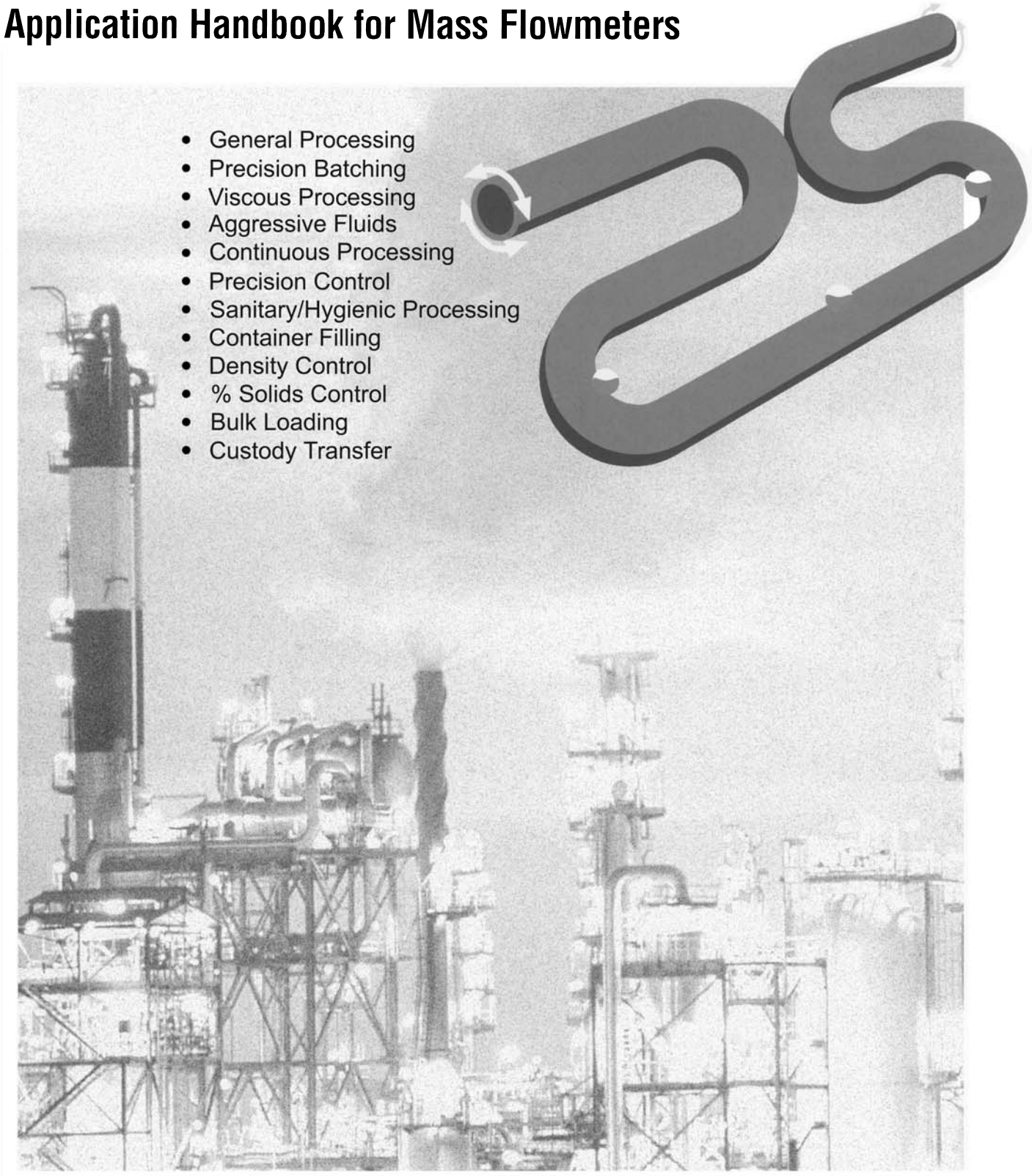
AHM-600
Rev. B
Mass Flow Applications

RED SEAL
MEASUREMENT

Mass Flow *Applicability*
Here's the proof…
Application Handbook for Mass Flowmeters



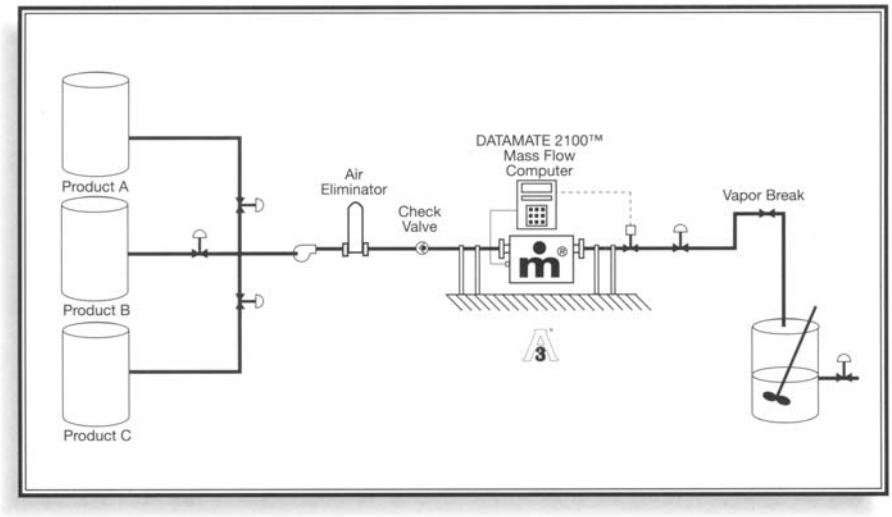
Mass Measurement Backed by an Application Satisfaction Team

