

OSISOFT ASIA TECHNOLOGY CONFERENCE 2007



Universal Platform, Infinite Possibilities

Validate and reconcile your plant data with Sigmafine

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Agenda

- Overview
- Looking at benefits
- Build a model
- Configuration
- So what do I need to get started?
- Summary

Sigmafine

What is it?

- Product that enables data reconciliation and validation for any industrial process
- Software that uses a model to calculate the most likely version of what really happened in your process

Sigmafine

Solving Common Problems

- Data validation issues
- Bad measurements
- Unmeasured flows
- Process losses

How does it do this?

1. Build model in Analysis Framework
 - Create elements
 - Configure data sources
 - Add constraints

How does it do this?

The image shows two overlapping software windows. The background window is titled 'Analysis Rule' and shows the 'Type' as 'Mass Balance' and a 'Summary' of configuration parameters such as 'Solvability=yes; Influences=no; Propagate Operations=yes; Maximum Iterations=10; Minimum Step Size=1; Trace=2; Inventory Measured Mass Attribute=Measured Mass; Inventory Measured Tolerance Attribute=Measured Mass; Meter Measured Mass Attribute=Measured Mass; Meter Measured Tolerance Attribute=Mass Tolerance; Meter Corrected Mass Attribute=Corrected Mass; Meter Corrected Tolerance Attribute=Corrected Mass; Transfer Measured Mass Attribute=Measured Mass; Transfer Measured Tolerance Attribute=Mass Tolerance; Transfer Corrected Mass Attribute=Corrected Mass; Transfer Corrected Tolerance Attribute=Corrected Mass; Inferred Status Attribute=Inferred Status; Reconciled Residual Attribute=Reconciled Residual; Reconciled Mass Correction Attribute=Reconciled Mass Correction; Reconciled Mass Attribute=Reconciled Mass; Reconciled Tolerance Attribute=Reconciled Mass Tolerance; Reconciled Mass Solvability Attribute=Reconciled Mass Solvability; Reconciled Influence Attribute=Reconciled Mass Test 1; Test 2 Attribute=Reconciled Mass Test 2; Mass Imbalance Attribute=Reconciled Mass Variance; Test 3 Attribute=Reconciled Mass Test 3; Test 4 Attribute=Reconciled Mass Test 4'. A 'Settings...' button is visible in the top right.

The foreground window is titled 'Mass Balance Configuration' and has three tabs: 'Control', 'Input', and 'Output'. The 'Control' tab is active and contains the following settings:

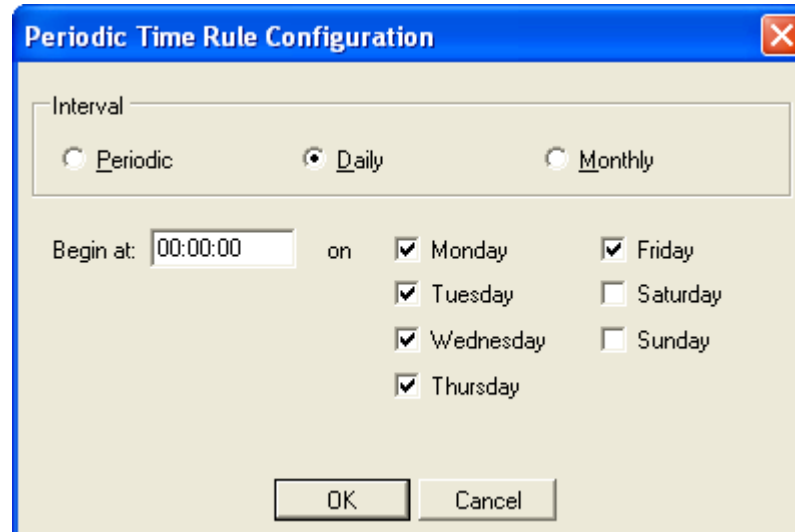
- Options:**
 - Solvability
 - Influences
 - Propagate service status
 - Unit of Measure for Solver: kg
- Convergence:**
 - Maximum iterations: 10
 - Minimum step size: 1
 - Gradient: 1
- Output:**
 - Confidence: 0.95
 - Tolerance: 2
 - Auto Diagnostics: 1
 - Trace: 2
- Gross Error Configuration:**
 - Buttons: Pre Validate, Post Validate, Cancel, OK

2. Choose a calculation method:
Analysis rule

How does it do this?

