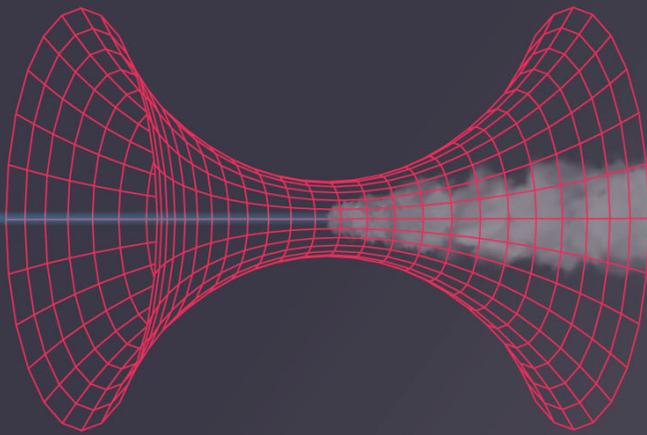


# BUXCO<sup>®</sup> Inhalation System

With exclusive SmartStudy<sup>™</sup> technology



SUBJECT-SPECIFIC TARGETED DOSING

IT'S ABOUT TIME.



## IT'S ABOUT TIME

Inhalation research is at the forefront of testing preclinical conditions and therapeutic efficacies. You don't have time to waste. Meet the only Inhalation Exposure System with real-time measurement and reporting of delivered dose now with the patented capability to stop aerosolization once a subject reaches their target, while continuing exposure for others.

### IT'S ABOUT...

### PRECISION.

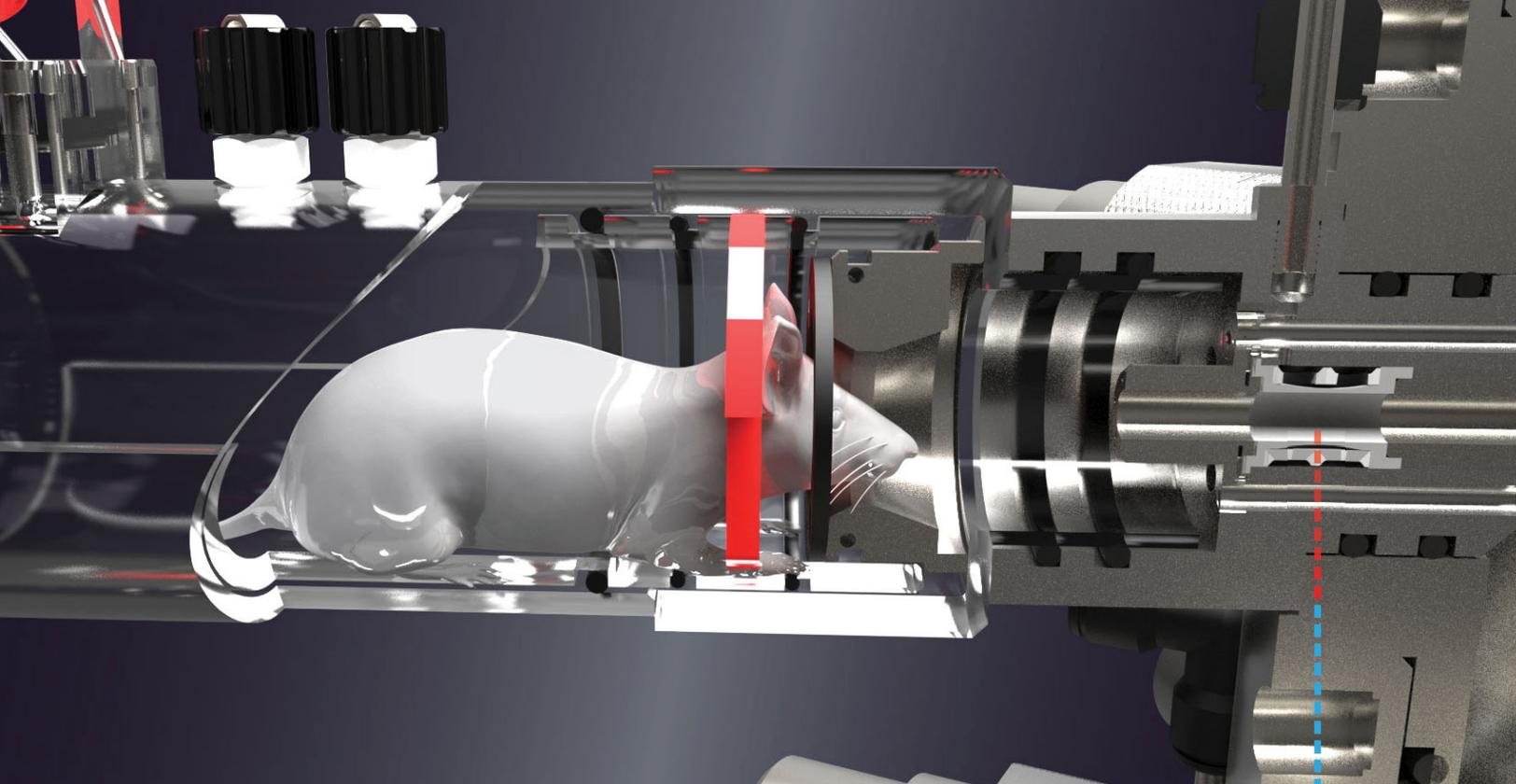
### SAVINGS.

