

Fact Sheet:

Formulation Systems

Formulation Systems generate a controlled blend of non-reactive ingredients.

LPT Formulation Systems are available to prepare liquid products, precursors, buffers or reagents to exacting standards for a broad array of industries

Formulation / Batch Compounding

Tailored to meet individual customer requirements through collaborative design processes or detailed specifications, we select the proper material delivery, measuring, mixing and process parameter control technologies to meet your needs. Formulation Systems are available to perform dedicated duties or may be designed with flexibility to generate a variety of liquid products.

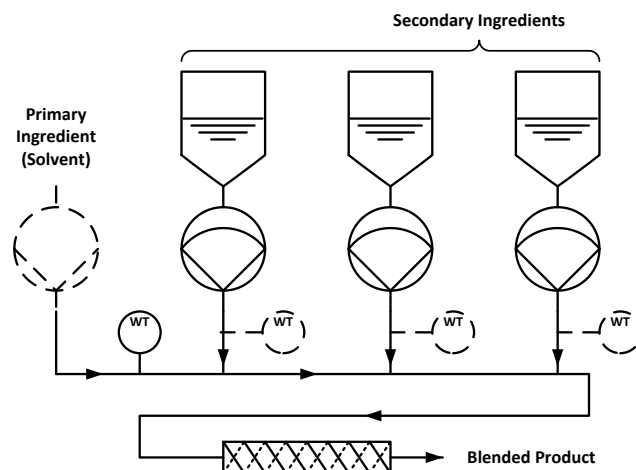
Our Formulation Systems are typically monitored and controlled by PLCs that have been programmed using our Automation Tool and techniques. This tool provides our customers with easy access to system parameters for fine tuning or process variation without restructuring PLC code.

Optimized Technology

Depending upon customer requirements LPT offers two primary technologies as the basis of our Formulation Systems; In-Line Blending or Batch Compounding. After years of supplying such systems LPT understands the optimum approach.

In-Line Blending

In-Line Blending prepares a ready-for-use stream of product by continuously metering liquid ingredients into a stream of the primary product ingredient (water, solvent, etc.).

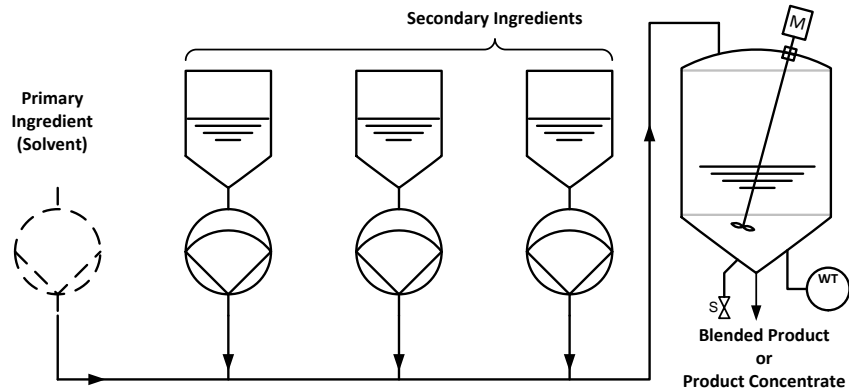


Depending upon product concentration accuracy or documentation requirements the final product ingredient stream rates may be controlled based on known physical parameters of the metering pumps or continuously measured based on mass flow. Product homogeneity is achieved by means of static mixing elements and pipeline jacketing / heat tracing may be

employed to control ingredient or product temperature
for improved mixing or
to maintain suitable
viscosities.

Batch Compounding

Batch Compounding prepares a predetermined volume of blended ingredients that are measured and stored for downstream processing or packaging. Batch compounding systems typically involve the measurement of ingredient weights as they are added to the batch.



The primary ingredient (solvent) is used to load the delivery lines prior to compounding. Secondary ingredients are loaded sequentially with the primary solvent used as a rinsing agent. The compounded batch may be stored as a concentrate for further dilution with solvent volume in a larger storage vessel, or diluted to the final concentration in the blending vessel.



Example of a custom system featuring advance LEWA pumps and LEWA Process technologies engineering.

Selection & benefits

Selection of the appropriate formulation system technology and features for any blending application will be dependent upon specific product requirements. The table below provides a list of features and benefits available from each technology.

Consideration	In-Line Blending	Batch Compound
Suited to products with high concentration accuracy requirements	Yes	Yes
Suited to products with quarantined QC test & release processes		Yes
Suited for shear sensitive ingredients	Yes	
Suited for temperature sensitive blends	More Suited	Less Suited
Suited for use with ingredients with high volatility	Yes	
Suited for dry material additions		Yes
Space / Containment requirements (for similar system flows and production runs requirements)	Smaller	Larger

Some applications may be best suited to a combination of these formulation techniques. For example, products are formulating using one or more dry ingredients which must eventually be blended with highly volatile ingredients (fragrances, etc.) will likely require a Batch Compounding system feed to an In-Line Blend-system. These systems may also be combined with high-shear mixers or homogenizers to handle ingredients with complex diffusion characteristics.

Industries & Applications

LPT has the design and fabrication expertise to deliver Formulation Systems for a variety of industries & applications. Examples include;

- ❑ *Cosmetic : Product Preparation, Fragrance Additions*
- ❑ *Food & Beverage : Liquified Ingredient Blending, Liquid Flavoring*
- ❑ *Pharma / Biotech : Preparation of Nutrient, Buffer and Perfusion Media*
- ❑ *Other Chemical : Preparation of Inks, Pigments and Coatings*

About LEWA Process Technologies, Inc.

LEWA Process Technologies designs, builds and installs process equipment for customers in biotechnology, pharmaceuticals, semiconductor, cosmetics/personal care, food & beverage, alternative energy and fine chemical industries—or in any industry where the integrity and purity of fluids are regulated or of intrinsic importance. We are the global center of excellence for the LEWA Group in systems for the life sciences, (biopharmaceutical and pharmaceutical), personal care, fine chemical and food & beverage industries.

To start a profitable discussion, please let us know the best way to be in touch: email/form/phone – sales@lewapt.com or call us at + 978 487 1100.