Elite Software HSYM

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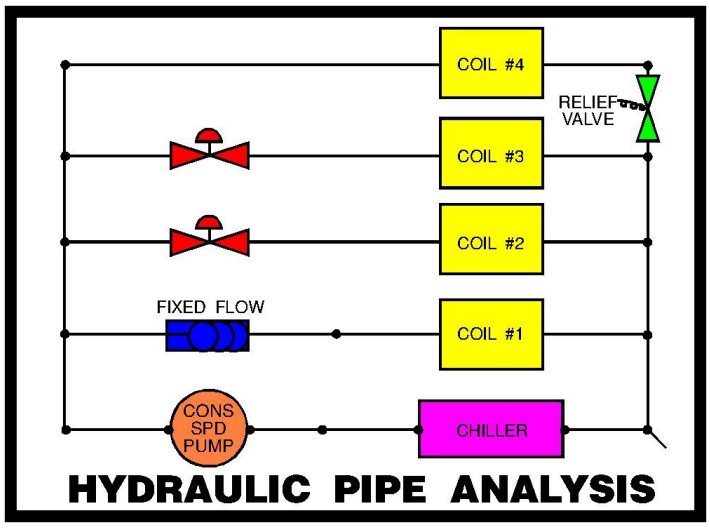

HSYM OVERVIEW

The Elite Software HSYM program analyzes centralized HVAC piping systems that use chilled and/or hot water. In the simulation of HVAC water piping systems, HSYM can determine pressure losses, actual operating pressures, temperatures of air and water, flow rates, and obtainable unit loads throughout the system. Complex systems containing all types and sizes of pipe, insulation, boilers, chillers, pumps, coils, exchangers, 2 and 3 way control valves, water temperature control valves, radiators, and insulation can be defined. HSYM can also size pipe and help select equipment. But more than just pipe sizing, HSYM is designed to simulate the operation of an HVAC water system as a whole. HSYM provides a cost effective way to obtain a steady state analysis of an existing or a proposed system. With HSYM a designer can investigate a myriad of design alternatives in search of an optimal design that provides low cost and reliable performance. Besides sophisticated simulation techniques, HSYM also provides many mundane, but useful features such as automatic adjustment of coil cfm values for altitude, calculation of effective coil UA values direct from manufacturer's catalog data, and the ability to automatically "look up" the equivalent length of all types of fittings. HSYM provides both comprehensive input and output reports. Output reports show not only calculated results, but also all input data used in the results computations. HSYM calculates extremely fast and performs extensive error checking of the pipe network system. HSYM is also available as a hydraulic only analysis program for a significant discount.

DEMONSTRATION VERSION

If you would like to evaluate HSYM in further detail, you can order a demonstration CDROM for only $35 plus shipping. This evaluation version is a full version of the program, including the complete manual, but with limitations. Demonstration versions can be “unlocked” into full versions by typing in a password you’ll receive upon purchase. $35 of the demo price can be credited to the full purchase price. A demonstration version of HSYM (without manual) may also be ***downloaded free of charge*** from Elite’s internet site, **www.elitesoft.com**

HSYM FEATURES

- Analyzes Hot and Chilled Water HVAC Piping
- Calculates Pipe Sizes, Flows, Velocities, and Pressures
- Calculates Both Water and Air Temperatures
- Hydraulic Only Analysis Version Also Available
- Allows Up to 3000 Pipe Sections and 2,999 Nodes
- Allows Up to 20 Chillers & Boilers
- Allows Up to 150 Coils, Exchangers, & Radiators
- Allows Up to 150 Valves of All Types
- Allows Up to 50 Constant and Variable Speed Pumps
- Considers Pipe Insulation Effects in Hot Water Piping
- Allows Both Constant and Variable Speed Pumps
- Cooling Coils Can be Wild, 2-Way, or 3-Way
- Instantaneous Input Error Checking
- Provides Comprehensive and Concise Reports

CALCULATION METHOD

HSYM uses a unique sparse matrix technique for solving pipe network simulation problems. Most of the modeling algorithms used in HSYM are based on ASHRAE sponsored research work performed by the University of Illinois. HSYM can be obtained with or without thermal analysis features enabled. Many designers only want to evaluate and flow and pressure conditions in a piping system without having to consider water and air temperature conditions. If a thermal analysis is not desired, HSYM can be purchased for less with hydraulic only features.