Mass Flow Applications Handbook Contents

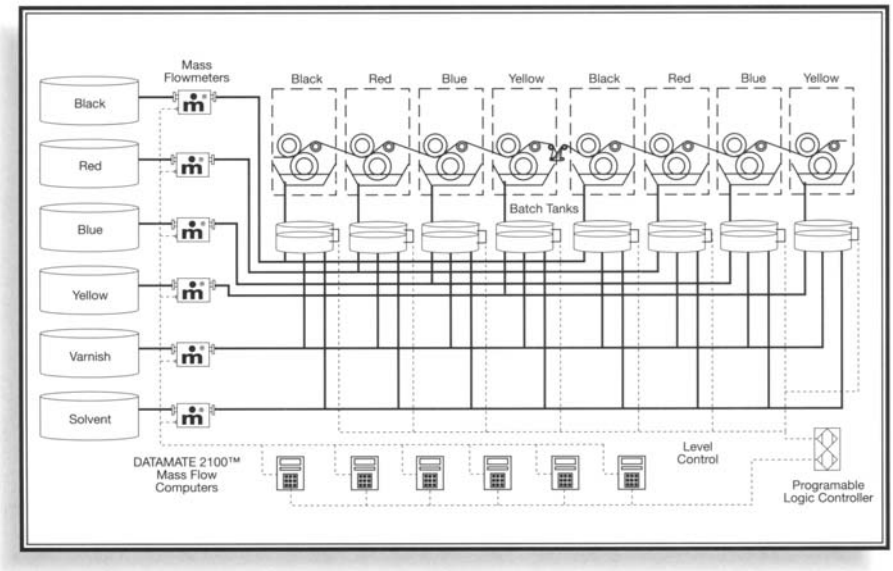
Multiple Liquid Batching

General Processing
SIC 2869, 2819, 2899

- One flowmeter measures multiple fluids without recalibration
- Accuracy not affected by changing viscosities
- Easy cleaning in sanitary/hygienic processing
- Stand-alone batching capability; easy interfacing with PLCs and higher-level control instrumentation



Ink Formulation on a High-Speed Web Press



Precision Batching
SIC 2752

- Reduces maintenance and calibration requirements
- Improves batching accuracy
- Better consistency from setup to setup
- Shortens press setup time, cuts waste
- Automatic ink consumption recording

Sample Operating Conditions

Viscosities, cP	1–380
Sp. gr.	0.8826–1.0831
Flow range, litres/min (gpm)	3.8–38 (1–10)
Temperature, °C (°F)	4–32 (40–90)
Pressure, kPa (psi)	241–414 (35–60)

Application Assistance 800-833-3357

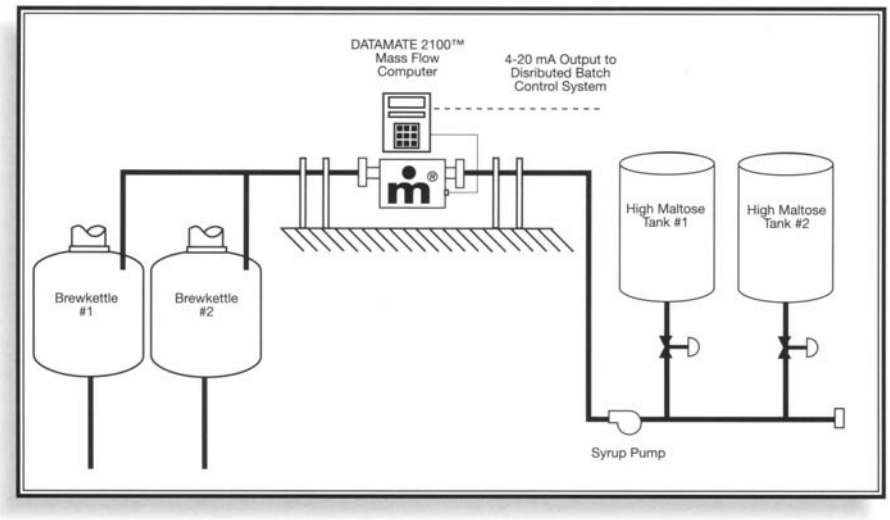
Accurate Brewkettle Dosing With Changing Temperature

