



PIPENET™ NEWS

VOLUME 2 . ISSUE 6 Winter 2009 / 2010

LEADING THE WAY IN FLUID FLOW ANALYSIS

Welcome to the PIPENET e-newsletter!

Contents:

1. **PIPENET** Vision 1.40 New Features *Page 2*
2. Inertial Pump and the Applications
A new feature in **PIPENET** Vision 1.40 *Page 3*
3. Converting the **PIPENET** Result
report to Excel *Page 7*
4. **PIPENET** Transient Module and
Composite Material Pipes *Page 11*
5. Importing and exporting into
PIPENET Vision *Page 11*
6. Specifying Standard Bends in Pipe
Work *Page 12*
7. Marketing Partners, Training Manuals
and **PIPENET** News! *Page 12 & 13*

Page 1

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

Leading The Way in Fluid Flow Analysis

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 dialog 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

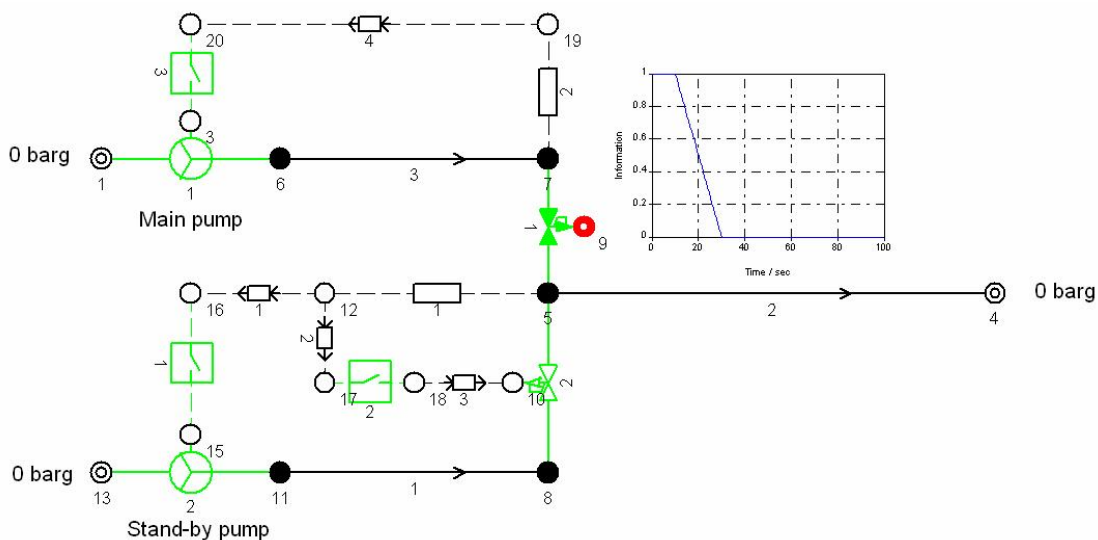
- New Explode Node facility . right click on a node containing 2 or more attached components & the node will split into a number of different nodes each attached to just 1 link
- Change the colour by left hand clicking on a colour
- The Help Menu can now take you straight to the Sunrise Systems website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

