MEASUREMENT SYSTEMS

JISKOOT

In-line blending systems

sensia

Rockwell Automation + Schlumberger

Backed by more than 60 years' experience in the design, manufacture, and supply of customized turnkey measurement systems, JISKOOT* in-line blending systems are supplied to many of the world's major oil companies and have gained a reputation for excellence and reliability. Sensia's dedicated engineering team selects the best measurement and control equipment and, can design, manufacture, install, and commission a turnkey blending system with a performance guarantee.

In-line blending is the controlled, continuous mixing of a number of components to produce a finished product of closely defined quality. The quality of the product is controlled as it is made. This is invaluable in continuous process industries because the final product can be blended, analyzed and loaded in a single process.

In-tank blending is the main alternative to in-line blending. It involves sequentially introducing measured volumes of each component into a tank. The components are then mixed, sampled, analyzed for quality and any adjustments are made to the blend. This is time-consuming and makes storing both pre-blended and finished products necessary. Nevertheless, for small volumes and certain applications, this remains a cost-effective option.

Why in-line blending?

In-line blending has many advantages over batch blending.

IMPROVED QUALITY

The accuracy of an in-line blending system is governed by the individual component metering devices or any online analyzer used. Accuracy greater than 0.25% over the full metering range can easily be achieved.

FASTER BLENDING

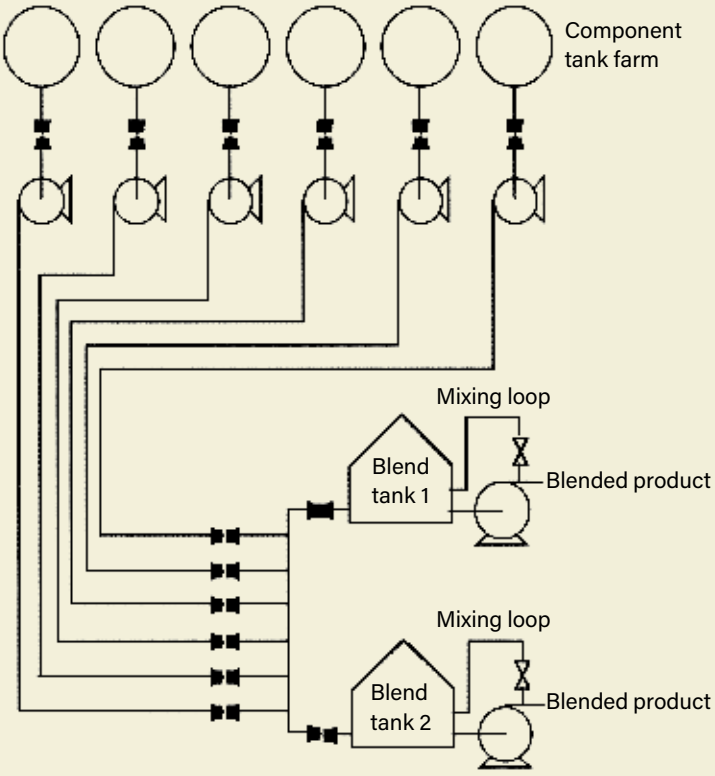
By analyzing and adjusting the blend ratio online, the time-consuming process of batch metering, tank mixing, product analysis, and blend adjustment is eliminated. In-line blending greatly reduces process time and provides a higher throughput potential.

