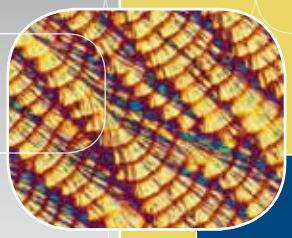


Frontier® ACELA™

Frontier Acela® High Performance Fume Hood, (vertical sash shown), Model EFA-4UDRVW-8. (Shown with EBA-4UDG-0)

Green Product

High Performance Fume Hood

Laminar Topography and Perfect Protection Perimeter

ESCO

WORLD CLASS. WORLDWIDE.

TABLE OF CONTENTS

About Esco

Since Esco was founded in 1978 our company has earned a reputation for innovation in the worldwide laboratory equipment and pharmaceutical equipment industry. Today, Esco has emerged as a market leader in containment, clean air, pharmaceutical, and laboratory equipment technologies with active sales in more than 100 countries and direct company offices in the top ten geospecific markets.

From our headquarters in Singapore, Esco directs a highly efficient research, product development, manufacturing and customer service program. We are the only company in our market that is completely configured to export most of what we manufacture.

Our many languages and cultures, customs and traditions, and modern business management techniques blend into a single effort focusing on customer service, one customer at a time. As you learn more about Esco, you will understand why World Class. Worldwide. is more than a phrase. It's part of who we are, where we are from and where we are going.

World-Class Test Facility

Esco is proud to be one of the few manufaturers in the world with a test facility capable of testing hoods to both ASHRAE 110-1995 (US) and the EN14175-3 (European) standards. Esco's Fume Hood Test Laboratory was designed with the assistance of Tintschl Engineering AG, a specialist consulting firm from Germany. It has controlled relative humidity, room temperature and pressure for optimum test conditions. Esco is also one of the few companies to routinely sample and subject production fume hoods to a battery of containment and safety tests. All custom fume hoods with modified dimensions are also tested in our laboratory to ensure containment before delivery.

A Complete Range

Frontier Acela® is the world's first high performance / low flow fume hood product range with an ergonomically angled front. Frontier Acela is available in Benchtop, Perchloric Acid, Radioisotope, Acid Digestion and Floor Mounted configurations, in a wide range of widths, with a full range of options and accessories.

American Standard ASHRAE 110-1995

The ASHRAE 110-1995 standard is a comprehensive method for evaluating the operator safety of fume hoods by determining quantitatively and repeatably how well the fume hood contains vapors released in the workzone. First published in 1985 and extensively revised in 1995, this standard employs a set of rigorous tests to evaluate hood performance:

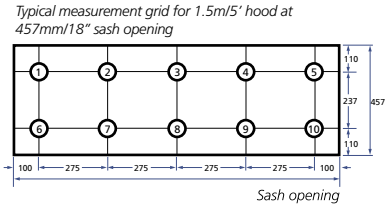
1. Airflow Visualization

- Local and gross airflow visualization tests conducted to observe airflow patterns inside work chamber

Grading	Observations
Fail	Smoke observed escaping from the hood
Poor	Reverse flow of smoke near opening Lazy flow into opening along boundary Observed potential for escape
Fair	Some reverse flow, not necessarily at opening No visible escape
Good	No reverse flows Active flow streams into hood around boundary

2. Face Velocity Measurements

- Face velocity and uniformity tested at 100% and design sash opening position



3. Tracer Gas Containment

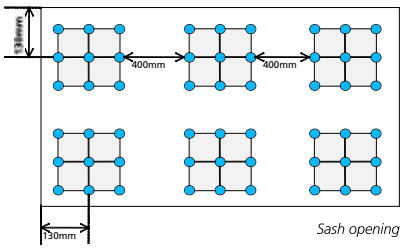
- Tracer gas containment test: SF6 released at 4L/min inside work chamber
- Consists of 3 parts
  - Static gas leak conducted at 3 positions (left, right, centre)
  - Face hood surface scan
  - Sash movement effect
- Test criteria: leakage of less than 0.05ppm as-manufactured

European Standard EN 14175

EN 14175 is a harmonized European standard which supercedes the former national standards of Germany, the UK and France. A key element of the EN 14175, which is not present in the American ASHRAE 110 standard, is the robustness test, which simulates airflow disturbance in front of the hood.

1. Inner Grid Test

- A set of 9 sampling tubes are arranged in a 3 x 3 grid, at a distance of 30 mm from the measurement plane
- Leakage will be measured at 6 different grid positions

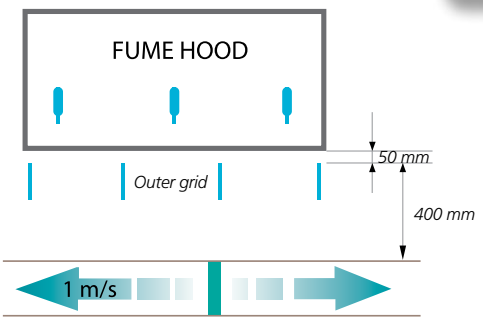


2. Outer Grid Test

- Outer grid testing measures the leakage of tracer gas across the entire sash opening
- Sash is closed then opened during the test to investigate dynamic effect of sash movement

3. Robustness Test

- For the robustness test, a 0.4 x 1.9 m plate crosses the front of the fume hood at 1 m/s for 6 times
- Provides an indication of the sensitivity of the fume hood towards external disturbances



Energy Efficiency

Fume hoods — essential safety devices used in laboratory environments — are highly energy-intensive, each one consuming more energy than three homes in an average U.S. climate. Depending on climate and system design, estimated energy costs for fume hoods range up to **US$9000 annually**[1], based on face velocities of 0.5m/s (100fpm) at full sash open position for a 1.8m (72.0") hood.

Variable Air Volume (VAV) is one of the various approaches presently employed to reduce hood energy consumption. The table below compares conventional hoods, VAV hoods, and the Esco Frontier Acela® High Performance Low Flow Hood.

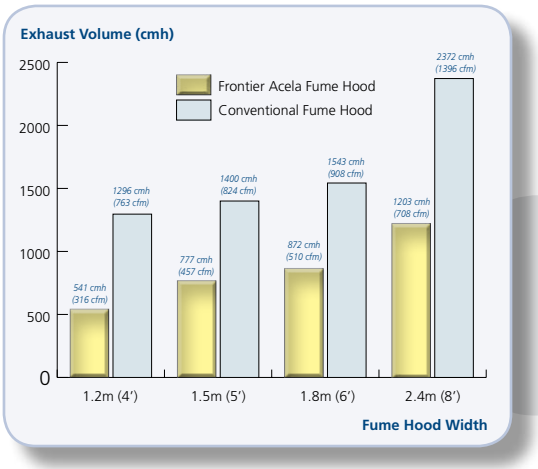
	Conventional Fume Hood	Variable Air Volume (VAV) Fume Hood	High Performance Low Flow Fume Hood
Working Principle	0.5 m/s (100 fpm) @ full open sash position	0.5 m/s (100 fpm) @ all sash positions with sophisticated control system	0.3 m/s (60 fpm) @ 457 mm (18") sash opening using advanced aerodynamic designs
Initial Cost	Low	High	Medium
Running Cost	Very High	Medium (VAV Maintenance)	Low
Ease of Installation, Commissioning and Maintenance	Easy	Difficult	Easy

[1] *Energy use and savings potential for laboratory fume hoods, Evan Mills, Dale Sartor; Energy, 2003*

Green Product

Compared with conventional hoods, Esco Frontier Acela® operates safely at 0.3 m/s (60 fpm) at 457 mm (18.0") or full open sash position while maintaining excellent ASHRAE and EN containment. Exhaust volume reductions of up to 58% may be achieved without compromising safety. **This translates into an annual operating cost savings of up to US$5600**. Unlike VAV systems the Esco Frontier Acela® is easy and inexpensive to install, commission and maintain.

