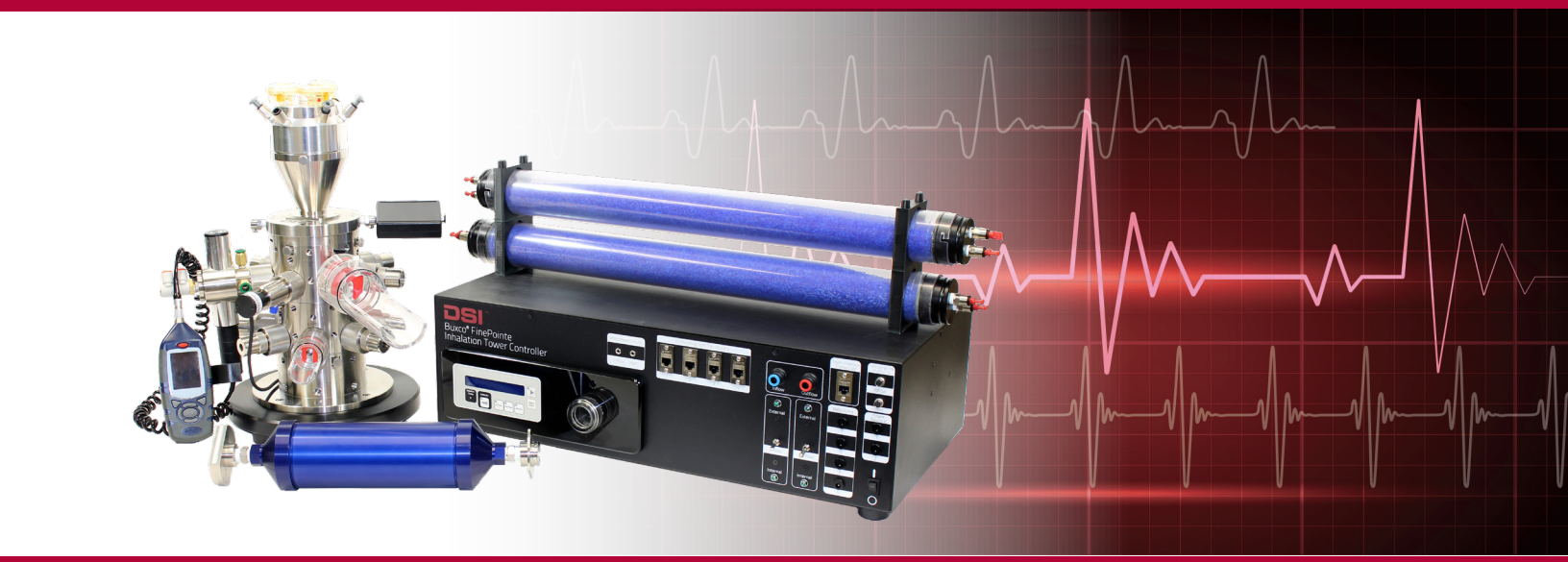
Guide to the Buxco® Inhalation Exposure System

