Separation Design Software
Description

MySep is a computer software program that enables the user to design (sizing) or evaluate (rating) separators and scrubbers in detail, right down to the selection of suitable separation internals. MySep can be used independently, but also in conjunction with process modelling tools used to simulate entire flow schemes, such as Hysys, Petro-SIM and UniSim Design. With the output from these process simulations, each vessel can be designed in detail using MySep. MySep effectively enables the user to determine vessel sizes, select internals and assess the associated overall performance of each vessel.

Furthermore, MySep can also be used to evaluate an existing design and determine its theoretical performance based on actual operating data.

What is the power of MySep?

MySep answers questions and increases efficiency for both the design engineer and his company. To name a few:

- Predict and assess the performance of new and existing separators. Be in the know.
- Reduce engineering hours and costs
- Avoid re-engineering
- Mitigate risk

Areas of application of MySep:

How can I use MySep?

MySep is set up such that the user is effectively guided through the design steps in the most efficient manner. At the same time, all aspects of the design are accessible at any time.

The effects of user input on key aspects of the design (e.g. droplet sizes, performance, residence times, etc) are calculated immediately and shown to the user in real-time. This allows fast optimisation of the design. MySep has built-in correlations for prediction of mist fractions, droplet size distribution and separation efficiencies at the various separation stages within the vessel. Nonetheless, the user has the possibility to override these predictions. By entering overriding values and reviewing the effect on overall performance, the user obtains insight in the sensitivity of the design.
MySep is available in two license types:

1) Standalone license version, for use on a single computer.
2) Network license version, for concurrent use on multiple computers on a network.

MySep adds value to your project, from Conceptual Design to daily Operations. It is all about you being in control of the design, its performance and consequently your peace of mind.

Features

Phase separation
- Gas - liquid separation
- Liquid - liquid separation
- Liquid - sand separation

Input
- Input up to 6 design and operating cases
- Selectable input units (SI/metric and English/Imperial and combinations)
- Communicate directly with Hysys, Petro-SIM and UniSim Design
- Import case data from Excel spreadsheet

Inlet piping
- Droplet size distribution prediction
- Liquid entrainment fraction and flow rate prediction
- Flow regime map and data

Inlet section
- Nozzle size, velocity and momentum calculation
- Inlet device selection: half pipe, vane type, inlet cyclones

Liquid levels
- Direct input of liquid levels setpoints
- Auto-calculation of level setpoints from height, volume and time requirements input

Gravity separation section
- Liquid from gas separation calculation (droplet size distribution based)
- Oil droplet from water separation calculation
- Water droplet from oil separation calculation
- Plate pack coalescer selection, dimensioning and performance
- Phase inversion point predictions
- Oil in water and water in oil outlet concentrations approximation
- Perforated distribution baffles design, pressure drop and level differences
- Degassing bubble size calculation
- Sand separation calculations: carryover and deposition height profiles

Demisting section
- Demisting device selection & performance predictions: Mesh pad, vane pack and cyclones
- Detailed geometrical parameters of equipment (e.g. mesh void fraction, wire diameter, cyclone swirl angle, diameter, etc, etc) used in performance calculations.
- Detailed design / sizing of demisting equipment
- Drain pipes design

Design layout
- To-scale layout drawing of vessel, nozzles and internals
- Setting / adjustment of nozzle and internals dimensions and layout
Pressure drop
- Prediction of pressure drop across nozzles, internals and vessel
- Prediction and consideration of drainage head in equipment drain pipes

Other
- Prediction of liquid in gas carryover and droplet size distribution
- Option to override predicted droplet sizes and liquid loads (mist) at each separation step
- Notifications if physical or equipment design limits are exceeded by user

Automatic vessel sizing
- Full automatic sizing of the vessel based on selected equipment and other optional criteria

Operating envelope
- Generation of graphical charts of a vessel’s operating envelope
- Iso-carryover curves
- Operating limits
- Custom point
- Multiple indicators
- Chart controls

Sensitivity analysis
- Plotting of selectable parameters in a chart
- Wide range of selectable operating parameters
- Custom calculation ranges and number of points
- Chart controls

External data processing
- Define your operating cases in an excel spreadsheet and have MySep run these cases and return all the key operating and performance parameters back to the spreadsheet

Datasheet generation
- Automatic generation or revision of vessel process datasheets
- Possibility to use your company’s Excel-based datasheet template

Benefits for design engineers

Predict and assess the performance of new and existing separators
Separators are commonly designed using design standards that do not provide the capability to determine the separation performance (e.g. liquid carryover in gas). As separation is the prime function of separators, it is essential that this performance be predicted during design.

