



Alfa Laval Packinox Performa

Turning data into performance

Get full insight into your Packinox heat exchanger

Alfa Laval Packinox Performa gives you a detailed view of the operation and condition of your Packinox heat exchanger by providing a real-time view of the operation, and weekly reports with condition analyses and performance predictions. This makes it easy to optimize maintenance, ensure reliable uptime, and maximize energy efficiency.

The software consists of two modules:

- The Operation Module allows operators to optimize the flow of recycle gas and minimize the load on your compressor.
- The Predictive Maintenance Module gives supervisors a complete view of the condition of your Packinox heat exchanger, as well as recommendations on future maintenance measures.

Real-time analysis of operating data

Performa continuously monitors your Packinox heat exchanger, automatically collects key operating data, interprets it, and presents the results together with relevant recommendations.





Fig. 1. Clear indicators make easy for operators to monitor their Packinox heat exchanger and make data-driven decisions



Operation Module

Proper lifting of the liquid feed through the heat exchanger is key for overall process performance in catalytic reforming and aromatics production.

The flow of the recycle gas must be high enough to lift the droplets through the heat exchanger. However, there is an incentive to keep the gas flow rate to a minimum to ensure low operating costs for the recycle gas compressor.

Setting the optimum flow rate

The Operation Module gives your operators full insight into the lifting process and makes it easy to set the optimum flow rate. The system monitors the lifting of the liquid feed and informs operators of the minimal required flow of recycle gas, giving them the flexibility to fine-tune the gas flow to changing operating conditions without risking any process upsets. In case insufficient lifting is detected, the system immediately sets off an alarm.

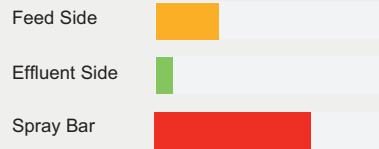
Predictive Maintenance Module

The second module of Packinox Performa analyses the operating data and issues weekly dashboards with thorough information on the condition of your Packinox heat exchanger, as well as recommendations on future maintenance actions.

The weekly dashboard has four sections:

- Thermal and hydraulic performance
- Fouling
- Lifting
- Mechanical integrity

Predictive fouling



Urgent: Maintenance and cleaning on Spray bar (backflush)
Please contact Alfa Laval Packinox Services

Vigilance on:

- Feed side pressure drop
 → Fouling is likely due to ammonium salts
 → Cleaning should be planned

Please contact Alfa Laval Packinox Services

Fig. 3. The predictive fouling section of the weekly dashboard gives a clear overview of the fouling situation in your Packinox heat exchanger.

HAT – Predicted vs measured



Fig. 2. By comparing the predicted and actual values, Packinox Performa can assess the condition of your Packinox heat exchanger.

Thermal and hydraulic performance

This section displays the Packinox’s actual thermal and hydraulic operating data and compares them to values predicted by Performa for the current gas and liquid flow rates.

By comparing the actual and predicted values, Performa detects any kind of deviation, e.g. incipient fouling, at a very early stage, and communicates clear recommendations on corrective actions. This makes it possible to plan for maintenance in good time.

The thermal and hydraulic performance section of the dashboard shows the actual and predicted hot approach temperature (HAT), as well as the actual and predicted pressure drops for the Spray Bar, feed and effluent streams, together with the liquid and gas flows, see figure 2 for an example.

Fouling

The fouling section shows the fouling status for the Spray Bars, as well as for the feed and effluent sides. It also analyses the fouling trend and compares it to the thermal performance to predict when the heat exchanger needs cleaning. Based on the conclusion, an easy-to-read indicator in green, yellow, or red alerts the supervisor if cleaning is required, and how urgently.

Lifting

In the lifting section of the dashboard, the number of alarms over the last days is displayed together with the average ratio between the actual and the minimum recycle gas flow rate.

The gas flow ratio shows if the Packinox heat exchanger is operating within acceptable limits and if there is potential to lower the flow rate in order to save energy in the recycle gas compressor.