3. Define a time from for the analysis:

Case



How does it do this?

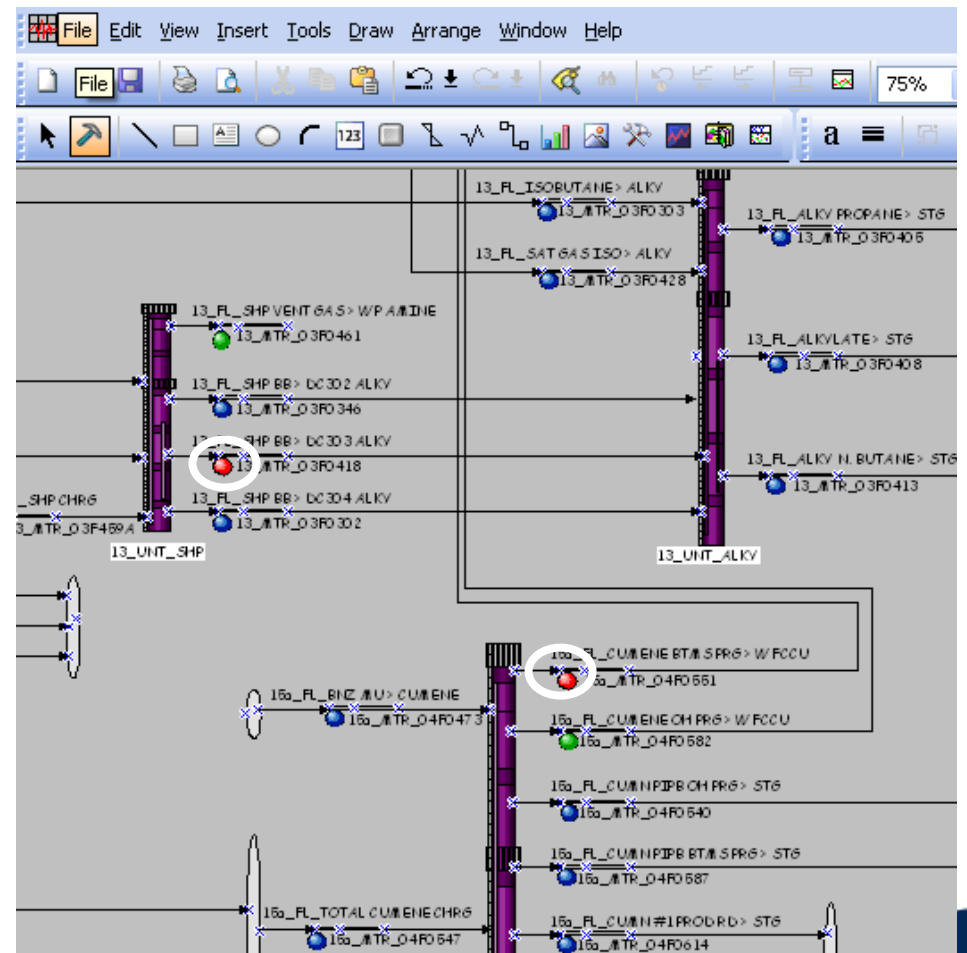
4. Run the analysis

Sigmafine validates the model and uses least squares to reconcile



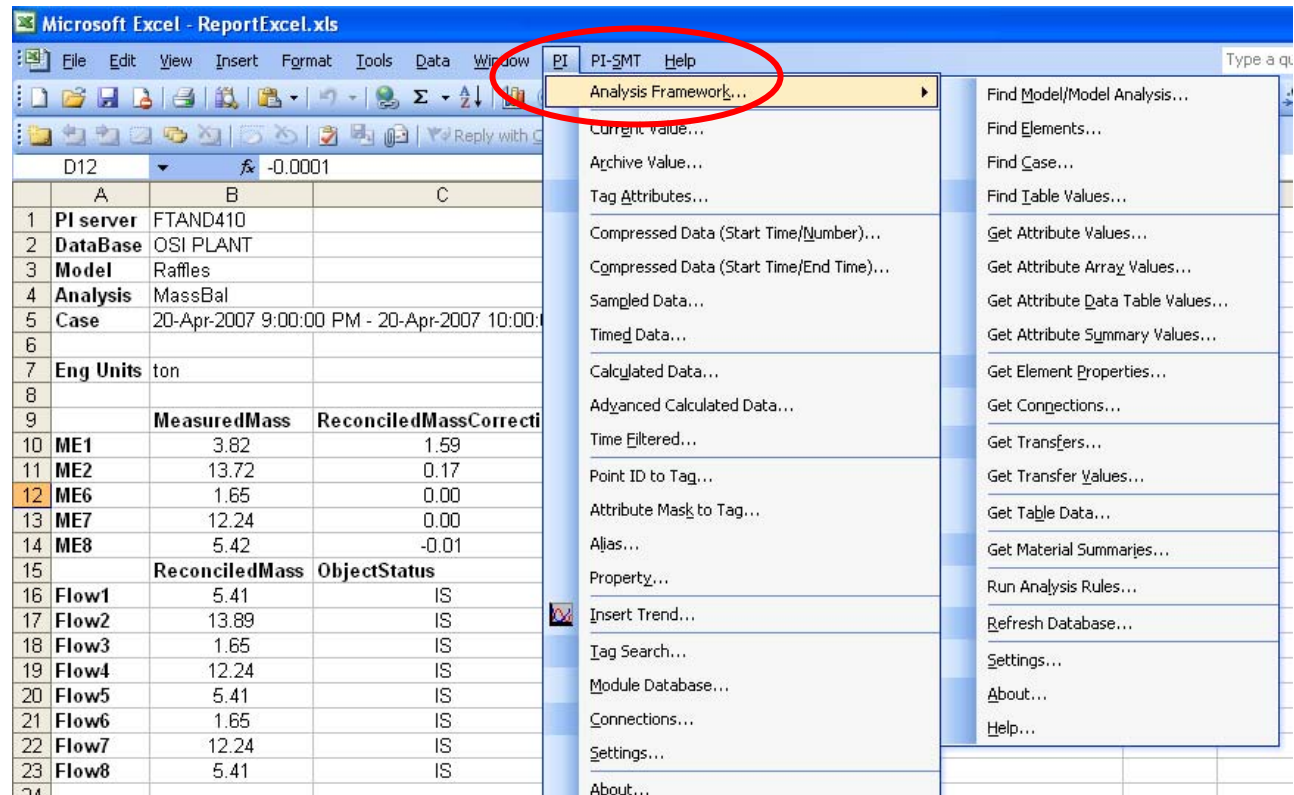
How does it do this?

5. Analyze the results



How does it do this?

5. Analyze the results



The screenshot shows a Microsoft Excel spreadsheet titled "ReportExcel.xls". The spreadsheet contains a table with columns A, B, and C. The table data is as follows:

	A	B	C
1	PI server	FTAND410	
2	DataBase	OSI PLANT	
3	Model	Raffles	
4	Analysis	MassBal	
5	Case	20-Apr-2007 9:00:00 PM - 20-Apr-2007 10:00:00 PM	
6			
7	Eng Units	ton	
8			
9		MeasuredMass	ReconciledMassCorrect
10	ME1	3.82	1.59
11	ME2	13.72	0.17
12	ME6	1.65	0.00
13	ME7	12.24	0.00
14	ME8	5.42	-0.01
15		ReconciledMass	ObjectStatus
16	Flow1	5.41	IS
17	Flow2	13.89	IS
18	Flow3	1.65	IS
19	Flow4	12.24	IS
20	Flow5	5.41	IS
21	Flow6	1.65	IS
22	Flow7	12.24	IS
23	Flow8	5.41	IS

The dropdown menu is open, and the "Analysis Framework..." option is circled in red. The menu items are:

- Analysis Framework...
- Current Value...
- Archive Value...
- Tag Attributes...
- Compressed Data (Start Time/Number)...
- Compressed Data (Start Time/End Time)...
- Sampled Data...
- Timed Data...
- Calculated Data...
- Advanced Calculated Data...
- Time Filtered...
- Point ID to Tag...
- Attribute Mask to Tag...
- Alias...
- Property...
- Insert Trend...
- Tag Search...
- Module Database...
- Connections...
- Settings...
- About...

The right-hand side of the menu shows a search bar and a list of options:

- Find Model/Model Analysis...
- Find Elements...
- Find Case...
- Find Table Values...
- Get Attribute Values...
- Get Attribute Array Values...
- Get Attribute Data Table Values...
- Get Attribute Summary Values...
- Get Element Properties...
- Get Connections...
- Get Transfers...
- Get Transfer Values...
- Get Table Data...
- Get Material Summaries...
- Run Analysis Rules...
- Refresh Database...
- Settings...
- About...
- Help...

