

# Precision Slurry and Chemical Blending / Delivery System

No Pumps, Vacuums, or Scales Used

CFC Series 2 LPM

## Description

ChemFlow's high precision Point-of-Use (POU) CFC series systems provide extremely accurate and repeatable blending of slurries and chemicals over a wide range of mixing ratios.

ChemFlow's volumetric blending process utilizes our **patented adjustable "U-tube" and a 3-gallon pipe-tank**. The CFC series provide 2 liters per minute blending and delivery of high purity or CMP chemicals to a single or multiple tools. Pneumatic valves are the only moving parts employed.

An innovative technology in combination with the simplicity in design provides many advantages over the competition (See Table 3).

## Theory of Operation

Each CFC series unit consists of two sub-units, the Blending Unit and the Delivery Unit.

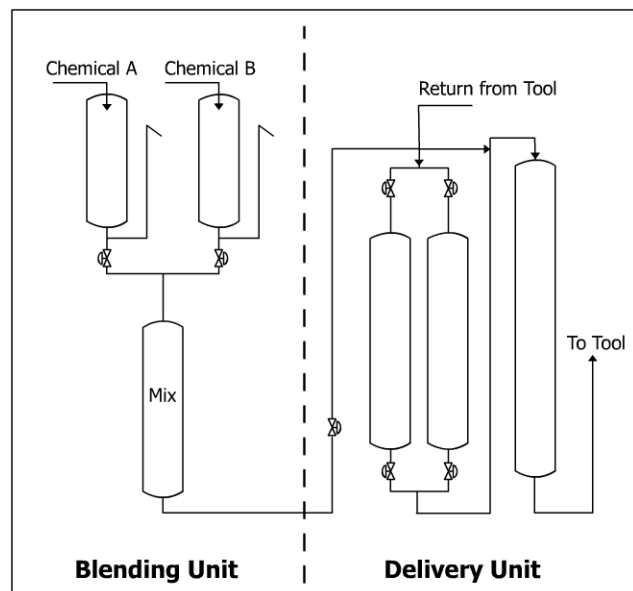
The Blending Unit accurately combines set quantities of up to three chemicals to achieve the desired slurry or chemical blend. ChemFlow system mixes the desired chemicals together by first filling individual volumetric measuring vessels. The chemical is introduced into the vessel until the desired volume is reached. The volume is determined by using our patented "U-tube" technique. This allows for highly accurate and repetitive volumetric measurements. Once all vessels are filled, the contents of each vessel are gravity transferred into the mixing vessel. The result is an accurately mixed slurry or chemical. The blended slurry or chemical is then transferred to the Delivery Unit of the system by pressure.

The 3 gallon pipe-tank of the Delivery Unit receives the mixed slurry or chemical. It is then pressure transferred into a distribution loop to the point of use under constant pressure and flow.

## Features and Benefits

There are many methods available to perform blending of slurries and chemicals. Current industry standards utilize metering pumps, scales, sensors, or a combination of the above, but these methods fail to maintain precision over time. The inherent problems with these methods are that they add layers of complexity to the blending and delivery processes. This translates into costly downtime due to improperly mixed batches, discarded material due to shelf-life, additional labor hours required for calibration, and/or preventive/corrective maintenance.

The ChemFlow CFC system is extremely easy to operate. It is self-monitoring, and contains few moving components. The system takes advantage of the physical properties of liquid and gravity to accurately and repeatedly fill mixing vessels with precise volumes of liquid. The "U-tube" design acts as a simple side flow gravity drain that naturally monitors the level within the mixing vessel. Once the U-tube drain is set, the volume obtained within the mixing vessel is precisely repeatable.



**ChemFlow Systems, Inc.** Tel: (408) 441-6575  
1725 Rogers Ave., Suite O, San Jose, CA 95112 U.S.A.  
[www.chemflowsys.com](http://www.chemflowsys.com)

**Table 1: Specifications**

Model	CFC
Applications	All Chemicals and Slurries
No. of Chemicals	Up to 3 chemicals
Mix Rate	¼ - 2 LPM
Delivery Rate	2 LPM
Repeatability	+/- 0.1 % of Setpoint
Real Time Analytical – Optional	Pressure, pH / ORP, Density
Pipe-tank	3 gal
Safety Certification	S2-93
Module Dimensions	45"(W) x 16½"(D) x 73½"(H)

**Table 2: Facility Requirements**

Items	Connection	Pressure	Flow	Voltage	Amperage
UPW Supply	½" Flare fitting	40 psig	2 GPM	N/A	N/A
UPW Return	½" Flare fitting	40 psig	2 GPM	N/A	N/A
Nitrogen	¼" VCR Male	80-125 psig	5 scfm	N/A	N/A
Drain	¾" NPT	N/A	Free flowing to industrial waste	N/A	N/A
Scrubbed Exhaust	2" SCH 40 Natural Poly pipe – 2" Stub	0.5" WC	50 scfm	N/A	N/A
Influent Chemicals Loop	Teflon PFA ½" Flare fitting	10– 20 psig	1 GPM	N/A	N/A
Influent Chemicals Dual Containment	2" SCH 40 Natural Poly pipe – 2" Stub	N/A	N/A	N/A	N/A
Primary Distribution Loop Supply and Return	Teflon PFA ½" Flare fitting	0 – 60 psig	2 GPM	N/A	N/A
Dual Containment Distribution Loop Supply and Return	2" SCH 40 Natural Poly pipe – 2" Stub	N/A	N/A	N/A	N/A
Electrical	¾" Sealtight	N/A	N/A	120 vac	10 amps

**Table 3: System Comparisons**

Item #	Criteria Description	ChemFlow System	Pressure / Vacuum System	Pump System
1	Precision blending relying on pumps, scales or system intrusive level sensors.	No	Yes	Yes
2	Frequent blending calibration / adjustments needed.	No	Yes	Yes
3	Potential CMP slurry particle agglomeration problems (i.e. tank design).	No	Yes	Yes
4	Slurry foaming problems.	No	Yes	No
5	Level sensors in contact with chemical product.	No	Yes	Yes
6	Air bubbles developed in delivery loop due to non-functional level sensors.	No	Yes	No
7	Frequent valve cycling.	No	Yes	Yes
8	Intensive preventive maintenance required.	No	Yes	Yes
9	Ergonomic issues and problems.	No	No	Yes