GREATER FLEXIBILITY

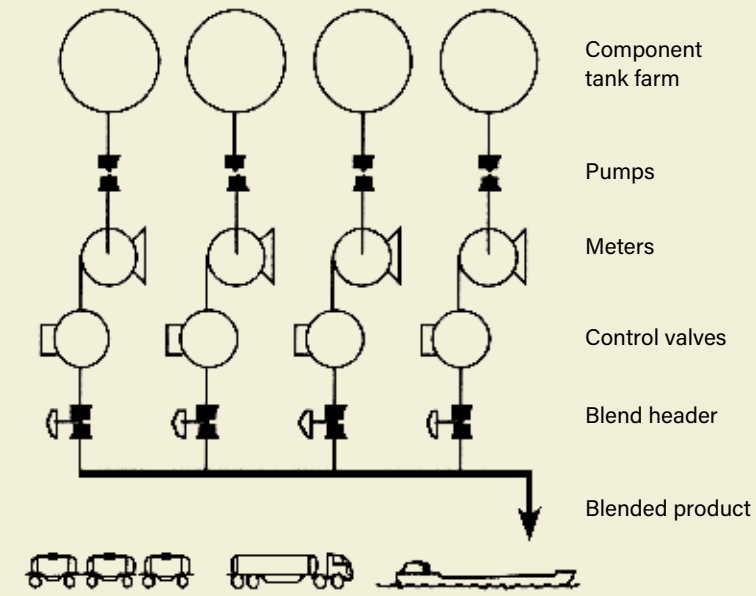
Changes in shipping schedules and product specifications can be accommodated by selecting different recipes from the controller. Because the blender operates in real time, configuring a new recipe is quick and easy compared to the planning and stock movement necessary with batch blending. This allows you to offer a wide range of products and can provide a valuable, competitive edge.

JISKOOT in-line blending system for fuel oil

Typical batch blending system



Typical in-line blending system



REDUCED STORAGE AND CAPITAL LOCK-UP

In-line blending produces a finished product almost instantaneously. It reduces the need for complicated production planning, and there is no need to hold stocks of blended product. An in-line blender can feed products directly into road, rail, or ocean tankers for shipment.

COST OPTIMIZATION

The in-line blending system's continuous metering, online analyzers, closed-loop control, and higher accuracy provide better product dispersion and better quality control and can substantially reduce the give-away of expensive components and additives. Considerable savings can be achieved in plants with a relatively low annual throughput.

