
Integrated blending solutions

Schedule, optimize and enhance ROI



Blending makes all the difference

Product blending is an important and final step that determines the right product quality - meeting Government regulations, international or industry specifications, matching the recipe defined amongst many others. More importantly it can positively influence profitability and productivity.

While several solutions and techniques address the growing concerns of refiners, ABB has developed a more cost-effective, flexible and modular solution. It helps optimize ROI by addressing specific challenges and concerns associated with blending, namely:

- **Over-correction:** The single biggest factor that truly affects profitability and cancels out benefits gained in upstream unit process areas.
- **Inaccurate flow measurement:** This can result in erroneous readings and ultimately, products that don't meet specifications, having a negative impact on production cost and overall profitability.
- **Analyzer performance and repeatability:** Minimizing the difference between a measured physical property and a critical specification on a tactical level can have a significant impact on refinery profitability
- **Blend flexibility:** Not being able to make smaller blends results does not permit accurate blending control/systems that restrict more accurate specification.
- **Inventory control:** Inaccurate blending may often result in more number of product tanks and stock that increases overall production and delivery cost.

- **Re-blending:** Poor or inaccurate blending increases operational cost and lowers productivity
- **Complex blending operation:** the biggest deterrent to accurate blending is having controls and systems that are difficult to comprehend and use
- **Real-time planning and optimizing:** inability to plan, schedule and optimize the operation based on real time information results in off specification
- **Multiple vendors:** different sections of a blending solution, provided by multiple suppliers, make the blending system less optimal in terms of investment, design, execution and operation

The three main components of the ABB integrated blending solution include Advanced blending control (the software), Regulatory blend control (hardware) and the analyzer. The schematic below shows how the three sub-systems work together.

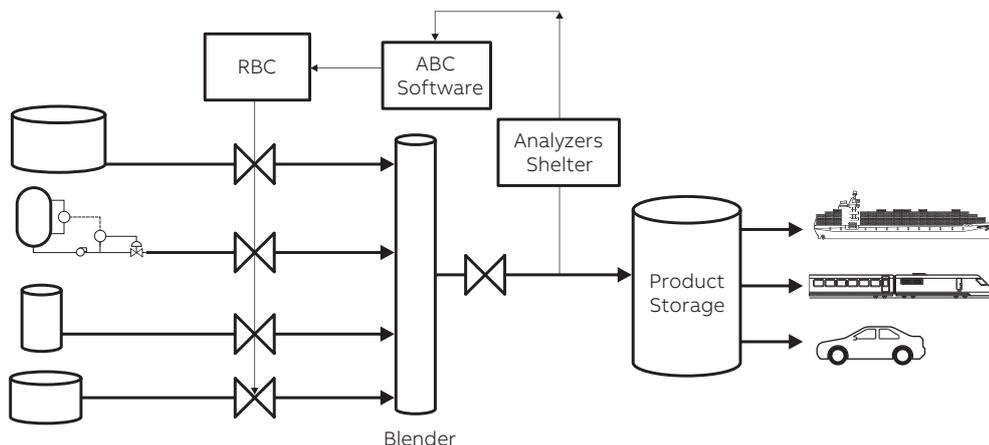


Fig (1) ABB Integrated blending solution

Simple operation

The following sequence of steps is followed to effectively operate the advanced blending control (ABC) component

Step-1: Define blend order

The blend planner module is used to create and optimize blend order in advance.



Post the steps followed in ABC, the following steps are carried out in the regulatory blending control (RBC)

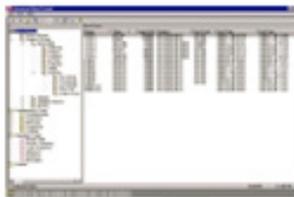
Step-1: Blend orders

Blend order data is entered from ABC or automatically from planner tool. On-line help tools allow order entries easy to make.



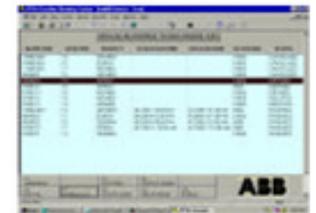
Step-2: Work List

The blend order is put in the navigator for the operator to select for later pre-blend optimization.



Step-2: Select equipment

Operator manually selects line ups and pumps or opts for automatic selection to execute the blend order.



Step-3: Communication to RBC

ABC downloads blend order, recipes and lineup, to RBC, which executes the start-up sequence, ratios the flows.



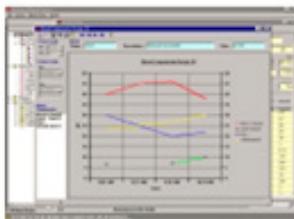
Step-3: Start blend order

Operator presses START, RBC opens valves to line up components, then starts pump in pre-defined sequence.



Step-4: Monitor and optimal online control

ABC performs analyzer validation, monitors the actual and predicted cumulative product properties and optimally adjusts the recipe.



Step-4: Monitor performance

RBC displays current & cumulative blending data including flows, totals and tank volumes and also material balance.

Item	Unit	Value	Status
Flow 1	kg/h	100	OK
Flow 2	kg/h	200	OK
Total	kg/h	300	OK
Tank 1	m³	500	OK
Tank 2	m³	1000	OK

Step-5: Reporting

Results of the blend are kept in the system indefinitely and readily available for any analysis.



Step-5: Blend report

RBC stops the blend at the target volume or on operator request. Finally a report with KPIs is generated.

Parameter	Target	Actual	Deviation
Flow 1	100	100	0
Flow 2	200	200	0
Total	300	300	0
Tank 1	500	500	0
Tank 2	1000	1000	0

To ensure accurate and repeatable measurement, ABB's field-proven **FT-NIR solution** is used to measure and analyze in real-time, properties such as RON, MON, RVP, D86 (distillation) property, boiling points - IBP & FBP, benzene content, Olefin content, Aromatics, etc and communicated back to ABC.

Distinctive features and benefits of ABB's integrated blending solution:

- Integrated, single-point design, engineering and commissioning including control system saves project and operational costs
- High-accuracy Fourier Transform Near Infrared (FT-NIR) spectroscopy from ABB that ensures consistent and reliable measurement without having to re-correct FT-NIR models
- Off-line simulation of blend order planning with optimization tool to determine deviation range in the presence of different constraints. This helps reduce multiple iterations all together otherwise required, thereby improving overall productivity
- A user-interface with an off-line pre-blend optimization tool allows fine tuning of the blend recipe to minimize deviations from actual blend specification

- The giveaway in RON, MON, RVP and other properties are minimal and blends are produced without any property violation
- It is no longer necessary to pause blend order for feedback from the lab or frequently correct the re-blend of the final product. This makes it possible to increase the production rate for gasoline by 30% or more depending on demand
- All processing plants can now monitor the status of blends
- Import, create, copy, modify and optimize blend orders

To remain competitive, ethanol blending helps reduce crude import while boosting Octane levels without compromising fuel performance.

Handling crudes of different grades continue to pose enormous challenges. ABB's approach and blending solution can substantially help optimize crude blending at source, enhancing life of the catalyst in the downstream processes.

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