Viscous Processing
SIC 2082

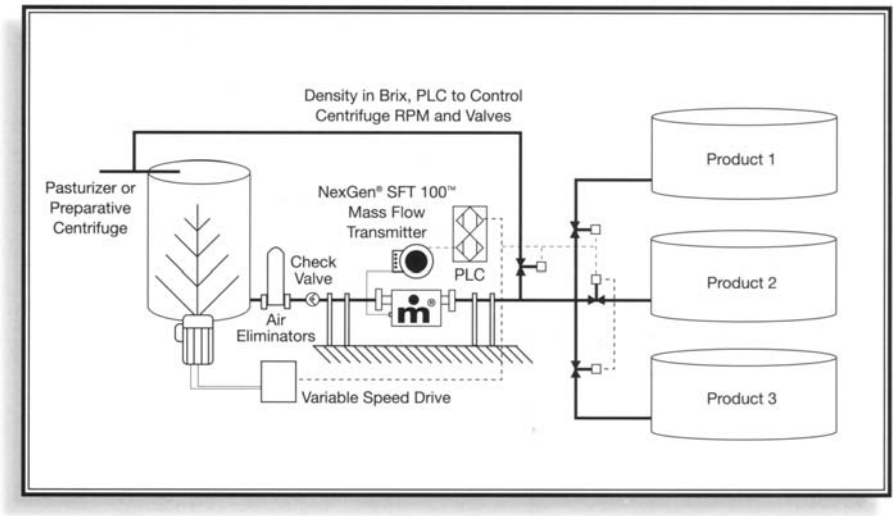
- 25–30% better batching accuracy than with PD flowmeters under changing temperature and viscosity conditions
- Repeatability ±0.05%
- Low maintenance
- Steady flow velocities shorten filling times
- Improved blending reduces batch cycle time

Sample Operating Conditions

Viscosities at 15°C (60°F), cP	4,000–12,000
Sp. gr. 15°C (60°F)	1.42
Flow range, kg/min (lb/min)	215 (475)
Temperature, °C (°F)	10 (50)
Pressure, kPa (psi)	689 (100)



Brix or Baumé Measurement and Control



Viscous Processing
SIC 2023, 2077

- Precise separation of immiscible liquids of different densities
- Ideal for mixed fats or dairy products
- Low pressure drop, easy cleaning
- Steady production consistency regardless of inlet flow rate

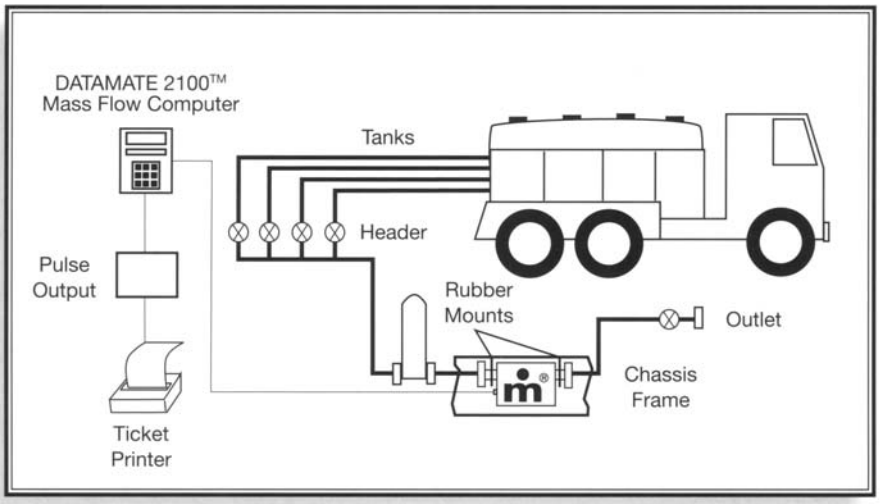
Mobile Transfer of Abrasive Paint Slurry

Aggressive Fluids
SIC 2851, 3713

- No wearing of wetted parts by abrasive ceramic slurry vs. 4-mo. life of PD meters
- 0.15% accuracy vs. 1% for fast-wearing (and undermeasuring) PD meters
- Interfacing with ticket printer for delivery tickets and invoicing
- Outstanding reliability in truck-mounted mobile application

Sample Operating Conditions

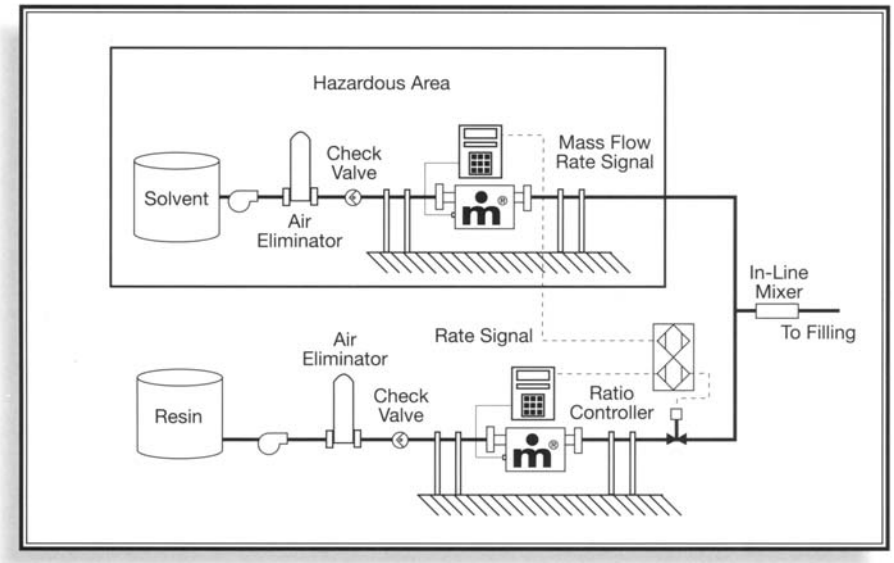
Viscosity, KUs (cST, ssu)	65–70 (400, 1800)
Sp. gr.	1.0–1.1
Flow range, kg/min (lb/min)	84–96 (185–211)
Temperature, °C (°F)	15–25 (59–77)



