

# CHEST

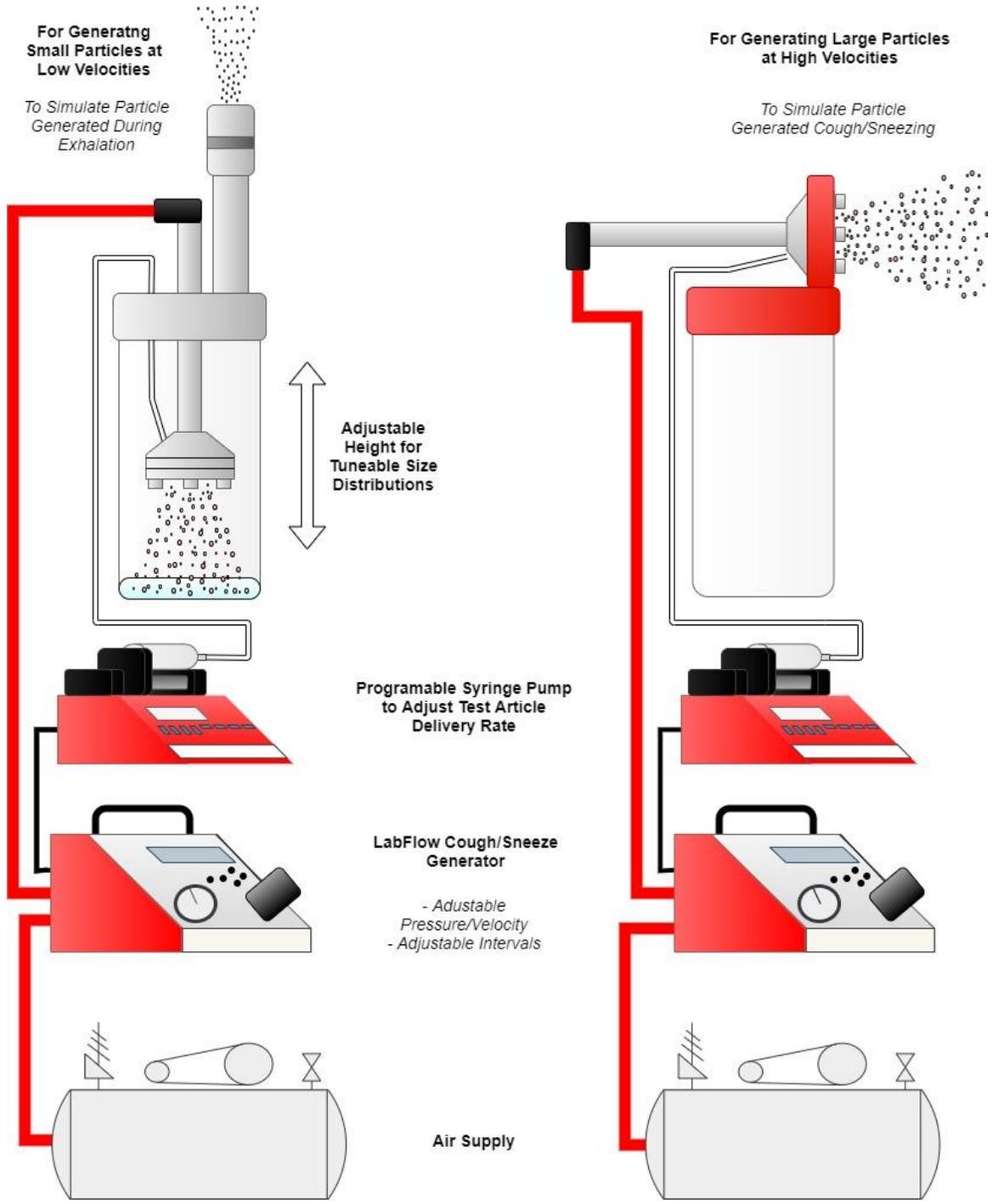
(Cough, Hack, and Sneeze Tool)



**Product Brochure**



**CH TECHNOLOGIES (USA), Inc.**



NOT TO SCALE:  
 Generator Enlarged for Detail

### **Description:**

The CHEST simulates conditions and particles produced during both respiratory exhalation and coughs/sneezes. The user inputs the length of the aerosol generation period and the interval in between generation. The syringe pump works with the system to deliver test article solution at programable feed rate. The system can also be set up to operate in gravity fed mode without the syringe pump. In this configuration the test article solution is gravity fed and controlled via a needle valve.