Fume Hood Width	Exhaust Volume		% Reduction in Exhaust Volume
	Frontier Acela® 0.3 m/s (60 fpm) @ 457 mm (18")	Conventional Fume Hood 0.5 m/s (100 fpm) @ full sash open	
1.2m (4')	541 cmh (316 cfm)	1296 cmh (763 cfm)	58%
1.5m (5')	777 cmh (457 cfm)	1400 cmh (824 cfm)	44%
1.8m (6')	872 cmh (510 cfm)	1543 cmh (908 cfm)	43%
2.4m (8')	1203 cmh (708 cfm)	2372 cmh (1396 cfm)	49%



Benefits For All Stakeholders

Health and Safety Authorities

- ASHRAE 110 and EN 14175 tested at face velocities down to 0.3m/s (60fpm)
- UL1805 Listed
- Sash-lock and creep-down mechanisms ensure operator safety
- Optional Sentinel XL Airflow Monitor

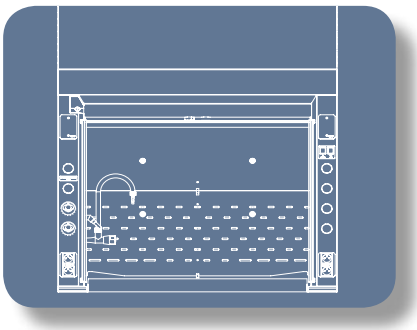
Facility Owners

Energy Efficient

- Operates at 0.3 m/s (60 fpm) at 457 mm (18.0") operating height
- Energy savings of up to US$5600 annually for each fume hood

Lab Personnel

- Certified safety
- Precisely-tuned aerodynamics
- High sight line
- Angled front
- Excellent ergonomics



Lab Designers and Architects

- Neutral color scheme
- Futuristic design
- Detailed architectural specifications and drawings

Installation and Service Personnel

- Robust tri-wall side pan construction
- Factory-fitted service fixtures are pre-plumbed
- Chain and sprocket sash
- Wide range of field-installed accessories

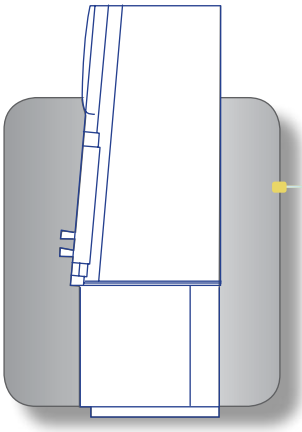
Frontier Acela® High Performance Fume Hood
Laminar Topography and Perfect Protection Perimeter

Chain and Sprocket Sash Support System

Large arbor sprockets and chain drive make sash travel quiet and effortless.

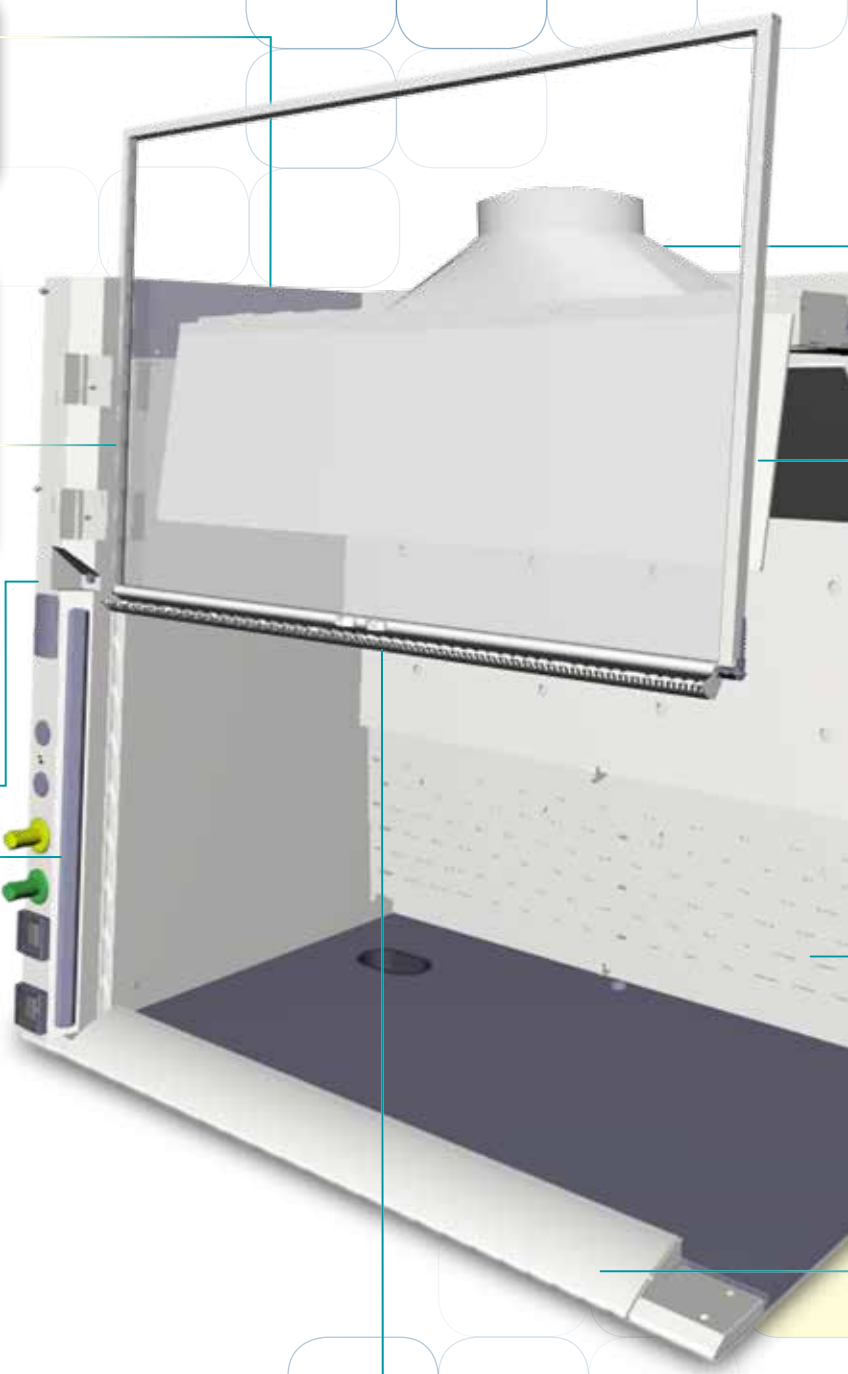
High Sight Line

High sight line of 1803 mm (71.0") coupled with an automatic lowering function combines safety and convenience.