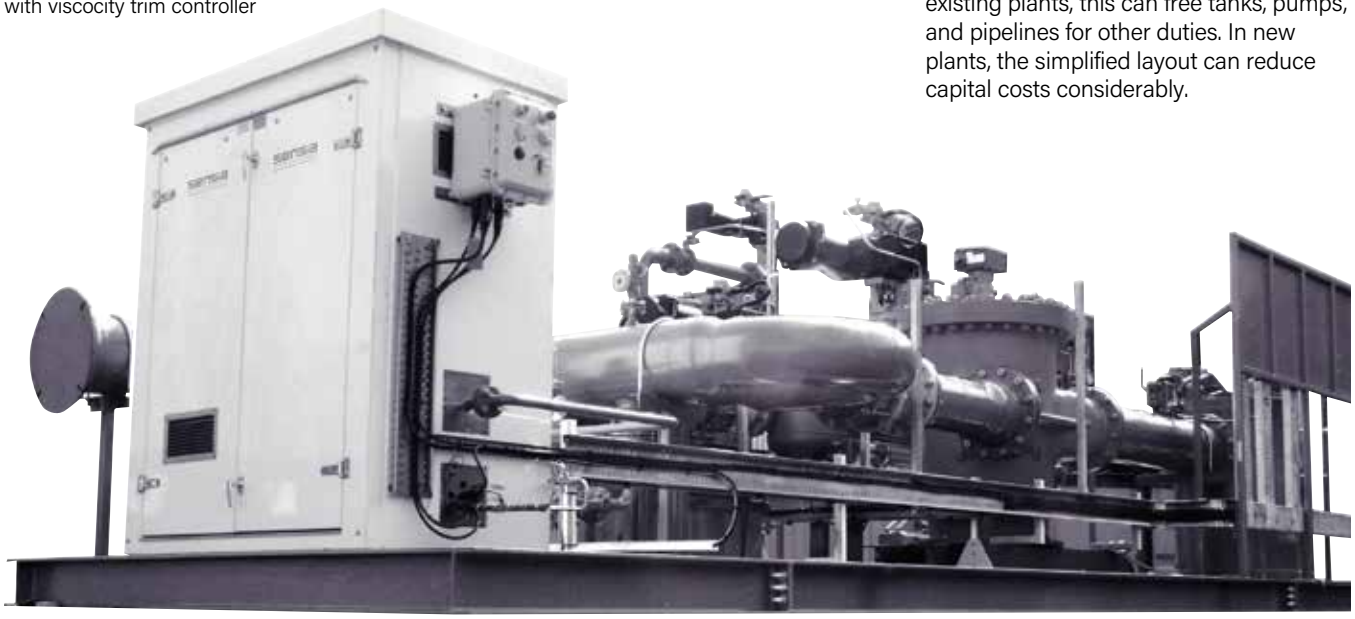
REDUCED OPERATING COST

Centralized control allows a single operator to manage several blending operations simultaneously. Once initiated, the blender will automatically produce the required final product.

SIMPLIFIED PLANT LAYOUT

In-line blending simplifies plant layout. In existing plants, this can free tanks, pumps, and pipelines for other duties. In new plants, the simplified layout can reduce capital costs considerably.

JISKOOT in-line blending system with viscocity trim controller



JISKOOT in-line blending system for fuel oil

In-line blending components

FIELD EQUIPMENT

Field equipment, such as valves, meters, analyzers, etc., enables the components to be metered simultaneously into the blend header to produce the final product. Products normally exit the blend header through a mixer and can be analyzed to allow quality trim to be performed. In refineries, the components can be taken directly to or from process units, avoiding or reducing intermediate storage.

CONTROL SYSTEM

The control system monitors field equipment outputs; performs calculations for meter linearization, temperature compensation, etc; and sends the appropriate control signals to the field equipment to maintain the blending process within the required parameters (i.e., closed-loop control).

Blending control systems use either real-time or PLC (ladder logic) technology, depending on the required application. While the cost, response times, and control provided by PLC technology has a number of restrictions, our products also include multitasking time-dedicated blending controllers for most applications.

Controllers can be designed for 2- to 10-stream applications and operate either as standalone devices or in conjunction with a dedicated SCADA system. They can also be integrated with a plant-wide distributed control system (DCS). Controllers have a simple user interface with multilevel security, allowing access to recipe management, alarms reports, and batch information.

Our controllers can perform all the necessary linearization, mass volume and temperature computation, and correction for accurate blending.

JISKOOT InSpec Blending* system controller

Blending control systems

There are two main types of blending control systems: ratio control and quality trim. System selection depends upon the products being blended, the quality of feedstock, the final product specifications, and the conditions under which the blender will operate. The control system and algorithms define the stability and performance of the blender, and selection of the correct control system is crucial to success.

RATIO CONTROL

Ratio control produces a product to an extremely accurate component ratio. The blender operates on either a fixed volumetric or mass ratio. This ratio is maintained by the closed-loop control between the flow signals from the field equipment and the control signals from the controller. The accuracy of a ratio control blender is determined by the measurement and control system.

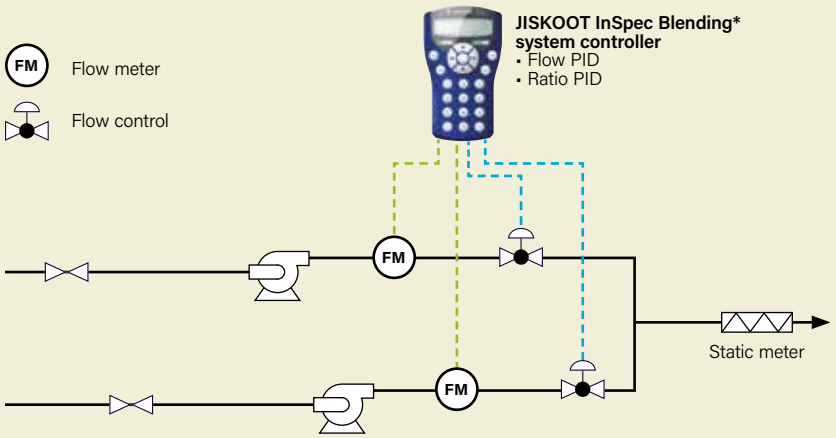
QUALITY TRIM

A quality trim blender produces a final product defined by a component ratio. One or more analyzers mounted at the exit of the blend header are used to trim the quality of the final product by adjusting the component ratio. Product quality is continuously measured by the analyzer(s), and the final product can be adjusted for parameters such as viscosity, density, and octane. The accuracy of a quality trim blender also is determined by the analyzer(s).