Benefits

- Reconciliation
- Identify losses
- Monitor and reduce meter maintenance
- Looking at the same information

Sigmafine model building

- AF Explorer to configure elements
- AF Configurator to configure elements using Excel
- ProcessBook to connect elements and model design

Sigmafine tools

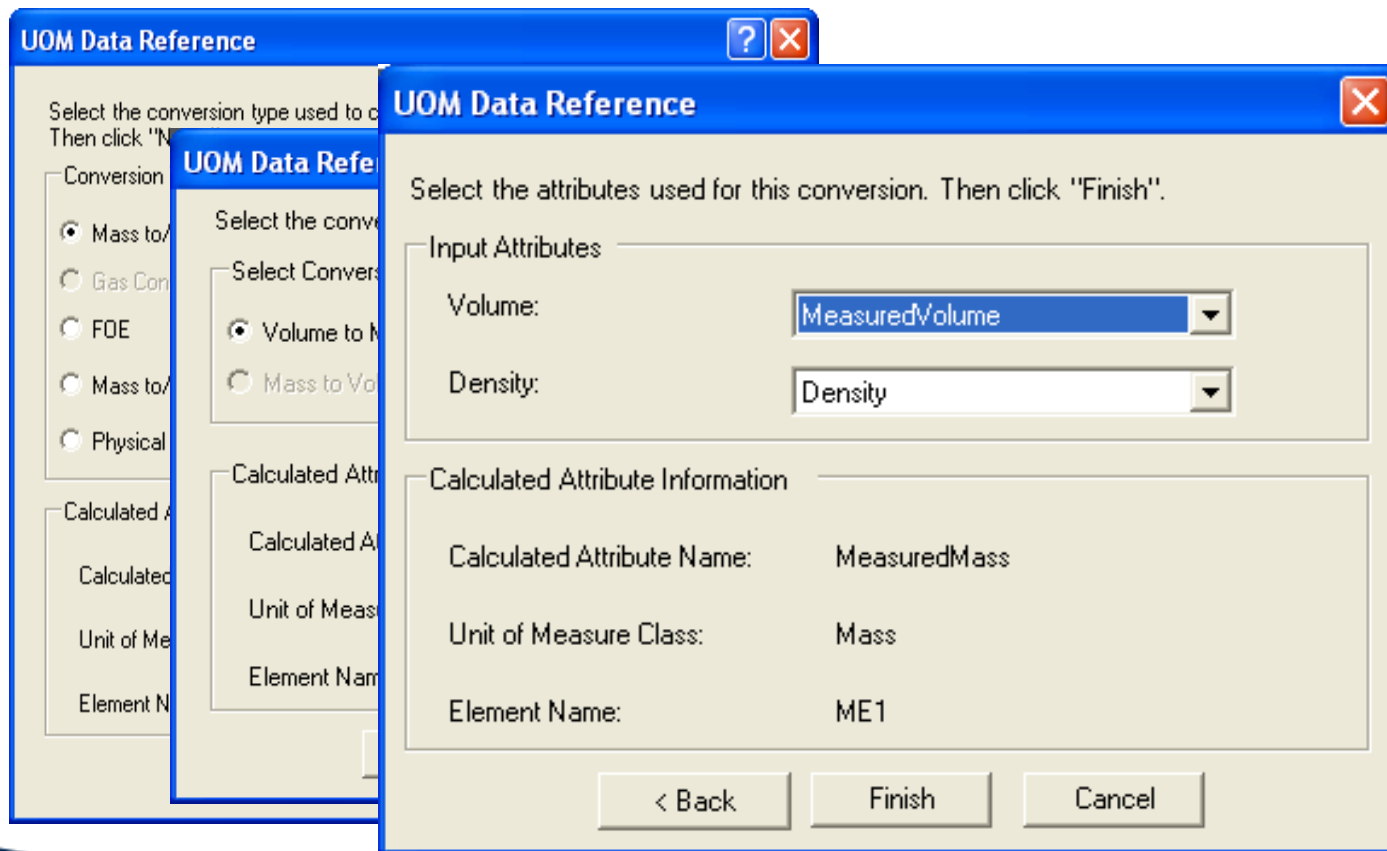
- Data References
- Analysis Rules
- Data Loader

What is a data reference?