Typically, the particles produced during coughs or sneezes will be larger and at a higher velocity than particles produced when an individual is exhaling. To simulate both conditions the BLAM is placed either inside or outside of a jar to simulate aerosols generated during smooth exhalation or more forceful coughing and sneezing. When the atomizer is operated inside the jar (Respiratory Exhalation or Nebulizer Mode), the particle size distribution is altered, and the velocity of the particles exiting the exhaust is reduced. When the atomizer is operated outside the jar (Cough/Sneeze Mode), some of the particles may be as large as 10 microns, and the velocity can be adjusted to simulate actual coughs/sneezes.

The BLAM can be configured to generate aerosols into a large volume chamber or room or alternatively, it may be mounted into sanitary piping with the optional BLAM Sanitary Flange Adapter.

### **Features:**

- Simulates particles generated during normal respiration (exhalation) or coughing/sneezing.
- Automatic control of pneumatic actuation and test article (fluid) delivery.
- Adjustable sneeze/cough output and time interval between respiratory events.
- Adjustable output velocity to approximate actual coughs/sneezes.
- Standard configuration uses a 4 Jet Standard Flow BLAM; however the automation controller can be implemented on all BLAM configurations and can also be used to control the output of other devices such as the Collision Nebulizer or the Bio-Aerosol Nebulizing Generator (BANG).
- The selection of the generator type configuration depends on the combination of operational flow rate and mass/number output that the investigator is seeking to achieve.
- When paired with a syringe pump, the system can minimize waste of fluid material that could be lost in the time between aerosol generation events.

