

HOTclash™

(for Elomatic's CADMATIC)

Installing Program

To install HOTclash on Windows NT, load the product CD supplied by SST Systems and execute the followings steps:

- 1 Browse the CD, and run the program "SETUP.EXE" and follow the instructions as they appear on the screen.
- 2 After successful installation of the program, create an environmental variable with the name "HOTclash_CADMATIC" and set the value of the variable as "HOTclash_Installed_Path". For example, assuming the HOTclash is installed in "C:\Program Files\HOTclashCADMATIC", the value would be "C:\Progra~1\ HOTclashCADMATIC").
- 3 The environmental variable can be set as given below
 - Open the Control Panel window and open the System Properties window by double clicking the "SYSTEM" icon from within the Control Panel window. Select the "Environment Variables" button from the "Advanced" tab for Windows 2000 or select the Environment tab and click "New" button.
 - Then enter in the Variable prompt "HOTclash_CADMATIC", and "HOTclash_installed_path" (where the HOTclash is installed) in the Value prompt, for example ""C:\Progra~1\ HOTclashCADMATIC".
 - Once entered, select the "Set" button to confirm

Note: For the program to work properly, avoid using space or special characters while entering the path or file name.

How to use HOTclash?

- 1 Pipes selected for Transfer need to be checked for the following.
 - a. Pressure and Temperature of the Pipeline defined using Pipeline Tags or Model Object Tags.
 - b. Support type can be transferred to HOTclash by creating a user-defined tag to the CADMATIC project with the name "sty" (Support Type) or any other tag name and assigning the same tag to the component connecting the pipe and the pipe support such as U-clamp, O-clamp, etc., at each pipe support location. The tag created as stated above should be set a value as given in the field #1 of the access db "SupportType.mdb" available in the installed directory of HOTclash to transfer the support type.
 - c. If the MMT_LEAVE_GASKET_GAPS is set to 1, then the translator treats the same as real gaps and might put an anchor at that location.
- 2 Load the CADMATIC Plant Modeler and run the macro "Setup\HOTclash.mac" available in the installed path of HOTclash through "Run Script". The following form appears.

HOTclash

File Name

Analysis Code Specific Gravity

Hydrotest Pressure Hydrotest Sp. Gravity

Starting Node Number Node Number Increment

Default Hanger Design to be Used

Boundary Condition

Vertical Axis: Y Direction Z Direction

Transfer 3 Way and 4 Way Valve as: Rigid Elements Pipes With Concen. Mass

Transfer Model in: SI units English Units

Transfer Flange as: Pipe With Flange Rigid Element

Transfer Supports: Using MDB Without Using MDB

Process Element, If Dia. is > mm

Read Pressure and Temperature from PipeLine Tags:
 Pressure Temperature

Read Pressure and Temperature from Model Object Tags:
 Pressure Temperature

Read Support Type from Model Object Tags:
 Support Type

Merge Nodes if length of component is less than mm

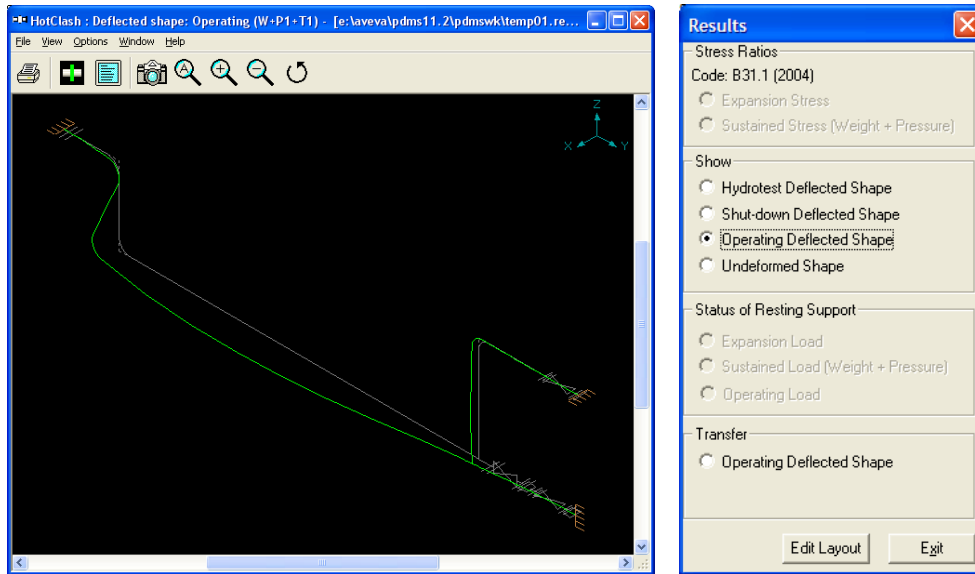
Functions:

PipeLine Name Lists :

- a. Select the piping code to be used for the analysis of the model from the list box.
- b. Enter the Starting Node number and Node increment value in the appropriate field. By default, the Starting Node number and Node increment are set to 10 and 10 respectively.
- c. Enter the Specific Gravity of operating fluid. By default the specific gravity of water (i.e. 1) will be used for analysis.
- d. Enter the Hydrotest Pressure in bar/psi with respect to SI Units/English Units respectively and Specific Gravity of the Test fluid in the corresponding field as shown in the form above.
- e. Select Default Hanger to be used in HOTclash model. This Hanger type will be used only when the hanger type in HOTclash corresponding to Plant Design hanger is not specified /available in the Mapping DB.
- f. Select the Boundary Conditions to be used from the form shown above. Refer section 4.0 titled "Reference" for details.
- g. Choose the Global Vertical Axis for HOTclash model from the vertical Axis option. By default, "Z Axis" shall be taken as Global Vertical Axis if not specified.

Note: Since CADMATIC always uses vertical global axis as "Z" and Stress Engineers from different parts of the world use different coordinate systems, it is recommended that the designers should consult with the stress department and choose the "Vertical Global Axis" before saving the stress model in CAEPIPE format (for Stress department to carry out the detailed analysis). On the other hand, for performing the first level stress check using HOTclash, designers shall continue to use "Z" as Global Vertical Axis.

- h. If the user wishes to eliminate those elements whose Nominal size (NS) is less than 50mm / 2in, then they can specify the value as "50" for SI Units and "2" for English Units in the field "Process elements, if dia >". In other words, the program will process only those elements whose nominal size is greater than the value specified in the field above.
- i. Specify how the 3 Way and 4 Way valves to be transferred to HOTclash. Refer section 4.0 for details.
- j. Specify how the Flanges are to be transferred to HOTclash. Refer section 4.0 for details.
- k. Specify whether the Mapping DB shall be used during transfer or not. Refer HOTclash.pdf for details.
- l. The 'Pick Pipe Line' lets the user to select the objects from the graphics. The user can select entire Pipelines or the Portion of the Pipes. Pipelines that are selected for transfer will be shown in "PipeLine Name Lists" box as shown in figure above.
- m. Press the button "Apply".



- n. Figure above shows the deflected shape of Operating Load Condition.
- o. Designers can transfer the deflected model by selecting the option available under the “Transfer” frame. If you wish to retain the deflected shape of the piping under different loading conditions in CADMATIC, then change the name of the neutral file in the dialog shown above during run time.

3.0 Limitations

The following are not transferred to HOTclash from CADMATIC database at this time. However user can add these in HOTclash through Edit Layout->Misc->Section

- 1 Insulation density and Insulation thickness.
- 2 Corrosion allowance and Mill tolerance.
- 3 Lining Density and Lining Thickness.

4.0 Reference Loads

By default, Temperature and Pressure values entered at Pipeline / Pipes and Standard components via OpT and opP shall be transferred to HOTclash. If the Temperature and Pressure values for Pipes and Standard components are entered at different tags names other than opT and opP, then designer can specify the name of the Tags in the dialog box as shown in the figure above. Designer should make sure that these tags are filled with appropriate values depending upon the Units of transfer. I.e., if you wish to transfer the model in SI units, then the value entered for Temperature and Pressure should be in Deg C and kg/cm² respectively. On the other hand, if you wish to transfer the model in English Units, then the Temperature and Pressure values shall be entered in Deg F and psi respectively.

User can also add / modify the Temperature and Pressure for the piping system in HOTclash through Edit Layout->Misc->Loads

Fluid Density

Specify the Specific Gravity of the fluid (with respect to water) during the transfer of the model.

Weight

The weights of Valves, Instruments, Flanges, etc. are extracted from the Dimension Table through first mass quantity type attribute. If the values are defined / available in the database, then the program extracts the information and transfers the same to HOTclash, otherwise, it will be set as 0.0.