PIPENET Vision 1.40 includes a new inertial pump component

Inertial Pump and the Applications

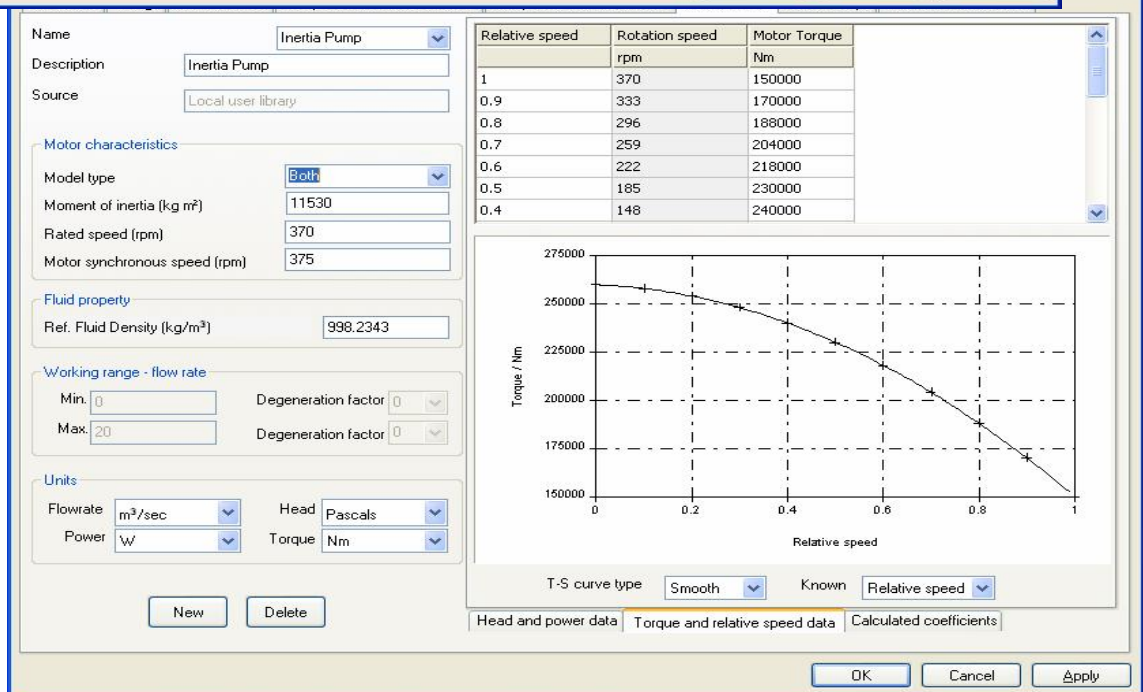
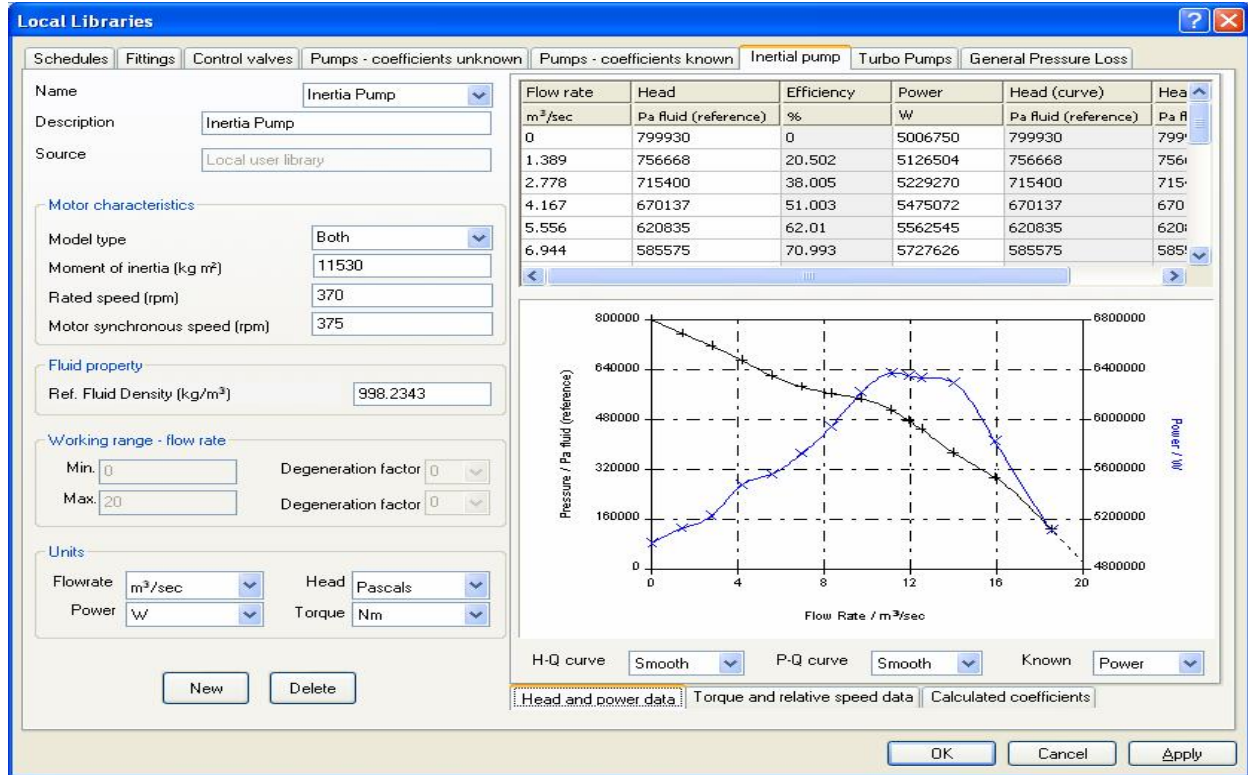
Pumps start-up and stoppage are two important transient sources in pipeline network. Turbo pump model can predict transient behaviour during pump trip for all four quadrants but Suter curves are not available for most pumps. On the contrary, simple pump model requires pumps performance curve (H-Q curve) 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 pumps 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.