Automatically cease exposure when user defined target dose is achieved.

Save days of offline calculation and research with automated aerosol diagnostics and characterization procedures.

## BUXCO® INHALATION EXPOSURE SYSTEM





## SAFETY.

Safely remove a test subject without risk of exposure.

## FLEXIBILITY.

Modular structure with the ability to test multiple dosage groups on the exposure tower.

SmartStudy Tower Port Adaptors automatically shut off the flow of the compound at the pre-determined level, then provide fresh air.



# IT'S ABOUT PRECISION

## Accumulated Inhaled Aerosol (AIA) with FinePointe™

### Integrate real-time digital aerosol concentration with live respiratory parameters

FinePointe™ software calculates and reports each subject's Accumulated Inhaled Aerosol (AIA), also known as delivered dose (DD).

- Ensure uniform lung delivery across all monitored subjects, while reducing variability due to individual breathing patterns and changes in aerosol concentration
- AIA is reported live, in both numerical and graphical representation for each animal
- Produce AIA reports post-study. Summarize the various inhaled aerosol amounts which allows you to yield better dose and effect conclusions, with longitudinal protocols available while tracking and accumulating subject AIA throughout study



Above: FinePointe inhalation single site screenshot

Right: FinePointe automatically calculates AIA by integrating realtime title volume and concentrations measurements.

Time	f	TV	MV	AV	Cnc	IA	AIA
00:05:28.13	128.4	0.2456	31.54	11.72	349.8	8.593e-05	0.003624
00:05:28.64	117.4	0.2553	29.97	11.98	347.7	8.877e-05	0.003713
00:05:29.15	119.1	0.2436	29.03	12.22	347.7	7.471e-05	0.003798
00:05:29.70	109	0.3161	34.46	12.54	347.7	0.0001097	0.003907
00:05:30.21	116.4	0.2989	34.81	12.84	346.7	0.0001036	0.004011
00:05:30.73	116.3	0.2897	33.69	13.13	347	0.0001005	0.004111
00:05:31.22	121.6	0.198	24.07	13.32	347.1	6.871e-05	0.00418

Perform accurate, real-time respiration monitoring during exposure using FinePointe™ software. Integrating exposure and respiratory capabilities, the system delivers precise amounts of various aerosols to multiple subjects in a uniform, and reproducible manner, then measures pulmonary effects from the same platform.