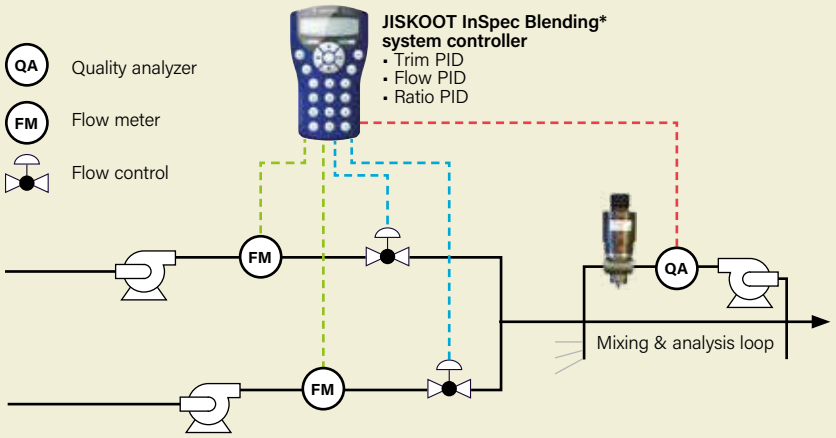
WHICH TO USE?

Where the ratio and accuracy of each component stream is crucial and the quality of the components is consistent and unlikely to vary, ratio control is the preferred option. Quality trim should be used in applications where there is a possibility of variations in the specification or quality of the component products supplied to the blender.

Ratio control blender



Quality trim blender



JISKOOT in-line blending systems

Sensia supplies a wide range of blending systems ranging from small two-stream fuel oil blenders to large multistream systems with analyzer trim and SCADA control.

Our blenders are supplied skid-mounted, piped, wired, tested, and ready for installation at your site and guaranteed to perform to your specifications. Every blending application is unique, and while the basic control principles remain the same, the configuration, selection of components, and design varies for each application.

CRUDE OIL BLENDING

Low-grade crude oils can be blended with a higher grade oil for refining or export. Often, the blender uses an analyzer to optimize the blended product for a specific component such as API gravity, viscosity, or sulfur content.