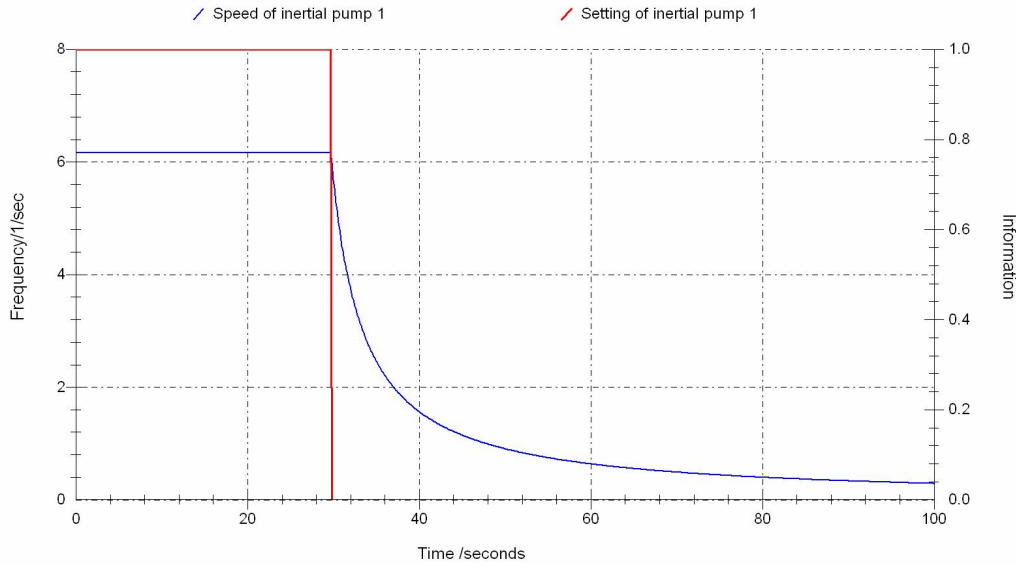
Pump library

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 . Head and Flowrate . 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 . 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.



