
1. Module details

Module name

EXHAUST SYSTEMS DESIGN

Nominal duration

One module
It is anticipated that students will achieve the competencies specified in 35 to 40 hours.

Module codes

EB142

Discipline code

2. Module purpose

To provide the student with the knowledge and skills necessary to effectively design commercial and industrial exhaust systems, including industrial dust extraction systems, in accordance with all relevant standards, codes and authorities.

3. Prerequisites

EB141 - Industrial Air Conditioning - Codes and Regulations
EA131 - HVAC Air Systems

4. Relationship to competency standards

TBA

5. Content

1. Relevant Codes and Regulations

- health and safety
- noise
- smoke
- fire
- hazard identification

2. System types

- applications
- application flow charts
- system requirements
- hazard identification
- effluent types and removal
- relationship with smoke spill systems
- supply air dilution applications
- natural ventilation applications
- fan assisted exhaust applications
- replenishment of exhaust air
- system components

3. Duct Design

- static, velocity, total pressure
- pressure drop
- fouling
- transitions
- elbows
- fan position and mounting

- noise and noise attenuation
- requirements for access and maintenance
- system integrity

3. Fan and motor selection

- applications
- suitable fan types
- motor rating and suitability
- balancing the fan duct system
- flame proofing

4. Filters and filter selection

- types and applications
- capture velocity

5. Outlet design and location

- prevailing winds
- position relative to air intakes
- weather and bird proofing

6. Cycling/operation control

- applications
- code/regulation requirements
- monitoring of contaminants
- contaminant detection
- sensors
- variable speed fans
- flame proofing of control equipment

6. Learning outcome details

Learning outcome 1

Assessment criteria

On the completion of this module, the learner will be able to:

Design commercial exhaust systems conforming to all relevant codes and regulations.

Open book short answer tests.
Project/assignments.

1.1 List the requirements for a range of minor or commercial exhaust systems and possible acceptable methods of system type/design in accordance with relevant standards codes and authorities.

1.2 Prepare the design, drawings, and specifications of a variety of exhaust systems representative of those found in minor or commercial applications, including at least two of the following:

- toilet exhaust
- kitchen exhaust
- battery charging room
- document copying room systems.

Learning outcome 2

Design industrial exhaust systems conforming to all relevant codes

Assessment criteria

and regulations.

Open book short answer tests.
Projects/assignments.

2.1 List the requirements for a range of industrial exhaust systems and possible acceptable methods of system type/design in accordance with relevant standards codes and authorities.

2.2 Prepare the design, drawings, and specifications of a variety of exhaust systems representative of those found in industrial applications, including:
- dust extraction system
- fume cupboard

7. Assessment Strategies

See Assessment Criteria

8. Module Delivery Strategies

This module contains learning outcomes that will require both theory and practical instruction. As such, it will require resources to facilitate both on and off-the-job delivery strategies.

These strategies may involve:

- co-operative registered off-the-job provider/employer delivery sharing available resources.
- delivery by an employer who is subregistered as an off-the-job provider, with qualified trainers in-house using resources to facilitate on and off-the-job delivery.
- off-the-job objectives should focus on the industry context while on-the-job objectives should reflect application within enterprise operations.

Assessment instruments will need to be developed by the module provider. These instruments will need to reflect consistency with stated module learning outcomes and related assessment criteria.

Student records will be the responsibility of the off-the-job provider and where more than one off-the-job provider is involved, formal processes for transfer of student information must be established.

9. Resource Requirements

AIRAH Application Manuals.

Airflow Developments Ltd, Airflow measurements in Building.

ASHRAE, ASHRAE Handbook, HVAC Systems, Atlanta.

SMACNA 1987, HVAC Systems Applications.

Standards Australia - Latest Editions to be used:

AS1324 Air Filters for use in Air Conditioning and General Ventilation.

AS1668 parts 1 & 2. The use of Mechanical Ventilation and Air Conditioning in Buildings.

AS1682 parts 1 & 2. Fire Dampers.

AS2340, Hazard Identification

AS2243 Part - , Fume Cupboards

AS3666, Air Handling and Water Systems of Buildings - Microbial Control.

ASHB40, The Australian Refrigeration and Air Conditioning Code of Good Practice.

Stoecker W.F, Jones J.W., 1982. Refrigeration and Air Conditioning, McGraw - Hill.

The Trane company 1986. Trane Air Conditioning Manual.

Additionally further information may be sourced from journal articles.

10. Occupational health and safety requirements

Learners must be made aware of all relevant OH&S issues in all situations and are required to demonstrate safe working practices at all times.

All work areas must comply with current OH&S legislation.