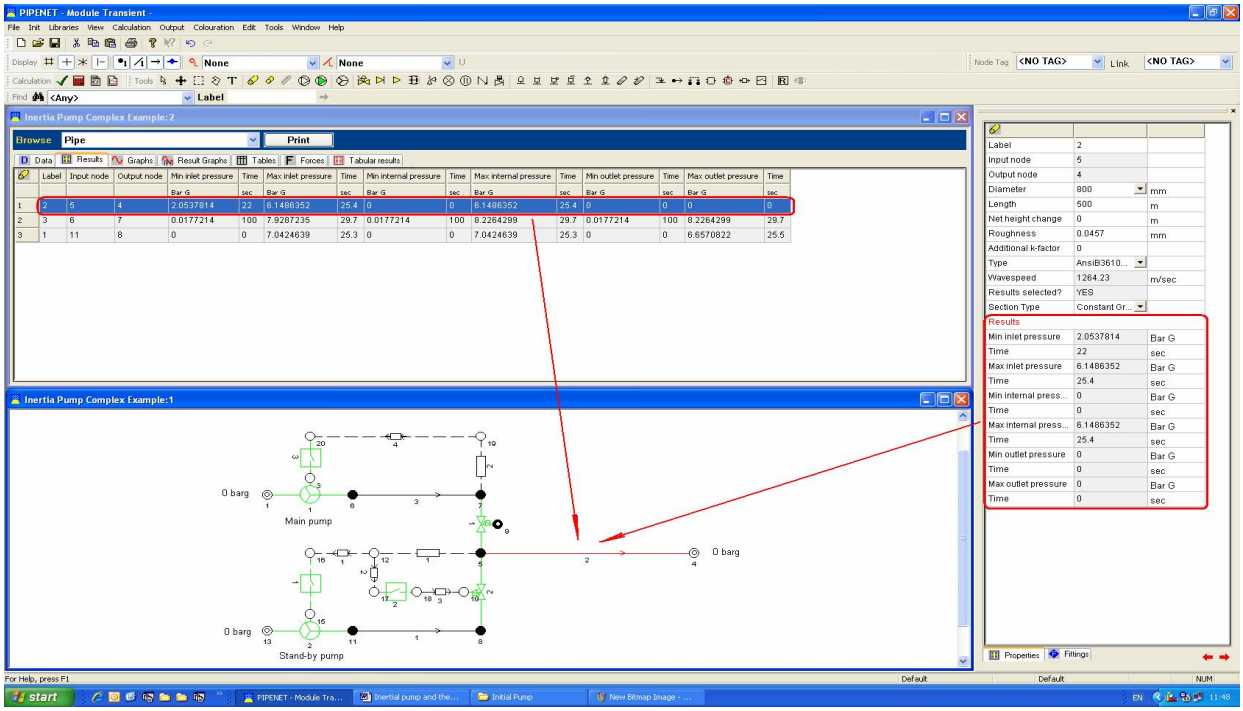
Pump start-up

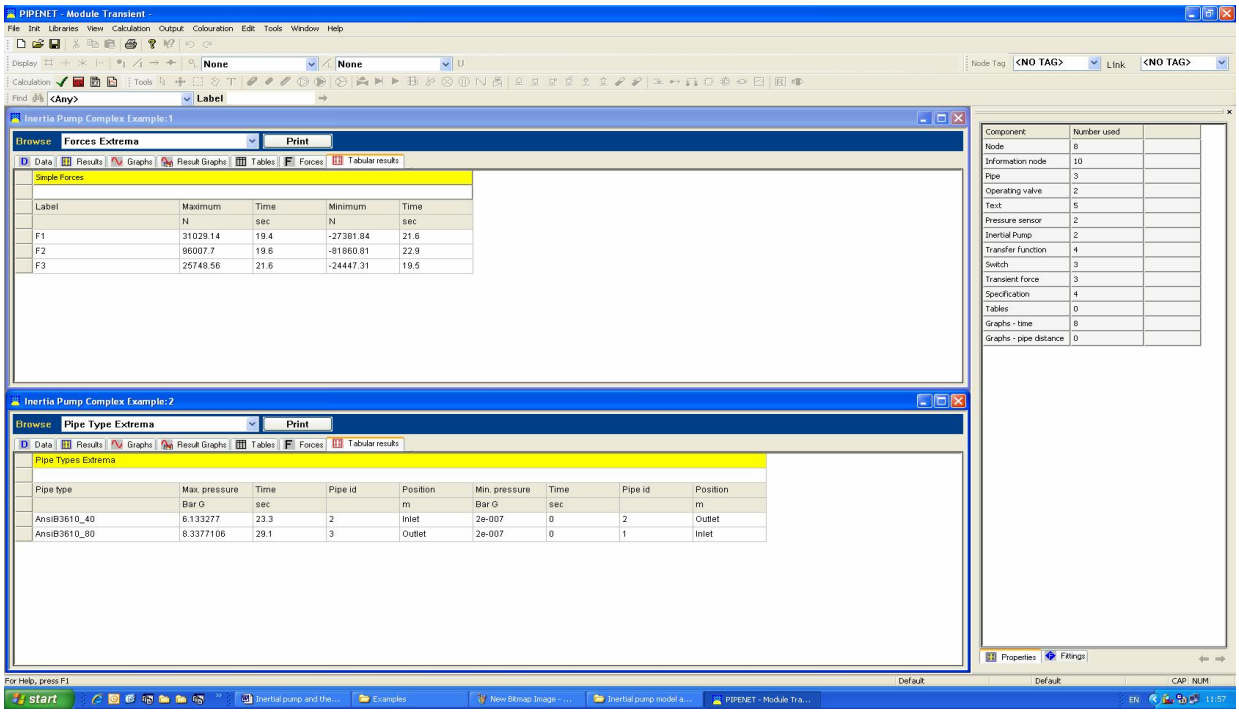
In this figure we can conclude that the pump start-up speed is much quick than the pump trip.