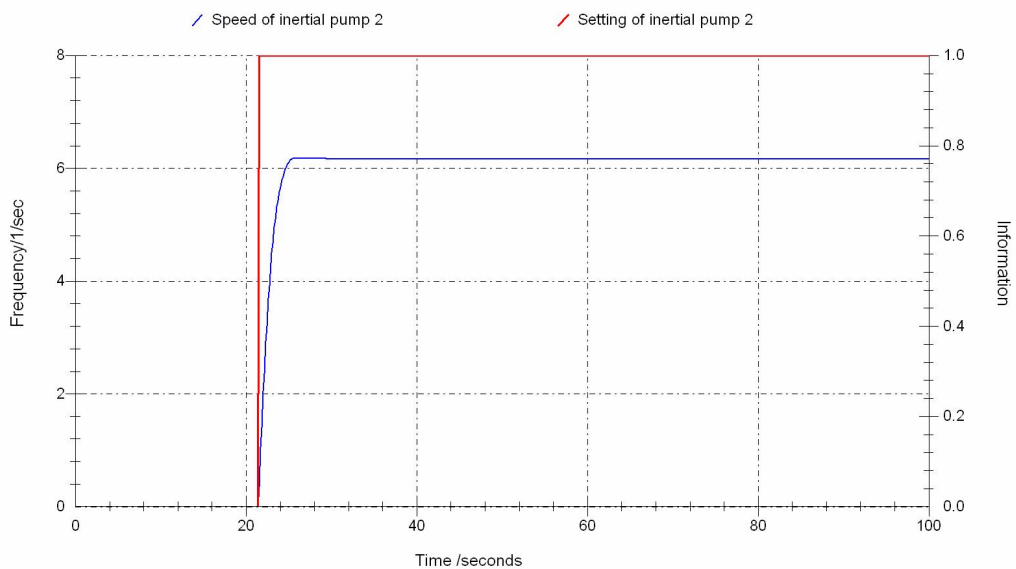
Pump trip

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 - Module Transient

File Edit Libraries View Calculation Output Colouration Edit Tools Window Help

Display: None None U Node Tag: <NO TAG> Link: <NO TAG>

Find: <Any> Label

Inertia Pump Complex Example: 2

Data	Results	Graphs	Result Graphs	Tables	Forces	Tabular results								
Label	Inlet node	Output node	Min inlet pressure	Time	Max inlet pressure	Time	Min internal pressure	Time	Max internal pressure	Time	Min outlet pressure	Time	Max outlet pressure	Time
2	5	4	2.0537814	22	6.1486352	25.4	0	0	6.1486352	25.4	0	0	0	0
3	6	7	0.0177214	100	7.9287235	29.7	0.0177214	100	8.2264299	29.7	0.0177214	100	8.2264299	29.7
1	11	8	0	0	7.0424639	25.3	0	0	7.0424639	25.3	0	0	6.6570822	25.5

Inertia Pump Complex Example: 1

0 barg 1 Main pump 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

0 barg 13 Stands-by pump

For Help, press F1

Component

Component	Number used
Node	0
Information node	10
Pipe	3
Operating valve	2
Text	5
Pressure sensor	2
Inertial Pump	2
Transfer function	4
Switch	3
Transient force	3
Specification	4
Tables	0
Graphs - time	8
Graphs - pipe distance	0

Properties Fittings

PIPENET - Module Transient

File Edit Libraries View Calculation Output Colouration Edit Tools Window Help

Display: None None U Node Tag: <NO TAG> Link: <NO TAG>

Find: <Any> Label

Inertia Pump Complex Example: 1

Forces Extrema

Label	Maximum	Time	Minimum	Time
	N	sec	N	sec
F1	31029.14	19.4	-27381.84	21.6
F2	96007.7	19.6	-81860.81	22.9
F3	25748.56	21.6	-24447.31	19.5

Inertia Pump Complex Example: 2

Pipe Type Extrema

Pipe type	Max. pressure	Time	Pipe id	Position	Min. pressure	Time	Pipe id	Position
	Bar G	sec		m	Bar G	sec		m
AnsiB3610_40	6.133277	23.3	2	Inlet	2e-007	0	2	Outlet
AnsiB3610_80	8.3377106	29.1	3	Outlet	2e-007	0	1	Inlet

For Help, press F1

Component

Component	Number used
Node	0
Information node	10
Pipe	3
Operating valve	2
Text	5
Pressure sensor	2
Inertial Pump	2
Transfer function	4
Switch	3
Transient force	3
Specification	4
Tables	0
Graphs - time	8
Graphs - pipe distance	0

Properties Fittings

PIPENET

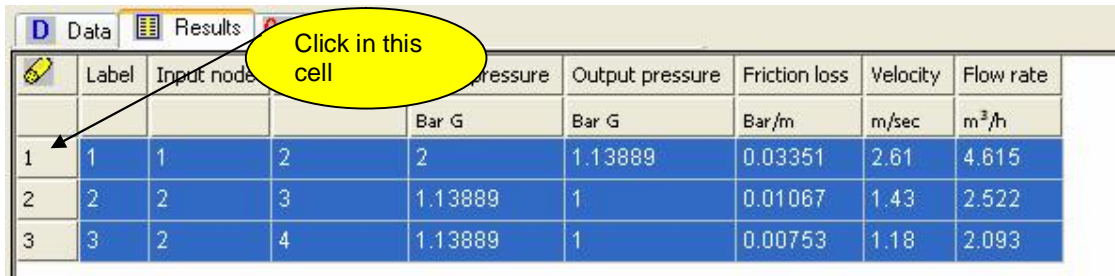
Leading The Way in Fluid Flow Analysis

Converting the Result Report to Excel

There are two methods for converting the Result Report.

