

Ratio Blending (continued)

tendency to mix better than with sequential blending. Also, because all products are running during the entire batch, the blend should be on spec at any time during the batch; therefore, if a batch is aborted, the product loaded should be a deliverable product. For a sequential blend to be on spec, the entire batch must be completed. The AccuLoad can accommodate typical ratio blending where all products are mixed in the piping downstream of the individual product control valves. It can also handle side stream blending where the smaller of the components is plumbed in upstream of the main product delivery meter. Yet another option is hybrid blending which is a combination of sequential and ratio that is primarily designed for ratio blending soybean oil into existing No. 1 and No. 2 diesel oil sequential

blenders. In any ratio or hybrid blender, meter and flow control valve sizing are critical. The system hydraulics in ratio blending must be carefully designed to ensure accurate blending. Once again, check valves need to be installed to prevent backflow and contamination.

Smith Meter offers PD meters, turbine meters, Coriolis meters, control valves, preset controllers, strainers and other line accessories for blending in sizes, of one through four inch. Equipment can be purchased separately, or a complete skid mounted can be supplied.

Ethanol or Biodiesel Unloading

This mode of delivery allows for unloading a truck compartment without entering a preset volume. Implementing this feature requires the load arm type to be programmed as “unloading.” Up to six load arms can be configured as

“unloading” in an AccuLoad III-Q unit and up to two in the AccuLoad III-S hardware. The unloading arms can be configured with loading arms in the same unit.

Control of delivery is accomplished by the use of three digital inputs, configured as stop, low, and high flow switches. These inputs define when to open the valve, when to advance from the low flow rate to the high flow rate, and when to close the valve.

General purpose inputs can be set up using Boolean equations to operate as product line security flow switches, with one switch per product. The purpose for monitoring these switches is to ensure that the correct product line is in use for the product currently being unloaded.

Tank Truck Loading Rack Solutions for Ethanol or Biodiesel Blending

Smith is the leading supplier for tank truck loading measurement and control equipment with:

- Experience: Over 60 years of experience in terminal applications worldwide – more than any other supplier.
- Worldwide sales and service: Local support before and after the sale.
- All current technologies with PD, Turbine, and Coriolis meters.
- The broadest offerings of blending configurations including sequential, ratio, side-stream, and a brand new version of a combination of sequential with ratio (hybrid).
- Accessory equipment with transmitters, strainers, air eliminators, self contained and externally powered flow control valves.
- Communications interface with most current terminal automation suppliers.
- Worldwide approvals for equipment that meets or exceeds most weights and measures and electrical requirements.

Powerful Solutions

The Smith Meter AccuLoad III can be configured to fit the application. It can be set up as a single arm device or up to a six arm device in one Class I, Division I housing or using the Split Architecture platform, can accommodate up to eighteen loading arms.

Any of the AccuLoad III controller configurations can be set up as a unique blender. In any AccuLoad III, the arms can be configured as sequential, ratio, sidestream or hybrid. The AccuLoad III can use any combination of these types of blenders with a specific type assigned to a given arm.



The specifications contained herein are subject to change without notice and any user of said specifications should verify from the manufacturer that the specifications are currently in effect. Otherwise, the manufacturer assumes no responsibility for the use of specifications which may have been changed and are no longer in effect.

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**Powerful Solutions
(continued)**

For example, a ratio blended gasoline arm, a sequential blended distillate arm, a 'hybrid' arm for ratio blending of bio-mass into sequential blended diesels (illustrated in diagrams below).



One or Two Arm Operation



Up to Six Arm Operation



Split Architecture Design
19" Rack Mounting
Up to Eighteen Arm Operation

Blending Considerations

Recipes

Blending of two or more products by any method requires a recipe. A recipe is derived from the components of the blend and the percentages of each component. When sizing equipment, it is necessary to calculate the flow range of each component using the component percentage(s) and the loading arm flow range (minimum to maximum). These calculations will determine meter and valve sizes and indicate any problematic flow control issues.

Product Measurement Profiles

Each product has its own unique set of characteristics that affect measurement. Parameters such as meter factors, API tables, density, etc., will need to be considered for the individual components in the recipe in order to deliver an accurate blend and maintain component inventories.

Product Flow Profiles

Any product delivery, including straight product loading, and any type of blending requires that each component be capable of accurately flowing in a controlled mode throughout the delivery batch. This flow profile is most critical for ratio or hybrid blenders. If pumps and flow control valves are not sized properly, the results will be erratic operation and off-spec blends. Complete pressure profile analysis should be done for all operating conditions to ensure accurate blending.

Product Mixing

Products with similar characteristics, such as density and viscosity, will generally blend well. Products with different characteristics or those that when blended simply do not mix or stay mixed may dictate the method of

blending or some other special consideration. Ethanol, for example, may have a tendency to stratify in gasoline. Other Bio-Mass may not mix well with distillates.

Types of Blending

Sequential

Sequential blending is defined as loading multiple products one at a time through one meter and control

valve. This method is most common for products that mix well. The recipe contains the percentage of each component. When a recipe is selected, the AccuLoad will calculate the exact amount of each component. Each component is then delivered as a type of "mini batch", complete with the specific product measurement and product flow profiles. Products are delivered in

the order programmed by the user. The "mini batches" and product sequence are converted by the AccuLoad opening and closing the appropriate product block valve. The product block valve should be motor operated and fast operating to minimize sequence loading time. Check valves should be installed in each product line and should be as close to the blend connection as

possible to prevent backflow and contamination.

Ratio Blending

Ratio blending is defined as loading multiple products into a truck at the same time. Unlike sequential blending, ratio blending has a meter and control valve for each product. Because the products are blended at the same time they will have a