PROGRAM INPUT

HSYM is a true Windows program that uses all the latest data entry techniques such as toolbars, hyper linked help, and form tabs. All input data is checked at the time of entry so that no improper data can be entered. If you have a question about what the program is requesting, you can press the F1 key to obtain additional help explanations. Three major types of data are requested: General Project Data, Detailed Pipe Data, and Equipment Data. The general project data includes the date, project location, client, designer , and project names, the altitude, pipe material data, and more. The detailed pipe data includes the pipe beginning and ending node numbers, pipe material, diameters, lengths, fitting information, insulation values if any, and indication of what equipment the pipes connect to. The equipment data involves the entry of any boilers, chillers, pumps, coils, heat exchangers, radiators, loop valves, water temperature control valves, and other valves. Wide open CV values for valves are required. Each equipment item also has certain details that must be entered. Boilers and chillers require temperature set points and capacity ratings. Pumps require that at least four data points from the pump performance curve be entered. Valves and coils require manufacturer design data to be entered concerning design water and air flow, and entering and leaving water temperatures. Load data must also be entered for coils, radiators, and heat exchangers.

SYSTEM REQUIREMENTS

HSYM is a Windows program and will run on any computer with Windows 2000 or higher including Windows 7.

PROGRAM OUTPUT

The HSYM program provides four basic output reports: pipe input data, equipment input data, pipe output data, and equipment output data. The pipe input data report lists all the detailed pipe data (material type, diameter, length, fittings, etc.) entered for the pipe network. The equipment input data report lists all the detailed information concerning each equipment item (chillers, boilers, coils, radiators, heat exchangers, pumps, etc.) specified in the system. The pipe output data report lists the flow, velocity, inlet water temperature, inlet and outlet water pressures, pressure losses, and any equipment for each pipe section. The equipment output data report lists all operating conditions for each equipment item. Chillers and boilers are shown with setpoints and design capacity versus actual load. Cooling coils and radiators are shown with water flow, air flow quantities, entering and leaving air temperatures, actual load, and check valve flow quantities. The user can specify desired reports and all reports can be printed to the screen or printer.

Sample Reports

HSYM - Hot / Chilled Water System Analysis — Lakeside Office Complex — Elite Software Development, Inc.
Elite Software — 979-690-9420 — Page 4

Pipe Output Data

Section Begin	Section End	Pipe Diameter	Pipe Length	Equiv. Length	Flow GPM	Flow FT/S	Pressure FTWG Inlet	Pressure FTWG Delta	Pressure FTWG Outlet	Equipment Description
MUWP	1C02	4.0	16.0	37.0	211.8	5.3	35.0	-0.94	34.1	Pipe
1C02	1C03	4.0	n/a	309.0	211.8		34.1	-7.89	26.2	Chiller
1C03	1M04	4.0	5.0	5.0	211.8	5.3	26.2	-0.13	26.0	Pipe
1M04	1P05	4.0	14.0	14.0	211.8	5.3	26.0	-0.36	25.7	Pipe
1P05	1P06	4.0	n/a	n/a	211.8		25.7	25.54	51.2	Con Spd Pump
1P06	1S07	4.0	37.0	47.0	211.8	5.3	51.2	-1.22	50.0	Pipe
1S07	1S08	4.0	52.0	68.7	211.8	5.3	50.0	-1.79	48.2	Pipe
1S08	1S10	4.0	3.0	19.7	17.3	0.4	48.2	-0.01	48.2	Pipe
1S08	1S09	4.0	22.0	43.0	194.5	4.9	48.2	-0.95	47.3	Pipe
1S09	1R10	4.0	16.0	474.0	194.5		47.3	-10.50	36.8	Cool Coil - WD
1S10	1R11	1.5	270.0	415.6	17.3		48.2	-11.44	36.8	Cool Coil - 2W
1R11	1R10	4.0	3.0	19.7	17.3	0.4	36.8	-0.01	36.8	Pipe
1R10	MUWP	4.0	52.0	68.7	211.8	5.3	36.8	-1.75	35.0	Pipe