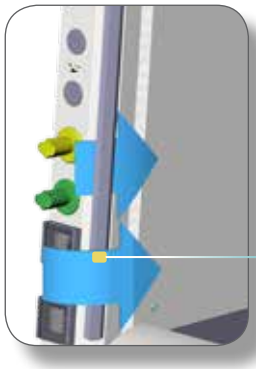
Perfect Pitch Profile

Ergonomics, safety and aesthetics all come together with the 5° pitch of the face.



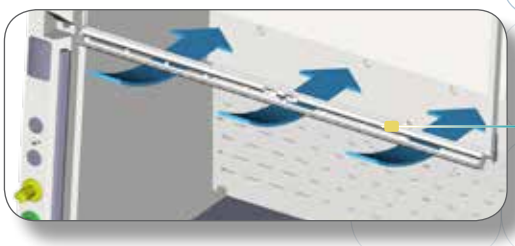
Acela® Shaping Vanes

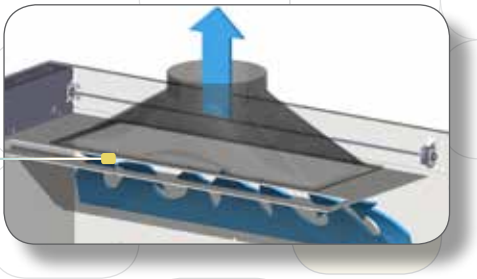
Increase airflow "sweep" at the critical area at the side walls to improve containment, especially when laboratory traffic disrupts airflow in front of the hood.



Ergonomic Sash Handle

Gently directs air into the hood without sacrificing visibility.



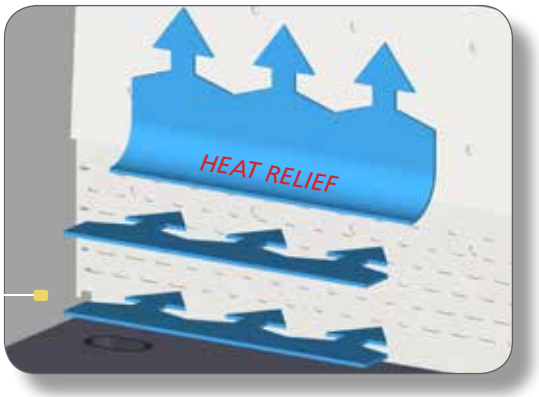


Tapered Fiberglass Exhaust Collar

Transitions exhaust air quietly and enhance airflow uniformity.

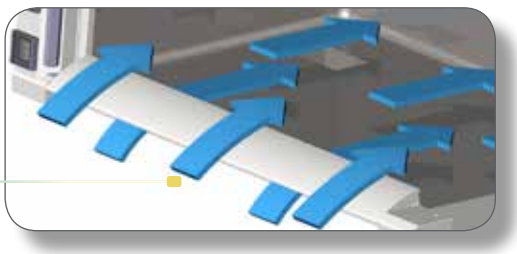
Functionally Robust Bypass

The unique design provides a robust stream of bypass air into the hood cavity.



Hot Zone Baffles

The unique Hot Zone Baffles draw most contaminants back in single pass displacement of the air. Thermal Heat Relief is quickly achieved.



Aerodynamic Foil Entry

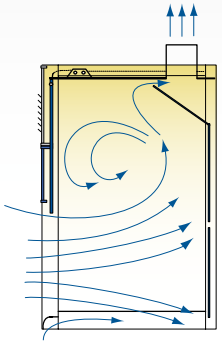
Provides maximum airflow "sweep" on the critical boundary layer near to the work surface level to reduce turbulence and eliminate backflow.

Computational Fluid Dynamics

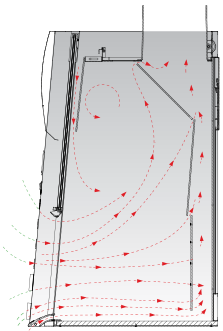
Computational Fluid Dynamics (CFD) modelling is employed in the development of Esco clean air and containment devices. Laminar Topography™ on Frontier Acela® Fume Hoods was developed with computational fluid dynamics modelling in the Esco Research and Development Center. The main thrusts of the project were improved airflow uniformity, enhanced safety, reduction in noise levels, and energy consumption.

First, engineering teams conceptualized possible designs, and, instead of building physical models, utilized CFD to simulate airflow patterns, pressurizations and visualize possible areas of turbulence. This allowed a large number of iterations of the airfoil, sash handle, baffle, bypass and exhaust collar to be evaluated. Finally, physical prototypes were constructed, tested, and the best design combination selected for production.

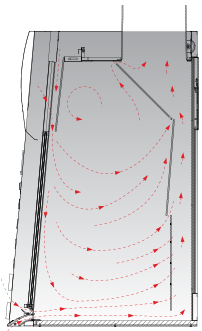
CFD has allowed us to effectively reduce the vortex in conventional fume hood designs to the minimum, resulting in a safe yet energy-saving fume hood design.



Conventional Fume Hood



Frontier Acela® High Performance Low Flow Fume Hood (Design Opening)



Frontier Acela® High Performance Low Flow Fume Hood (Full Close)

	Chemical Fume Containment	Electrical Safety
Standards Compliance	ANSI/ASHRAE 110-1995, USA EN 14175, Europe	CAN/CSA-22.2, No.61010-1 EN-61010-1, Europe IEC-61010-1, Worldwide

Safety Certified and Tested

All Esco fume hoods are manufactured for the most demanding laboratory applications.

- Independently tested and certified (4ft, 5ft and 6ft models) by Tintschl Engineering AG to the European Standard EN 14175-3.
- Independently tested and certified by Exposure Control Technologies, Inc. to the American Standard ASHRAE 110.
- UL1805 Listed
- Ergonomic design features combine to create a more comfortable work environment, which promotes safety by enabling the user to concentrate on his / her work.
- Hoods are ASHRAE tested on the production line on a sampling basis (industry exclusive).
- Sash is clearly labeled with all operating instructions and illustrations.

Superstructure

- Tri-wall construction for maximum robustness.
- Fabricated of electro-galvanized steel (zinc coated to prevent rusting even if the powder coat is abraded, and phosphate for better adhesion of the powder coating).
- Epoxy-polyester hybrid Isocide™ antimicrobial powder coating provides long term chemical, abrasion and weathering resistance.
- The pan type design from a single piece of steel (unlike frame welded designs) is easier to assemble on site, and more robust for long-term usage.