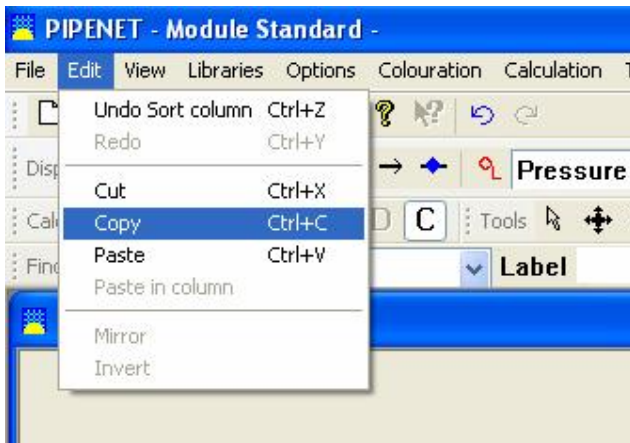
Method 1:

1. Select the Data Window showing results:

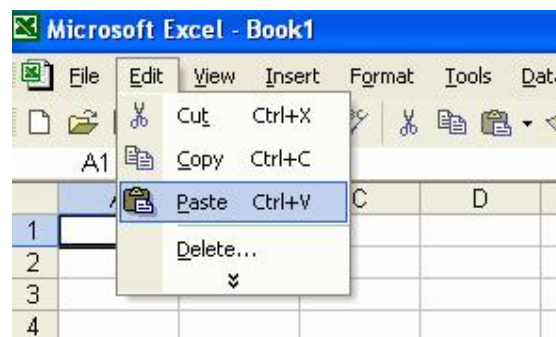


	Label	Input node	Output node	Input pressure	Output pressure	Friction loss	Velocity	Flow rate
				Bar G	Bar G	Bar/m	m/sec	m ³ /h
1	1	1	2	2	1.13889	0.03351	2.61	4.615
2	2	2	3	1.13889	1	0.01067	1.43	2.522
3	3	2	4	1.13889	1	0.00753	1.18	2.093

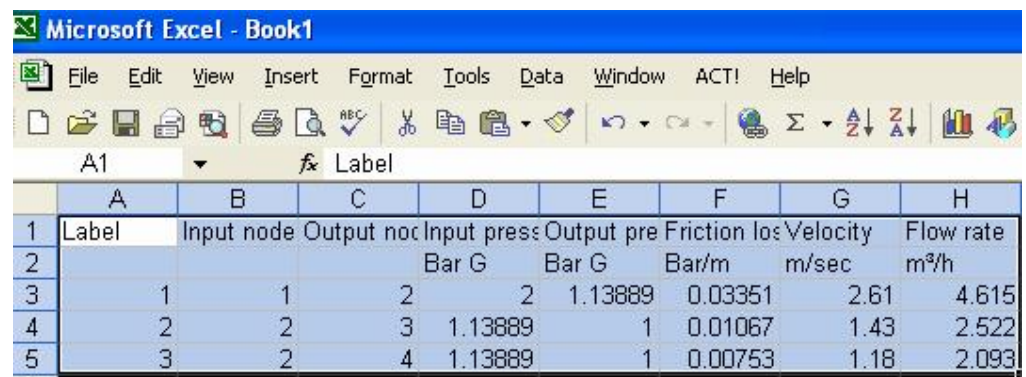
2. Edit/Copy



3. Paste in Excel:



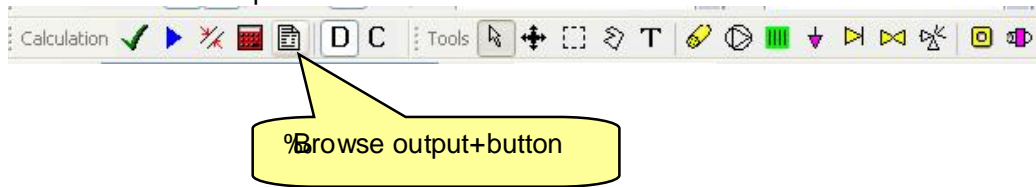
4. It is done:



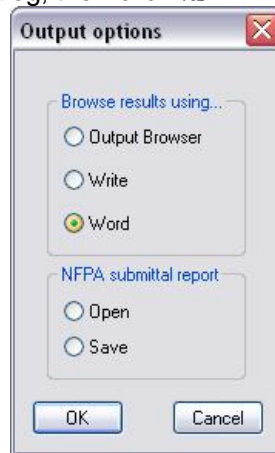
	A	B	C	D	E	F	G	H
1	Label	Input node	Output node	Input pressure	Output pressure	Friction loss	Velocity	Flow rate
2				Bar G	Bar G	Bar/m	m/sec	m ³ /h
3	1	1	2	2	1.13889	0.03351	2.61	4.615
4	2	2	3	1.13889	1	0.01067	1.43	2.522
5	3	2	4	1.13889	1	0.00753	1.18	2.093

Method 2:

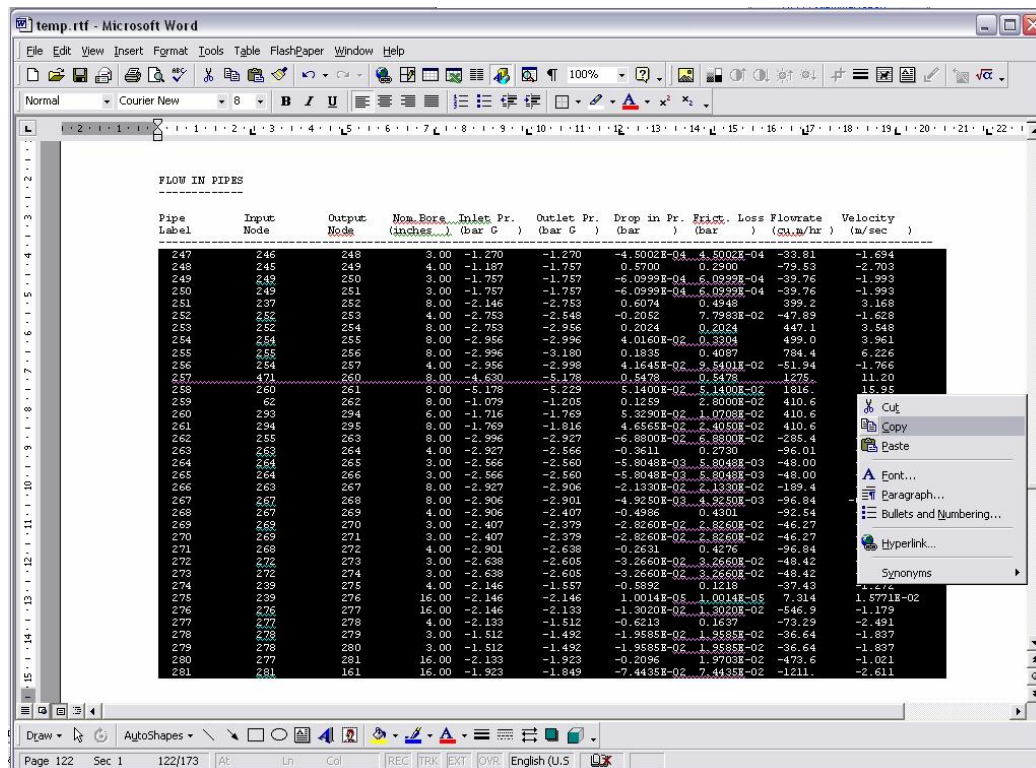
1. Click %Browse output+button after the calculation.



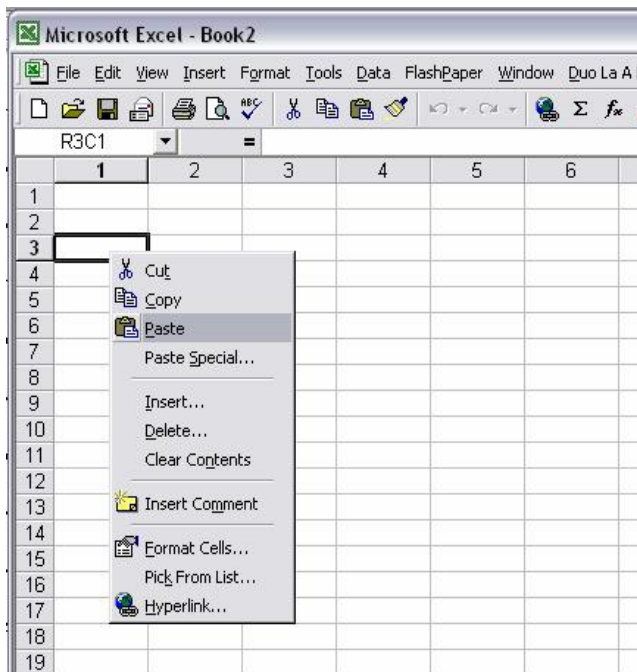
2. Select %Word+in the %Output options+dialog, then click %OK+