Display of Maximum and Minimum

Maximum & minimum pressures are displayed for each component in both the Properties and Data Window. Force and pipe type maximum and minimum can be displayed in Data Window also.





PIPENET

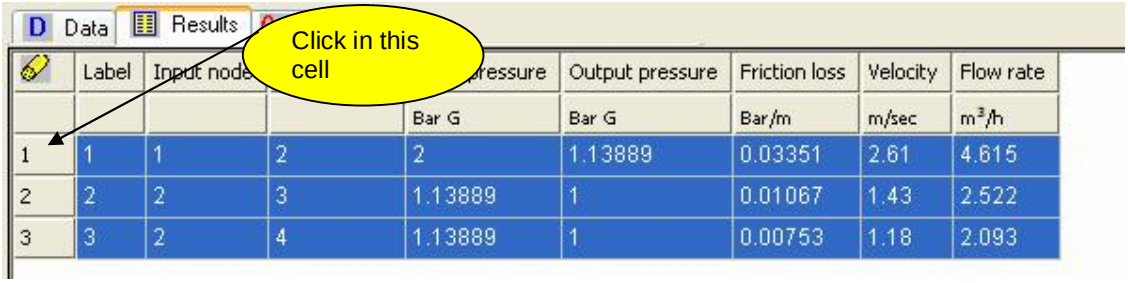
Leading The Way in Fluid Flow Analysis

Converting the Result Report to Excel

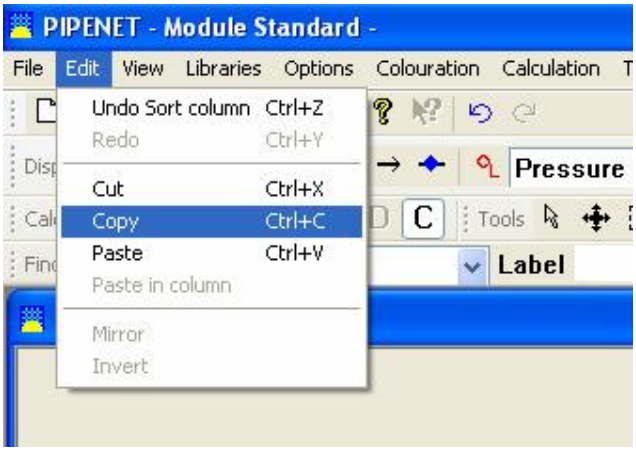
There are two methods for converting the Result Report.

Method 1:

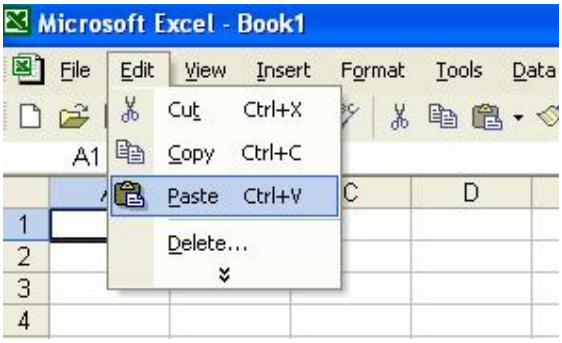
1. Select the Data Window showing results:



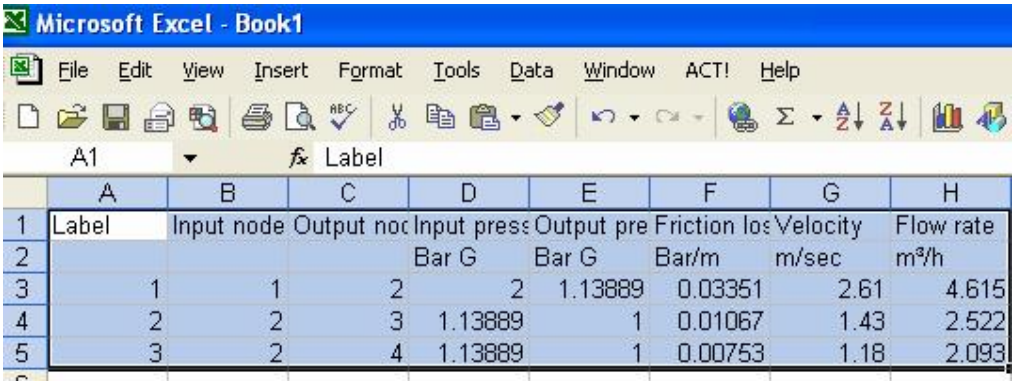
2. Edit/Copy



3. Paste in Excel:

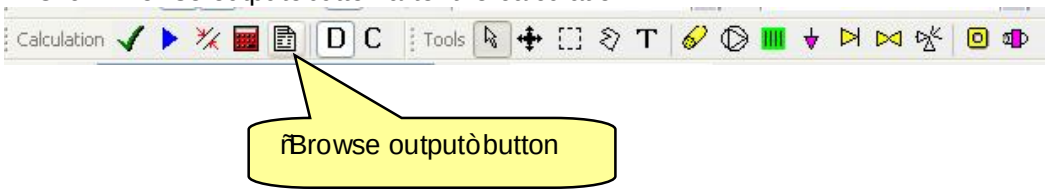


4. It is done:



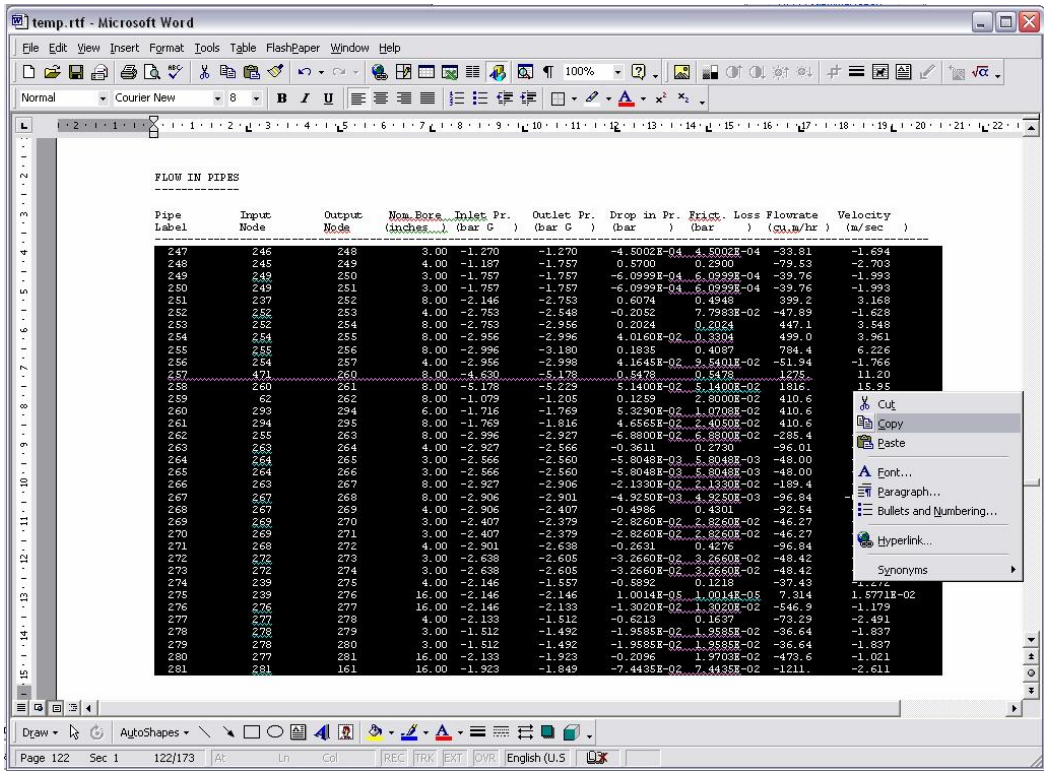
Method 2:

1. Click ñBrowse outputòbutton after the calculation.

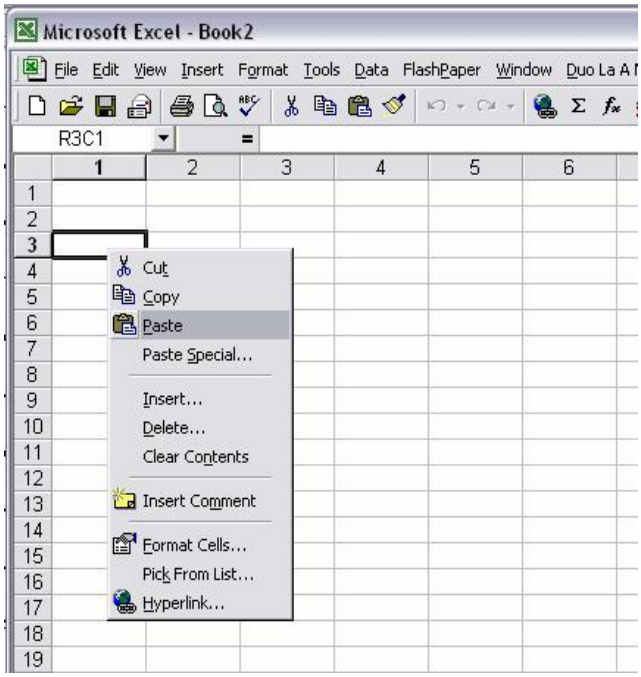


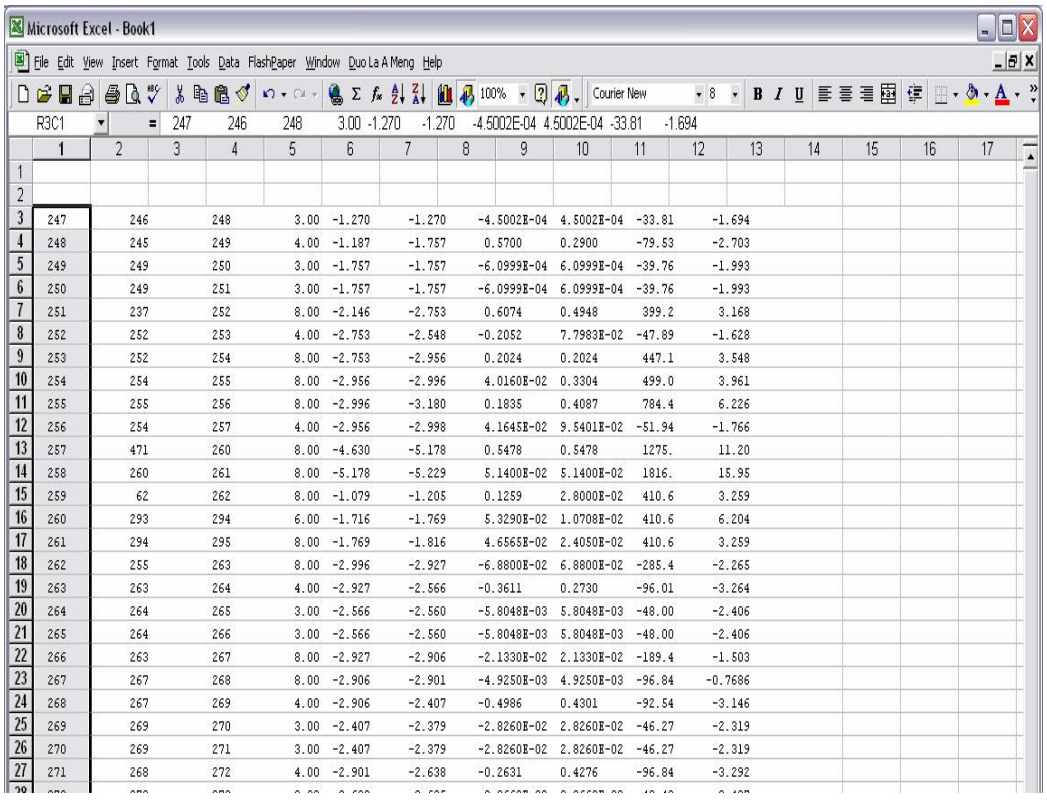
2. Select ñWordòin the ñOutput optionsòdialog, then click ñOKò

