Symphonite™ Refining and Petrochemical Modeling System (RPMS)

Product Information Note

Planners solve a variety of problems using their planning tools. These range from the impact of long term capital projects, decisions to make a new product mix, process new feed stock, or significantly vary the operation of the plant due to asset limitations. In each case, the planner uses the overall plant model and economics to determine the optimal solution.

Symphonite Refining and Petrochemical Modeling System (RPMS) is designed specifically to answer the demands of the planning process. Planners can integrate all the constraints that affect their plans using data from a variety of sources and then develop the optimal solution rapidly and accurately.

Modeling Components

Symphonite RPMS provides a rich and proven platform for developing a mathematical model representing any refinery, petrochemical or O&G facility. RPMS makes use of FICO Xpress as the optimizer.

Multi-Period Modeling

The Symphonite RPMS multi-period module supports modeling multiple time periods with user-defined intervals. This option is valuable in a number of applications, including inventory management, analysis of discounted cash flows across time, and inclusion of varying processing capacity at intervals within an overall operating plan. Results for multiple periods are made available through flowsheets and reports.

The planning challenge for refineries, petrochemical plants and Oil & Gas facilities is to determine the optimal feed and product mix, and the most profitable way to operate the plant taking into consideration varied supply, demand, prices, product specifications, production as well as supply & distribution asset capabilities.

FEATURES & BENEFITS

Maximized profitability through development and optimization of refining, petrochemicals and Oil & Gas models

Use of planning tools for the full range of planning processes – from strategic to short term operational plans

Embedded domain expertise for refining and petrochemical modeling

Faster and more efficient planning and decision making

Intuitive User Interface allowing new users to become experts faster
Multi-Plant Modeling
The Symphonite RPMS multi-plant module generates mathematical models for the solution of broader supply chain management problems. Each individual operating plant can be represented to any required degree of detail and incorporated as a sub-model in the broader optimization problem. Model structure is added to represent the overall supply chain (i.e. terminal, pipeline, mode of transportation, terminal blending, exchange agreements, etc.)

Mixed Integer Programming
Symphonite RPMS enables discrete decisions with ease through the use of mixed-integer programming. This technique allows users to specify, for example, that a raw material must be purchased at a minimum level or not at all (soft minimum). Symphonite RPMS includes soft minima for material purchase and sales, as well as turndown capacities for operating units.

Handling Non-Lineairties
Symphonite RPMS uses successive linear programming (SLP) with distributive recursion technique which allows varied representations of non-linear relationships in the model. Distributive recursion allows Symphonite RPMS to associate the effect of changing feedstock to a change in byproduct properties. This concept is used in various ways to allow representation of non-linear relationships and converge to an optimal solution.

Symphonite RPMS is unique in its ability to handle process plant pooling problems. Techniques available to perform this task include the following:
- Representation of many different process unit logical operating modes
- Flexibility to combine or segregate feedstock and/or byproducts on a stream-by-stream basis
- Ability to combine streams explicitly for subsequent dispositions while correctly tracking quality effects
- Implicit pooling of byproduct streams to be sent to downstream dispositions in the same proportion as they are produced, without actually combining the streams

System Components
Refining Process Database
Symphonite RPMS offers a refining database that provides a comprehensive selection of process unit sub-models and investment-capacity relationships for the most commercially available processes used by the refining industry worldwide. The database contains sub-models for both volume- and weight-based process units, offering complete flexibility in customizing refinery models, middle distillates and fuel oils, and quality data for most intermediate refinery streams.

Chemical Process Database
The Symphonite RPMS chemicals database contains a broad range of petrochemical processes and products. Sub-models for more than 100 chemical processing units (and associated investment costs) are included. Finished products include synthetic fibers, synthetic rubbers, resins, plastics, solvents, plasticizers, and fertilizers.

User Interface Components
Graphical User Interface (GUI)
The Symphonite RPMS user interface provides a graphical view of the plant. The characteristics of the display can be modified to provide an intuitive image of the complete model for execution and modification purposes. The intuitive graphical UI in RPMS can be used to easily view the exceptions, limiting constraints, solution results, edit tables and navigate through the solution results, improving the overall user experience.