Stand-Alone Explosion-Proof Batching

Hazardous Areas
SIC 2851, 2891, 2952

- Only mass flowmeter with stand-alone explosion-proof batching capability
- Prevents long cable runs and potential signal loss/noise
- Simpler and less expensive installation



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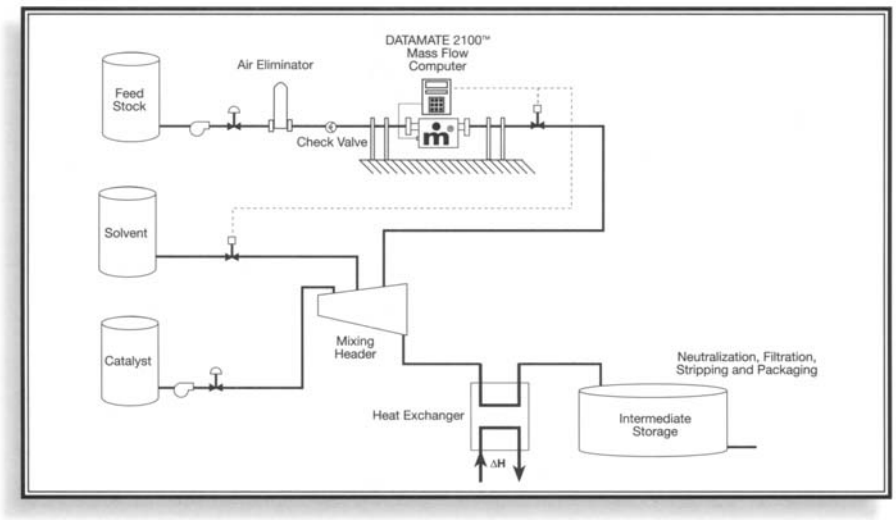
On-The-Fly Mixing

Continuous Processing
SIC 5161P

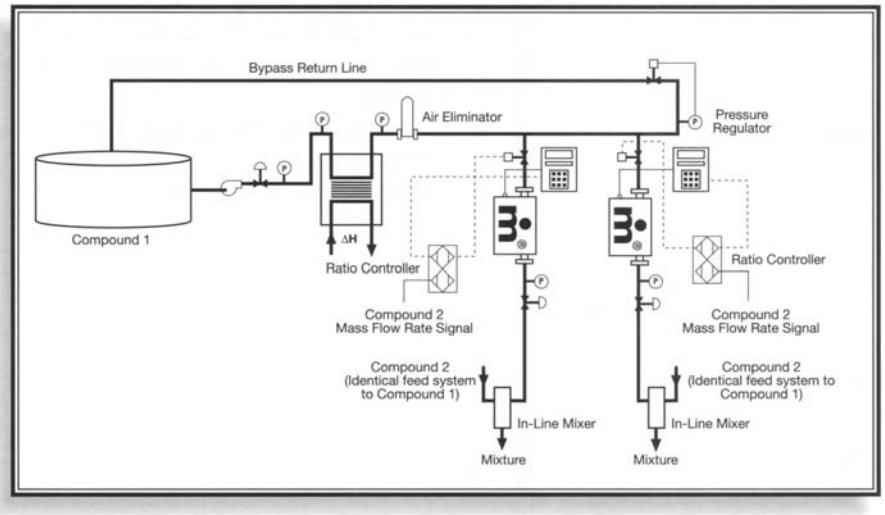
- Improves consistency of component ratios
- Significant savings by reducing over-dosing of expensive catalyst
- Accuracy of ±0.17% including zero stability
- Installed easily by plant operations/ maintenance personnel



Sample Operating Conditions

Flow range, litres/min (gpm)	26–30 (7–8)
Sp. gr.	0.88–0.96
Pressure, bar (psi)	3.8 (55)
Temperature, °C (°F)	32–66 (90–150)

Low-Pressure-Drop, High-Accuracy Continuous Processing



Continuous Processing
SIC 3079, 3086

- 100:1 turndown—high flow rate/ accuracy flexibility—±0.22% accuracy
- Optimal flowmeter sizing to obtain design pressure drop and accuracy
- Instantaneous on-line measurement
- Eliminates hand sampling and calibrating