However user can add / modify the weight of components by selecting the component type such as Valve, Rigid, Flange, etc. through Edit Layout->Window->List.

Nominal Size, OD and Wall Thickness

Nominal Size is extracted from the first NS Quantity type from Dimension Table. For components with Two Key Nominal Sizes, the values are extracted from first and second NS quantity type from Dimension table.

Similarly, OD and Wall Thickness is extracted from first diameter and first wall thickness quantity type respectively from CADMATIC Dimension Table. For reducers and tees, the arrive OD and Thickness will be read from first Diameter and Wall Thickness quantity type and leave OD and Thickness will be read from second Diameter quantity type and Wall Thickness quantity type.

User can also modify OD, Wall thickness and Nominal size of the piping components directly in HOTclash through Edit Layout->Misc->Section.

Flange

Flange from CADMATIC can be transferred as “Pipe with Flange” or “Rigid element” to HOTclash. If the user selects “Pipe with Flange” option from the dialog, then the program creates a pipe with the length of the pipe equivalent to length of flange and creates a Flange node with stiffness as “Rigid” and type as “Weld Neck” in HOTclash. The OD and Thickness (in or mm) corresponding to Flange Nominal Size is transferred to pipe in HOTclash.

On the other hand, If the user selects “Rigid element” option then, the program will transfer the same as “Rigid Element” to HOTclash. Dry weight of flange extracted from CADMATIC will be transferred to “Weight” field of the Rigid Element in HOTclash.

User can also modify the property of Flange through Edit Layout->Window->List->Flanges.

Boundary Condition

Selecting the option “Anchor end if connected to Nozzle or Pipelines” will Anchor the Pipe Ends only when they are connected to a Nozzle or Pipelines, otherwise it leaves them as Free. On the other hand, if one end of the pipe is connected to a Nozzle and the other end of Pipe is connected to a Pipe and if that Pipe is not included as part of the Stress model, then the program will anchor both the end automatically.

For more clarity, consider the following examples. If one end of the pipe is connected to a Pump Nozzle and the other end is not connected to any Nozzle or Pipeline, then the program will anchor the first end and leave the other end as free (i.e., do not create any support). On the other hand, if one end of the pipe is connected to a Nozzle and the other end is connected to a Pipe and that Pipe is not included in the Stress model, then the program will anchor both the ends automatically.

Similarly selecting the option “Anchor all Free Ends” will “Anchor” the Pipe ends automatically irrespective of whether they are connected to Nozzle or Pipelines.

In addition to the above, user can also add / modify supports in piping system in HOTclash directly through Edit Layout->Misc->Data Types.

Supports

- Checks for user defined attribute “sty” or the tag name specified by the user in the dialog box as shown above. If available, then reads the details of support from this attribute and transfers them accordingly to HOTclash.
- The Support Tag defined above should be set a value as given in the field #1 of the access db “SupportType.mdb” (i.e., “PdSupport”), when the user selects the option “Use Mapping DB” for transferring the support details to HOTclash. Otherwise, the attribute should be filled with values as specified in **Appendix E** of HOTclash User’s Manual supplied along with the product.
- User can also add / modify support through Edit Layout->Misc->Data Types or by double clicking the Data Type in the Layout window.

Three Way Valve

Three Way Valve from CADMATIC can be transferred either as “Three Rigid Elements” or “Three Pipes with a Concentrated Mass at its Centre” to HOTclash by connecting the near end & center, far end & center and branch end & center. From the section property, weight of fluid (kg/lb) is calculated and is added to the dry weight (kg/lb) of Three Way valve read from CADMATIC database. The total weight thus obtained is transferred to each rigid element in proportion to its length.

In the later option, the dry weight of Three Way valve is transferred as weight of the Concentrated Mass at the intersection of the three pipes.

User can modify the weight of rigid element through Edit Layout->Misc->Element Types and Concentrated Mass through Edit Layout->Misc->Data Types.

Four way Valve

Four Way Valve from CADMATIC can be transferred as “Four Rigid Elements” or “Four Pipes with one Concentrated Mass at its Centre” to HOTclash by connecting the near end & center, far end & center and two branch end & center. From the section property, weight of fluid (kg/lb) is calculated and is added to the dry weight (kg/lb) of Four Way valve read from CADMATIC. The total weight thus obtained is transferred to each rigid element in proportion to its length.