Optimise the design
Being able to determine the performance of a separator opens up a host of benefits. For example, it is now possible to optimise the separator design in terms of vessel size, nozzle sizes, internals type selection and dimensions. Also, on a larger scale, the separation system can be optimised since the performance of one separator will have effect on the performance of the downstream equipment.

Internals performance prediction
A key part of the vessel performance prediction is the performance prediction of the separation internals in the vessel. These predictions are based on the actual geometry of the internals (typical geometrical values are provided by default in MySep). This means that the design engineer no longer needs to await or rely on vendor’s input for performance data. The design engineer can predict the performance himself. In addition, he can in fact use MySep to verify vendor’s designs.
Visualisation
An important aspect in design work is to be able to assess the relative and physical meaning of design output numbers. For this, MySep provides graphical representation of detailed performance characteristics. Also, a to-scale layout drawing of the vessel and internals design is created, with the possibility to adjust dimensions and layout.

Flexibility
MySep has been designed with the convenience and needs of the user in mind. This means that the program is very flexible in terms of usage. For example, user can override predicted efficiencies and droplet sizes with his own values; a useful feature for sensitivity analysis. Also, the level of detail the user wishes to go into during design is completely at user’s discretion: from rough vessel sizing to detailed internals design.

Auto-sizing
The auto-size feature allows the user to obtain an initial vessel size within a matter of seconds. This can be used for vessel budget cost estimating purposes or as a starting point for further optimisation of the design.

Operating envelope
With Operating Envelope a graphical map of a vessel’s performance can be generated. This gas vs liquid flow rate chart shows iso-carryover curves as well as operating limits for the vessel. This provides insights in off-design operating characteristics as well as vessel capacity limits that can be input to e.g. production planning.

Sensitivity analysis
Investigate the effect of operating parameters (e.g. liquid surface tension or liquid level) on vessel performance and other parameters. A wide range of selectable parameters are available for plotting, to obtain more in-depth insight in the dependencies and sensitivities of the design.

Datasheet generation
The creation of datasheets may traditionally be a tedious, time consuming exercise, with potential of typing errors. With MySep, datasheets can be generated or revised automatically (using your Company’s Excel-based datasheet template), complete with to-scale vessel sketch, within seconds.

Comprehensiveness
The completeness of the capabilities and features of MySep provides the designer with one single convenient tool for the design and rating of separators.
Benefits for the user’s company

Time saving on design work
The consequence of the benefits for the design engineer outlined above is that reliable vessel designs can be obtained much faster using MySep. On top of this, the import process data from Hysys, Petro-SIM or UniSim Design feature provides further time saving and eliminates risk of typing errors in the input data.

Avoid re-engineering
It is not uncommon that during some projects, re-engineering of separation equipment turns out to be necessary when for example during the Detailed Design phase of the project it is discovered that vessel and internals size estimates determined during the FEED phase are actually not suitable. This costly exercise is avoided as MySep enables reliable and suitable vessel designs to be made during the FEED stage.

Cost savings
The optimisation capabilities outlined on the previous pages provide an excellent opportunity for equipment cost saving. Vessels designed based on actual performance predictions can often be made smaller than vessels designed solely based on common engineering standards. A reduction in vessel size not only reduces the cost for the vessel, but it can also have a significant knock-on effect on the overall project cost. Namely, smaller vessel sizes result in lower overall topsides weight, which can result in cost savings on the platform structure. This can result in significant reductions in the overall project cost.

Budgeting accuracy
By using MySep in an early stage in the project (e.g. Conceptual and FEED phase), representative vessel sizes can be swiftly obtained. Having reliable vessel sizes in an early stage in the project means a more reliable and accurate project budget cost estimate.

Risk mitigation
Without prediction of separator performance one does not know what e.g. the carryover rate will be and thus there is a risk of separator mal-performance and operating issues. The cost consequences of a mal-performing separator are typically very large (shutdown, production loss, vessel entry, new internals purchase). As MySep provides performance predictions, it can be a key tool for mitigation of this risk.

Reduced dependency on equipment vendors
During project execution, oil companies and EPC contractors typically rely on vendor for vessel sizing and/or vessel performance estimates. With MySep, these companies can determine these matters in-house. This then results in less time spent on vendor communication, more detailed vessel and internal specifications can be provided to vendors during procurement. In addition vessel performance feedback from vendors can be verified. All this results in time savings and more confidence in the designs.

Production increase assessment
MySep can be used to assess the performance of existing vessels that are in operation. This is not only useful during daily operations and troubleshooting, but also when looking into increasing or maximising vessel throughput. In effect, MySep can be used to determine the achievable throughput / production increase of a separator or entire system.