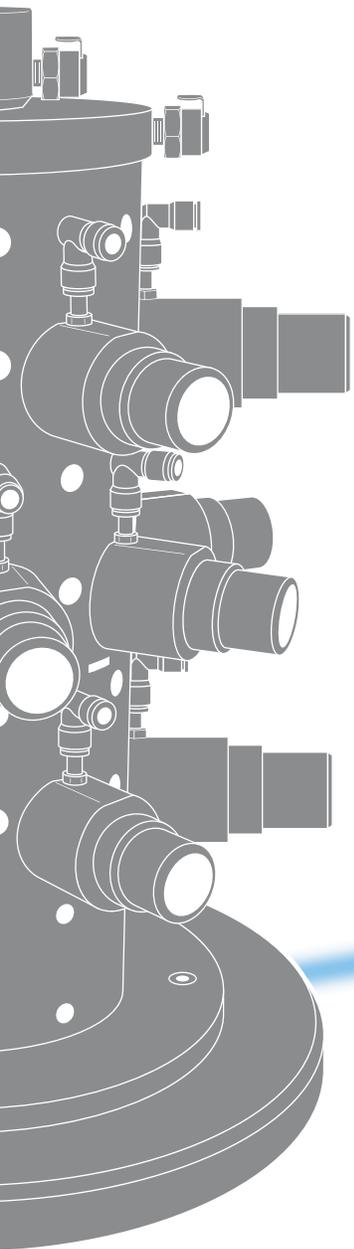
By reporting measures against real-time respiratory endpoints using FinePointe, researchers can observe a direct correlation between dose and lung function over time.

## **Combined respiratory endpoint measurements and inhalation environment conditions**

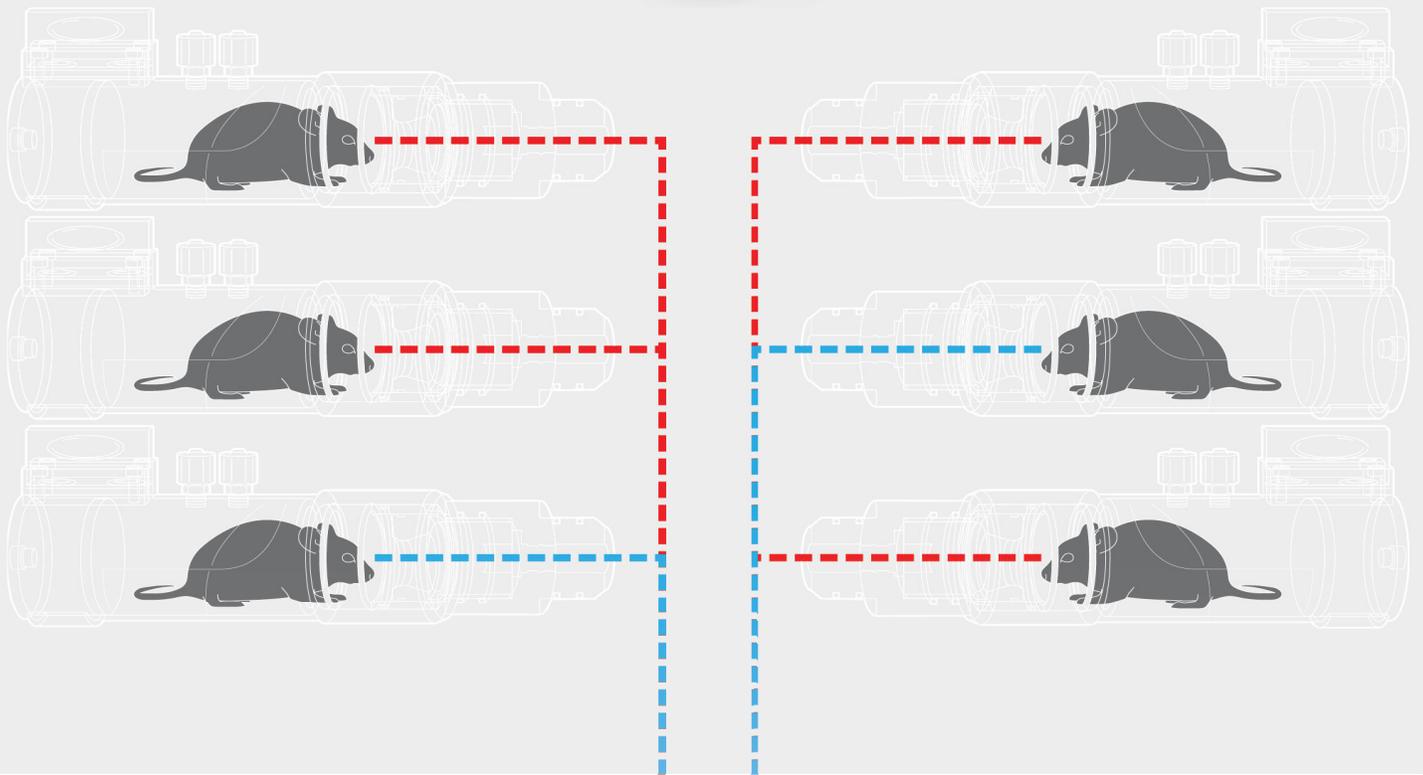
FinePointe software offers the ultimate user experience by combining respiratory endpoint measurements and inhalation environment conditions, along with the standard automation and diagnostics common to all FinePointe platforms. Unique to the nose-only inhalation application, users benefit from the following capabilities:

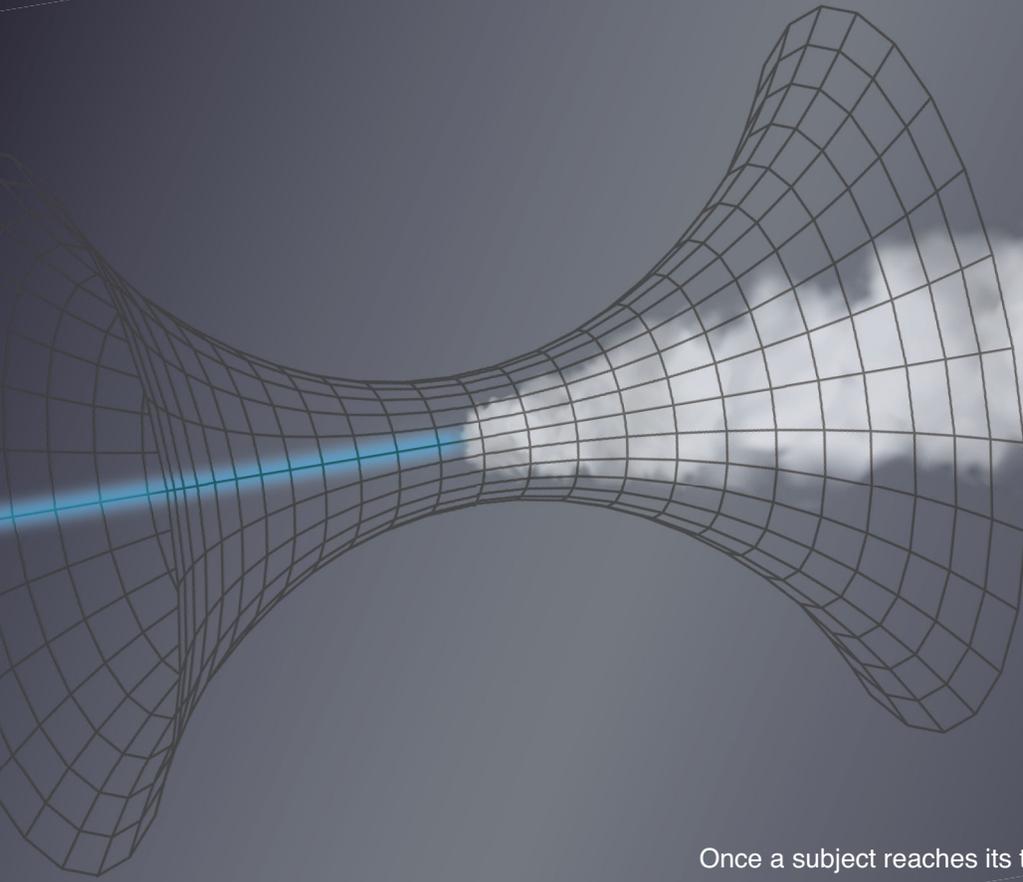
- Comprehensive step-by-step wizard guiding user from subject-specific target dose, to required compound amount and estimated exposure duration in real-time
- Multiple SmartStudy protocols available including AIA/DD targets, and time of exposures
- Multiple aerosolization protocols:
  - Precise aerosol output rate (ml/min)
  - Amount of aerosol during user-defined duration
  - Animal breathing zone targets humidity conditions
- All system flows and pressures regulated, recorded and saved for reproducibility and record keeping
- System diagnostics ensure proper operation/calibration prior to animal exposure

