GLOBAL FINISHING SOLUTIONS

Air Replacement Systems

- Eliminate problems with drafts, stale or contaminated air, and temperature stratification
- Create balanced building pressure and maintain proper comfort levels
- Introduce make-up air to improve indoor air quality
- 100% fresh air
- 80/20 or variable recirculating airflow
- Cooling and humidity control available
- Curing/bake systems

GFS' direct gas fired Air Replacement Units provide an economical source of replacement air and are furnished with heater, filters, motor and blower, controls, mounting hardware and auxiliary equipment. Choice of mounting arrangement; Horizontal or Vertical, Indoor or Outdoor, Platform or Ceiling suspended.

Air Replacement Systems

HOW AIR REPLACEMENT SYSTEMS WORK

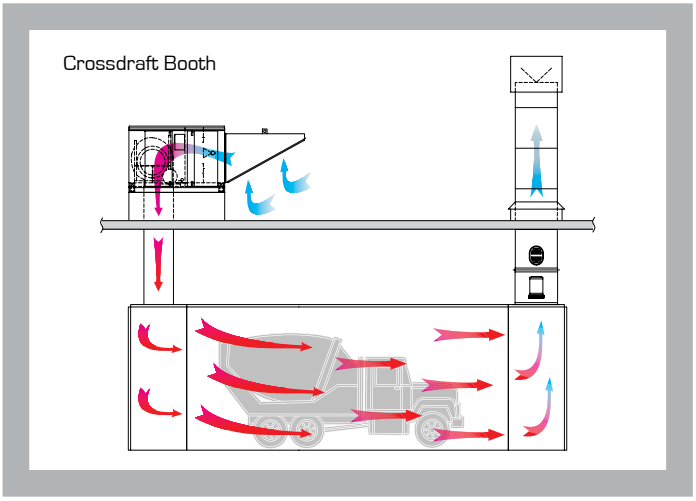
Air replacement systems replace contaminated air exhausted from industrial and commercial buildings or spray booths, with fresh, heated outdoor air, maintaining a constant leaving-air temperature regardless of the incoming, outdoor-air temperature. Air replacement systems replenish equal amounts of fresh air for every cubic foot of air exhausted.

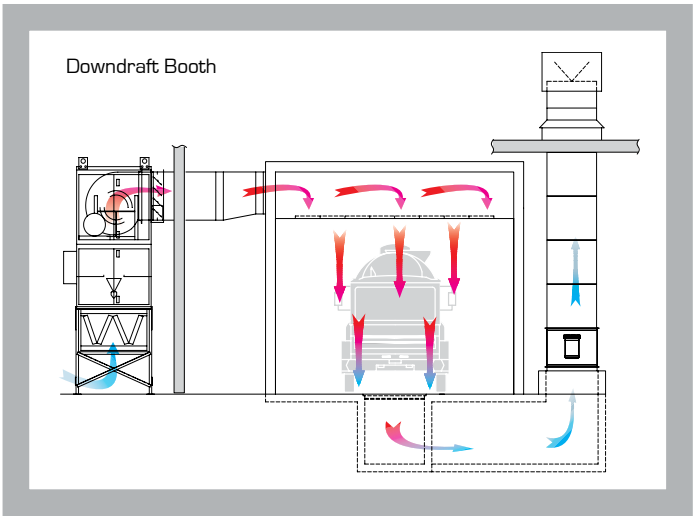
A direct-fired burner with a turndown ratio of 30:1 that is 100% efficient - all the heat goes directly into the airstream. The high turndown capability allows the flame to adjust to wide, outdoor-air temperature swings throughout heating season. For example, a unit with a maximum temperature rise of 90° in the winter can adjust down to as little as a 3° temperature rise for milder spring and fall weather