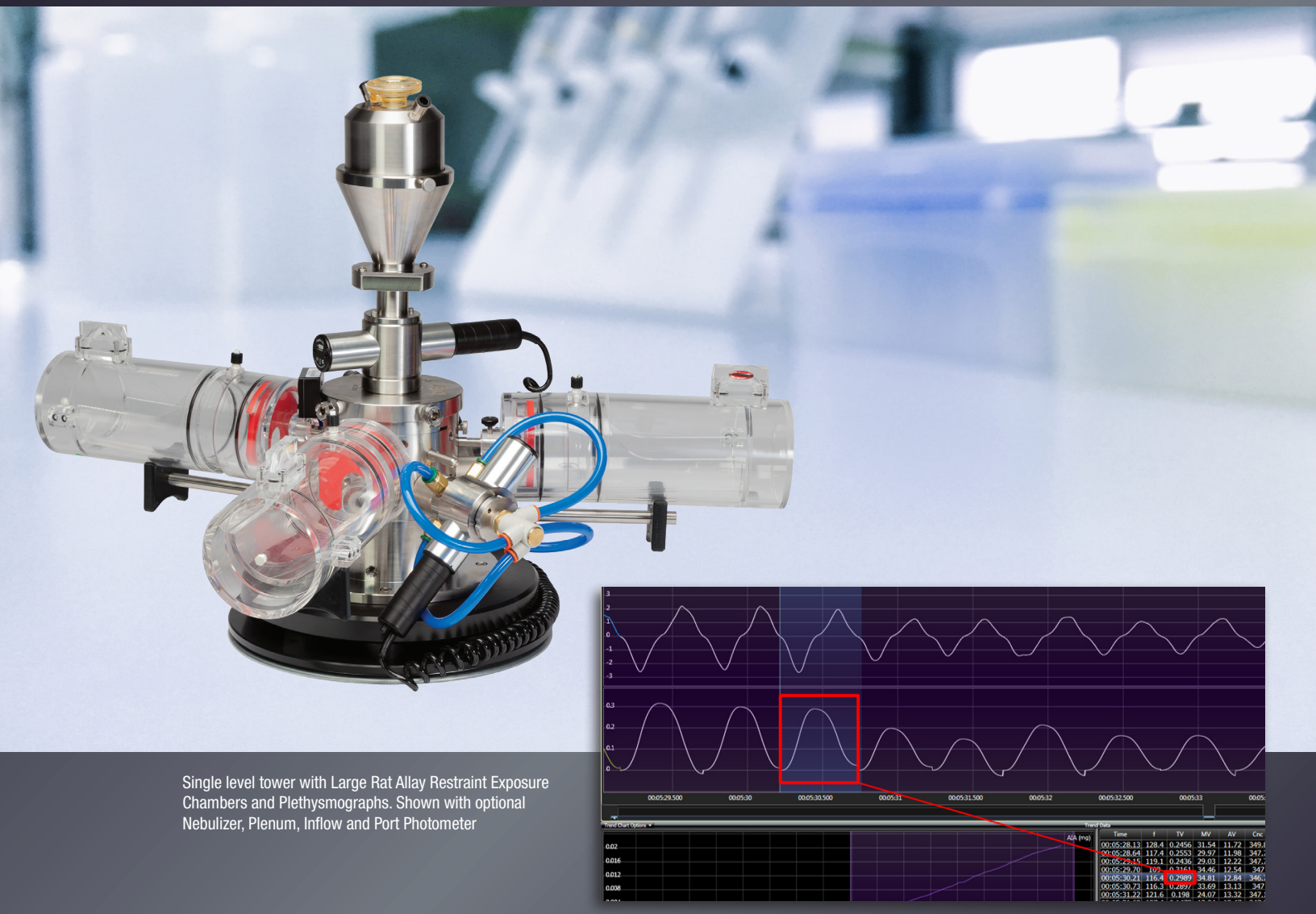


- Inhalation Toxicology
- Bioaerosol
- Environmental
- Disease Models
- Pharmaceutical

