

# Mega ProQual

## Slurry / Chemical Batch Optimization

### Advantages

- Small batch slurry / chemical optimization
- Experiment precision
- Decreased slurry / chemical costs
- Greater understanding of particle size distribution impact

### Applications

- New CMP or cleaning process development
- Existing CMP or cleaning process improvement
- Accurate, reproducible chemistry mixing
- Process transfer and requalification
- Troubleshooting



Mega Fluid Systems' Mega ProQual Slurry / Chemical Batch Optimization System is an automated chemical blend unit which offers liquid chemistry optimization in small batches for use in a development setting. The Mega ProQual System is ideal for precisely fine-tuning CMP processes, clean processes, or for creating standardized solutions. Four chemicals from carboys, and DI water from a house supply line, are drawn up to construct small batches (30 to 100 liters [8 to 26 gallons]) of a specific chemical composition. Once a formulation is defined, the recipe is easily transferred to production equipment to formulate the same chemistry for use in a manufacturing environment. (Patent Pending)



# Mega ProQual

# Operation

The basic operation of the system is divided into five basic functions: chemical addition, batch circulation and dispense, process flush & purge, carboy flush, and sampling.

## Chemical Addition

The chemical addition function is defined by up to ten different recipes stored in the system.

Pumps in each chemical carboy supply line draw chemical from the carboy and dispense directly into a blend tank. Up to 2 of the chemical carboy supply circuits have double diaphragm, positive displacement pumps, and up to 2 chemical carboy circuits have fine granularity peristaltic pumps.

DI water is added to the blend tank via manual flow controller. A bulk scale on the blend tank meters the quantities of the two bulk chemical carboy feeds and the DI water house supply.

## Batch Circulation and Dispense

Once the chemicals have been added in the appropriate proportion, the blend tank contents are circulated locally for a given period. Once the blend circulation period is complete and the operator has accepted the batch, the blend system will fill the distribution tank.

If the operator has not accepted the batch, the system will pause and allow the operator to choose between adding other constituents to correct the batch concentration or directly aborting the batch.

## Process Flush and Purge

The flush and purge function allows complete removal of residual chemical upstream and downstream of the circulation pump. The flush process begins by filling the blend tank. The system will then circulate the DI water throughout the local circuit and then the material will be pumped to drain. The operator will then be prompted to initiate the upstream and downstream flushes of the circulation loop.

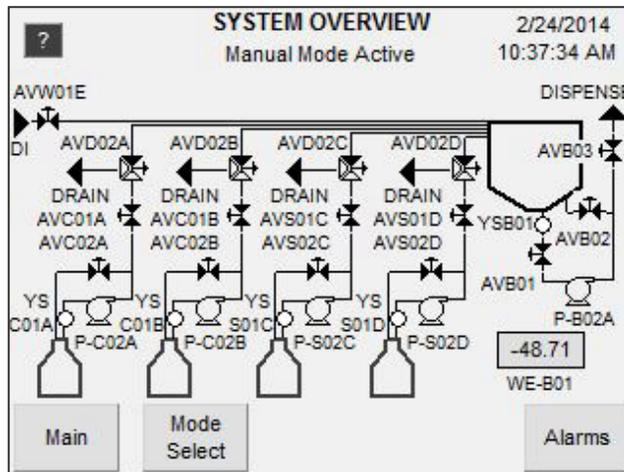
After a user-defined period of time has elapsed, the flush valves close, and a purge of the system upstream and downstream of the circulation pump is initiated.

## Carboy Flush

Each of the carboy circuits can also be flushed, initiated directly from the HMI. Carboys are flushed by opening the carboy valve and filling the carboys. The material is then flushed through the local carboy circulation piping. When complete, the system will begin pumping material from the carboy to the drain.

## Sampling

During the batch making process, the batch can be sampled and confirmed before dispense to the external distribution tank. Sampling occurs after batch circulation is complete, and must be accepted, augmented, or aborted before the distribution process will begin.

