Heating, Ventilating, and Air

Conditioning

Element D Services

# D3042 Exhaust and Ventilation

# PART 1 - GENERAL

### 1.1 OVERVIEW

A. This section describes building exhaust and relief systems. Refer to Design Guideline Element D3041, Air Handling Distribution, for design criteria related to ductwork and ductwork accessories.

# PART 2 - DESIGN CRITERIA

### 2.1 GENERAL EXHAUST

- A. With the exception of general laboratory exhaust, the exhaust systems may be interlocked with the supply air system to shut down when the supply air system shuts down during unoccupied hours for energy conservation. For research laboratory applications, refer to Design Guideline Element D304202.
- B. Toilet exhaust air quantity shall be based on ASHRAE 62.1 using 70 CFM exhaust airflow per restroom fixture.
- C. Plan for a general exhaust system to exhaust toilet rooms, janitor's closets, and general building exhaust requirements including general laboratory exhaust as applicable.
- D. Provide additional exhaust systems as needed for generator exhaust and for specific applications.
- E. Provide pressure independent, variable volume exhaust air terminals to measure and control all general exhaust.

#### 2.2 BUILDING PRESSURE RELIEF SYSTEM

- A. Plan for a building pressure relief system consisting of a riser, fan and associated controls to relieve the building of excess outside air that cannot be exhausted through the building general exhaust system. For research laboratory applications, refer to Design Guideline Element D304202.
- B. Evaluate the effectiveness of recovering the relief system energy for pretreatment of outside air into the building using an enthalpy wheel, fixed-plate heat recovery, or heat recovery pipe. Refer to Design Guideline Element D3041 for energy recovery requirements.
- C. Provide pressure independent, variable volumeexhaust air terminals or dampers and air flow stations to measure and control all relief exhaust.

Element DServicesHeating, Ventilating, and Air<br/>ConditioningD3042 Exhaust and Ventilation

### 2.3 KITCHEN EXHAUST SYSTEMS

- A. Design food service exhaust systems to control heat, moisture, and grease. A dedicated grease exhaust system will be provided for kitchen hoods in the food service area.
- B. The kitchen equipment supplier will typically provide the hoods. Hoods will be UL listed and equipped with fire suppression systems listed under UL300.
- C. Plan for a separate dedicated duct to transport moisture-laden air from the dishwashers to the building exterior. A dedicated exhaust fan shall be provided and control interlock to start upon start of the dishwasher and stop (time delayed) when dishwashing machine is shutdown. The fan wheel and casing shall be fabricated with appropriate materials to withstand the corrosive conditions of the moisture-laden exhaust air. Slope ductwork back to dishwasher to prevent the accumulation of condensation.
- D. Specify cleanouts at approximately every 12 feet in horizontal ductwork sections and at changes in direction. Slope horizontal exhaust duct back to hood connection.
- E. Fire rated enclosure for kitchen grease exhaust ductwork system must be rated for shaft protection in accordance with U L 2221 or must be enclosed by a fire rated shaft enclosure. Cleanouts must remain accessible without disturbing the fire barrier.
- F. All kitchen and dishwasher exhaust ductwork shall be routed up to the building roof or alternatively through the building exterior wall or lower level roof depending on wind tunnel/air quality analysis results.
- G. Kitchen exhaust system shall comply with NFPA96 and mechanical code.
- H. Locate building air intakes as to ensure the cleanest possible air. Locate exhaust discharge where exhaust air cannot be easily reintroduced into the building outside air intakes.
- I. Provide a grease collector at kitchen exhaust fans and pipe the collector for convenient cleanout and servicing.
- J. Provide dedicated exhaust fan systems for each Type 1 grease exhaust hood with a fryer or grill, and also for Type 2 hoods with broilers and ovens. <u>The optimum goal is to reduce as much make-up air as possible if the kitchen equipment being served is not in use</u>.
- K. Consider designing variable air volume kitchen hood controls for all hoods to automatically control exhaust based on amount of cooking occurring. Refer to additional requirements in ASHRAE 90.1 for kitchen exhaust systems over 5,000 CFM.

Element D Services

Heating, Ventilating, and Air Conditioning

# D3042 Exhaust and Ventilation

# PART 3 - SPECIAL CONTRACT DOCUMENT REQUIREMENTS

### 3.1 GENERAL

- A. The A/E shall include a schematic of the general exhaust and pressure relief systems in the Contract Documents.
- B. All fans shall be direct drive where possible and specified with a variable frequency drive if the motor is not electrically commutated (ECM).

## **PART 4 - PRODUCTS**

## 4.1 GENERAL

- A. Refer to Owner's Master Construction Specifications. These are available on the Owner's Design Guidelines website: http://www2.mdanderson.org/depts/cpm/standards/specs.html
- B. Refer to Design Guideline Element D3041 for additional criteria on outside air intakes.

# PART 5 - DOCUMENT REVISION HISTORY

Issue	Date	Revision Description	Reviser
	20190301	Initial Adoption of Element	
Rev. 1			

#### END OF ELEMENT D3042