Aesthetics and Ergonomics Design

- Perfect Pitch Profile™. The gentle pitch of the hood enhances visibility and enables users to work further into the hood without strain.
- A tall sight line creates a bright, airy work space.
- Coordinated color scheme (neutral white with light grey accents) blends the hood with any casework, metal or wood.
- Color temperature is tuned to provide a gentle, bright (but not harsh) and comfortable work environment for the user.
- Ergonomic design on the Esco Frontier Acela® is anthropometrically proven.
- Hood lighting is pre-wired. Lighting is electronically ballasted, energy efficient, instant start. Typical light intensity on work surface is >1076 lux (>100 foot candles) in zero ambient conditions.

Additional Safety Features

- Sash stop limits sash movement beyond 457 mm (18.0”), ‘encouraging’ user to work at safe positions.
- When sash is raised above 457 mm (18.0”), it will automatically and gently fall back to the safe level (Esco's creep-down mechanism) unless held in place. This enables the sash to be raised temporarily to the full open position for set up of equipment and apparatus in hood, while enforcing regular operation of the hood with a lowered sash.

- Sash creep down can only be disabled with a key, which permits the laboratory manager or safety officer to restrict operation of the hood at sash openings above 457 mm (18.0”).
- The sash can also be locked down in the fully closed position with the key, in the event of a fume hood fault, facility shutdown, or, simply to restrict access to equipment set up in the hood.
- Fluorescent light casing is not secured, acting as an explosion relief, allowing upward pressure release during explosions, maximizing user safety.

General Specifications, Frontier Acela® Fume Hood

Model			EFA-4UDR_W-_	EFA-5UDR_W-_	EFA-6UDR_W-_	EFA-8UDR_W-_
Nominal Size			1.2 meters (4')	1.5 meters (5')	1.8 meters (6')	2.4 meters (8')
External Dimensions (W x D x H)			1220 x 900 x 1521 mm 48.0" x 35.4"x 59.9"	1525 x 900 x 1521 mm 60.0" x 35.4"x 59.9"	1830 x 900 x 1521 mm 72.0" x 35.4"x 59.9"	2440 x 900 x 1521 mm 96.0" x 35.4"x 59.9"
Internal Dimensions * (W x D x H)			996 x 675 x 1230 mm 39.2" x 26.6"x 48.4"	1301 x 675 x 1230 mm 51.2" x 26.6"x 48.4"	1606 x 675 x 1230 mm 63.2" x 26.6"x 48.4"	2210 x 675 x 1230 mm 87.0" x 26.6"x 48.4"
Maximum Sash Opening			740 mm (29.1")			
Exhaust Volume/ Static Pressure Required	Face Velocity	Sash Opening				
	0.3 m/s (60 fpm)	457 mm (18.0")	541 cmh @ 14.3 Pa 316 cfm @ 0.06" WG	777 cmh @ 14.6 Pa 457 cfm @ 0.06" WG	872 cmh @ 19.9 Pa 510 cfm @ 0.08" WG	1203 cmh @ 14.2 Pa 708 cfm @ 0.06" WG
	0.4 m/s (80 fpm)	457 mm (18.0")	721cmh @ 19.7 Pa 424 cfm @ 0.08" WG	942 cmh @ 23.7 Pa 554 cfm @ 0.10" WG	1163 cmh @ 28.8 Pa 684 cfm @ 0.12" WG	1604 cmh @ 26.4 Pa 944 cfm @ 0.11" WG
	0.5 m/s (100 fpm)	457 mm (18.0")	901 cmh @ 31.8 Pa 530 cfm @ 0.13" WG	1177 cmh @ 34.7 Pa 692.8 cfm @ 0.14" WG	1453 cmh @ 41.8 Pa 855 cfm @ 0.17" WG	2005 cmh @ 32.3 Pa 1180 cfm @ 0.13" WG
	0.3 m/s (60 fpm)	Full	899 cmh @ 22.1 Pa 526 cfm @ 0.09" WG	1175 cmh @ 28.7 Pa 691 cfm @ 0.12" WG	1450 cmh @ 36.1Pa 848 cfm @ 0.15" WG	1819 cmh @ 27.3 Pa 1070 cfm @ 0.11" WG
	0.4 m/s (80 fpm)	Full	1199 cmh @ 36.7 Pa 701 cfm @ 0.15" WG	1556 cmh @ 49.3 Pa 922 cfm @ 0.20" WG	1933 cmh @ 61.4 Pa 1138 cfm @ 0.25" WG	2668 cmh @ 48.3 Pa 1570 cfm @ 0.19" WG
	0.5 m/s (100 fpm)	Full	1499 cmh @ 66.6 Pa 877 cfm @ 0.27" WG	1958 cmh @ 76.6 Pa 1152 cfm @ 0.31" WG	2197 cmh @ 94.7 Pa 1285 cfm @ 0.38" WG	3335 cmh @ 74.3 Pa 1962 cfm @ 0.30" WG
Exhaust Outlet Diameter			305 mm (12.0")			
Number of Exhaust Collars			1	1	1	2

** When sash is in full open position, total height of fume hood is 1644mm/ 64.7".Please ensure sufficient ceiling height clearance is available.*

Guide to Models

EFA-4U D R V W-8

External Width Code		Internal Depth Code		Internal Liner Code		Sash Type		Color Code		Electrical Code	
1220 mm (48.0")	**4U**	900 mm (35.4")	**D**	Esco Resinate	**R**	Vertical	**V**	Esco White	**W**	230V, AC, 50/60Hz	**8**
1525 mm (60.0")	**5U**			Esco Resinate Plus	**U**	Combination*	**C**			110-120V, AC, 50/60Hz	**9**
1830 mm (72.0")	**6U**										
2440 mm (96.0")	**8U**										

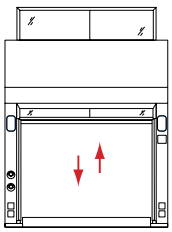
** Combination Sash not available for EFA-8UDR_W-_ model.*

Serviceability

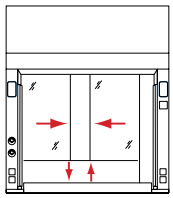
- Baffles remove to allow cleaning inside the hood.
- Internal access panels on side walls facilitate access to plumbing connections for service, especially when hoods are installed next to each other.
- Removable front panel facilitates easy access to lighting and other electrical components mounted above the hood work chamber.
- Chain and sprocket sash system requires minimal service.

Warranty

The Frontier Acela® High Performance Fume Hood is warranted for 1 year excluding consumable parts and accessories. Contact your local sales representative for specific warranty details.