## USER-DEFINED, TARGETED AUTOMATED SUBJECT-SPECIFIC AEROSOL ADMINISTRATION



SmartStudy Tower  
Port Adaptor





Once a subject reaches its targeted dose, port adaptors automatically shut off the flow of the compound once a subject reaches its targeted dose, followed by a flow of fresh air, allowing the test subject to remain on the tower while other subjects continue to receive dosage.

**Automatically shuts off aerosol delivery to a single subject or have the flexibility to stop delivery to multiple-dosage groups.**

- Reduce the margin of error **by being able to stop** the known delivery amount
- **Decrease animal count** by conducting targeted dosing leading to fewer subjects needed to achieve study significance

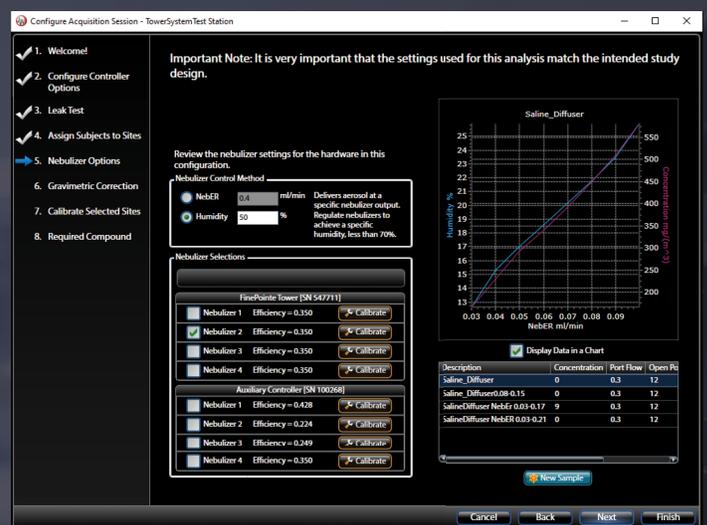
# IT'S ABOUT SAVINGS

## Save Days in Study Preparation

Automated system diagnostics and patented aerosol characterization procedures save days of offline calculation and research, enabling the exposure of test subjects with the best knowledge at hand.

### Using a single click, you access:

- System efficiency and accuracy working range – unique to formulation and conditions
- Graphical and tabular representation of aerosol output range that meets your specific study requirements
- Critical environmental conditions data points for critical aerosol concentration setpoints
- Real-time estimated exposure time, calculated based off study definitions, previews experiment prior to actual aerosolization
- Real-time calculation of maximum API amount needed for defined exposure study
- Integrated gravimetric correction step allows confirmation or correction of digital concentration measurements



## Economic Savings



In a world that constantly asks to do more with less, now streamline efficiencies and focus on what matters most – the research.