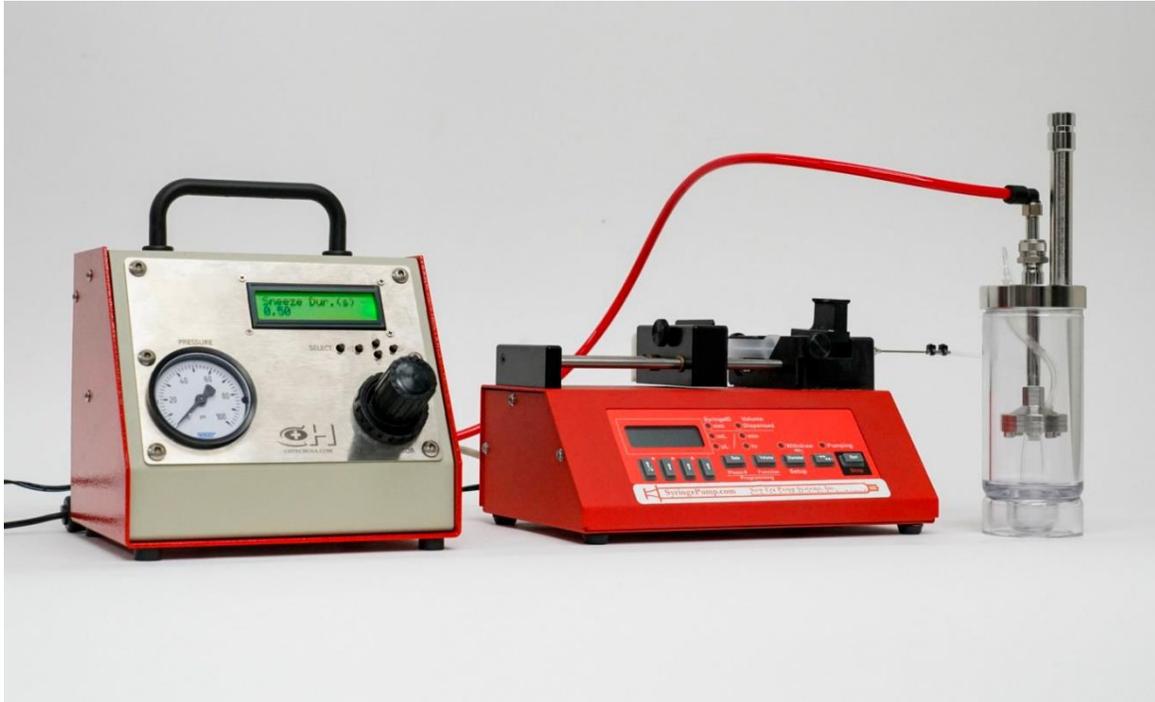


Figure 1: Syringe Fed Respiratory Exhalation Mode



Figure 2: Syringe Fed Cough/Sneeze Mode



Figure 3: Gravity Fed Respiratory Exhalation Mode



Figure 4: Gravity Fed Cough/Sneeze Mode



Figure 5: Syringe Fed Cough/Sneeze Mode Close Up

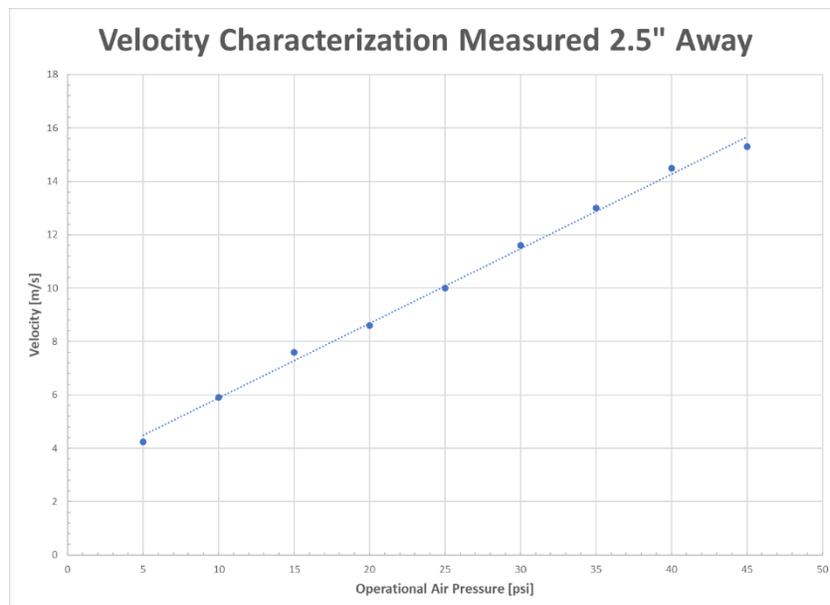


Figure 6: Velocity Characterization

## Specifications:

### **CHeST Control Unit**

Air Pressure Range: 0 – 100 [psi]  
Sneeze/Cough Duration: 0 – 2 [s]  
Sneeze/Cough Resolution: 100 [mS]  
Pause Interval Duration: 0 - ? [s]  
Pause Interval Resolution: 100 [mS]  
Power supply output rating: 12V DC @ 800 mA  
Dimensions: 6.75" x 5.75" x 7" (W x D x H)  
Weight: 3 lbs

### **Syringe Pump**

Syringe sizes: Up to 60 mL (140 mL partially filled)  
Number of syringes: 1  
Motor type: Step motor  
Motor steps per revolution: 400  
Microstepping: 1/8 to 1/2 depending on motor speed  
Advance per step: 0.2126  $\mu\text{M}$  to 0.8504  $\mu\text{M}$  depending on motor speed  
Motor to drive screw ratio: 15/28  
Drive screw pitch: 20 revolutions/"  
DC connector: 2.1 mm, center positive  
Voltage at DC connector: 12V DC at full load  
Amperage: 750 mA at full load  
Power supply output rating: 12V DC @ 800 mA  
Dimensions: 8.75" x 5.75" x 4.5" (W x D x H)  
Weight: 3.6 lbs

### **BLAM (Aerosol Generator)**

Flow Rate: 0.1 – 52 [Lpm]  
Operational Pressure: 0 – 90 [psi]  
Output Velocity: 5 – 28 [m/s]  
Size Distribution: Adjustable and Test Article Dependent  
Concentration Range: 0 – 22000 [ $\text{mg}/\text{m}^3$ ] depending on dilution ratio