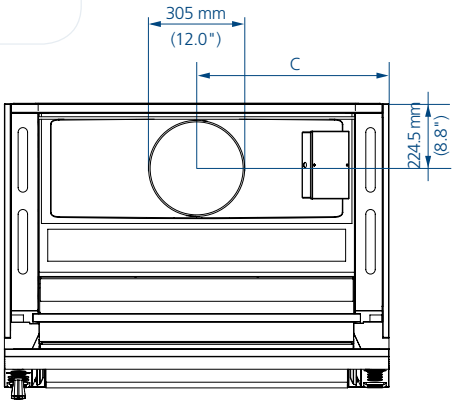
Vertical sashes provide for full face opening.



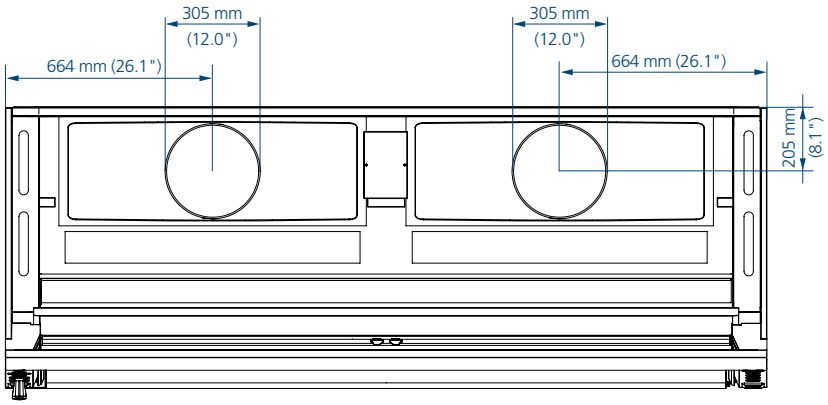
Combination vertical and horizontal sashes enable full face opening for loading and set up, while allowing the operator to restrict the maximum opening of the face, but allow access to the top interior of the hood.

Model EFA, Frontier Acela® Fume Hood Technical Specifications

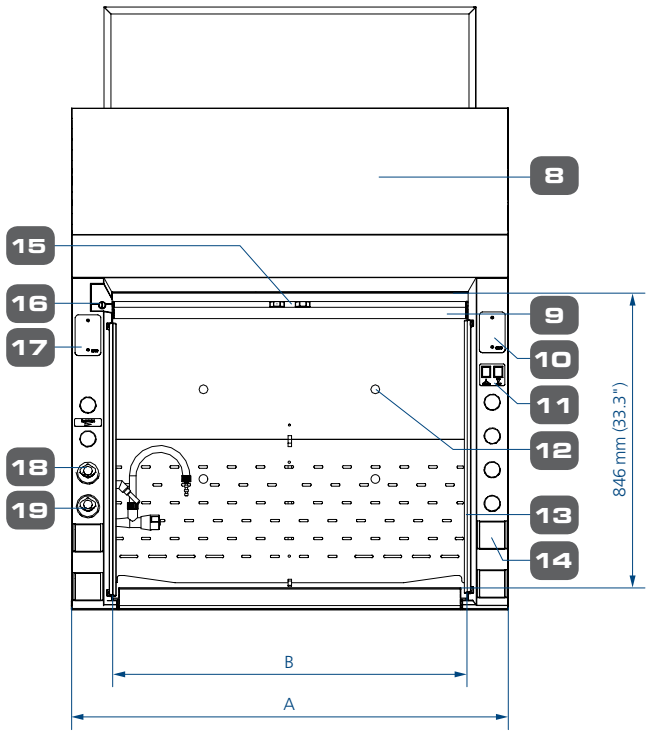
Top View
(for EFA-4UDR_W-_, EFA-5UDR_W-_, EFA-6UDR_W-_)



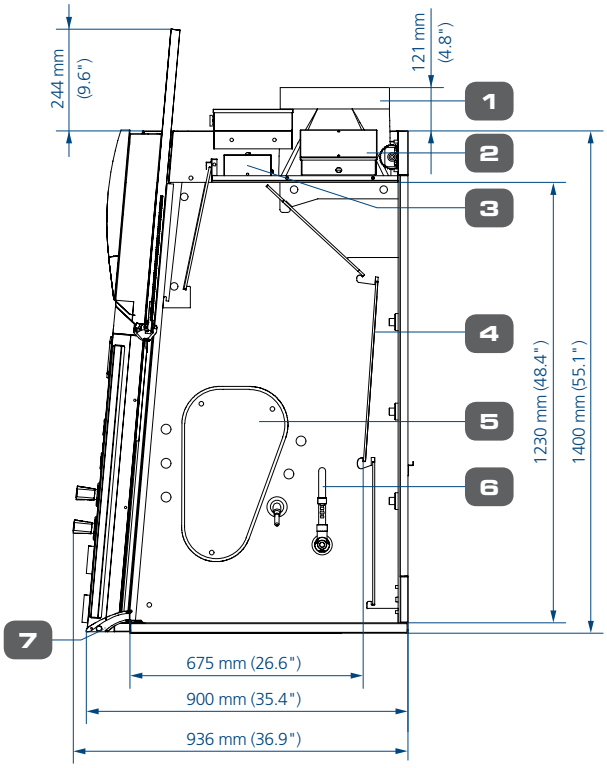
Top View
(for EFA-8UDR_W-_)



Front View



Side View



1. *Fiberglass exhaust collar*
2. *Electrical junction box*
3. *Light housing*
4. *Removable baffle*
5. *Side access panel*
6. *Swan-neck water faucet*
7. *Flash airfoil, hinged for cleaning, spillage containment 0.4 Litres/0.1 gallons*
8. *Removable front panel*
9. *Tempered laminated framed sash glass*
10. *Provision for airflow alarm hinged airfoil*
11. *Light and fan switch*
12. *Distillation grid provision*
13. *Side vane*
14. *Electrical outlets*
15. *Sash stop*
16. *Sash keylock (lock sash at fully open and fully close)*
17. *Provision for additional outlets*
18. *Gas fixture remote*
19. *Cold water fixture remote*

Fume Hood Dimensional Data

Model	A	B	C
EFA-4UDR_W-_	1220 mm (48.0")	996 mm (39.0")	610 mm (24.0")
EFA-5UDR_W-_	1525 mm (60.0")	1301 mm (51.0")	763 mm (30.0")
EFA-6UDR_W-_	1830 mm (72.0")	1606 mm (63.0")	915 mm (36.0")
EFA-8UDR_W-_	2440 mm (96.0")	2210 mm (87.0")	664 mm (26.0")

Fume Hood Installation Requirements

- Proper location (refer to Esco recommendations)
- Exhaust system capable of delivering airflow and pressure drop requirements
  - Exhaust ductwork and connection accesories
  - Exhaust blower (or building exhaust system)
  - Contactor (if applicable)
  - Means of adjusting exhaust flow (damper or frequency inverter)
- Sufficient laboratory supply air
- Base cabinet or other means of support
- One set of filler panels for each continuous row of hoods
- Plumbing and electrical hook-up
- Unless otherwise specified, items and services specified above are not provided by Esco

Options and Accessories

Esco offers a variety of options and accessories to meet application requirements.