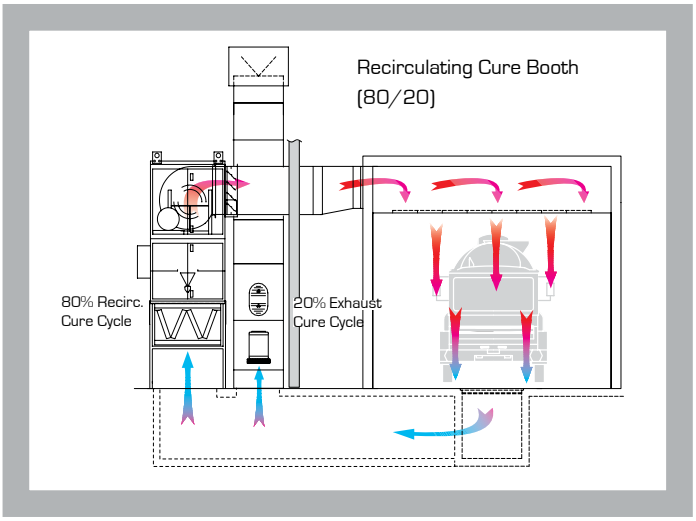
DURING SPRAY BOOTH OPERATIONS

A spray booth's exhaust system is removing significant quantities of shop or plant air. A typical 10' x 8' x 6' spray booth may exhaust more than 8,000 cubic feet of air per minute. If replacement air is pulled directly from outside, this volume may be sufficient to cool the interior of the building and may adversely affect the quality of coatings. An air replacement system may be required, using an air replacement unit which supplies conditioned and filtered air to the booth, minimizing temperature variations and removing particulates that compromise finish quality.

In the case of pressurized spray booths, air replacement is introduced directly into the spray booth, eliminating the need for air to be drawn from the facility. This allows for greater control over the temperature and filtration quality in both the facility and the spray booth environment, therefore improving working conditions and lowering overall operating costs.







Sizing and Location

UNIT LOCATION

The unit location requires consideration of the, Intake – fresh air intake, unit size, proximity of the unit's air discharge to the spray booth, access for installation and service. Determine the best location, unit arrangement, heat type, and the type of discharge.

TEMPERATURE RISE

The temperature rise is the discharge air temperature from the unit, above the ambient outside air temperature. An example would be; the facility is located in an area where the winter low temperature may be –10°F, desired temperature is 70°F, therefore a unit with a 90 degree rise would provide 80 degree process air with –10°F outside air.

Unit Arrangement

- Horizontal or Vertical
- Indoor or Outdoor

Heating Types:

- Natural Gas or Propane
- Steam
- Hot Water
- Indirect Fired
- Electric Heated

Discharge Type:

- Horizontal: End, Bottom or Top
- Vertical: Side or Top

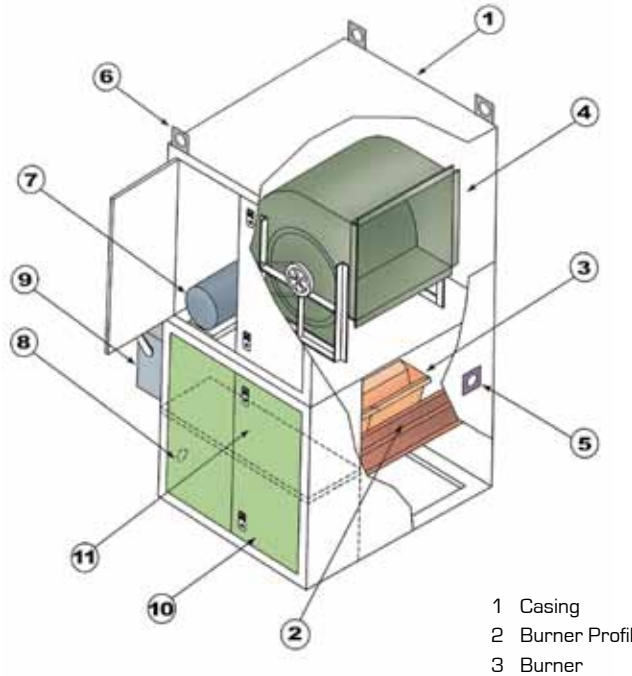
CURING/BAKE SYSTEMS

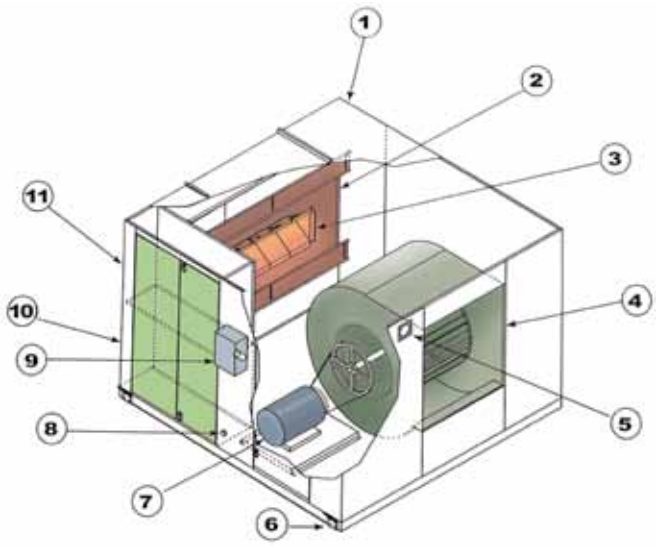
Variable Speed Unit: The air replacement unit is designed with a variable speed drive/motor and damper package to discharge either 140°F or 160°F air for accelerated curing cycle. This design reduces airflow 50% during the curing mode. This system always uses outside air during the cure mode to ensure good clean air for the cure cycle.

This system also includes an auto-balance system with a variable frequency drive to automatically adjust the airflow of the exhaust fan(s), to ensure proper booth balance, not only during the curing mode but during the painting mode as well.

Recirculating Unit: The air replacement unit is designed with a variable speed drive/motor and damper package to discharge either 140°F or 160°F air for accelerated curing cycle. This design recirculates up to 80% of the air while exhausting 20% to atmosphere.

This design provides further energy efficiency through the recirculation of heated air, requiring less for the heating unit. This system also includes an auto-balance system with a variable frequency drive to automatically adjust the airflow of the exhaust fan(s), to ensure proper booth balance, not only during the curing mode but during the painting mode as well.





1 Casing
2 Burner Profile
3 Burner
4 Blower
5 Burner Observation Port
6 Lifting Lugs
7 Motor
8 Gas Connection
9 Main Fused Disconnect
10 Manifold Controls Vestibule
11 Electrical Controls Vestibule

Configurations

Constant Volume System

(100% Replacement)

The constant volume system provides a consistent rate of supply air to the facility. The Direct-Fired air system heater warms the fresh air on intake, eliminating energy losses associated with alternative heat sources. In most applications, the intake air is of slightly higher volume than the exhausted air, resulting in a positive building pressure for best results. However, these units can be adjusted to intake less volume than the exhaust for applications requiring a negative building pressure.

Variable Air Volume System

When air replacement requirements fluctuate and Constant-volume or Two-Speed systems are not suitable, a Variable Air Volume System is the solution. By integrating a Variable Frequency Drive into the motor system, automatic adjustments can be made to the system during operation to compensate for changing conditions. Several options are available to control these adjustments:

a) A Potentiometer can be used to manually adjust CFM

b) Pre-set CFM levels can be programmed and manually selected

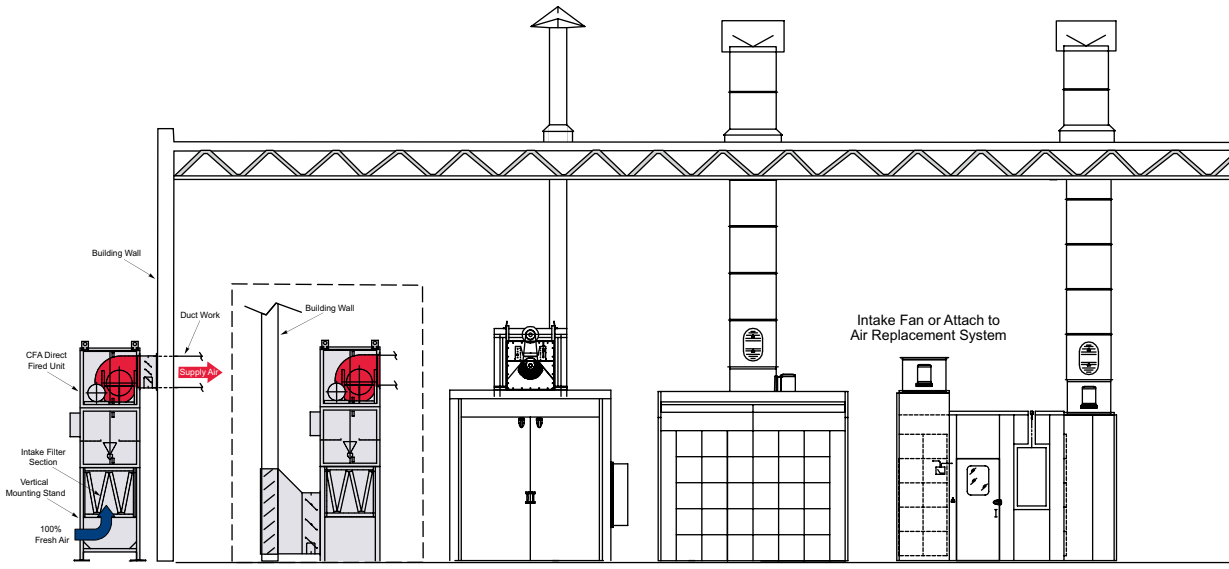
c) A pressure control device can be added to automatically adjust CFM relative to building pressure. The VFD allows for much lower energy costs due to smooth motor start-up and the elimination of power spikes. Integrated safety features have been added to ensure safe burner operation.

