

Variable Range Flow (VFC) Canopy

Exhausting of a Class II, Type A2 Biological Safety Cabinet (BSC)

While searching for that extra degree of safety in your laboratory or trying to remove fumes/gases from the laboratory environment NuAire has the proper canopy connections to exhaust your Class II, Type A2 Biological Safety Cabinet.

Canopy Exhaust Transitions

Canopy Transitions provide an air gap between the exhaust efflux of the BSC and the transition. The air gap essentially insulates the BSC from potential variations of airflow in the facility exhaust system, particularly if multiple BSC's are connected to the same exhaust blower system.

NuAire's VFC employs adjustable slide plates **[A]** to vary slot height corresponding to the amount of room exhaust volume desired. Upon canopy low flow or loss of exhaust, the integrated airflow monitor **[B]** will provide both an audible and visual alarm, and then energize a DC solenoid **[C]** opens the front panel allowing the BSC inflow to be maintained at NSF recommended inflow velocities.



VFC Integration into a Laboratory Mechanical Design

Traditionally, exhaust canopies using a fixed slot area provided a fixed exhaust volume requirement that was added to the cabinet exhaust volume for the total exhaust volume requirement used for the laboratory mechanical design. However, now the VFC has variable slot areas, so the exhaust requirement that is added to the cabinet exhaust volume for the total exhaust volume requirement is also variable for the laboratory mechanical design.

With the VFC offering a range of exhaust volume possibilities, the question becomes, what exhaust volume should be designed into the laboratory mechanical system? Traditionally, exhaust canopies were designed to exhaust approximately

25% more air volume than the cabinets exhaust volume. The VFC now can be used with as little as 5% more or up to 100% more in some cases depending upon cabinet size. The answer to the above question becomes one of what produces the optimal mechanical design. Laboratory size, pressure, air change rate, heat load and other exhausting devices can all have an impact on the designed exhaust volume of the VFC.

If it is found that there is not a specific exhaust requirement, then it is suggested to use a target canopy air volume (i.e. 100 cfm plus cabinet exhaust volume) that offers the ability for on-site adjustment (slot area on canopy) for optimal capture velocity (i.e. 200 fpm). If energy efficiency is desired, then use the minimum canopy air volume (i.e. 25 cfm plus cabinet exhaust volume).

The real benefit of the VFC is the adjustability both through the design and installation phases. It will provide the mechanical designer flexibility to specify to the optimal exhaust flow volume for the application. It will also let the installer/certifier field adjust to assure the proper capture slot velocity.



◀ CellGard ES (Energy Saver) NU-480-400 Class II, Type A2 Biological Safety Cabinet outfitted with Variable Range Flow (VFC) Canopy NU-911-400 and manual AireValv stainless steel butterfly valve NU-940-010.



Variable Range Flow (VFC) Canopy

The characteristics of VFC Canopy are as follows:

- Preserves airflow balance within the BSC in a simple dependable manner.
- Has a front service panel to permit exhaust HEPA filter integrity checks.
- Simplifies exhaust system design.
- Provides the adjustability for the amount of laboratory air exhausted whether more for general exhaust or to limit loss of conditioned air for greater energy efficiency.
- Integrated audible and visual low exhaust alarm.
- Provides a safety operational tolerance range for normal exhaust system fluctuations.

Performance Specifications

To apply the VFC to a BSC and design the exhaust properly, additional information required is provided below. The tables are expressed in nominal values meaning where the systems should be set up to run. However, due to field variables, NuAire suggests sizing the exhaust systems with excess capability. A 5% increase over the nominal volume and static pressure requirements will assure a properly operating system.

NU-911 Exhaust Flow Volume

NuAire BSC Model	Work Access Opening Inches (mm)	Nominal Inflow CFM 105 FPM CMH (.53 m/s)	Air Gap CFM (CMH)	Total Nominal Volume Range CFM (CMH)
NU-475 / 477 / 480-300	8 (203)	200 (340)	25 to 250 (43 to 425)	225 to 450 (383 to 765)
NU-475 / 477 / 480 / 481-400	8 (203)	270 (459)	25 to 250 (43 to 425)	295 to 520 (502 to 884)
NU-475 / 477 / 480 / 481-400	10 (254)	338 (575)	25 to 250 (43 to 425)	363 to 588 (617 to 1000)
NU-475 / 477 / 480 / 481-500	8 (203)	340 (578)	25 to 250 (43 to 425)	365 to 590 (621 to 1003)
NU-475 / 477 / 480 / 481-500	10 (254)	426 (724)	25 to 250 (43 to 425)	451 to 676 (766 to 1149)
NU-475 / 477 / 480 / 481-600	8 (203)	411 (697)	25 to 250 (43 to 425)	436 to 661 (741 to 1124)
NU-475 / 477 / 480 / 481-600	10 (254)	513 (872)	25 to 250 (43 to 425)	538 to 763 (915 to 1297)

NU-921 Exhaust Flow Volume

NuAire BSC Model	Work Access Opening Inches (mm)	Nominal Inflow CFM 105 FPM CMH (.53 m/s)	Air Gap CFM (CMH)	Total Nominal Volume Range CFM (CMH)
NU-425 / 437 / 440-300	8 (203)	200 (340)	25 to 250 (43 to 425)	225 to 450 (383 to 765)
NU-425 / 437 / 440-400	8 (203)	270 (459)	25 to 250 (43 to 425)	295 to 520 (502 to 884)
NU-425 / 437 / 440-400	10 (254)	338 (575)	25 to 250 (43 to 425)	363 to 588 (617 to 1000)
NU-425 / 437 / 440-500	8 (203)	340 (578)	25 to 250 (43 to 425)	365 to 590 (621 to 1003)
NU-425 / 437 / 440-500	10 (254)	426 (724)	25 to 250 (43 to 425)	451 to 676 (766 to 1149)
NU-425 / 437 / 440-600	8 (203)	411 (697)	25 to 250 (43 to 425)	436 to 661 (741 to 1124)
NU-425 / 437 / 440-600	10 (254)	513 (872)	25 to 250 (43 to 425)	538 to 763 (915 to 1297)
NU-629-400	12 (305)	406 (690)	25 to 250 (43 to 425)	431 to 656 (733 to 1115)
NU-629-500	12 (305)	511 (876)	25 to 250 (43 to 425)	536 to 761 (911 to 1294)
NU-629-600	12 (305)	616 (1047)	25 to 250 (43 to 425)	641 to 866 (1090 to 1473)

NuAire offers a Variable Flow Canopy to meet most installation requirements.

- **NU-911 for CellGard ES** - offers an air gap exhaust volume range from 25 to 250 cfm (43 to 425 cmh) with a corresponding exhaust static requirement of .05 to .20" w.g. (1.3 to 5.0 mm w.g.)
- **NU-921 for LabGard ES** - offers an air gap exhaust volume range from 25 to 250 cfm (43 to 425 cmh) with a corresponding exhaust static requirement of .05 to .20" w.g. (1.3 to 5.0 mm w.g.)



Cabinet Width	Collar Diameter	Part Number
3 ft. (0.9 m)	8 in. (203 mm)	NU-9xx-300*
4 ft. (1.2 m)	10 in. (254 mm)	NU-9xx-400*
5 ft. (1.5 m)	10 in. (254 mm)	NU-9xx-500*
6 ft. (1.8 m)	10 in. (254 mm)	NU-9xx-600*