- All Frontier Acela® Fume Hoods include 1 water and 1 gas Enhanz™ remote-controlled fixture plumbed to the top of hood and and 4 single outlets standard. (Specify outlet code when ordering)

Electrical Outlets

4 single outlets per fume hood.

EO – D **A**

Electrical Supply Code	Electrical Outlets	Electrical Supply Code	Electrical Outlets
A		H	
C		I	
D		J	
E		GFCI	
F		UNI	
G			

Enhanz™ Service Fixtures

Remote control service fixtures for fume hoods, pre-plumbed. Up to 8 service fixtures per fume hood.

SFA – **E** **W**

Style
E : European

Utility
W : Water
G : Gas
V : Vacuum
N : Nitrogen
O : Oxygen
C : Compressed Air
A : Argon
HW : Hot Water
CO2 : Carbon Dioxide
DI : Deionised Water

Sentinel•XL™ Airflow Alarm Kit

Real-time digital display of face velocity. Audible and visual alarms.

SXL – EFA

Distillation Grids

Scaffoldings to support clamps for distillation apparatus.

DG – **4U** **S**

External Width
4U: 1220mm (48")
5U: 1525mm (60")
6U: 1830mm (72")
8U: 2440mm (96")

Material
S : Stainless steel

Drip-Cups

SPP – DC

Material
SPP : Polypropylene
SIC : Ceramic,
Only For Ceramic Work Tops

Work Tops

WT – **4U** **D** **R** – **0**

External Depth
D: 900 mm

External Width
4U: 1220mm (48")
5U: 1525mm (60")
6U: 1830mm (72")
8U: 2440mm (96")

Material
R : Trespa TopLab Plus
E : Epoxy
C : Ceramic
4 : SS304
6 : SS316

Drip-Cup Cut-Out Position
0 :
1 :
2 :
3 :

Fume Hood Work Surface Selection

Esco offers 5 types of fume hood work surfaces for different applications

Type	SS304	SS316	Trespa TopLab Plus Phenolic Resin	Epoxy	Ceramic
Chemical Resistance	Good	Better	Better	Better	Best
Temperature Resistance	Better (300°C)	Better (300°C)	Good (110°C)	Good (165°C)	Best (1200°C)
Cost	Low Price	Mid Price	Mid Price	Mid Price	Premium

Frontier Acela® Base Cabinetry (EBA)

Safety Certified and Tested

- Built and tested according to SEFA-8 recommended practices.

Superstructure

- Fabricated of electro-galvanized steel (zinc coated to prevent rusting even if the powder coat is abraded, and phosphated for better adhesion of the powder coating).
- Epoxy-polyester hybrid Isocide™ antimicrobial powder coating provides long term chemical, abrasion and weathering resistance.
- Ships unassembled, assembles rapidly on site.

Aesthetics and Ergonomics Design

- Concealed door hinges.
- Soft-close insulated doors.
- Adjustable shelf allows user to select optimum heights for upper and lower storage compartments.

Serviceability

- Convenient access to levelers from inside base cabinet.
- Removable rear access panel facilitates installation and maintenance of plumbing and drainage systems.

Options and Accesories

- MCB/ELCB
  - Protects laboratory equipment during sudden fluctuation of current.
  - Fume hood circuit protection.
  - Only applicable to 230V, AC, 50/60Hz hoods.
  - Factory-installed; specify when ordering.
- Ventilation Kit (VK-EBA)
  - Ventilates base cabinet utilizing the hood exhaust system.
  - Field-installed.
- Filler Panel (FP-EBAD)
  - One set of filler panels required per continous row of hoods.
  - Field-installed

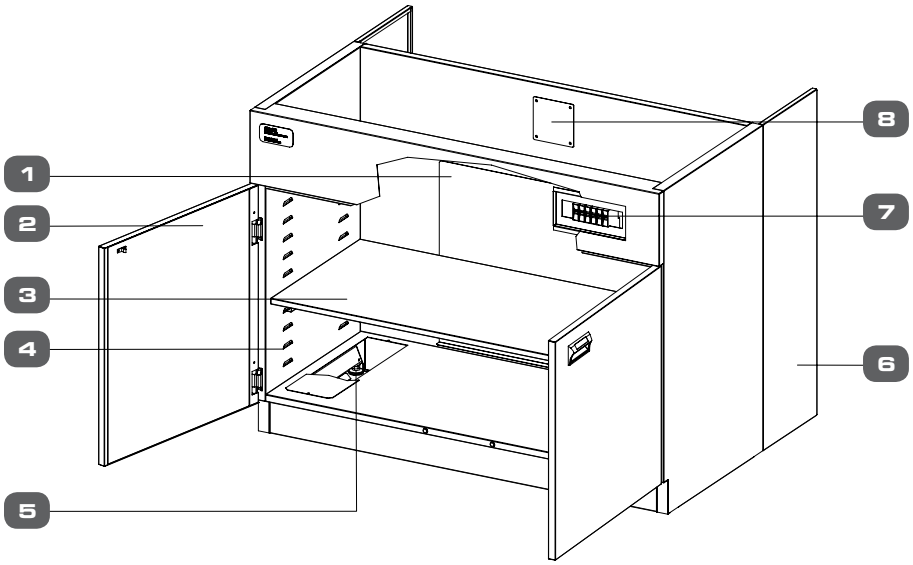
SEFA-8 Test on Frontier Acela® Base Cabinet (EBA)

No.	Type of Test	Test Result
1	Cabinet load test	PASS
2	Cabinet concentrated load test	PASS
3	Cabinet torsion	PASS
4	Cabinet submersion test	PASS
5	Door hinge test	PASS
6	Door impact test	PASS
7	Door cycle test	PASS
8	Chemical spot test	PASS
9	Hot water test	PASS
10	Impact test	PASS
11	Paint adhesion on steel	PASS
12	Paint hardness on steel	PASS

Door Hinge Test

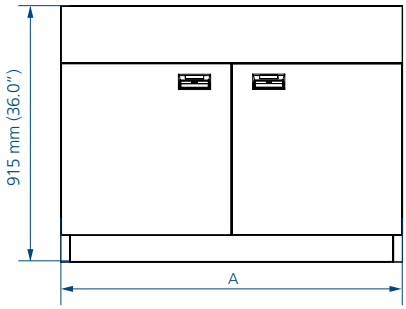
Cabinet Load Test

Model EBA, Frontier Acela® Base Cabinet Technical Specification

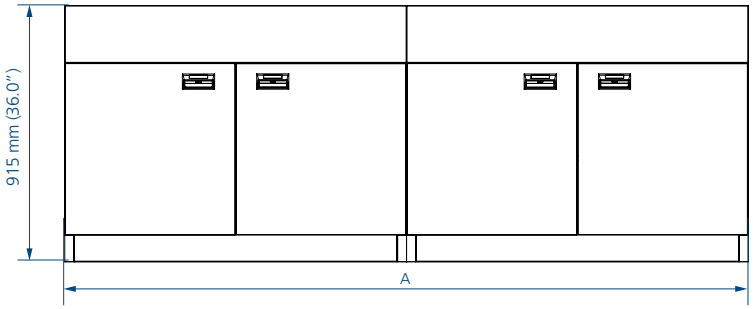


1. *Rear access panel*
2. *Soft close door*
3. *Adjustable shelf*
4. *Adjustable shelf slot*
5. *Base cabinet height leveler*
6. *Base cabinet filler panel (optional)*
7. *MCB/ELCB set (optional)*
8. *Ventilation provision*