Lifting

Summary for the last 7 days of operations

Number of Lifting Alarms actuation 0

Actual RG Flowrate / Minimum RG Flowrate Average Ratio: + 15%

Fig. 4. The lifting section presents the number of alarms the past 7 days and the average ratio between the actual and the minimum predicted flow rates.

Mechanical integrity

For operation in design conditions

Average over the last 7 days of operation

HAT (Hot Approach Temperature) = 56.0°C
 Maximum: 80.0°C Margin from the limit: 30%

DPR1 - Feed side = 0.344 bar
 Maximum: 2.0 bar Margin from the limit: 83%

DPR4 - Spray bars = 1.0 bar
 Maximum: 6.0 bar Margin from the limit: 83%

DPR5 - Total DP value including PKX + Heaters + Reactors = 2.5 bar
 Maximum: 4.8 bars Margin from the limit: 48%

Skin temperature status

Sudden fall of 50°C
 Please contact Alfa Laval Packinox Services

For transient operation

Average over the last 7 days of operation

Transient HAT = 80°C
 Maximum: 100.0°C Number of exceeding: 0

HAT ramp-up
 Maximum: +50°C/h Limit exceeded

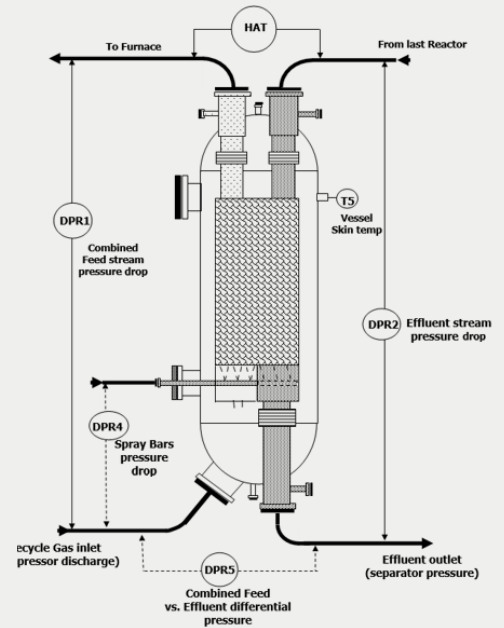


Fig. 5. The mechanical integrity section lists a number of key parameters and indicates if any of them have exceeded their design limits, which can require corrective actions.

Mechanical integrity

The mechanical integrity section of the weekly dashboard displays a number of parameters that indicate the mechanical status of your heat exchanger. These parameters include the hot approach temperature (average, transient and ramp-up rate), the surface temperature of the top part of the heat exchanger and various pressure drops.

In case Performa detects one or more of the parameters exceeding their design limits, it indicates this clearly on the dashboard. An example is if a sudden drop in the surface temperature in the upper part of the heat exchanger is detected, which could indicate a compromised expansion below.

Customized for each Packinox heat exchanger

To maximize accuracy and operating reliability, each installation of Packinox Performa is customized to the specific heat exchanger it monitors.

At present, Packinox Performa is available for heat exchangers used in catalytic reforming and aromatics production. Performa will soon be available for other applications such as hydrotreatment and long-duration energy storage.

Installation

To maximize security and flexibility, Packinox Performa is installed on either a real or a virtual computer as an OPC DA client. It is easily integrated with your control system (DCS) via an OPC server or it can be embedded in an existing solution.

Performa continuously reads real-time operating data through the OPC server and monitors the lifting process. All historic data are stored in a database for easy access and further analysis.

A heartbeat signal together with Bad Calculation and Normal Calculation signals ensure the data received by the DCS is valid.

Subscription

Packinox Performa is available as a subscription. This gives you access to all future upgrades and technical support from our help desk.

Please contact Alfa Laval Packinox for further information. Contact information is available on our website:

www.alfalaval.com/packinox/service



How to contact Alfa Laval

Up-to-date Alfa Laval contact details for all countries are always available on our website at www.alfalaval.com

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Alfa Laval reserves the right to change specifications without prior notification.