3. Go to the page which you are interested, select the results which you need and copy them.



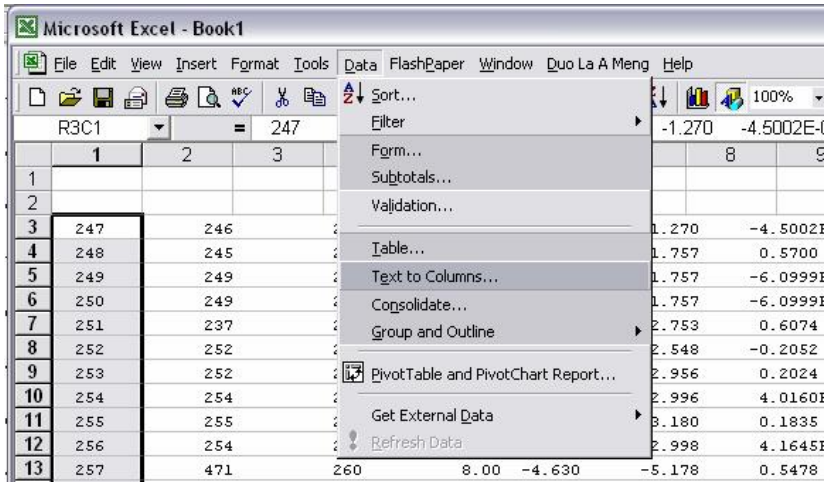
4. Go to Excel and do ñPasteò



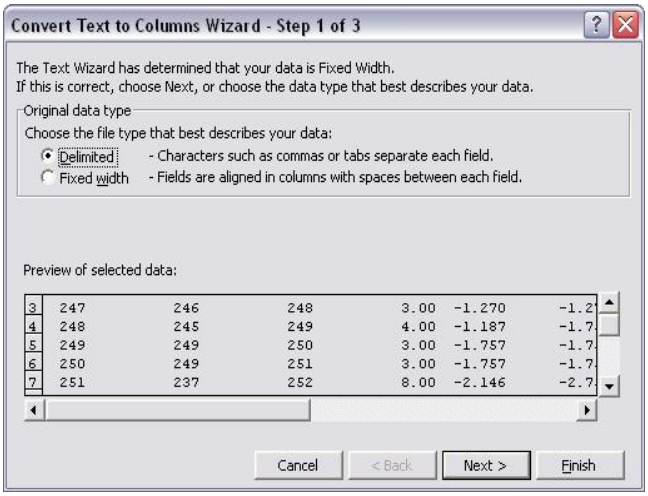


1																	
2																	
3	247	246	248	3.00	-1.270	-1.270	-4.5002E-04	4.5002E-04	-33.81	-1.694							
4	248	245	249	4.00	-1.187	-1.757	0.5700	0.2900	-79.53	-2.703							
5	249	249	250	3.00	-1.757	-1.757	-6.0999E-04	6.0999E-04	-39.76	-1.993							
6	250	249	251	3.00	-1.757	-1.757	-6.0999E-04	6.0999E-04	-39.76	-1.993							
7	251	237	252	8.00	-2.146	-2.753	0.6074	0.4948	399.2	3.168							
8	252	252	253	4.00	-2.753	-2.548	-0.2052	7.7983E-02	-47.89	-1.628							
9	253	252	254	8.00	-2.753	-2.956	0.2024	0.2024	447.1	3.548							
10	254	254	255	8.00	-2.956	-2.996	4.0160E-02	0.3304	499.0	3.961							
11	255	255	256	8.00	-2.996	-3.180	0.1835	0.4087	784.4	6.226							
12	256	254	257	4.00	-2.956	-2.998	4.1645E-02	9.5401E-02	-51.94	-1.766							
13	257	471	260	8.00	-4.630	-5.178	0.5478	0.5478	1275.	11.20							
14	258	260	261	8.00	-5.178	-5.229	5.1400E-02	5.1400E-02	1816.	15.95							
15	259	62	262	8.00	-1.079	-1.205	0.1259	2.8000E-02	410.6	3.259							
16	260	293	294	6.00	-1.716	-1.769	5.3290E-02	1.0708E-02	410.6	6.204							
17	261	294	295	8.00	-1.769	-1.816	4.6565E-02	2.4050E-02	410.6	3.259							
18	262	255	263	8.00	-2.996	-2.927	-6.8800E-02	6.8800E-02	-285.4	-2.265							
19	263	263	264	4.00	-2.927	-2.566	-0.3611	0.2730	-96.01	-3.264							
20	264	264	265	3.00	-2.566	-2.560	-5.8048E-03	5.8048E-03	-48.00	-2.406							
21	265	264	266	3.00	-2.566	-2.560	-5.8048E-03	5.8048E-03	-48.00	-2.406							
22	266	263	267	8.00	-2.927	-2.906	-2.1330E-02	2.1330E-02	-189.4	-1.503							
23	267	267	268	8.00	-2.906	-2.901	-4.9250E-03	4.9250E-03	-96.84	-0.7686							
24	268	267	269	4.00	-2.906	-2.407	-0.4986	0.4301	-92.54	-3.146							
25	269	269	270	3.00	-2.407	-2.379	-2.8260E-02	2.8260E-02	-46.27	-2.319							
26	270	269	271	3.00	-2.407	-2.379	-2.8260E-02	2.8260E-02	-46.27	-2.319							
27	271	268	272	4.00	-2.901	-2.638	-0.2631	0.4276	-96.84	-3.292							