80/20 Systems

For those operations requiring re-circulating capability, an 80/20 system can provide energy-efficient make-up air and heating functions. By drawing at least 20% outside air, and up to 80% re-circulated air from the building, the 80/20 system reduces the energy needed for heating. The ratio of new-to-re-circulated air varies according to the requirements of the building environment. Automatic sensors and pressure monitors continually adjust to maintain the most consistent working environment, the most efficient operation and lowest operating cost. These units can be configured as a fully functional building heat unit, a supplementary air make-up unit, or as a combination of both.

SAMPLE CONFIGURATIONS

The following illustrations are for example purposes ONLY, contact GFS for the air replacement system configuration that fits your needs.



Auto Balancing Systems

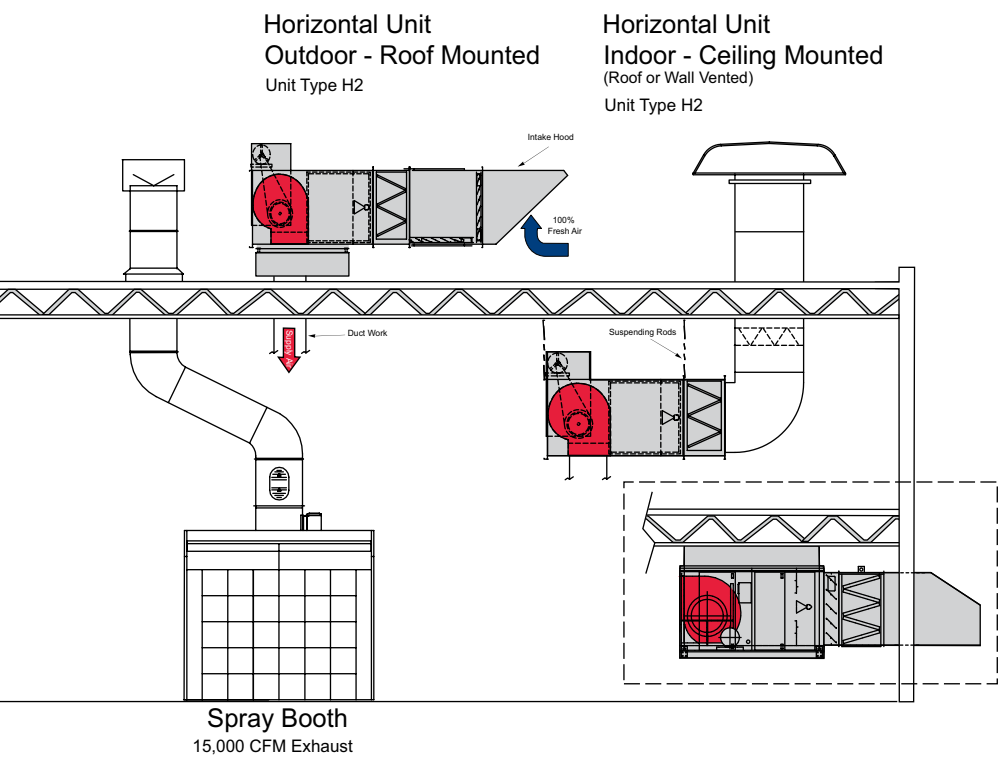
VARIABLE FREQUENCY DRIVES (VFD)

Features:

- Automatically adjust fan motor speeds based on actual airflow conditions and maintains an air balance within a paint spray booth that keeps paint fumes from escaping and preventing dust from entering.
- Provides constant air pressure and consistent exhaust airflow for spray booths to operate at their optimum rate and efficiency.
- Provides a consistency of controlled temperature.