HB

DSI™

Get More from Inhalation Exposure Studies

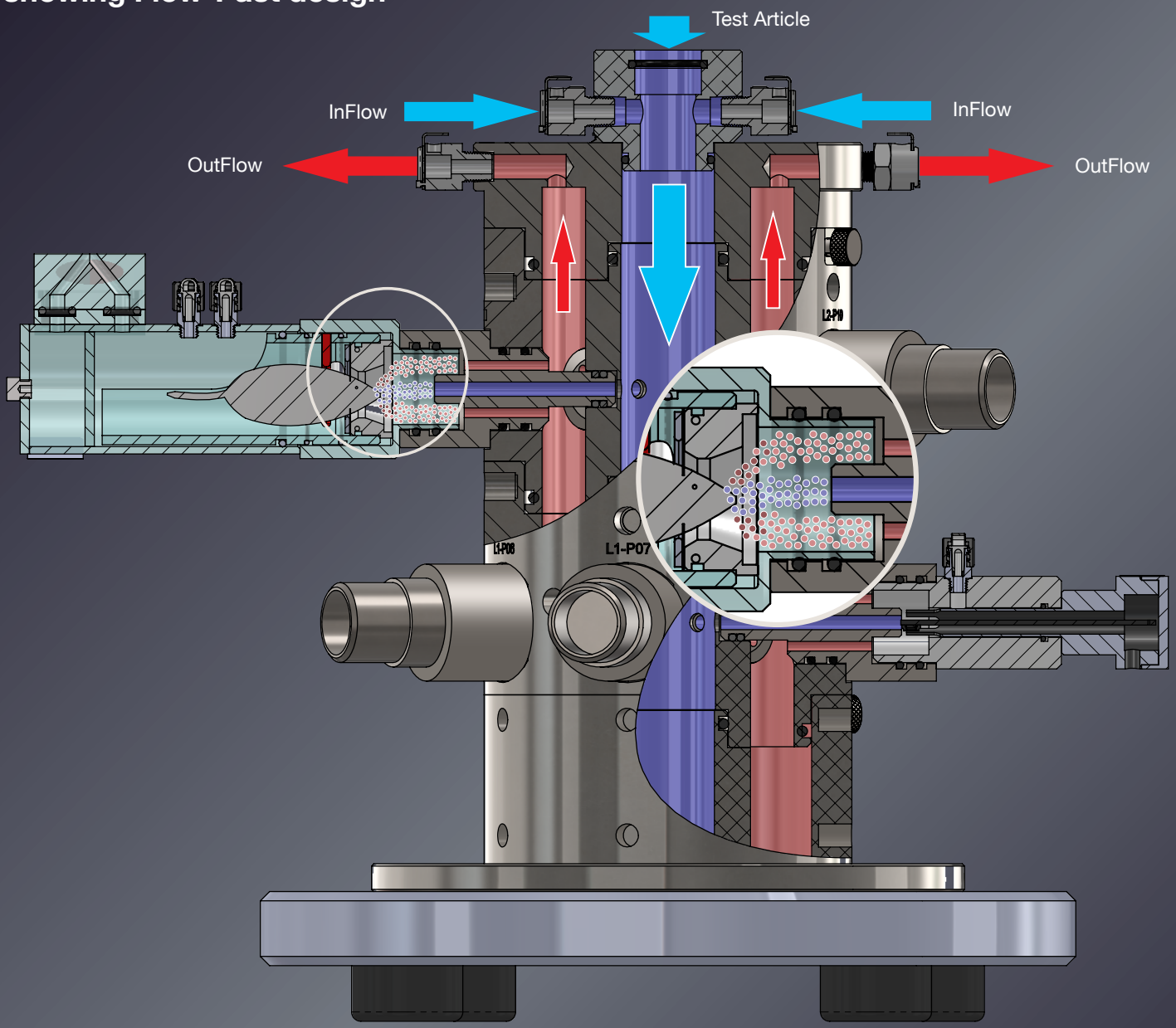


Single level tower with Large Rat Allay Restraint Exposure Chambers and Plethysmographs. Shown with optional Nebulizer, Plenum, Inflow and Port Photometer

The DSI Buxco inhalation exposure system is easy to use for researchers who are new to inhalation exposure studies, while providing the performance and flexibility required by the experts. Unique to DSI's solution is the ability to perform accurate real-time respiration monitoring during exposure using FinePointe software—critical for animal welfare and determining accurate deposition levels.

Unique Tower Design

Cross section view of Inhalation Tower showing Flow-Past design



Flow-past design utilizes inner and outer cores in order to

- eliminate rebreathing, reducing $C0_2$ levels
- improve port-to-port uniformity

Species Supported:

- mouse
- rat
- guinea pig
- ferret

Stainless steel construction

- corrosion resistant, ideal for harsh chemicals
- ultra-smooth finish minimizes test article loss

Modular design

- Stackable tower design for 1 to 6 levels, up to 42 subjects
- Easily separates into manageable size pieces
- Simple to clean for quick turnaround between experiments

Buxco® Allay™ Restraint Exposure

Designed through customer collaboration, the patented Buxco Allay restraint secures the animal without compressing the thorax and keeps airways completely unobstructed. This is achieved by using a neck restraint clip positioned between the base of the skull and shoulders as compared to traditional plunger systems that compress the subject. Several sizes of the Allay neck restraint are provided to ensure comfortable restraint no matter the size of the animal.