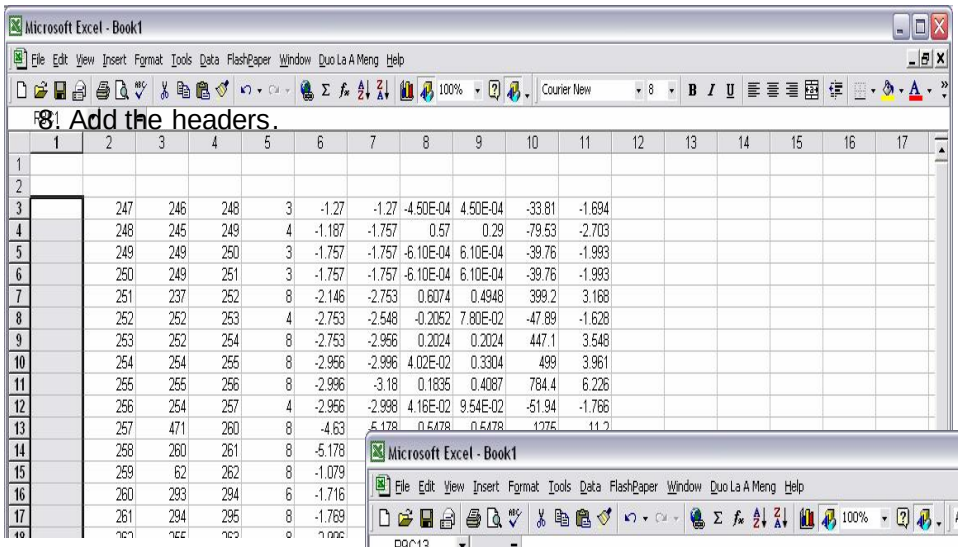
5. Click Menu->Data->Text to columns.