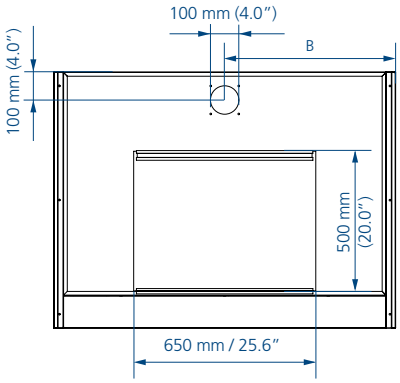
Front View
EBA-4UDG-_ (for EFA-4UDR_W-_)



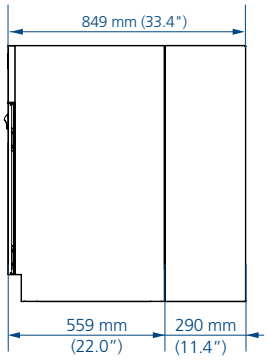
Front View
EBA-5UDG-_/ EBA-6UDG-_/ EBA-8UDG-_
(for EFA-5UDR_W-_ , EFA-6UDR_W-_, EFA-8UDR_W-_)



Top View *(for All Sizes)*



Side View *(for All Sizes)*



Model*	A	B
EBA-4UDG-0 / EBA-4UDG-8	1220 mm (48.0")	610 mm (24.0")
EBA-5UDG-0 / EBA-5UDG-8	1525 mm (60.0")	381 mm (15.0")
EBA-6UDG-0 / EBA-6UDG-8	1830 mm (72.0")	457.5 mm (18.0")
EBA-8UDG-0 / EBA-8UDG-8	2440 mm (96.0")	610 mm (24.0")

* *Model EBA-____-0 is standard base cabinet without MCB/ELCB.*

Model EBA-____-8 is with MCB/ELCB protection and only applicable for 230V,AC,50/60Hz units. MCB/ELCB panel is always mounted on the top right hand corner of base cabinet set.

Esco Resinate™

Esco Resinate™ is a proprietary composite material specifically designed for use as internal liner in laboratory fume hoods.

- Excellent chemical resistance (refer to table below)
- Excellent physical properties provide structural reinforcement for the hood
- Smooth, attractive, easy-to-clean finish

Chemical Resistance* of Esco Resinate™ Internal Liner

	Chemicals	Result
Acids	85% Sulfuric Acid	No Effect
	98% Sulfuric Acid	1st Grade
	50% Nitric Acid	1st Grade
	65% Nitric Acid	2nd Grade
	36% Hydrochloric Acid	No Effect
	85% Phosphoric Acid	No Effect
	40% Hydrofluoric Acid	No Effect
	60% Chromic Trioxide	No Effect
	99% Glacial Acetic Acid	No Effect
	Aqua Regia	No Effect

	Chemicals	Result
Solvents	37% Fomaldehyde	No Effect
	N-Hexane	No Effect
	Ethyl Acetate	No Effect
	Ethyl Ether	No Effect
	Ethyl Alcohol	No Effect
	Isopropyl Alcohol	No Effect
	Carbon Tetrachloride	No Effect
	Naphthalene	No Effect
	Chloroform	No Effect
	Methanol	No Effect
	Toluene	No Effect
	Xylene	No Effect
	Acetone	No Effect
	Styrene	No Effect
	Phenol	No Effect

	Chemicals	Result
Alkalis	40% Sodium Hydroxide	No Effect
	65% KOH	No Effect
	10% Iron Chloride	No Effect
	10% Copper Sulfate	No Effect
	15% Sodium Sulfide	No Effect
	Ammonium Hydroxide	No Effect

	Chemicals	Result
General Reagents	50% Magnesium Sulfate	No Effect
	34% Hydrogen Peroxide	No Effect
	Urea	No Effect
	Copper Sulfate	No Effect
	Karl Fisher Reagent	No Effect
	Iodine	No Effect

	Chemicals	Result
Stains and Indicators	1%Gentian Violet	No Effect
	Methylene Blue	No Effect
	Crystal Violet	No Effect
	Methyl Red	No Effect
	Methyl Orange	No Effect

Note: Esco Resinate™ may not be suitable for fume hoods for increased acidic and heat loads. Contact your local sales representative for details.

** Test Method: One drop of test chemical placed on material surface and covered with watch glass for 16 hours before result is observed.*

- 1st Grade: Slight effect on color and gloss. No change to physical properties.