Benefits:

- Greatly improved process control
- Increases transfer efficiency
- Controls and directs overspray into filtration systems
- Controls and exhausts VOCs from the work place
- Extends dry filter usage up to 50%
- Decreases energy cost up to 40% as compared to damper systems
- Provides a cleaner system and paint finishes



VFD APPLICATIONS

Direct Fired Air Replacement Systems

Designed to provide greater energy savings and efficiency when variable air volumes are needed for multiple stations such as manual applications to automatic electrostatic.

Auto-Balance System

Designed to automatically keep the paint booth balanced when in operation. It is recommended by GFS on all pressurized booths. This systems consists of a variable frequency drive that controls the exhaust fan motor, differential pressure gauge and sensing probes.

The system monitors the interior booth pressure and will adjust the exhaust fan RPM's to what is needed for the volume of exhaust air based on what the incoming intake air is. The result is a booth that is balanced automatically and will stay in balance as the filters load up with paint over spray. System will increase useful filter life, provide a constant airflow through the booth and the ability to control booth pressure.

Consta-Flow System

Designed to automatically adjust the exhaust fan to the changing conditions of the exhaust filters. This system is recommended by GFS on all paint booths with conveyor openings and/or booths with multiple filter stages that have high static pressure when loading.

This system consists of a variable frequency drive that controls the exhaust fan motor, differential pressure gauge and sensing probes.

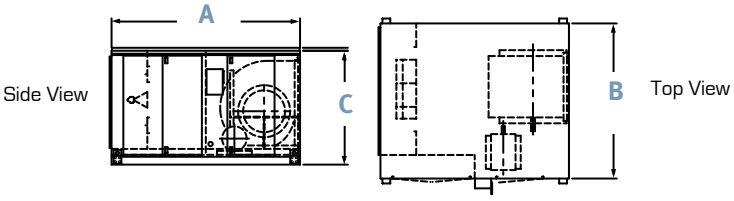
The system monitors the static pressure and will adjust the exhaust fans RPM's to what is needed for the volume of exhaust air based on how loaded the filter are. The result is a booth with constant air flow as the filters load up with paint and will increase filter life.

Air Replacement Heaters

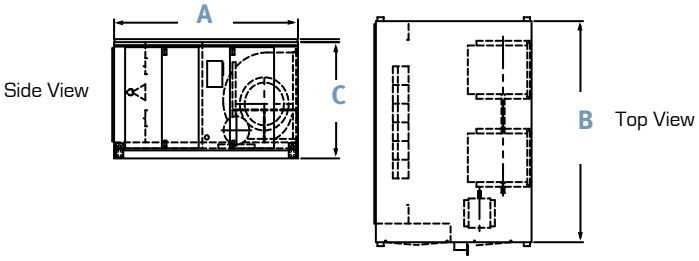
HORIZONTAL UNITS

Model	Unit Dimensions		
	A	B	C
RAM-12	70	46	38
RAM-15	70	46	38
RAM-18	82	60	54
RAM-20	82	60	54
RAM-22	100	79	58
RAM-25	100	79	58
RAM-27	100	88	66
RAM-30	100	88	66
RAM-33	112	98	76
RAM-36	112	98	76
RAM-222*	100	146	58
RAM-225*	100	146	58
RAM-227*	100	156	66
RAM-230*	100	156	66