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

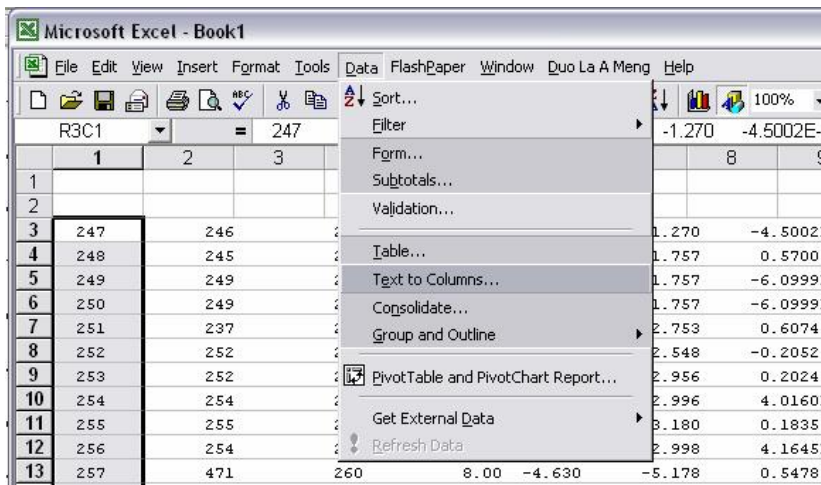


4. Go to Excel and do %Paste+

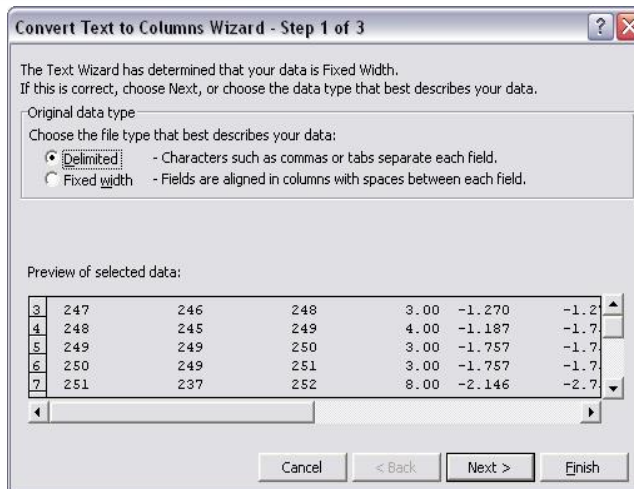


	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1																	
2																	
3	247	246	248	3.00	-1.270	-1.270	-4.5002E-04	4.5002E-04	-33.81	-1.694							
4	248	245	249	4.00	-1.187	-1.757	0.5700	0.2900	-79.53	-2.703							
5	249	249	250	3.00	-1.757	-1.757	-6.0999E-04	6.0999E-04	-39.76	-1.993							
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							