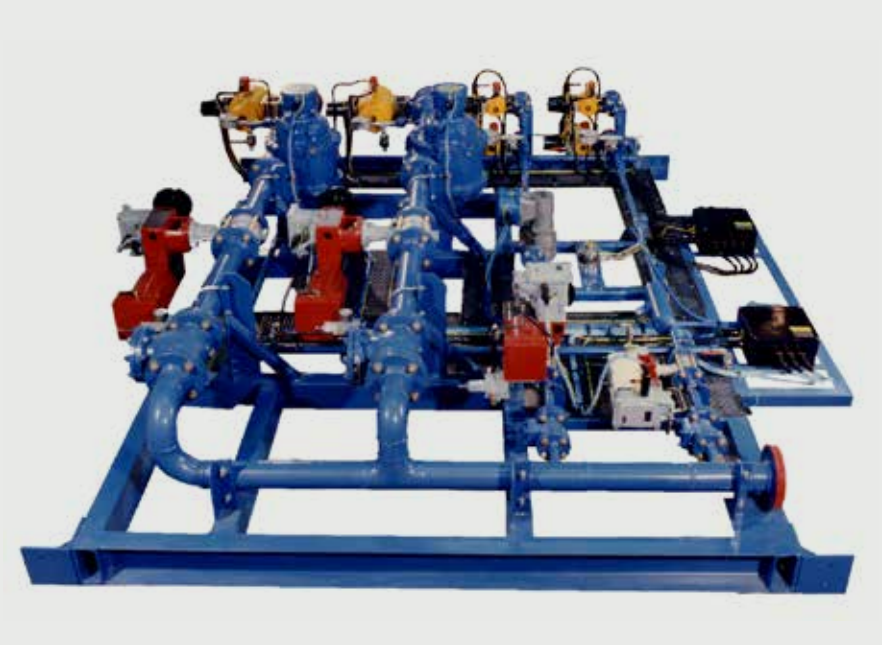
REFINED PRODUCT BLENDING

Higher specification, lower cost diesel can be produced by in-line blending. Blenders can take major components directly from process units to reduce intermediate tank storage. Using analyzers for sulfur and cetane, the blended diesel can be produced to an exact environmental specification.

ETHANOL BLENDING

Ethanol is used in a wide range of industries. Ethanol typically is denaturized before being dispatched from a bonded plant. This is achieved by blending a variety of denaturants with the ethanol. Contamination of sequential loads with different denaturants must be avoided by incorporating a flush cycle in each batch.

JISKOOT in-line blending system for crude oil



JISKOOT in-line blending system for ethanol

JISKOOT in-line blending system for fuel oil

JISKOOT in-line blending system for lube oil

FUEL OIL/BUNKER BLENDING

Fuel oil (or bunker fuel) is blended globally. Blenders can be trailer-mounted, mounted on fuel barge decks, or shore-mounted. They enable operators to produce any type of fuel oil within very close viscosity and volumetric tolerances from as few as two base components, normally heavy fuel oil (HFO) and marine diesel oil (MDO).

LPG BLENDING

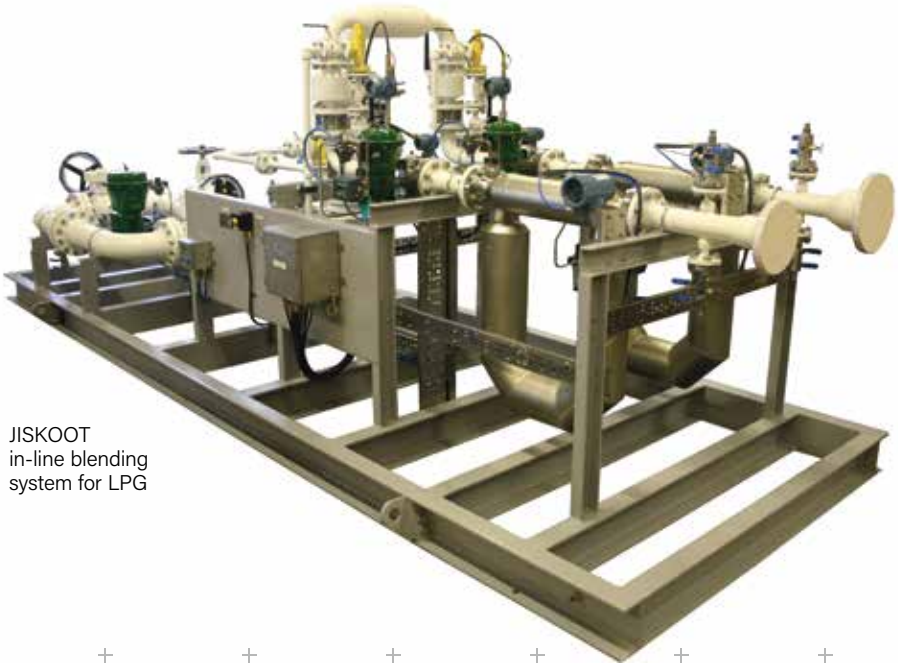
The demand for propane, butane, and blends of these products has increased significantly. The search for CFC-free propellants and the growth in liquid gas fuel production have given rise to the need for propane/butane blenders. Typically systems use a densitometer mounted in the blend header to provide a signal to the blend controller, which trims the blend to a specified density.