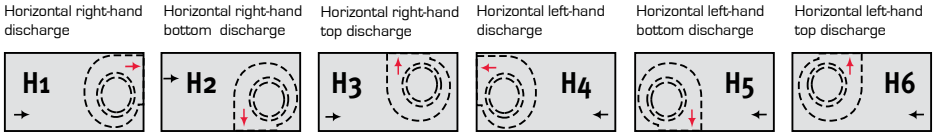
Single Blower Heaters



Twin Blower Heaters



Identify Air Flow Discharge for Maximum Product Performance

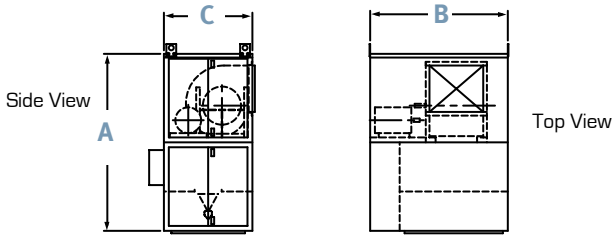


VERTICAL UNITS

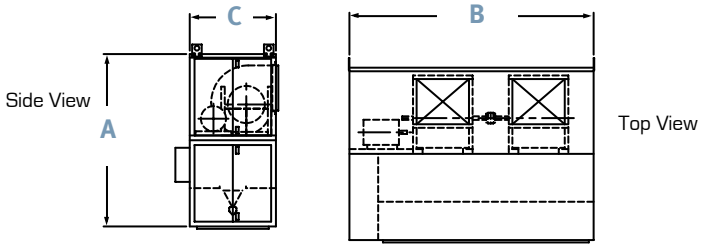
Model	Unit Dimensions		
	A	B	C
CFA-12	70	50	36
CFA-15	70	50	36
CFA-18	82	65	50
CFA-20	82	65	50
CFA-22	100	80	50
CFA-25	100	80	50
CFA-27	110	88	60
CFA-30	110	88	60
CFA-33	128	112	70
CFA-36	128	112	70
CFA-222*	100	146	50
CFA-225*	100	146	50
CFA-227*	110	156	60
CFA-230*	110	156	60
CFA-233*	128	191	70

* indicates twin blowers

Single Blower Heaters



Twin Blower Heaters



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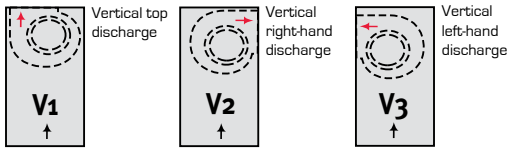
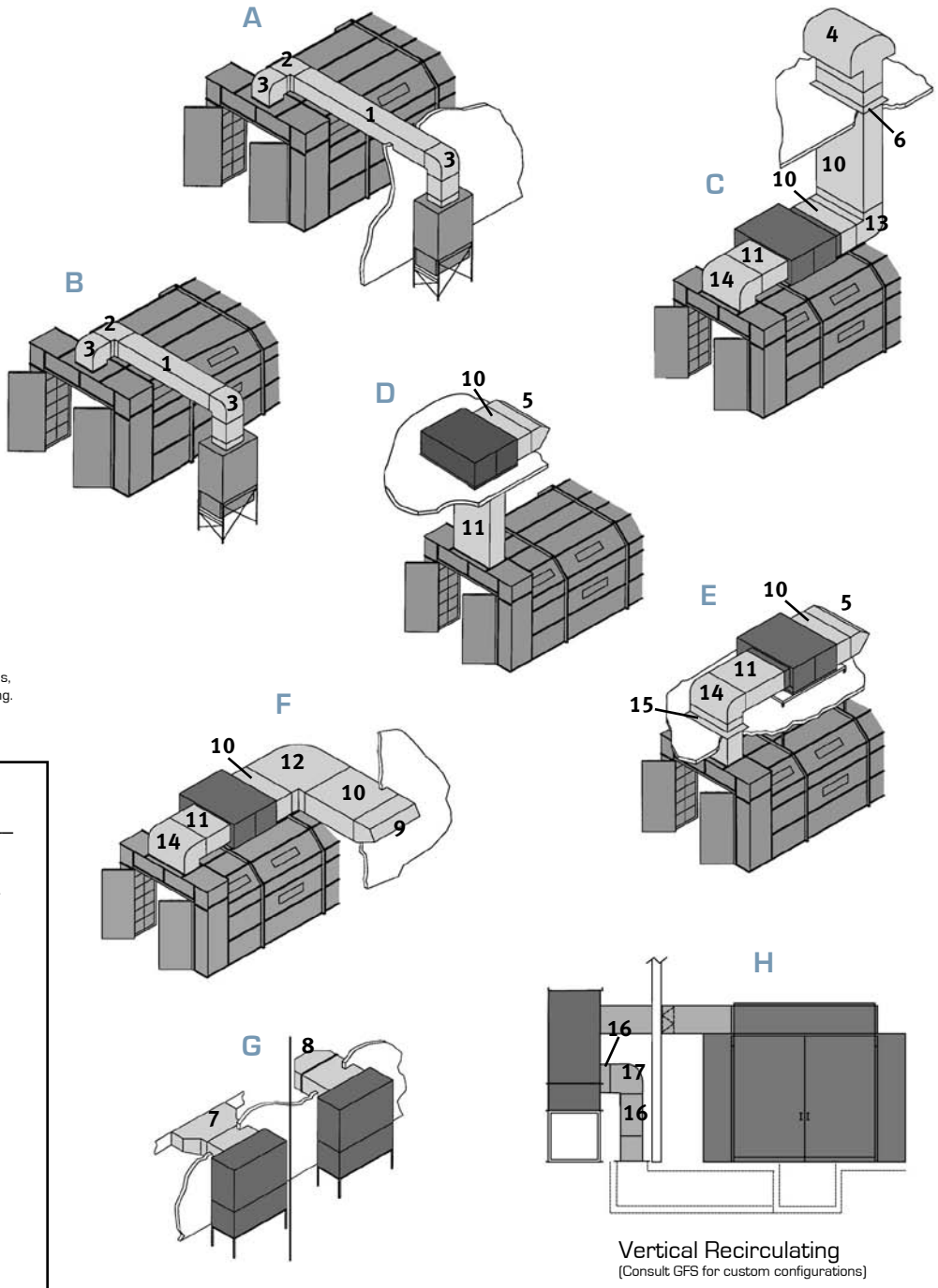