In the later option, the dry weight of Four Way valve is transferred as weight of the Concentrated Mass at the intersection of the three pipes.

User can modify the weight of rigid element through Edit Layout->Misc->Element Types and Concentrated Mass through Edit Layout->Misc->Data Types.

Material

Material description entered at Material tag of corporate catalogue (MT) is extracted from the database and the material property is then obtained from the intermediate mapping db. Refer Appendix B of HOTclash User’s Manual for more details.

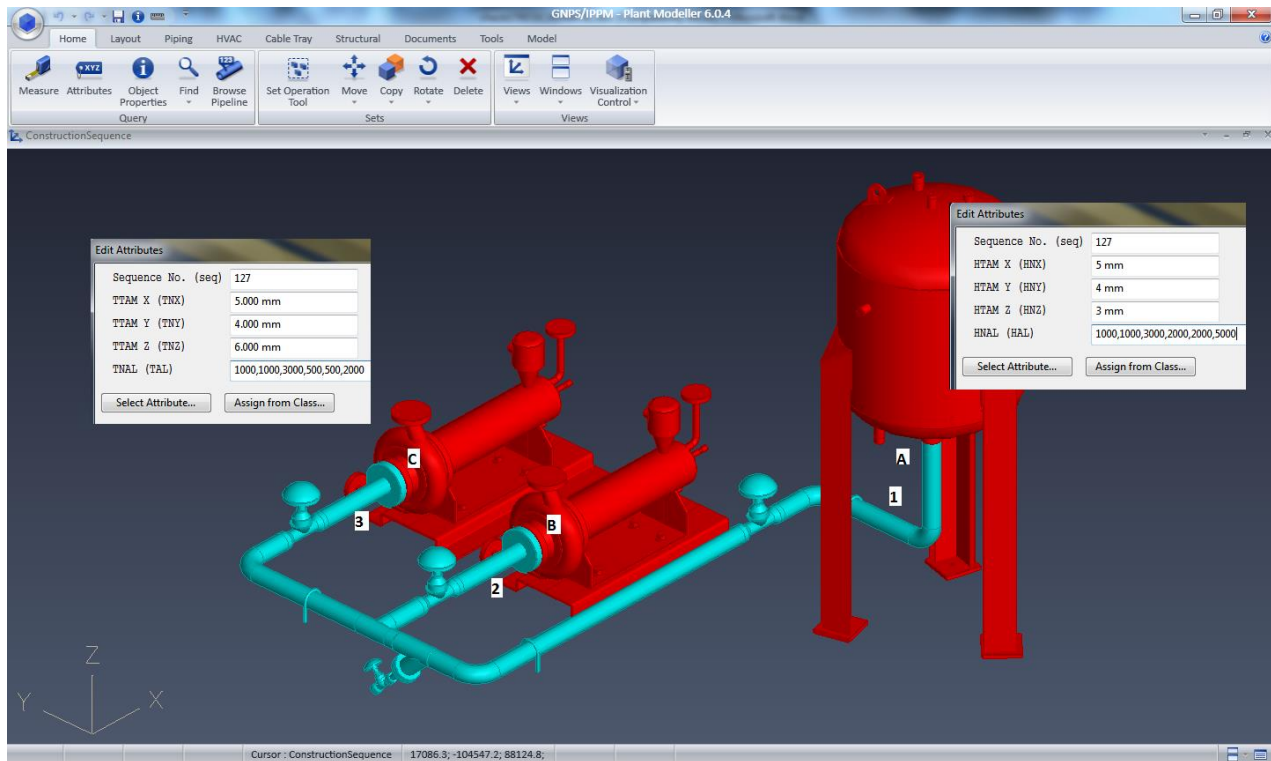
User can add / modify the Material properties in HOTclash through Edit Layout->Misc->Materials.

Thermal Anchor Movement (TAM)

Thermal Anchor Movement (TAM) values entered at User defined attributes HNX, HNY and HNZ or TNX, TNY and TNZ (attributes need to be added and assigned for Model Object through CADMATIC COS and their values to be assigned in Plant Modeller using the option “Whole Pipeobject”) corresponding to Start or End of pipe run is transferred to HOTclash. In other words, TAM at starting of the Pipe run should be entered at HNX, HNY and HNZ of Pipe Run. On the other hand, TAM at the end of the Pipe run should be

entered at TNX, TNY and TNZ of Pipe run. TAM values should be defined in “mm” for CADMATIC projects in SI units and in “Inch” for CADMATIC project in English units.