Modeling Components:
- Multi-period modeling
- Multi-plant modeling
- Mixed Integer Programming
- Facility Integer Programming
- Model Investment
- Model Swing cuts
- Supports modeling discrete yields

System Components:
- Refining Process Database
- Chemical Process Database
- Solution Database

GUI Components:
- Intuitive UI to know the problem areas and limiting constraints
- Easy Model and Case Management
- Reporting in Excel, text and HTML formats
Managing Data (Data Factory)
The Symphonite RPMS Data Factory is an integrated Microsoft Excel application for displaying and manipulating model data using Excel worksheets. The usual spreadsheet facilities are available for adding or deleting rows or columns, performing calculations, copying and pasting between worksheets, changing appearance and printing. This table-oriented view is fully integrated into the overall user interface. Different views of a table can help to clarify case or period data differences. Symphonite RPMS provides context sensitive navigation to the relevant tables and HTML reports for the selected object from the flowsheet.

Reporting (HTML and Report Factory)
The Report Factory is an integrated Excel application that produces the standard Symphonite RPMS reports, as well as user-defined reports, in the form of Excel worksheets. User-defined reports are designed using regular spreadsheet facilities, and the package includes a library of user functions provided specifically to process model related information. The Report Factory is a very powerful application that can produce reports in almost any conceivable format.

Model and Case Management
Symphonite RPMS provides a clear view of all models which have been built and allows the user to organize, group and access these easily using a model tree. It also provides ability to compact and backup or restore point (can also be set up for automatic) models. Symphonite RPMS also provides powerful yet simplified capability to create, manage and solve cases through excel spreadsheets.

Investment Module
Symphonite RPMS has a unique investment module that gives the model a choice of investments, e.g. hydrocracking, resid cracking, hydrotreating, etc. Symphonite RPMS uses a non-linear investment cost vs. capacity relationship. It also considers various elements such as escalation factor, fixed operating expenses, catalyst loading cost and paid up royalty, plant service factor, tank cost and offsite investment, maintenance cost, salvage value and capital recovery factor, among others.

Other Features
Symphonite RPMS provides a facility to import the crude assay data generated by ASSAY2 or any other crude assay management tool, based on a predefined format. Symphonite RPMS provides the capability to interface with simulators via tools like excel to update yields and properties during the optimization cycles, using a predefined format.
Symphonite™ Supply Chain and Production Management Suite
Symphonite Refining and Petrochemical Modeling System is part of Symphonite portfolio of software and services, which provides end-to-end solution for the supply chain and production management (SCPM) processes. From integrated planning to post-execution reconciliation and analysis, we offer comprehensive, scalable answers to your challenges. Built on deep domain knowledge, our tools help you make better business decisions and drive continuous improvement helping you achieve supply chain and production management excellence.

Other SCPM Tools
- Symphonite Capacity and Distribution Planner (CDP)
- Symphonite BLEND
- Symphonite ASSAY2
- Symphonite SAND
- Symphonite Production Accounting and Reconciliation (PAR)
- Symphonite Production Manager
- Symphonite Downtime Reporter
- Symphonite Port and Marine Manager

Symphonite™ SCPM Support Services
This product comes with worldwide, premium support services through our Benefits Guardianship Program (BGP). BGP is designed to help our customers improve and extend the usage of their applications and the benefits they deliver, ultimately maintaining and safeguarding their advanced applications.

Honeywell provides a complete portfolio of service offerings to extend the life of your plant and provide a cost-effective path forward to the latest application technology. Honeywell services include:
- Software installation services
- On-site engineering services
- Migration services
- Scope expansion services
- Assessment services
- Performance baseline and tuning services
- Customized training

For More Information
Learn more about how Honeywell’s Symphonite RPMS can help with the planning challenges at your refinery, petrochemical or oil & gas facility visit www.honeywellprocess.com/software or contact your Honeywell Account Manager

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