- A component or module of the AF that can perform the following tasks:
 - Read data from an external system
 - Write data to an external system
 - Can execute predetermined calculations

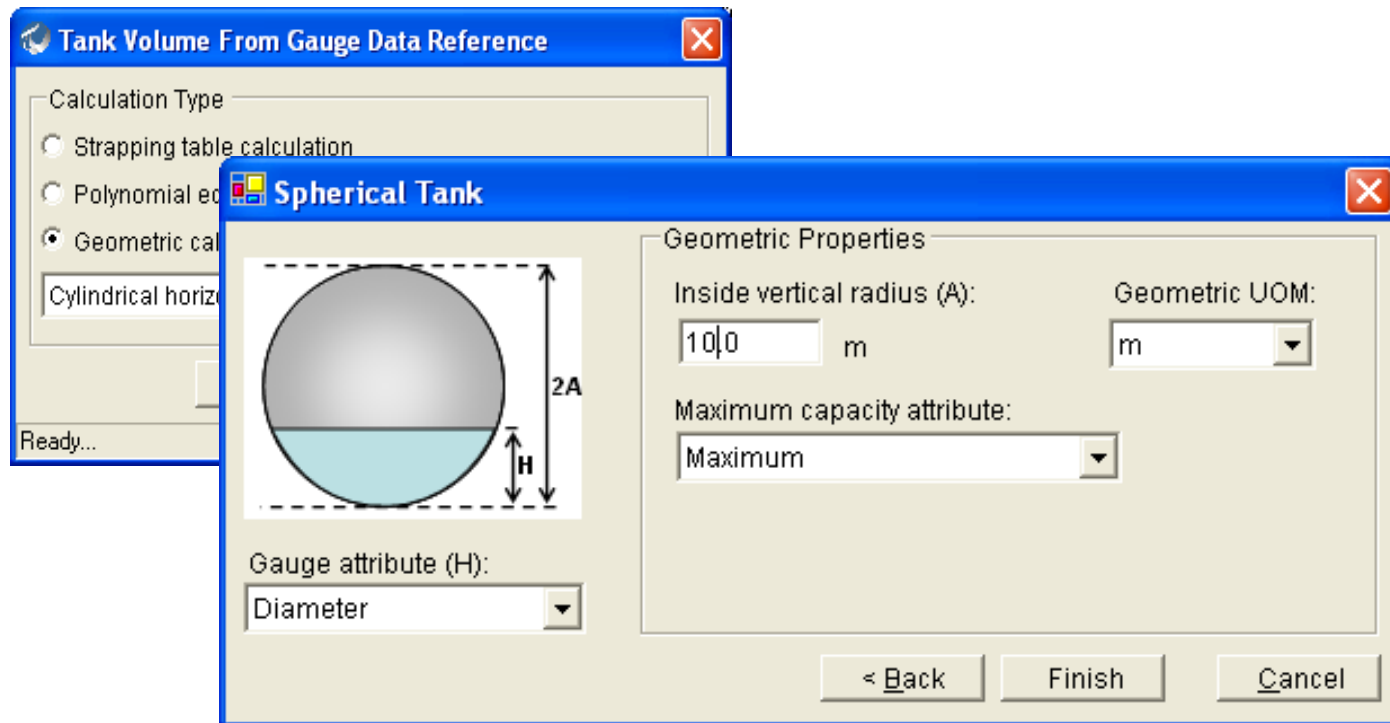
Data references

- UOM is a class-to-class converter



Data references

- Gauge to Volume



Data references

- Components

Components Data Reference

Select the calculation type. Then click "Next".

Calculation Type:

- Analyzer Configuration
- Measurement Basis Conversion

Selected Attribute Information

Configured Attribute Name:

Attribute Type:

Element:

Analyzer Configuration

Select the components measured in this analyzer. Then click "Finish."