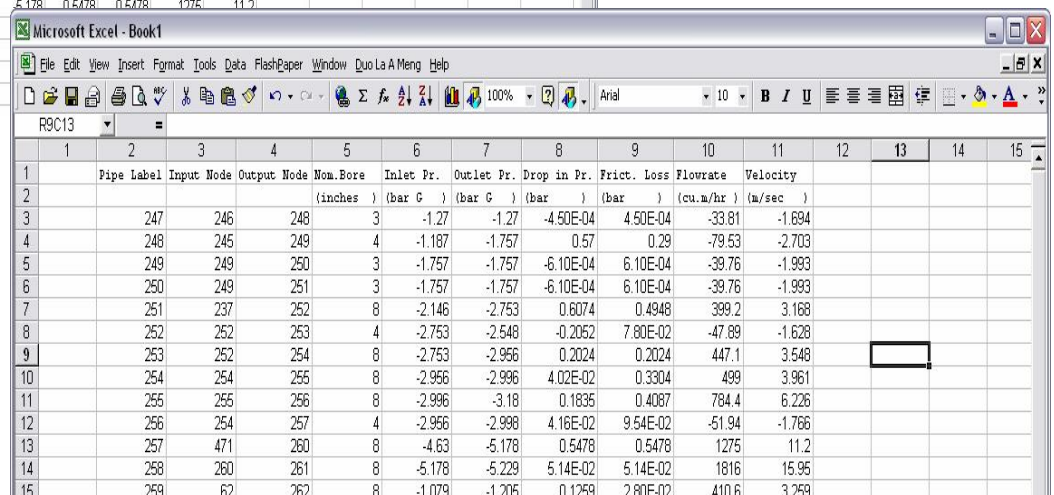
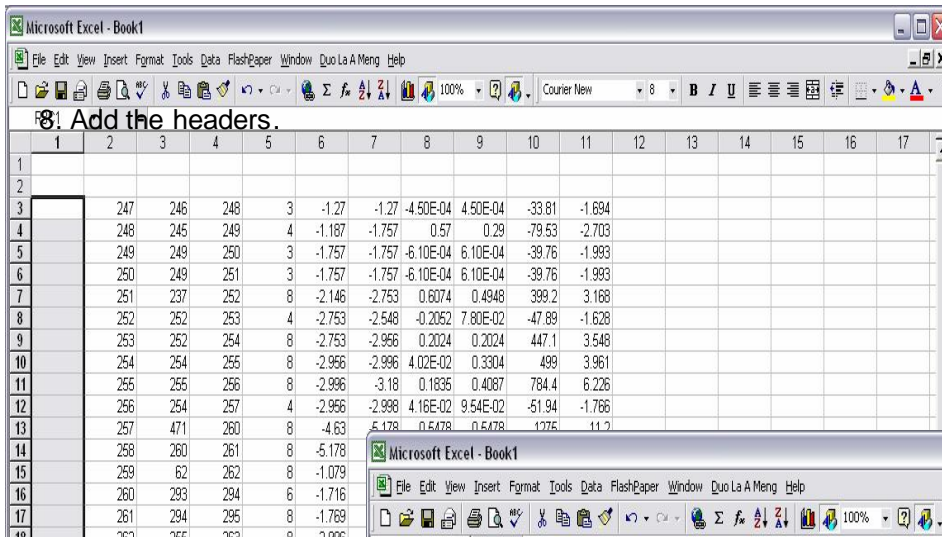
5. Click Menu->Data->Text to columns.



6. Select **Delimited** and click **Next**



7. Select **Space** and click **Finish**



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

Condensate System:1

Condensate System:2

Browse Pipe Print

Label	Input node	Output node	Diameter	Length	Elevation	C-factor	Status	Type	Design group
			mm	m	m				
1	1	2	250	3.735	1.337	120	Normal	ANSI B36.10 Schedule 40	Unset
2	2	3	300	195.743	-1.687	120	Normal	ANSI B36.10 Schedule 40	Unset
3	3	4	300	48.746	0	120	Normal	ANSI B36.10 Schedule 40	Unset
4	4	5	300	16.505	0	120	Normal	ANSI B36.10 Schedule 40	Unset
5	5	249	300	2.022	0	120	Normal	ANSI B36.10 Schedule 40	Unset
6	6	7	300	12.962	0	120	Normal	ANSI B36.10 Schedule 40	Unset
7	7	8	300	42.038	0	120	Normal	ANSI B36.10 Schedule 40	Unset
8	8	9	300	25.611	0	120	Normal	ANSI B36.10 Schedule 40	Unset
9	9	10	300	0.700	0	120	Normal	ANSI B36.10 Schedule 40	Unset

Properties Fittings

Click on Add

Click 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 latest news 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.

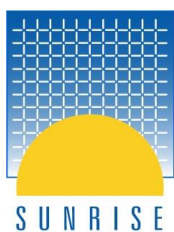
PIPENET NEWS

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 ~~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 ~~£~~Contact Us page of our website www.sunrise-sys.com.



SUNRISE SYSTEMS LIMITED ● SUNRISE BUSINESS PARK
ELY ROAD ● WATERBEACH ● CAMBRIDGE CB25 9QZ ● UNITED KINGDOM
TELEPHONE (01223) 441311 (INT +44 1223 441311)
FAX (01223) 441297 (INT +44 1223 441297)
E-mail: pipenet@sunrise-sys.com ● Web site: www.sunrise-sys.com