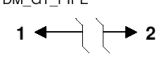
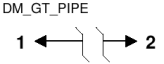
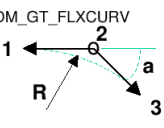
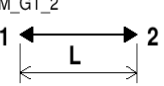
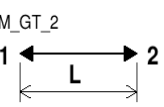
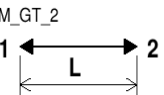
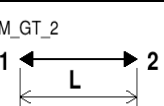
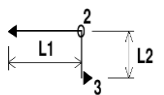
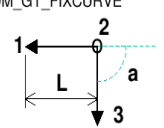
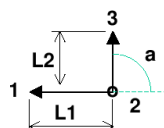
For more clarity, consider the following example shown in figure below. Point A is connecting to a Tank. The TAM values corresponding to this point should be defined by selecting the Pipe run 1 and their values should be entered to attributes “HNX”, “HNY” and “HNZ”. Similarly, TAM values for Point B and C should be defined at attributes “TNX”, “TNY” and “TNZ” of the Pipe runs 2 and 3 respectively.



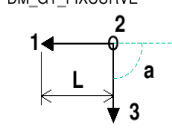
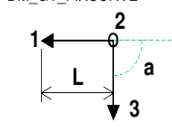
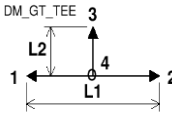
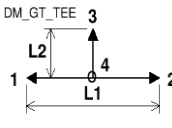
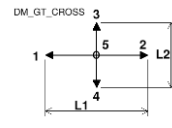
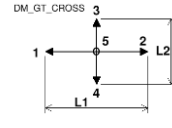
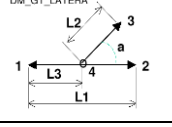
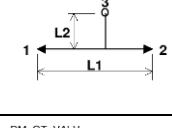
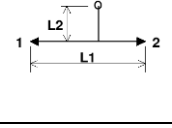
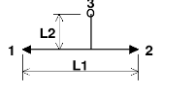
User can add / modify the Thermal Anchor Movement values through Edit Layout option. i.e., Click Edit Layout then select “Anchor” and select “Edit data” through Layout > Edit. From the dialog box shown, click on “Specified Displacement” and enter the TAM values.

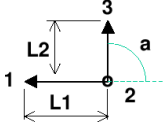
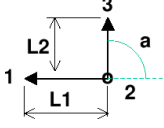
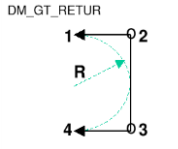
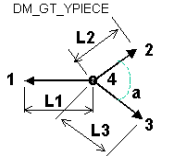
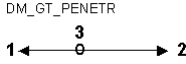
5.0 CADMATIC to HOTclash Component Mapping

The types of components available in CADMATIC are simulated as tabulated below in HOTclash.

Cadmatic Component Description	Constraints	Geometric Types	HOTclash Component	Key Word in Neutral File
If modeled as Piping Components				
Straight Pipes	DM_GT_PIPE = TRUE & Bend Angle = 0	DM_GT_PIPE 	Pipe	PI
Free Bends	DM_GT_PIPE = TRUE & Bend Angle > 0	DM_GT_PIPE 	Bend	EL
Flexible Curves	DM_GT_FLXCURVE = TRUE	DM_GT_FLXCURV 	Bend	EL
Flanges	DM_GT_2P = True & Primary Connection Code = 1 or 3 (Connection Type is Flange)	DM_GT_2 	Rigid Element or Pipe with Flange	FL
Conc. Reducer	DM_GT_2P = True & 2 nd Nominal Size > 0	DM_GT_2 	Reducer Concentric	RD
Straight Pipes	DM_GT_2P = True & Keyword in corporate catalogue of CADMATIC has "*PIPE*" e.g. Seamless Straight Pipe	DM_GT_2 	Pipe	PI
Flow meters, Adaptor, Flexible hoses, Caps	DM_GT_2P = True	DM_GT_2 	Rigid Element	RB
Eccentric Reducer	DM_GT_3PDIRFIX = True		Reducer Eccentric	ER
Fixed Angle Curves	DM_GT_FIXCURVE = True	DM_GT_FIXCURVE 	Bend	EL
Asymmetric Curves	DM_GT_ASYMCURVE = True		Bend	EL