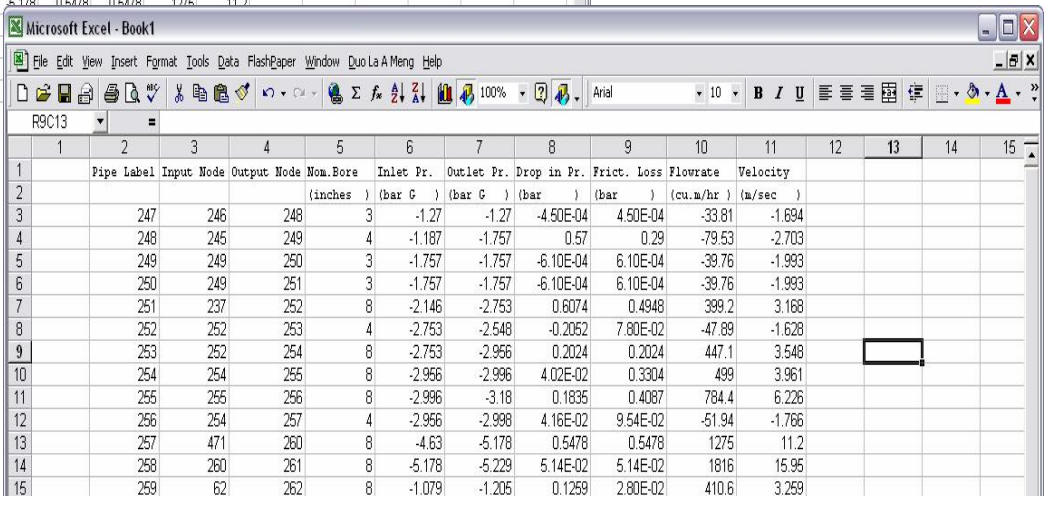
6. Select ñDelimitedò and click ñNextò



7. Select ñSpaceò and click ñFinishò



8. Add the headers.



	Pipe Label	Input Node	Output Node	Nom.Bore	Inlet Pr.	Outlet Pr.	Drop in Pr.	Frict. Loss	Flowrate	Velocity
				(inches)	(bar G)	(bar G)	(bar)	(bar)	(cu.m/hr)	(m/sec)
3	247	246	248	3	-1.27	-1.27	-4.50E-04	4.50E-04	-33.81	-1.694
4	248	245	249	4	-1.187	-1.757	0.57	0.29	-79.53	-2.703
5	249	249	250	3	-1.757	-1.757	-6.10E-04	6.10E-04	-39.76	-1.993
6	250	249	251	3	-1.757	-1.757	-6.10E-04	6.10E-04	-39.76	-1.993
7	251	237	252	8	-2.146	-2.753	0.6074	0.4948	399.2	3.168
8	252	252	253	4	-2.753	-2.548	-0.2052	7.80E-02	-47.89	-1.628
9	253	252	254	8	-2.753	-2.956	0.2024	0.2024	447.1	3.548
10	254	254	255	8	-2.956	-2.996	4.02E-02	0.3304	499	3.961
11	255	255	256	8	-2.996	-3.18	0.1835	0.4087	784.4	6.226
12	256	254	257	4	-2.956	-2.998	4.16E-02	9.54E-02	-51.94	-1.766
13	257	471	260	8	-4.63	-5.178	0.5478	0.5478	1275	11.2
14	258	260	261	8	-5.178	-5.229	5.14E-02	5.14E-02	1816	15.95
15	259	62	262	8	-1.079	-1.205	0.1259	2.80E-02	410.6	3.259

PIPENET Transient Module and Composite Material Pipes

Composite material pipes are increasingly common in low pressure piping systems, such as cooling water systems. This is usually because of lack of corrosion, cost and so on. Interestingly, in some cases logistics has also played a part. There is an application for which **PIPENET** Transient and Standard modules are being used. The main headers in this application are 3.5 and 4.5 meters in diameter and they are made of GRP. They are more like tunnels than pipes! As these pipes were made of GRP, the vendor simply built a plant on site. (GRP pipe manufacturing is a relatively simple process, in comparison to carbon steel pipe.)

One of the disadvantages of using commonly available composite pipes is the fact that they cannot usually withstand a high pressure. This means that phenomena such as water hammer and pressure surge are of concern. This is why **PIPENET** Transient module is widely used for modelling composite piping systems. Users of **PIPENET** Transient module can avoid high pressures occurring.

However, there is another potential problem which is not always recognised. Typically fittings such as flanges are attached to composite material pipes by the use of adhesives. If such a system is subjected to wild fluctuations in the pressure inside the pipe, there is a tendency for relative movement between the pipe and the flange as the pipe is less rigid than the flange. It is thought that this might lead to the adhesive material cracking and the flange becoming detached from the pipe as a consequence. **PIPENET** Transient can be used to reduce the amplitude of the pressure oscillations to an acceptable level. The basic message is ‘How to design composite material piping systems in such a way that we can harness all the advantages which such materials offer, and avoid potential disadvantages.’

Supporting composite material piping systems also requires greater care. **PIPENET** Transient module can calculate the force-time history for the hydraulic forces which can occur in such systems. **PIPENET** Transient module has an interface with pipe stress analysis programs such as Caesar and Triflex.

How can AUTOCAD be imported and exported into PIPENET Vision?

We have been asked many times, so, just in case you missed in a previous edition, here it is again

1. Import the AutoCAD drawing (such as a plot, plan or general arrangement drawing) into **PIPENET** as a .wmf or .dxf file.