- Reduce compound use
  - DSI inhalation tower 70-85% efficient under standard conditions
- Reduce animal count
  - Less post-exposure sacrifices
  - Eliminated need for large subject groups for statistical relevance with precise dosing
- Saved setup and cleanup time when running multiple dosage groups with single exposure
- Reduced experiment setup from days to minutes with single-click diagnostics

# IT'S ABOUT SAFETY

## Stable Uniform Conditions

Safely remove a test subject from the tower without exposing yourself or others to the inhalant.

Automated system diagnostics including real-time main and sample flow monitoring ensure a safe, stable exposure environment.



## Ensure Animal Welfare

Designed through customer collaboration, the patented Buxco® Allay Restraint secures the animal without compressing the thorax, and keeps airways completely unobstructed. A neck restraint clip positioned between the base of the skull and shoulders eliminates traditional subject-compressing plunger systems. In addition, several sizes of the Allay neck restraint are provided to ensure comfortable restraint - *no matter the animal size*.

## Allay Restraint Exposure Chamber

- Positions subjects for normal breathing in a reduced-stress environment
- Provides consistent placement of nose from subject to subject
- Delivers better access via restrainer to subject during exposure



Mouse Allay Restraint Exposure Chamber



Mouse Allay Restraint Exposure Chamber with Plethysmograph

## Allay Plethysmograph

- Accurately measures respiratory parameters during exposure
- Records minute volume and rate, critical for determining the amount of inhaled compound
- Ensures animal welfare with real-time respiratory monitoring

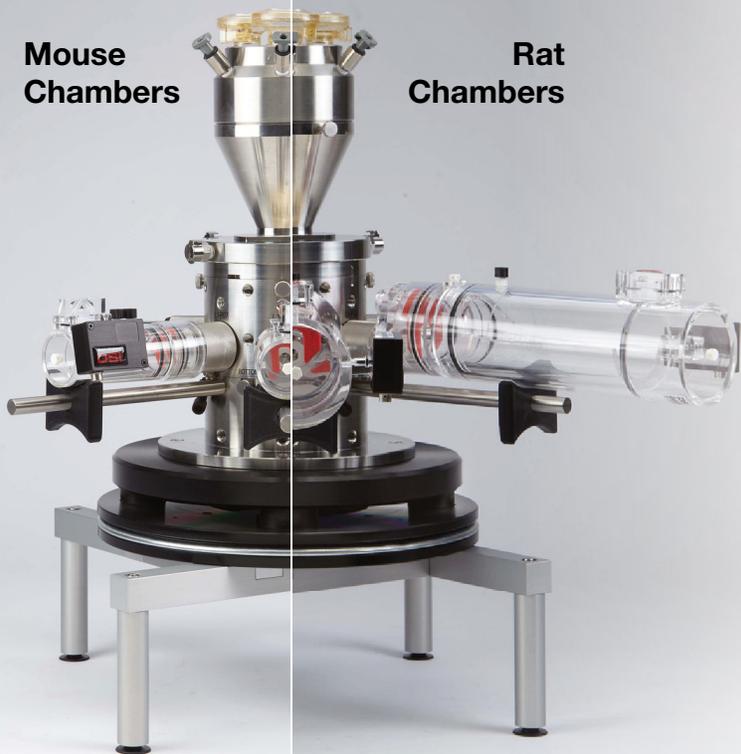
## IT'S ABOUT FLEXIBILITY

Designed for your lab or remote work environment, the Buxco® Inhalation Exposure System is easy to use for new researchers while delivering the performance and flexibility required by experts. Whether conducting a pilot study or a larger experiment, the scalable, stackable tower accommodates anywhere from one to six levels and up to 42 subjects.