Cadmatic Component Description	Constraints	Geometric Types	HOTclash Component	Key Word in Neutral File
U-Piece	DM_GT_RETURN = True	<p>DM_GT_RETUR</p>	Bend	EL
Sliding Sockets, Unions	DM_GT_PENETR = True	<p>DM_GT_PENETR</p>	Rigid Element	RB
If modeled as Standard Components				
Filter / Strainer	DM_GT_FLXCURVE = TRUE	<p>DM_GT_FLXCURV</p>	Rigid Element	RB
Some Flanges	DM_GT_2P = True & Primary Connection Code = 1 or 3 (Connection Type is Flange)	<p>DM_GT_2</p>	Rigid Element or Pipe with Flange	FL
Straight Pipes	DM_GT_2P = True & Keyword in corporate catalogue of CADMATIC has “*PIPE*” eg Seamless Straight Pipe	<p>DM_GT_2</p>	Pipe	PI
Valves	DM_GT_2P = True & Keyword in corporate catalogue of CADMATIC has “*VALVE*” eg Ball check valve PVC	<p>DM_GT_2</p>	Valve	VA
Conc. Reducer	DM_GT_2P = True & 2 nd Nominal Size > 0	<p>DM_GT_2</p>	Reducer Concentric	RD
Flow meters, Adaptor, Flexible hoses	DM_GT_2P = True	<p>DM_GT_2</p>	Rigid Element	RB
Eccentric Reducer	DM_GT_3PDIRFIX = True		Reducer Eccentric	ER
Fixed Angle Valves	DM_GT_FIXCURVE = True & Keyword in corporate catalogue of CADMATIC has “*VALVE*” eg Pressured rig-valve WDP	<p>DM_GT_FIXCURVE</p>	Valve	VA

Cadmatic Component Description	Constraints	Geometric Types	HOTclash Component	Key Word in Neutral File
Straight Pipes	DM_GT_FIXCURVE = True & Keyword in corporate catalogue of CADMATIC has “*PIPE*” eg Seamless Straight Pipe	DM_GT_FIXCURVE 	Pipe	PI
Filter / Strainer	DM_GT_FIXCURVE = True	DM_GT_FIXCURVE 	Rigid Element	RB
3 Way Valves	DM_GT_TEE = True & Keyword in corporate catalogue of CADMATIC has “*VALVE*” eg Three-way valve Wafer	DM_GT_TEE 	Three Rigid Elements or Three Pipes with Concentrated Mass	3W
Welding TEE	DM_GT_TEE = True	DM_GT_TEE 	Pipes with Branch SIF (Welding TEE)	TW
4 Way Valves	DM_GT_CROSS = True & Keyword in corporate catalogue of CADMATIC has “*VALVE*” eg Four-way valve Wafer	DM_GT_CROSS 	Four Rigid Elements or Four Pipes with Concentrated Mass	4W
Crosses	DM_GT_CROSS = True	DM_GT_CROSS 	Four Pipes with Branch SIF (Welding TEE)	CR
Lateral TEE	DM_GT_LATERAL = True	DM_GT_LATERA 	Pipes with Branch SIF (Welding TEE)	TW
Valves	DM_GT_VALVE = True & Keyword in corporate catalogue of CADMATIC has “*VALVE*” eg Ball Valve	DM_GT_VALV 	Valve	VA
Reduced Valves	DM_GT_VALVE = True & 2 nd Nominal Size > 0 & Key word in corporate catalogue should not have “*valve*”.	DM_GT_VALV 	Reducer Concentric	RD
Flow meters, Pressure gauges, Manometers,	DM_GT_VALVE = True	DM_GT_VALV 	Rigid Element	RB

Cadmatic Component Description	Constraints	Geometric Types	HOTclash Component	Key Word in Neutral File
Strainers				
Asymmetric Valves	DM_GT_ASYMCURVE = True & Keyword in corporate catalogue of CADMATIC has “*VALVE*” eg Pressured rig-valve WDP		Valve	VA
Asymmetric Curves	DM_GT_ASYMCURVE = True		Bend	EL
U-Piece	DM_GT_RETURN = True		Bend	EL
Y-piece	DM_GT_YPIECE = True		Pipes with Branch SIF (Welding TEE)	TW
Sliding Sockets, Unions	DM_GT_PENETR = True		Rigid Element	RB