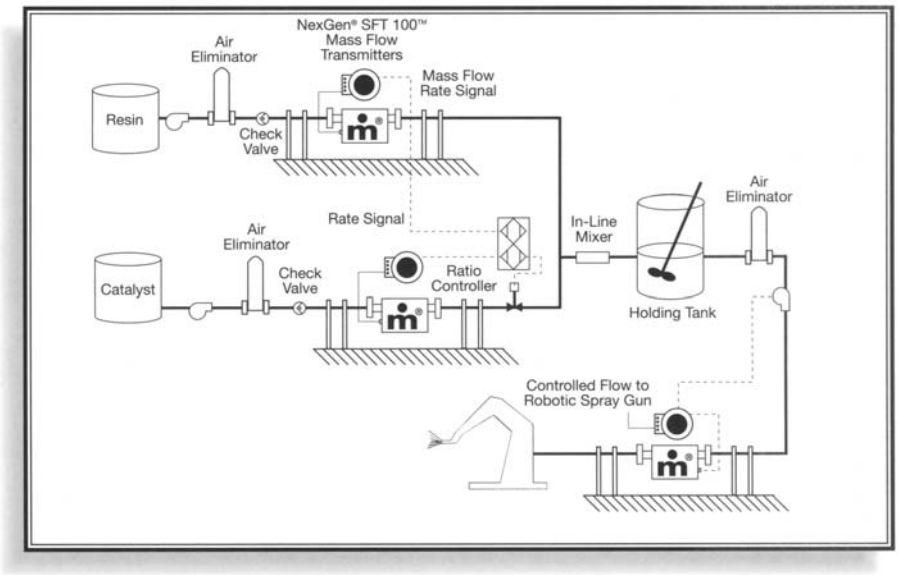
Sample Operating Conditions

Viscosity, cP	1000
Flow range, kg/min (lb/min)	2.27–22.7 (5–50)
Pressure drop across flow range, bar (psi)	0.207–1.86 (3–27)

Paint Mixing and Spraying

Continuous Processing
SIC 3479, 3711

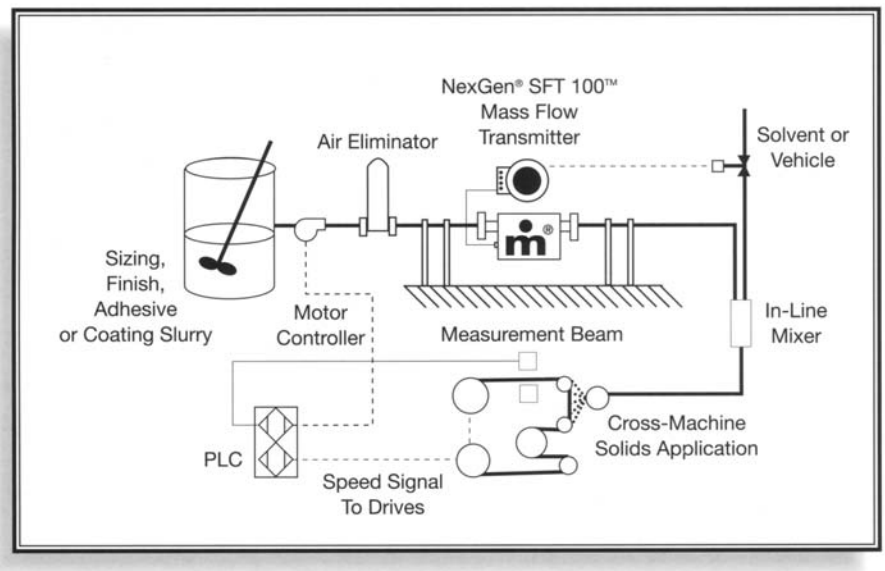
- Precise resin/catalyst ratio
- Savings in expensive catalyst
- Precise flow control at sprayer head for even coverage



Cross-Machine Mass Flow Control

Continuous Processing
SIC 2672, 2671, 2679, 2273

- Precise control of % solids
- Uniform application across the machine
- Ideal for papermaking and paper converting, textiles
- Useful for adhesive application



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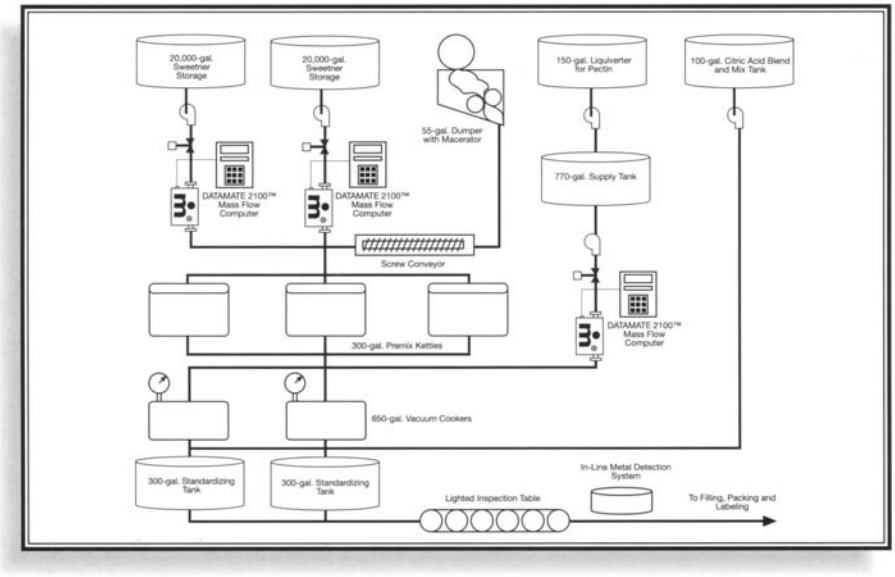
Sanitary/Hygienic Blending