UP TO  
**42**  
SUBJECTS

Mouse  
Chambers

Rat  
Chambers



### Species Supported

- Mouse
- Rat
- Guinea pig
- Ferret

**The modular design** easily separates into manageable size pieces and is simple to clean for quick turnaround between experiments. The ultra-smooth, stainless-steel construction minimizes test-article loss and is corrosion resistant, which is ideal when working with harsh chemicals.





Multi Nebulizer Configuration

## Aerosol Generation Options

### Aerogen nebulizer integration

- Single and multi-head options
- Fully integrated into study protocol yielding reproducible experiments, from one day to the next and one technician to the next
- Unique nebulizer efficiency calibration producing accurate, microprocessor-controlled, aerosol delivery, with real-time representation of aerosol output in ml/min



EVT Smoke Generator

### Traditional and Electronic Cigarettes (EVT)

- Multiple smoke stations provide countless configurations and flexible comparative studies
- Patented disposable Smoke Bellows protects electrical/mechanical components from smoke, while providing simple and quick cleaning process
- Full adherence to ISO standard for both combustion and e-cigarettes research
- Software-based control provides default approved puff regimes, and user-defined custom protocols
- Integrated sampling enables total exposed particulate matter calculation and automatic puff cessation



MDI Aerosol Configuration

### Metered Dose Inhalers (MDI)

- Fully automated 5-cannister design allows flexible actuation protocols
- Comparatively efficient aerosol delivery option

### Dust and Powders

### Jet Nebulizers

## Environmental Measurements

- Aerosol concentration – digital and gravimetric
- Particle size analysis – digital and gravimetric
- O<sub>2</sub>/CO<sub>2</sub> measurement at breathing zone and chamber (tower inner core)
- Digital temperature and humidity at breathing zone and inlet air

<b>Tower Settings</b> FinePointe Tower [SN 547711] Auxiliary Controller [SN 100268]		<b>Subjects</b> Subject Flow Rate (l/min) <input type="text" value="0"/> l/min Number of Subjects <input type="text" value="9"/>	
Inflow Photometer <input type="text" value="&lt;none&gt;"/> Port Photometer Casella 2500 mg/m <sup>3</sup> Tower Pressure <input type="text" value="-5"/> cm H <sub>2</sub> O Additional Inflow <input type="text" value="0"/> l/min		<b>Alarms</b> Inflow Alarm <input type="text" value="10%"/> Tower Pressure Alarm <input type="text" value="0.25 cm H&lt;sub&gt;2&lt;/sub&gt;O"/> Supplemental Flow 1 Alarm <input type="text" value="10%"/> Supplemental Flow 2 Alarm <input type="text" value="10%"/> Supplemental Flow 3 Alarm <input type="text" value="10%"/> Supplemental Flow 4 Alarm <input type="text" value="10%"/>	
<b>Port Connections</b> Temperature/Humidity Sensors <input type="text" value="1"/> Cascade Impactors <input type="text" value="0"/> Particle Sizers <input type="text" value="0"/> Inline Port Filters <input type="text" value="0"/> Additional Open Ports <input type="text" value="0"/>		<b>Computed Settings</b> Inflow <input type="text" value="0"/> l/min Secondary Flow <input type="text" value="0"/> l/min Supplemental Flow 1 (Cascade Impactor Pull) <input type="text" value="0"/> l/min Supplemental Flow 2 (Cascade Impactor Push) <input type="text" value="0"/> l/min Supplemental Flow 3 (inline Filter) <input type="text" value="0"/> l/min Supplemental Flow 4 (Diluter) <input type="text" value="0"/> l/min	
<input type="button" value="Valve Automation Settings"/>			

## Software Controlled Parameters

- All system flows and pressures
- External gas sources flow management
- Aerosol output according to user requirements
- System flow management adheres to specific user setup

### **About Data Sciences International**

DSI provides a complete preclinical platform to assess physiological data for research ranging from basic, to drug discovery, and drug development. DSI is the leading provider of telemetry systems, pulmonary solutions, associated software platforms, and services. DSI is a division of Harvard Bioscience Inc.



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