Components

DUCT WORK

1 Straight Discharge
2 90° Horizontal Discharge Turn
3 90° Vertical Discharge Turn
4 Vertical Intake Hood
5 Horizontal Intake Hood
6 Intake Roof Flange
7 Transition Duct
8 Discharge Air Diffuser
9 Full Turn Down Hood
10 Straight Intake
11 Straight Discharge
12 90° Horizontal Intake Turn
13 90° Vertical Intake Turn
14 90° Vertical Discharge Turn
15 Discharge Roof Flange
16 Recirc. Straight Duct
17 Recirc. Elbow

Insulated duct available for Straight Duct, 90° Horizontal Turns, 90° Vertical Turns, and Transition Duct, consult GFS for pricing.



Vertical Recirculating
(Consult GFS for custom configurations)

Qty. of Booths: _____

CFM:_____

Total:_____

Growth %:_____

Choose a configuration (A - H)

_____

Duct work	Qty.	Length
> _____	_____	_____
> _____	_____	_____
> _____	_____	_____
> _____	_____	_____
> _____	_____	_____
> _____	_____	_____
> _____	_____	_____

MAXIMUM ENERGY SAVINGS!

RECIRCULATING BOOTHS: Dampers reduce exhaust to approximately 20%, delivering approximately 80% of the previous heated air and 20% fresh air into cabin during cure cycle. Consult GFS for recirculating cure (80/20).

Air Replacement Systems

STANDARD FEATURES

- Structural G-90 galvanized base or tube frame
- Heavy gauge G-90 galvanized steel casing
- Interlocked wall seam and roof panels
- Weatherproof construction
- Hinged service doors with flush-mount latches
- Standing roof seams
- Double wall doors
- Single piece construction on RAM up to 230
- Six discharge options

ACCESSORIES AND OPTIONS

- Inlet hood with 2" cleanable filter with bird screen
- Fresh air V-Bank filter sections
- Return air V-Bank filter sections
- External discharge dampers
- Internal discharge dampers
- Intake dampers
- Air diffuser heads
- Vertical mounting stand
- Roof curbs
- Casing insulation with G-90 galvanized steel liners
- Remote control panel with operating lights
- Spring isolated blower and motor
- Painted casing

OPTIONAL CONTROL PANEL:

Clogged Filter Switch with Light: Senses air pressure drop across the filter, and is mounted in unit. When the filter becomes dirty, the switch activates a remote control panel light, indicating a required filter change.

Dual-Range Selector Dial, 90°-140°F, 401M: Allows for two, separate discharge temperature set points for spray and dry modes in both paint booth applications.

High Temperature Option: Adapts unit with special construction and controls to high temperature paint-booth and industrial-process heating applications.

Low Gas-Pressure Switch: Stops unit's operation when inlet gas pressure goes below set point. Standard on FM manifolds over 2,500 MBTU and on FIA (IRI) manifolds over 150 MBTU.

Pressure Gauge 0-15#, 0-35": Monitors supply pressure to unit, or to burner on gas manifold. Reads low gas pressures between 0 and 15"; 35".

Low-Temperature Blower Shutdown with Bypass Timer: Shuts blower off if discharge temperature drops below 40°F for longer than five minutes.

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