Analyzer Configuration

Available components

Sugar

Component	Absolute T	Relative T	Default	Max.	Min.	Measu	Settings
Cocoa	0	2	0	1	0	<input checked="" type="checkbox"/>	ChocMilkAna.Compone
Milk	0	2	0	1	0	<input checked="" type="checkbox"/>	ChocMilkAna.Compone
Syrup	0	2	0	1	0	<input checked="" type="checkbox"/>	ChocMilkAna.Compone
*							

Attribute Information

Configured Attribute Name: ComponentData

Element Name: SF_ChocolateMilkAnal

Allow Defaults When no PI Data is Available

Normalize Data

< Back Finish Cancel

Data references

- Sigmafine

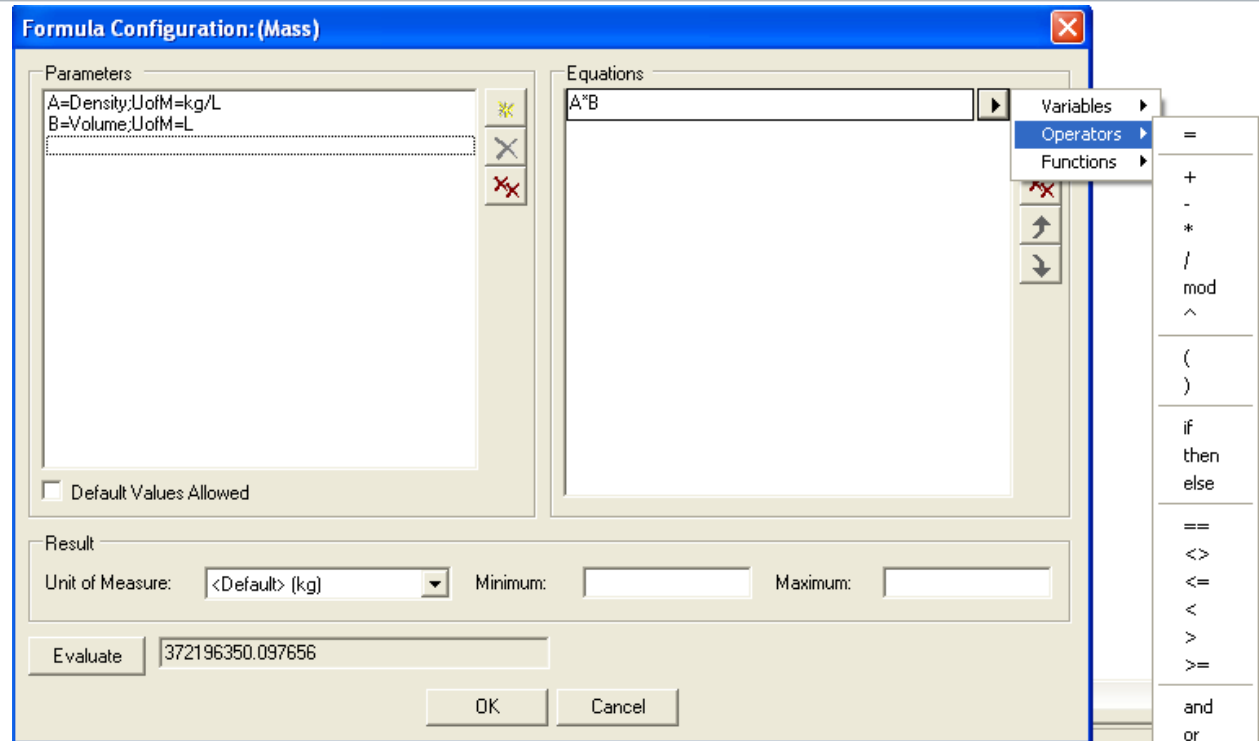
The image shows three overlapping dialog boxes from the Sigmafine software interface. The background dialog is 'Sigmafine Data Reference', which prompts the user to 'Select the Calculation Category, Then click "Next"'. It has radio buttons for 'Meters' and 'Tank Inventory', and fields for 'Selected Attribute Information', 'Calculated Attribute Name:', 'Unit of Measure Class:', and 'Element Name:'. A 'Next' button is at the bottom right.

The middle dialog is 'Tolerance', which prompts the user to 'Select the Calculation Type.'. It has radio buttons for 'Tank Tolerance Bas...' and 'Measurement Toler...', with the latter selected. It also has fields for 'Selected Attribute Information', 'Calculated Attribute Name:', 'Unit of Measure Class:', and 'Element Name:'. A '< Back' button is at the bottom right.

The foreground dialog is 'Measurement Tolerance', which prompts the user to 'Enter the Measurement Information used for this calculation. Then click "Finish."'. It has a 'Measurement Information' section with fields for 'Measurement:' (a dropdown menu showing 'MeasuredMass'), 'Unit-of-Measure', 'Relative Tolerance:' (a text box with '3'), and 'Absolute Tolerance:' (a text box with '1'). There is also a 'kg' dropdown menu. Below this is a 'Selected Attribute Information' section with fields for 'Calculated Attribute Name:' (showing 'MassTolerance'), 'Unit of Measure Class:' (showing 'Mass'), and 'Element Name:' (showing 'SF_MilkTank2'). At the bottom are '< Back', 'Finish', and 'Cancel' buttons.

