



ENTECH 4600A

AUTOMATED DYNAMIC DILUTER

The analysis of Volatile Organic Compounds at ppm through sub ppb levels requires the generation of standards for instrument calibration. These standards can be prepared in passivated stainless steel canisters, Tedlar™ bags, or sorbent tubes, depending on the application to be calibrated. The most accurate procedure for obtaining ppb level standards is to dilute NIST-referenced standard mixtures contained in cylinders at low ppm levels. Accuracy can be maximized if the transfer is done under equilibrium conditions so initial losses on surfaces will not affect overall final concentrations. The only way to achieve this equilibrium is by performing dynamic dilutions.

The 4600A Dynamic Diluter

The 4600A Dynamic Diluter prepares analytical standards in canisters or Tedlar™ bags by blending 1-5 cylinders together with a diluent gas under mass flow control. The controlled flow streams are combined and then pass through a blending region to insure complete homogeneity before sampling into the canister or bag. The diluter can be given several minutes to reach equilibrium under the current temperature, pressure and flow before the stream is partially diverted into the storage receptacle. The remainder is vented out of a 35psig back pressure regulator which maintains a constant pressure in the manifold whether or not canister filling is occurring. Obtaining the required concentration at the outlet is done by setting up the method in the 4600A application software and then activating the method allowing control of the 4600A through the SmartLab2® network.

The 4600A can be ordered with a minimum of 2 mass flow controllers, one for diluent flow control (5000 sccm) and a second for a single cylinder mixture (50 sccm). Additional flow controllers can be ordered for channels 3-6 which increase the number of cylinders being blended to 5. The extra channels can be ordered with MFC's ranging from 10 to 1000 sccm.



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Sample Pressurizing

The 4600A can perform automated pressurizing of canisters to support static dilution standard preparation or to pressurize samples that were filled to less than 1 atmosphere during field sampling. A high accuracy sensor ($\pm 0.3\%$) first measures the initial pressure, then fills to a requested final pressure and calculates the dilution factor. A second operating mode allows dilution by a constant factor of 1.5, 2, or 3 x. This conveniently eliminates the need to determine different dilution factors for each sample. Pressurizing samples with a surrogate containing nitrogen cylinder can add further reliability to the results by validating the actual volume withdrawn from the sample canister during analysis.

Support for Static Dilution

The 4600A supports the preparation of custom standard blends when no cylinder standards are available. The static dilution option 4600-02 provides a convenient means for injecting a gas or liquid phase standard mixture directly into a canister while the 4600A software fills the canister with diluent or surrogate to a preset, final pressure. The extensive calculations required with this form of standard preparation are simplified

using the Entech Standard Preparation software (ESP). Combining dynamic and static dilution capabilities allows a laboratory to calibrate their GC or GCMS for virtually any VOC's requiring quantitative analysis.

SmartLab2® Control Interface

The 4600A is controlled using the Entech SmartLab2®

network. The interface includes screens for defining and running methods and for pressurizing samples or standards before analysis. Maximum flow rates for each channel can be changed for easy expansion or system optimization. The graphical interface simplifies operation and accelerates the user's understanding of operation principles.

Features

- Dynamically dilutes 2-6 cylinders (including diluent).
- Analytes well mixed before splitting into collection vessel.
- Maintains pressure, temperature, and flow equilibrium during canister filling.
- Controlled using SmartLab2 network.
- ESP software calculates flows in response to user requested concentrations.
- Optional canister sample pressurization feature for sample dilution and surrogate standard introduction.
- 2-stage model (4620A) allows up to 1 million times dilution for low part-per-trillion standards generation from PPM level cylinders .
- Start/Stop control of dilution process controllable through the 7100A Preconcentrator, providing freshly prepared standard on demand.
- Diluent is pre-humidified for superior VOC transmission through manifold.
- All stainless steel interconnective manifold. Optional Silonite coated stainless manifolds available.

Part Number

Description

4600A	Dynamic Diluter (with MFC's)
4620A	2-Stage Dynamic Diluter (2MFC's per stage)
12-51150	5m USB SL2 Cable
03-1xxxx	Extra MFC Channels (xxxx specifies flow in standard cc/min)
07-10546	Humidifying Chamber with Water Level Indicator
4600-01	Canister Pressurizing Option
4600-02	Static Dilution Kit
4600-03	Silonite Coated Internal Parts Option for Sulfur Stds. Prep
01-ESP	Entech Standard Preparation Software