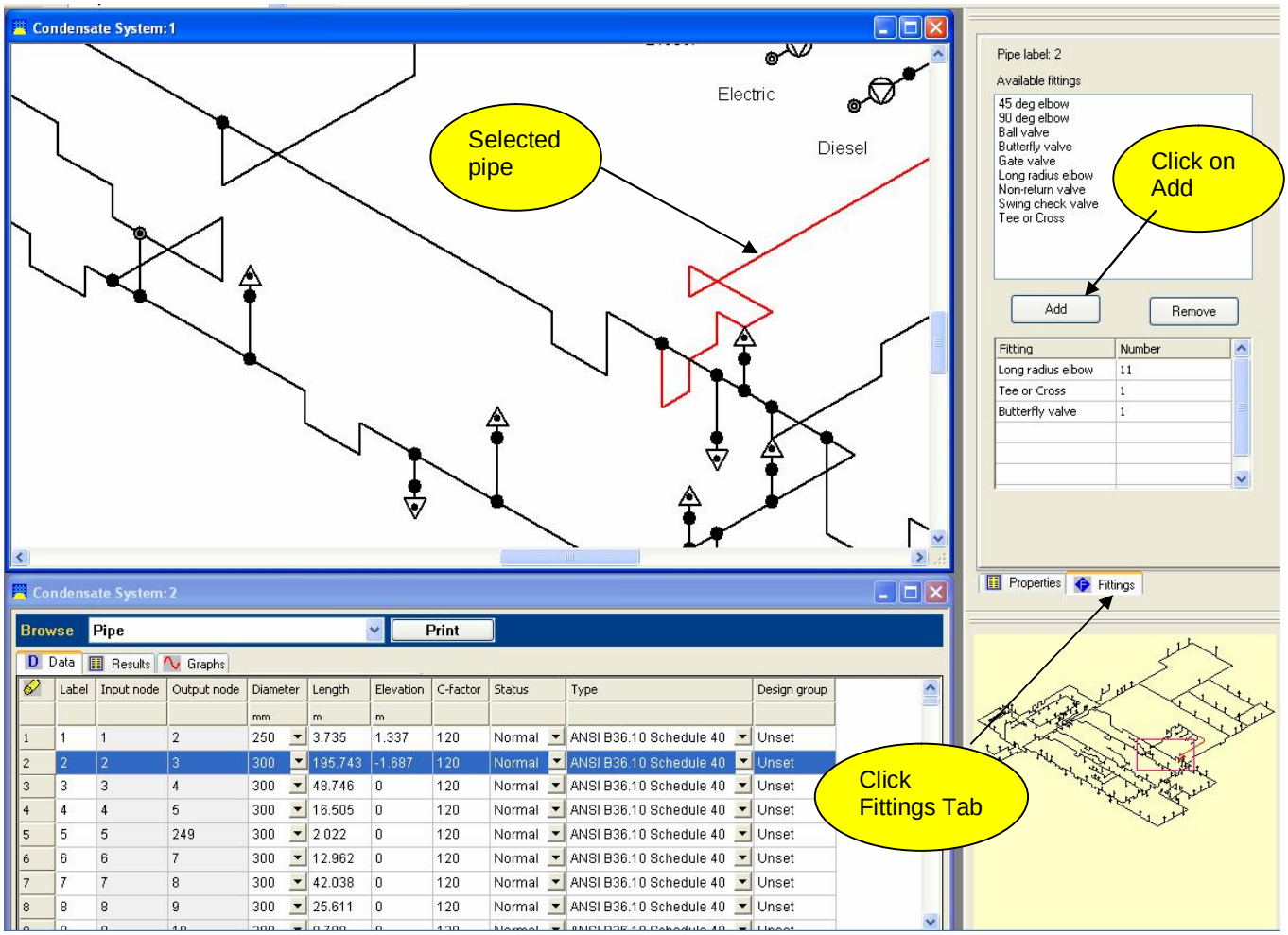
2. Draw the **PIPENET** schematic on top of the imported drawing.

3. Optimise the **PIPENET** design and perform the necessary calculations.

4. This new schematic and other data are exported to AutoCAD by choosing from the **PIPENET** tool bar, **‘tools’, ‘export to .dxf’** and finalising the exported schematic as a piping drawing.

Specifying Standard Bends in Pipe work

1. Click on the relevant pipe to make it active.
2. Click on the fittings tab



3. Select the required fitting and click on the Add button.

PIPENET Training Manual

The **PIPENET** Development Team have put a lot of work into enhancing the Training Manuals**.** They are filled with more examples than ever before, for the many applications of PIPENET and really useful if you are a new user or haven't used **PIPENET** for a while. We dispatch a training manual (on cd) with every order. If you can't find your training manual, please do let us know and we will give you another, free of charge.

PIPENET Demonstration

Do you want to know more about **PIPENET**? Are you looking for a demonstration? Visit the registration page of www.sunrise-sys.com and ask to see the new **PIPENET** Vision demonstration of all three modules.

PIPENET Demonstration

We will be releasing new demonstrations very soon, starting with **PIPENET** Transient Module. Mini-demonstrations of around a minute and a half will also be available for each module before the summer. Full details will be in the next edition of **PIPENET** News, but do watch the ôlatest newsô page of www.sunrise-sys.com for news of demonstrations, new service packs and other new developments

PIPENET Marketing Partners offer an excellent service to PIPENET users

We are pleased to welcome new marketing partners to join the outstanding team of expert **PIPENET** Marketing Partners across the globe. Many of these **PIPENET** Marketing Partners now offer

- Sales advice
- Training in the locality
- Technical Support

Please do email us: pipenet@sunrise-sys.com if you would like a marketing partner close to you to contact you with further information.

PIPENET NEWS

If you would like to be added to the **PIPENET NEWS** circulation list, please email: sales@sunrise-sys.com. (If you would prefer to be removed from the circulation list, please email ôNoô to the same address. Thank you.)

PIPENET Maintenance Updates and Support Subscription

For a small annual subscription you can ensure that you are always working with the latest version of **PIPENET,** as well as being assured of assistance from our support. Email sales@sunrise-sys.com for more information. **PIPENET Vision 1.40** will be sent, free of charge to all customers with a valid Maintenance, Updates and Support contract.

PIPENET Customer Feedback. We value customer feedback and comments highly, so we will be very pleased to hear from you. Please give us your comments via the ôContact Usô page of our website www.sunrise-sys.com**.**

SUNRISE

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