Data references from AF

- Formula DR for add hoc calculations



Data references from AF

- PI Point data reference

PI Point Data Reference

PI Server: FTAND410

Tag name: Tank1.Volume

Alias name:

Attribute:

Value retrieval methods

By Time: Automatic

Relative Time:

By Time Range: Not Supported

Calculation basis: Time Weighted

Min percent good: 80

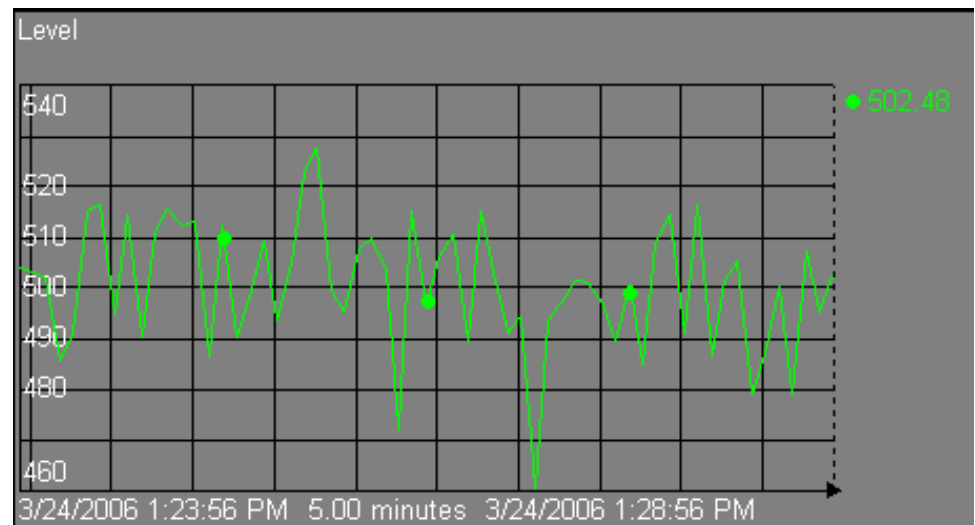
By Case: Automatic

Unit of Measure

UOM: <Default> (m3)

Read only

OK Cancel



Data References from AF

- Table Lookup

Table Lookup Data Reference

Table: SF_Material table

Result column: Material Density

Unit of Measure: kg/L

Where

Column:	Operator	Attribute or Value:	
Material	=	DesignGravity	Add And
			Add Or

Complete WHERE Clause:

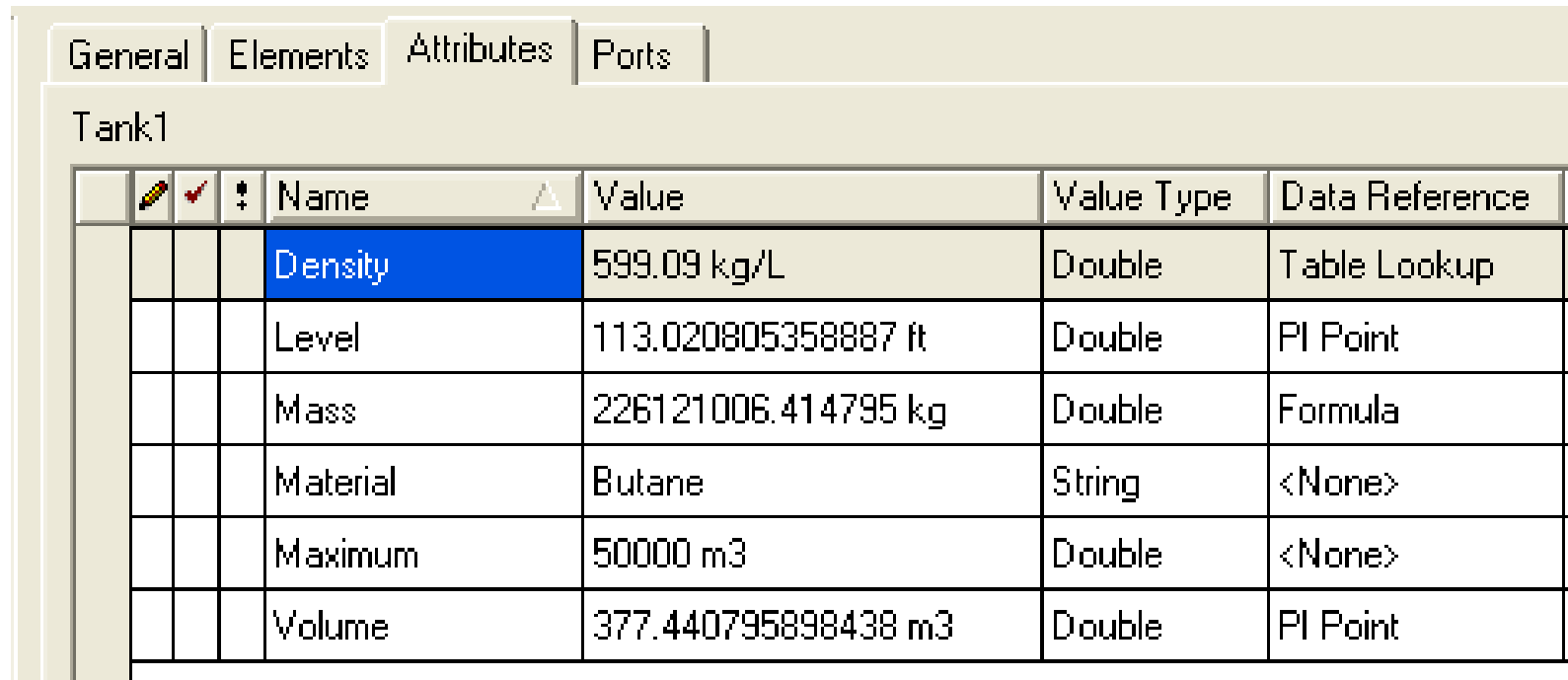
Material = @DesignGravity

OK Cancel

Material	Material Description	Material Gro...
MilkA	Whole Milk	MILKGROUP
MilkB	Skim Milk	MILKGROUP
MilkC	2% Milk	MILKGROUP
MIXA	Dark Chocolate Mix	MIXGROUP
MIXB	Dark Chocolate Mix	MIXGROUP
MIXC	Medium Chocolate Mix	MIXGROUP
CHOCOLATE	Fine Chocolate Milk	FINALPRO...

Configuration of data references

- Configuration using AF Explorer



Tank1

			Name	Value	Value Type	Data Reference
			Density	599.09 kg/L	Double	Table Lookup
			Level	113.020805358887 ft	Double	PI Point
			Mass	226121006.414795 kg	Double	Formula
			Material	Butane	String	<None>
			Maximum	50000 m3	Double	<None>
			Volume	377.440795898438 m3	Double	PI Point

Summary of data references

- Configurable
- Chained automatically
 - Sequence is controlled by AF
- UOM conversions are handled automatically
- Some import information, others perform calculations

Demo

What is an analysis rule?

- A component or module of AF that has the ability to analyze a model by using some predetermined logic or algorithm
 - Collect information
 - Validate the model and data
 - Execute logic in the context of a model
 - Write results to a case

Using analysis rules

- Sigmafine Balance
- Components Balance
- Energy Balance
- Composition Tracking
- Gross Error Detection

Sigmafine balance analysis rule

- Linear balance of any quantity type:
 - Mass
 - Volume
 - Standard gas volume
 - Normal gas volume
- Easy configuration
- Any quantity that is conserved in a process can be balanced using this rule

Summary of analysis rules

- They contain the logic that understands the model and its data
- They are used for different types of balances: mass, components and energy
- They produce results for the case of analysis

Data Loader Utility

- Allows you to import data for elements:
 - Tanks, meters and analyzers
- Supports different formats:
 - csv and xls file formats
- Can send data to PI or AF cases directly
- Creates transfers

So What Do I Need?

- Windows 2000 (SP 2) or later
- Microsoft SQL Server 2000 Desktop Edition or better
- Microsoft Excel 2000 or later

- PI Server 3.4.363.60 or later
- PI Analysis Framework 1.2.0.1225 or later
- PI ProcessBook 3.0 or later

Summary

- Sigmafine can be applied to any industry
- Validated data is available to make better business decisions
- Sigmafine increases confidence of what you measure and estimates what you don't measure, which helps you to make better business decisions