BITUMEN BLENDING

Bitumen blending is an arduous duty. The bitumen must be heated and kept moving, and local hot spots must be avoided to eliminate coking and meter damage. JISKOOT in-line blending systems were the first to use a double-case meter in a recycle loop. In addition, bitumen blenders need flushing facilities to avoid solidification after blending.

LUBE OIL BLENDING AND DEHYDRATION

Lube oil is one of the most demanding blending applications, so considerable expertise is needed to produce a closely specified product from a wide range of ingredients without contamination. The patented JISKOOT lube oil dehydration system is unique and often employed to dry wet stocks to a specified crackle-test level prior to blending.



JISKOOT
in-line blending
system for LPG

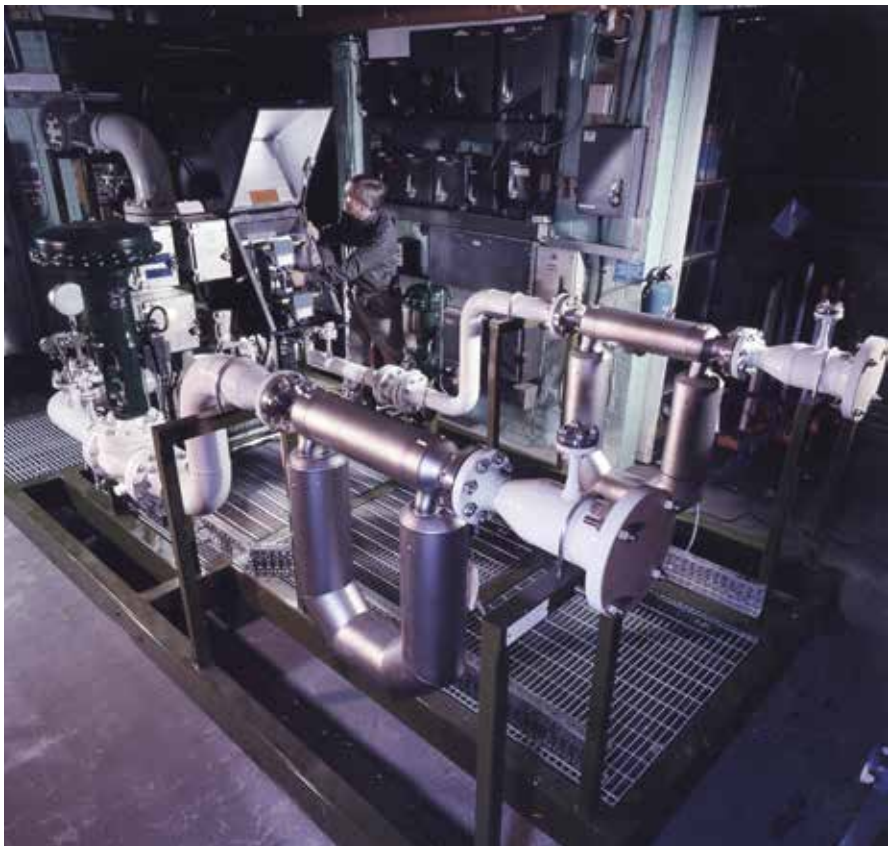
Engineered-to-order solutions

JISKOOT in-line blending systems are designed and manufactured to the highest standard by engineers with years of practical experience.