Food/Pharmaceuticals
SIC 2033, 2035

- Accurate measuring of viscous syrups regardless of temperature
- Obstruction-free flow path for easy and thorough cleaning
- Easily interfaced to PLC-based control systems
- Low pressure drop



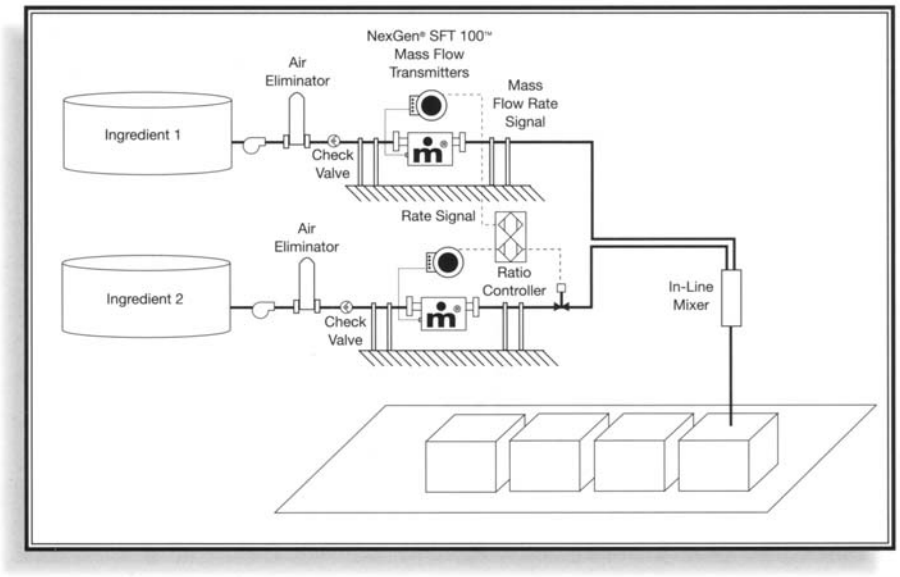
Sample Operating Conditions

Flow range, kg/min (lb/min)	91–136 (200–300)
Viscosity at operating temperature, cP	500–2500
Sp. gr.	1.39–1.42
Temperature, °C (°F)	43–152 (110–170)

Multiple Components in a Single Container

Container Filling
SIC 2851, 2891, 1799

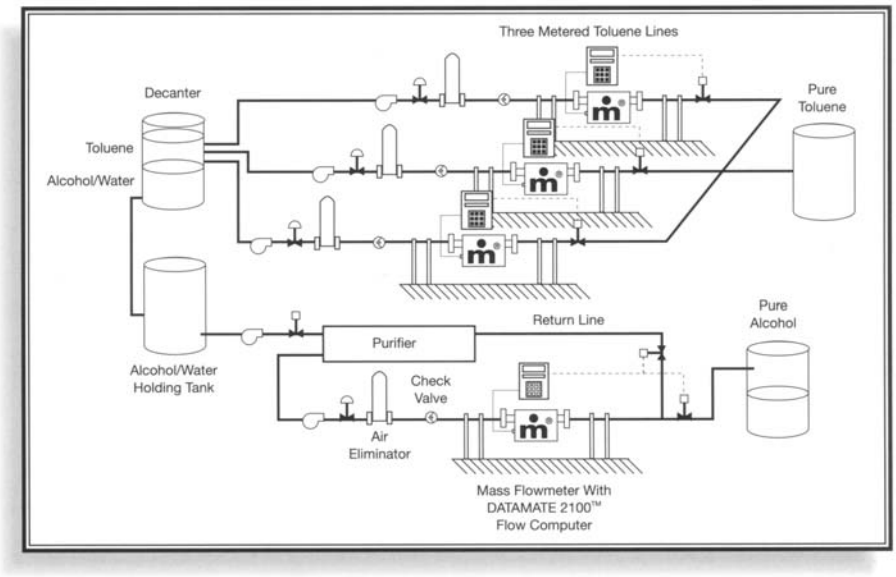
- Accurate dosing of multiple fluids during container filling
- Consistent filling
- Easily interfaced to conveyor speed control
- Easy installation and set-up



Separating Immiscible Fluids by Density Cut

Density Control
SIC 2869, 2834

- Avoiding distillation with high energy costs and carry-over
- Precise density cuts
- Easy installation and set-up