Allay Restraint Exposure Chamber

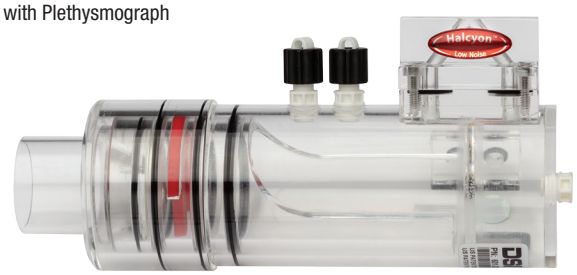
- Subjects positioned for normal breathing in a reduced stress environment
- Provides consistent placement of nose from subject to subject
- Restrainer provides better access to subject during exposure

Mouse Allay Restraint Exposure Chamber

Allay Plethysmograph

- Accurately measure respiratory parameters during exposure
- Record minute volume and rate, critical for determining amount of inhaled compound
- Ensure animal welfare with real-time respiratory monitoring

Mouse Allay Restraint Exposure Chamber with Plethysmograph



Accumulated Inhaled Aerosol (AIA)

By integrating real-time digital aerosol concentration with live respiratory parameters, FinePointe software calculates and reports each subject accumulated inhaled aerosol (AIA), also known as delivered dose (DD). This crucial parameter can be used in the following major study approaches:

- Ensures uniform delivery to the lung across all monitored subjects. This method reduces variability due to different animal breathing patterns and changes in aerosol concentration:
  - AIA reported live in numerical and graphical representation for each animal
  - Once target AIA is reached, the user can pull a subject off the tower without aerosol contamination, resulting in accurate exposure uniformity
- Produce AIA reports post-study. This method summarizes the different inhaled aerosol amounts and allows the researcher to make educated dose/effect conclusions:
  - Various reports automatically generated by FinePointe software
  - Longitudinal protocols available while tracking and accumulating subject AIA throughout study

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	8.471e-05	0.003798
00:05:29.70	109	0.2831	34.46	12.54	347	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

Illustration of AIA real-time report with calculation in FinePointe

Aerosol Generation Options

Aerogen nebulizer integration

- Single and multi-head options
- Fully integrated into study protocol yielding reproducible experiments
- Unique nebulizer efficiency calibration producing accurate, microprocessor controlled, aerosol delivery

Jet nebulizers

Metered Dose Inhalers (MDI)

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

Dust and powders

Traditional and electronic cigarettes

- Includes adaptators for JUUL and NJOY brands
- Compatible with various tobacco cigarettes
- Conforms to FDA approved puff regimen

Multi Nebulizer Configuration

MDI Aerosol Configuration

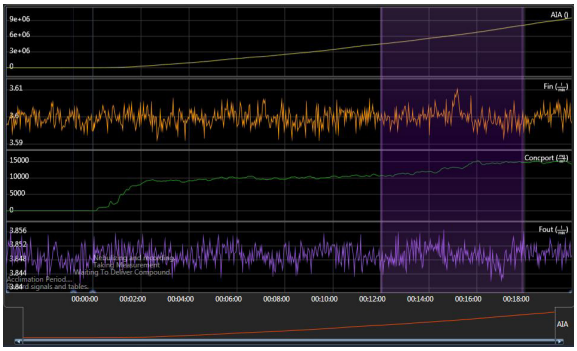
E-cig/vape generator with whole body exposure chamber

Environmental Measurements

- Aerosol concentration, digital and gravimetrical
- Particle size analysis, digital and gravimetrical
- O2/CO2 measurement, at breathing zone and chamber (tower inner core)
- Digital temperature and humidity at breathing zone and inlet air

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



Sample of inhalation parameters displayed in Finepointe

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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