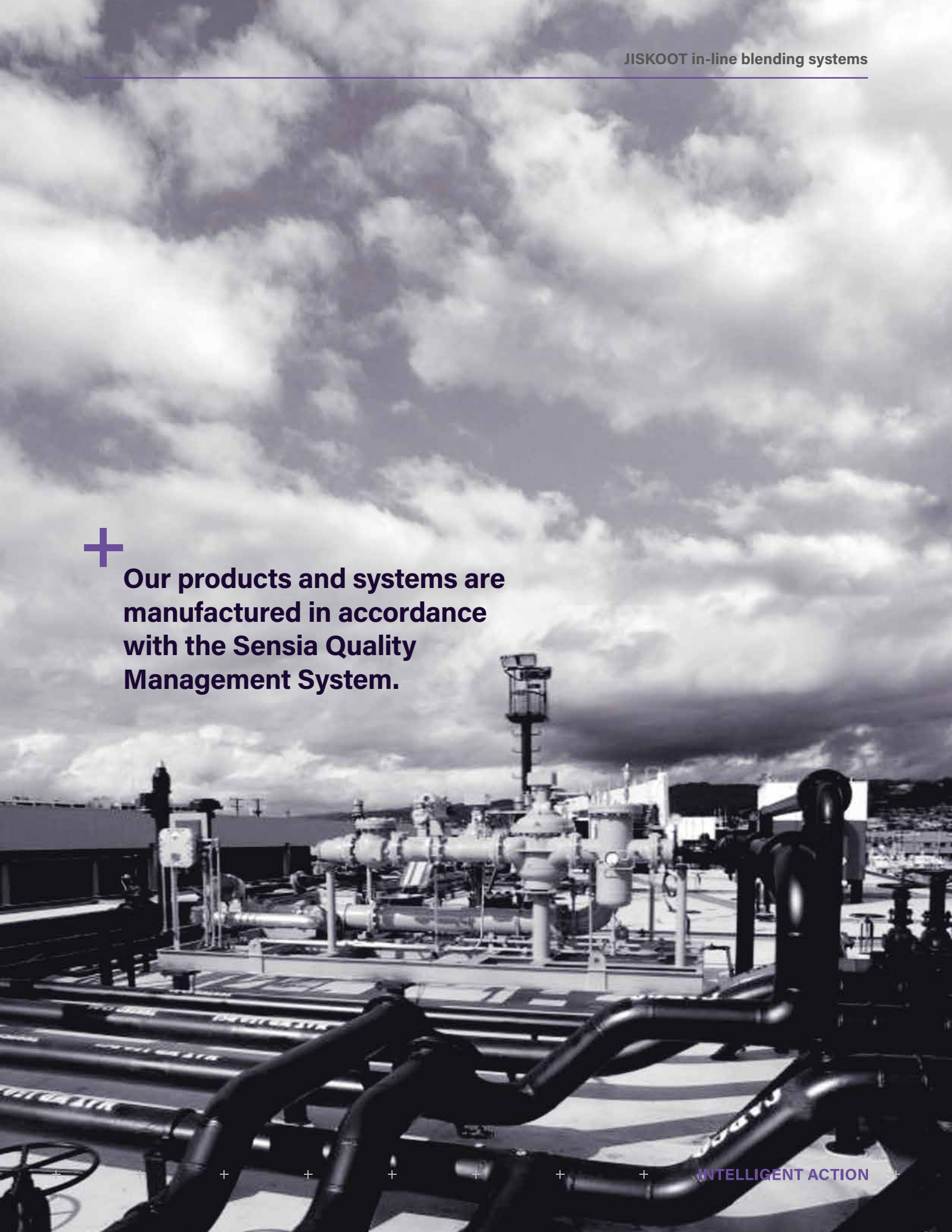
Turnkey service includes:

+ The design, manufacture, and supply of instrumentation and terminals tested under simulated operating conditions
+ Selection, sizing, procurement, inspection, and supply of all system equipment such as flow meters, control valves, pumps, etc.
+ Design and supply of completely self-contained piped and wired skids
+ Supply of site termination drawings, wiring diagrams, and operation/ maintenance manuals
+ Certification to site electrical/ pneumatic/piping specifications.
+ Technical supervision of installation teams
+ Commissioning services and maintenance contracts
+ Factory/onsite training of operating personnel

Sensia also can provide consulting services to help you better define the blending options and system requirements.



JISKOOT in-line blending system for propane and butane fitted with mass flow meters



Our products and systems are manufactured in accordance with the Sensia Quality Management System.

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Add intelligent action to your oil & gas solutions

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