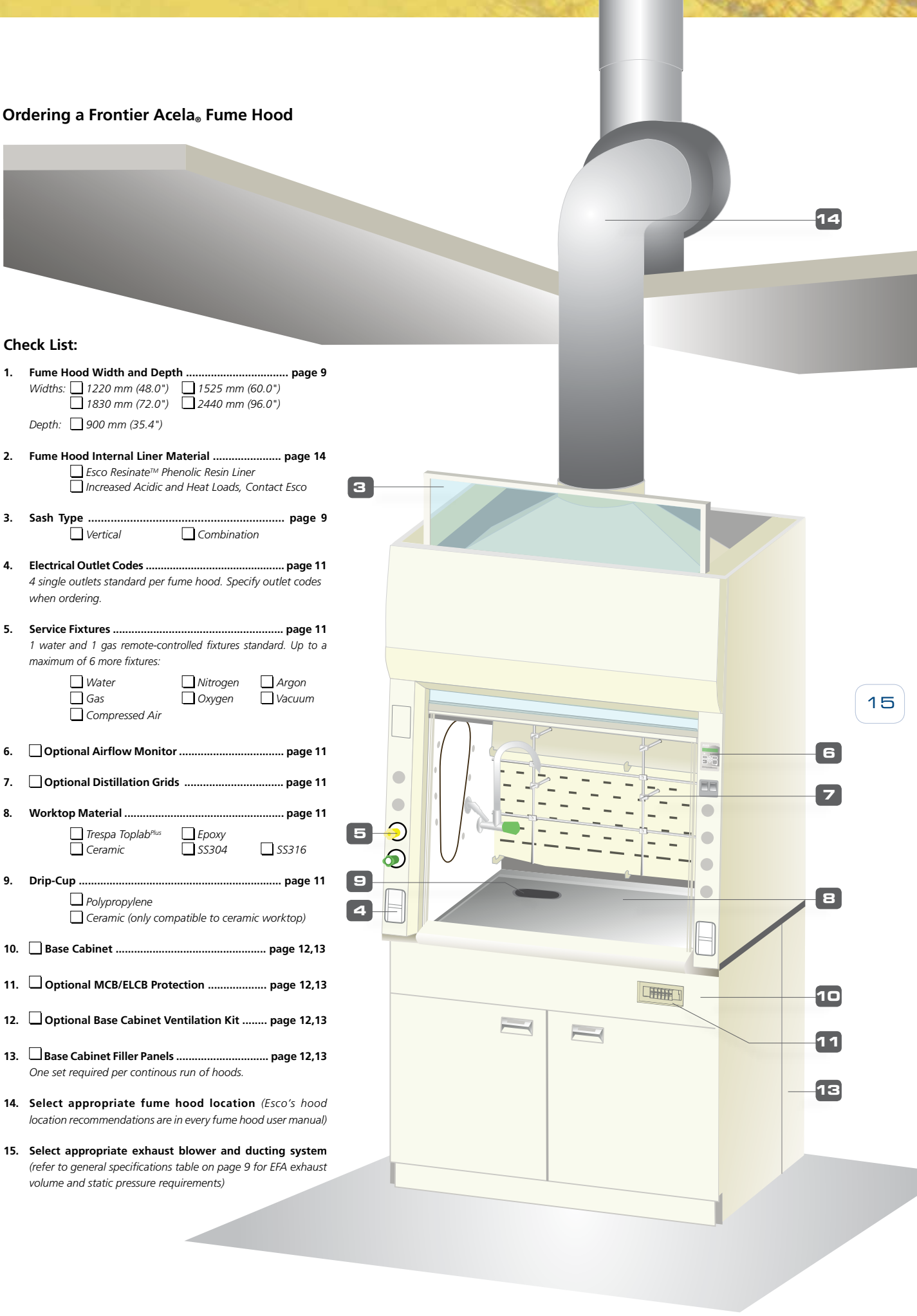
- 2nd Grade: Clear effect on color and gloss. No change to physical properties.

Esco Resinate PlusTM

Esco Resinate Plus liner is offer excellent chemical and physical resistance against harsh environments particularly against highly corrosive acids.

- Fiberglass Reinforced Plastic
- UL1805 Compliant
- Smooth, attractive, easy-to-clean finish

Ordering a Frontier Acela® Fume Hood



Check List:

1. **Fume Hood Width and Depth** ..... **page 9**
   Widths: ☐ *1220 mm (48.0")* ☐ *1525 mm (60.0")* ☐ *1830 mm (72.0")* ☐ *2440 mm (96.0")*
   Depth: ☐ *900 mm (35.4")*

2. **Fume Hood Internal Liner Material** ..... **page 14**
   ☐ *Esco Resinate™ Phenolic Resin Liner*
   ☐ *Increased Acidic and Heat Loads, Contact Esco*

3. **Sash Type** ..... **page 9**
   ☐ *Vertical* ☐ *Combination*

4. **Electrical Outlet Codes** ..... **page 11**
   4 single outlets standard per fume hood. Specify outlet codes when ordering.

5. **Service Fixtures** ..... **page 11**
   1 water and 1 gas remote-controlled fixtures standard. Up to a maximum of 6 more fixtures:
   ☐ *Water* ☐ *Nitrogen* ☐ *Argon*
   ☐ *Gas* ☐ *Oxygen* ☐ *Vacuum*
   ☐ *Compressed Air*

6. ☐ **Optional Airflow Monitor** ..... **page 11**

7. ☐ **Optional Distillation Grids** ..... **page 11**

8. **Worktop Material** ..... **page 11**
   ☐ *Trespa Toplab*[Plus] ☐ *Epoxy*
   ☐ *Ceramic* ☐ *SS304* ☐ *SS316*

9. **Drip-Cup** ..... **page 11**
   ☐ *Polypropylene*
   ☐ *Ceramic (only compatible to ceramic worktop)*

10. ☐ **Base Cabinet** ..... **page 12,13**

11. ☐ **Optional MCB/ELCB Protection** ..... **page 12,13**

12. ☐ **Optional Base Cabinet Ventilation Kit** ..... **page 12,13**

13. ☐ **Base Cabinet Filler Panels** ..... **page 12,13**
    One set required per continous run of hoods.

14. **Select appropriate fume hood location** *(Esco's hood location recommendations are in every fume hood user manual)*

15. **Select appropriate exhaust blower and ducting system** *(refer to general specifications table on page 9 for EFA exhaust volume and static pressure requirements)*

ART Equipment
Biological Safety Cabinets
CO_2 Incubators
Compounding Pharmacy Equipment
Containment / Pharma Products
Ductless Fume Hoods
Lab Animal Research Products
Laboratory Fume Hoods
Laboratory Ovens and Incubators
Laminar Flow Clean Benches
PCR Cabinets
PCR Thermal Cyclers
Powder Weighing Balance Enclosures
Ultra-low Freezers

Since 1978, Esco has emerged as a leader in the development of controlled environment, laboratory and pharmaceutical equipment solutions. Products sold in more than 100 countries include biological safety cabinets, compounding pharmacy equipment, containment / pharma products, ductless fume hoods, in vitro fertilization workstations, lab animal research products, laboratory fume hoods, laboratory ovens and incubators, laminar flow clean benches and PCR products and instrumentation. With the most extensive product line in the industry, Esco has passed more tests, in more languages, for more certifications, throughout more countries than any biosafety cabinet manufacturer in the world. Esco remains dedicated to delivering innovative solutions for the clinical, life science, research and industrial laboratory community. www.escoglobal.com.

Life Science • Chemical Research • Assisted Reproductive Technology (ART) • Pharmaceutical Equipment • General Equipment

ESCO®

WORLD CLASS. WORLDWIDE.

Esco Technologies, Inc. • 2940 Turnpike Drive, Units 15-16 • Hatboro, PA 19040, USA
Toll-Free USA and Canada 877-479-3726 • Tel 215-441-9661 • Fax 215-441-9660
us.escoglobal.com • usa@escoglobal.com

Esco Micro Pte. Ltd. • 21 Changi South Street 1 • Singapore 486 777
Tel +65 6542 0833 • Fax +65 6542 6920 • mail@escoglobal.com
www.escoglobal.com

Esco Global Offices | Beijing, China | Chengdu, China | Kuala Lumpur, Malaysia | Manama, Bahrain | Guangzhou, China | Hanoi, Vietnam | Melaka, Malaysia | Mumbai, India | Philadelphia, PA, USA | Salisbury, UK | Shanghai, China | Seoul, Korea | Delhi, India | Osaka, Japan | Manila, Philippines | Midrand, South Africa | Jakarta, Indonesia | Singapore

escoglobal.com LIVE SUPPORT | ISOCIDE™

SEFA

Esco Micro Pte Ltd Cert. No. 65176

PT Esco Bintan Indonesia Cert. No. 651334