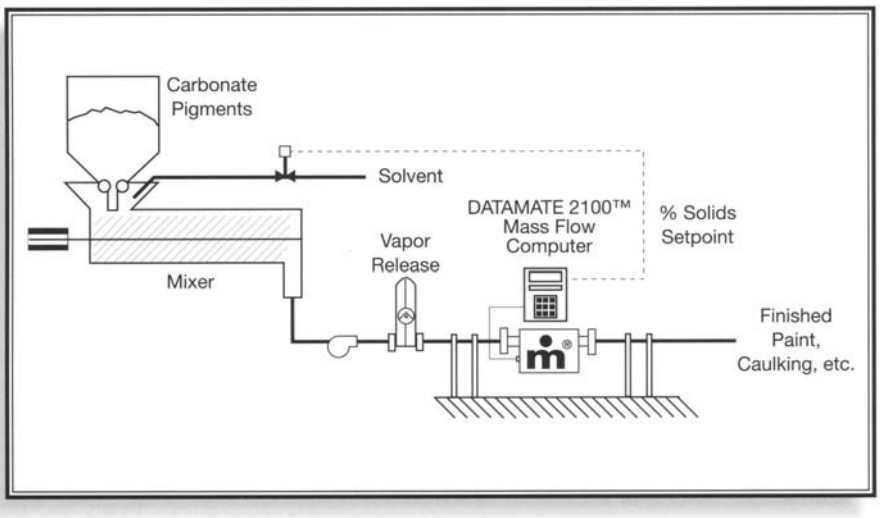
Sample Operating Conditions

Flow range, litres/min (gpm)	11–113 (3–30)
Viscosity, cP	0.24–0.62
Pressure, bar (psi)	2.2–3.4 (30–50)
Temperature, °C (°F)	16–19 (60–100)

Slurry Control

Control by % Solids or Density
SIC 2851, 1799

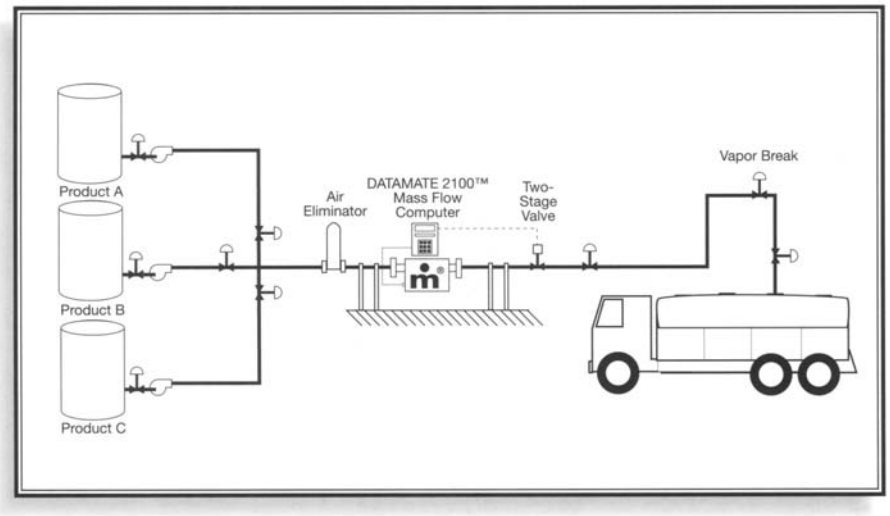
- Precise formulation by % solids or density
- Reduce waste
- Easy installation and set-up
- Easy interfacing with packaging/ filling lines



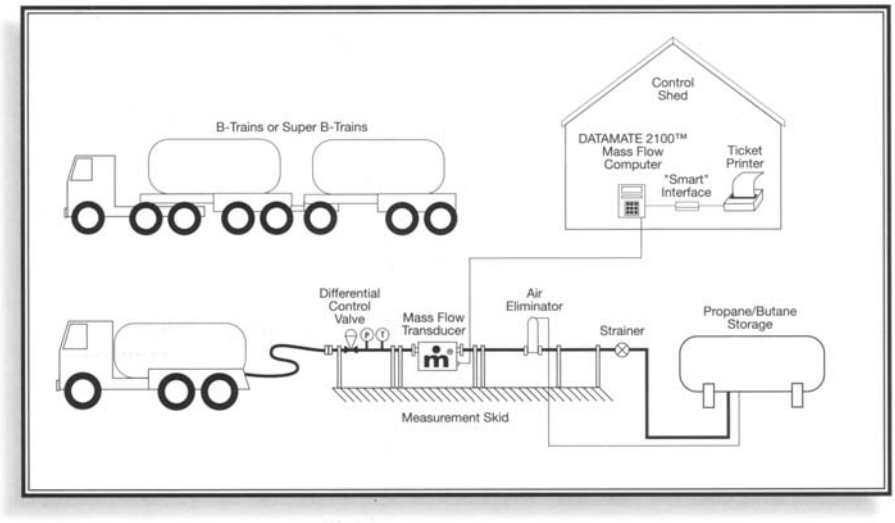
Rapid Transfer With Two-Stage Shut-Off

Bulk Loading
SIC 2992, 2911, 4613, 2077

- Replaces expensive truck scales
- Faster loading
- More complete filling without spillage
- Helps prevent hazardous exposure
- Accurate delivery regardless of environmental conditions
- Savings in calibration and maintenance costs



Propane and Butane in Distribution Terminal



Custody Transfer
SIC 2911, 5172A

- Direct mass measurement eliminates effects of temperature, pressure or viscosity
- Convertible to W&M-approved volume measurement
- Density measurement detects mixed gases and verifies proper Btu content
- Multiple product measurement capability without recalibration
- User-configurable ticket/invoice layout and printing