HSYM - Hot / Chilled Water System Analysis — Lakeside Office Complex — Elite Software Development, Inc.
Elite Software — 979-690-9420 — Page 5

Equipment Output Data

Chiller Data

Section	Equipment	Control	Unit Capacity
1C02-1C03	Chiller	1C03-1M04	1000.0 TONS

Cooling Coil/Heat Exchanger Data

Section	Equipment	Flow Lbs/Hr	Water GPM	W.CV	A.CV	F.OP
1S09-1R10	Cool Coil - WD	69872.	194.5			
1S10-1R11	Cool Coil - 2W	7686.	17.3	20	20	YES

LAKESIDE OFFICE COMPLEX
Hsym Title Page Report

for

Culpepper Plaza
123 Texas Ave
College Station, TX 77845

Prepared By:

Bill Smith
Elite Software
2700 Arrington Road
College Station, TX 77845
979-690-9420
January 20, 2004

HSYM - Hot / Chilled Water System Analysis — Lakeside Office Complex — Elite Software Development, Inc.
Elite Software — 979-690-9420 — Page 2

General Project Data Report

General Data

Project Title:	Lakeside Office Complex		
Designed By:	Bill Smith	Date:	January 20, 2004
Client Name:	Culpepper Plaza	Phone:	
Address:	123 Texas Ave	City, State Zip Code:	College Station, TX 77845
Company Name:	Elite Software	Representative:	Bill Smith
Company Address:	2700 Arrington Road	City And State:	College Station, TX 77845
Phone:	979-690-9420		

Design Data

Pressure at First Node (ft wg):	35	Avg. Design Water Velocity (ft/s):	4.5
Viscosity Factor WRT H2O:	1	Default Ambient Temp. For Piping (F):	65
Default Insulation Effectiveness:	75	Elevation Above Sea Level (ft):	5500
Fluid Density (lb/ft^3):	62.34	Pipe Roughness Factor (New):	0.002
Fluid Viscosity (lb/ft-h):	2.753	Pipe Roughness Factor (Old):	0.004
Volume of water in piping system (gal):	174.0		

HSYM - Hot / Chilled Water System Analysis — Lakeside Office Complex — Elite Software Development, Inc.
Elite Software — 979-690-9420 — Page 3

Pipe Input Data

Beg. Node	End. Node	Material Description	Diameter (inch)	Length (ft)	Fitting Data	Additional Length (ft)	Equipment
MUWP	1C02	SCH - 40	4.000	16.00	B		Pipe
1C02	1C03	SCH - 40	4.000			309.0	Chiller
1C03	1M04	SCH - 40	4.000	5.00			Pipe
1M04	1P05	SCH - 40	4.000	14.00			Pipe
1P05	1P06	SCH - 40	4.000				Con Spd Pump
1P06	1S07	SCH - 40	4.000	37.00	E		Pipe
1S07	1S08	SCH - 40	4.000	52.00	ET		Pipe
1S08	1S10	SCH - 40	4.000	3.00	ET		Pipe
1S08	1S09	SCH - 40	4.000	22.00	B		Pipe
1S09	1R10	SCH - 40	4.000	16.00	B	437.0	Cool Coil - WD
1S10	1R11	SCH - 40	1.500	270.00	2E2N	134.0	Cool Coil - 2W
1R11	1R10	SCH - 40	4.000	3.00	ET		Pipe
1R10	MUWP	SCH - 40	4.000	52.00	ET		Pipe