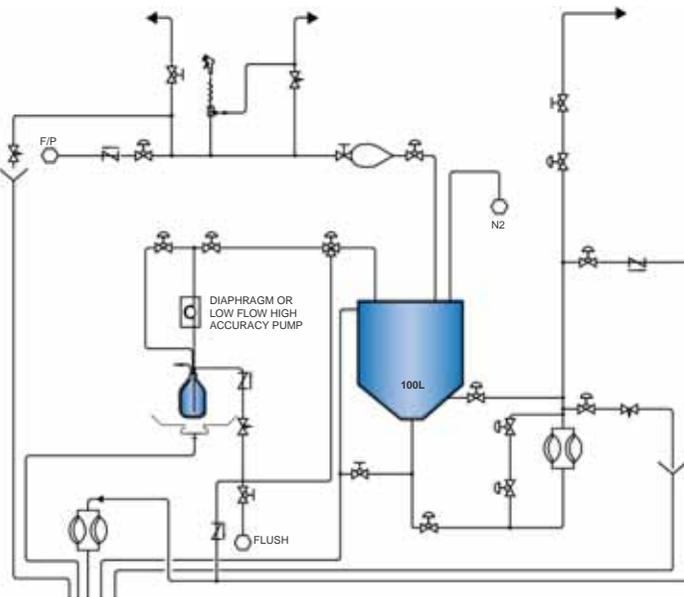


# Mega ProQual

# Features

## Standard Product Features

- ◆ 100 liter [26 gallon] blend tank
- ◆ High purity diaphragm pumps for transferring from carboys to blend tank
- ◆ High purity diaphragm pumps for delivery and tank recirculation
- ◆ Low flow peristaltic delivery pump for low mass additions
- ◆ Pressurized drain and cabinet drain diaphragm pump
- ◆ 45.7 x 45.7cm 299kg [18"x18" 660 lb] (max) scale for measuring the addition of DI and abrasives
- ◆ 30.5 x 30.5cm 29kg [12"x12" 66 lb](max) scale for measuring the addition of high accuracy constituents
- ◆ Blend tank recirculation
- ◆ Storage for up to four 20 liter [5.28 gallon] carboys
- ◆ Humidified N2 blend tank supply
- ◆ Recirculation of raw constituent carboys
- ◆ Sample port
- ◆ Standard door interlocks and leak detects
- ◆ 15.25cm [6"] flange exhaust port
- ◆ Flexible dispense hose with delivery cart tank level detection and automated shut-off
- ◆ 110 VAC cord for power connection to standard plug-in socket allowing mobility

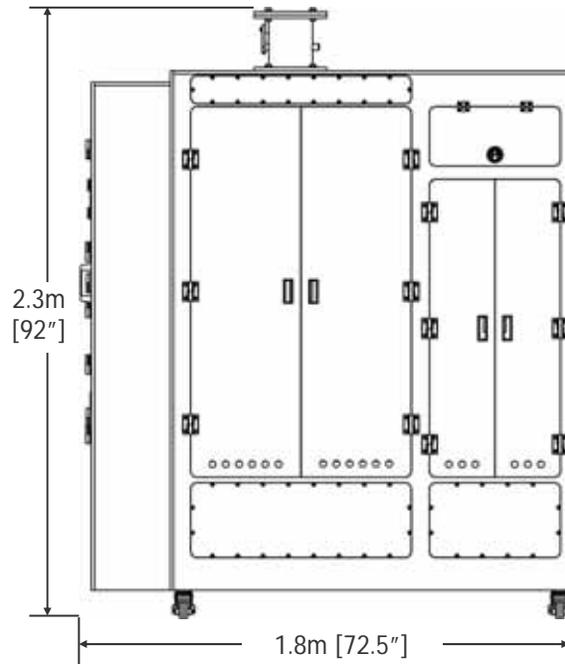
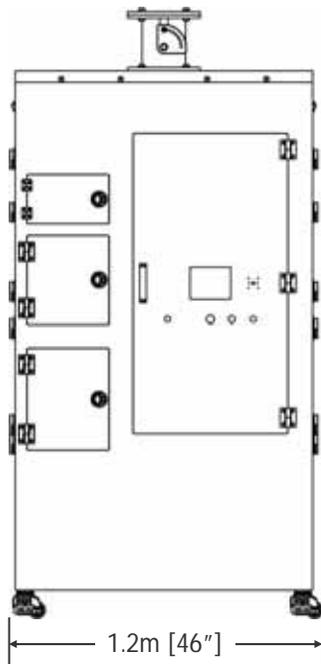


## Optional Features

- ◆ Recirculating pump to maintain slurry suspension.
- ◆ Up to four chemical, chemical/slurry, or solid constituent channels, plus one DI water addition channel available for blending.
- ◆ Numerous metering methodologies available: flow control, passive flow metering, mass flow, passive mass metering, metering pumps, level, etc. Systems may combine metering methodologies on different channels for blend error performance enhancements.
- ◆ Chemical and/or slurry channels can be fed directly from house supply sources or internally pumped.
  - ◆ Internally pumped chemical and/or slurry channels can be optionally circulated back to the source vessel.
  - ◆ Blend Tank size is variable to a 100 liter [26 gallon] maximum.
  - ◆ External level sensors or hard-wired communication relay circuits to assess destination system fill and full levels.
  - ◆ Castors and castor brakes to allow the systems to be moved from site to site and fixed in position when needed.
  - ◆ Connection to a separate single slurry/chemical dispense system with filtering (Dispense System sold separately).
  - ◆ Analytics cart (sold separately).
- ◆ Temperature control "cart" to monitor, heat, cool, and maintain blend temperature (requires additional power source) capable of monitoring bulk fluid, local recirculation (monitor reaction temperature), as well as supply to a dispense system.

# Mega ProQual

# Specifications



Description	Pressure	Flow Rate	Connection Size
DIW Supply	241.3 kPa [35 PSIG]	37.8 LPM [10 GPM] Max	1" PFA Flaretek Bulkhead
DIW Return	241.3 kPa [35 PSIG]	0 LPM [0 GPM]	3/8" PFA Flaretek Bulkhead
Nitrogen Supply	620.5 kPa [90 PSIG]	52.5 LPM [13.8 GPM] Max	3/8" SS Swagelok Bulkhead
CDA Supply	620.5 kPa [90 PSIG]	383.8 LPM [101.4 GPM] Max	3/8" SS Swagelok Bulkhead
Process Drain	482.6 kPa [70 PSIG]	36.8 LPM [9.7 GPM] Max	1" PP FNPT Full Coupling
Exhaust	-0.0249 kPa [-0.0036 PSIG]	11016.7 [2910.3 GPM] LPM	3" Flange Connector
Gravity Drain	Gravity Fed		2" PP FNPT Half Coupling
Power	120VAC, Single Phase, 50-60 HZ, 6.3A Max		3/4" FNPT



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