Sample Operating Conditions

Fluid	Propane, butane or NGL mix
Flow range, litres/min (gpm)	380–1140 (100–300)
Viscosity, cS	1
Pressure, bar (psi)	6.9–13.8 (100–200)
Temperature, °C (°F)	-20–30 (-4–86)
Sp. gr.	0.55–0.59
Vapor pressure at 21°C (70°F), bar (psig)	9.3 (133)

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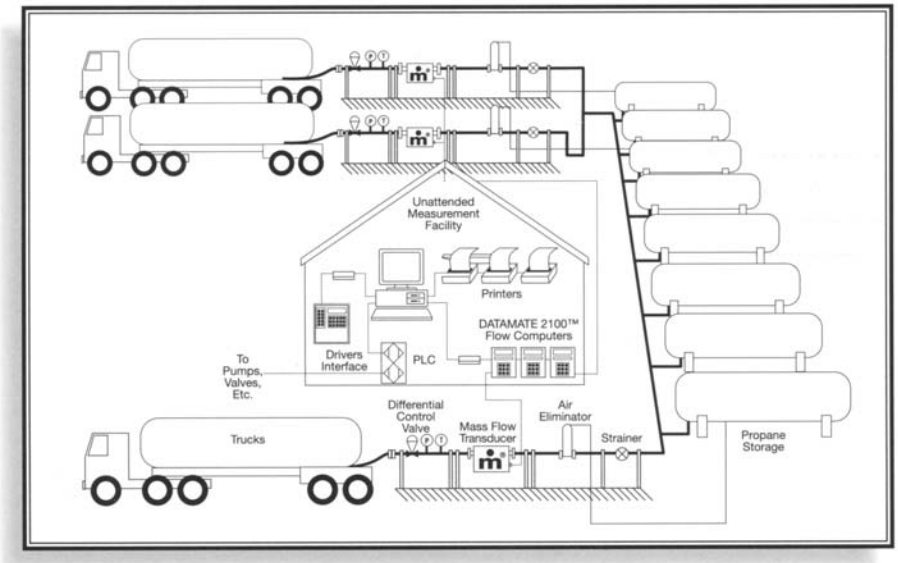
LP Gas in Distribution Terminal

Custody Transfer
SIC 2911, 5172A

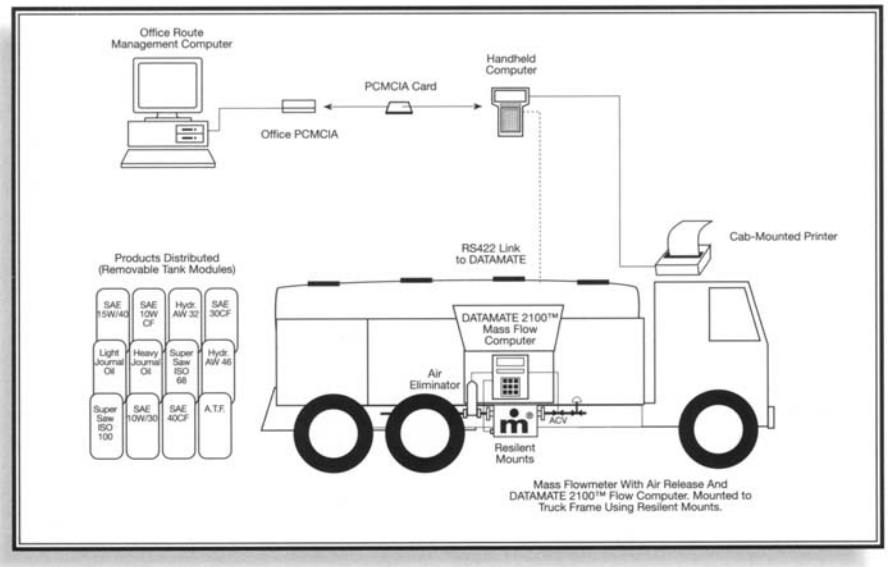
- Faster vehicle cycling
- Reduced maintenance vs. PD meters or weigh scales
- Direct mass measurement eliminates effects of temperature, pressure or viscosity
- Convertible to W&M-approved volume measurement
- Flexible transaction report formatting

Sample Operating Conditions

Fluid	Propane
Flow range, litres/min (gpm)	1514–1893 (400–500)
Viscosity, cP	0.1
Pressure, bar (psi)	13.8–15.2 (200–220)
Temperature, °C (°F)	-20–30 (-4–86)
Sp. gr.	0.51
Vapor pressure at 21°C (70°F), bar (psig)	9.3 (133)



Mobile Distribution of Multiple Products



Custody Transfer
SIC 5172G, 5172H, 7538F

- Twelve products measured through one truck-mounted mass flowmeter
- Accuracy from ±0.05% to 0.26% throughout the viscosity range
- RS422 interfacing to electronic transaction management system
- Mass flow signal converted to volume readout
- Flexible transaction report formatting

Sample Operating Conditions

Fluid	Lube oils
Flow range, kg/min (lb/min)	56–152 (123–334)
Kinematic viscosity, cS[1]	5.0–15.2
Sp. gr. at 15°C (59°F)	0.865–0.878
Vapor pressure at 21°C (70°F), bar (psig)	9.3 (133)

[1] At 100°C (212°F)

Application Assistance 800-833-3357

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