

LEV SYSTEMS UPGRADE PROJECT, GRETB
TRAINING CENTRES, MERVUE BUSINESS
PARK, MERVUE, GALWAY.



An tSeirbhís Oideachais Leanúnaigh agus Scileanna
Further Education and Training Authority

VOLUME A.2.3.1.2 - MECHANICAL SERVICES
SPECIFICATION

Document Control Sheet

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INDEX

VOLUME A.2.3.1.2 - MECHANICAL SERVICES SPECIFICATION

1. ELEMENT (57) FUME EXTRACT VENTILATION SERVICES

ELEMENT (57): EXTRACT VENTILATION SERVICES

57.1 EXTENT OF WORKS IN THIS SECTION

This section shall include for the provision of the upgrade works required to the Local Extract Ventilation (LEV) systems in the Metal Fabrication room (LEV Systems 1 to 5), Welding Workshop (LEV Systems 6 to 12) including the balancing of the existing LEV systems 14, 15 in the Plumbing Unit in Building No 1, including the upgrade works to the LEV systems 18 to 21 in the Garage in Building No 2, consisting of the provision of a number of replacement fume extraction arms, fume extraction fans, attenuators and fume extraction reels, including the provision of all associated alterations and additions to the galvanised steel fume extraction ductwork, ductwork supports, including the provision of some new isolation and control dampers, etc., all as indicated on the drawings and as specified below.

This section shall also include the provision of upgrade works to the existing “METRON” down-draft table in the welding workshop (LEV system No 13), including supply and installation of a tower all-in oneself cleaning cartridge filter unit complete with built-in fume extraction fan to serve the Plasma down-draft table (LEV system No 5), in the metal fabrication workshop in Building No 1.

57.2 DUCTWORK

The Contractor shall supply and install smooth long seamed type rigid circular sheet metal ductwork as indicated on the drawings. The sizes of the ductwork shall be as indicated on the drawings, but the Contractor shall satisfy themselves that the ducts can be accommodated in the positions shown before proceeding with fabrication. **The ductwork shall be constructed of best quality galvanised sheet steel complying with BS EN 10143: 2006 and DW 144 for a Very High Pressure (Class D) system**, from long-seamed sheets to a thickness of 1.0 mm for all sizes up to 200 mm dia and 1.5 mm for sizes greater than 200 mm dia up to 500 mm dia.

The ductwork shall be fabricated in accordance with good practice in a neat and workmanlike manner true to size and internally free from sharp edges and obstructions, with all components provided with a rolled collar at each end.

All components shall be jointed where necessary using galvanised snap-lock circular clips, fitted over the rolled collars and provided with rubber O-ring to ensure that an airtight seal is achieved.

The ductwork shall be supported by means of suitable circular clips/brackets, suspended by drop rods from the structure of the building as necessary.

57.3 DUCTWORK SUPPORTS

Circular ductwork shall be supported at 1.5 metre intervals irrespective of size by means of two 6.35 mm diameter drop rods suspended from the structure connecting to circular straps around the duct, with soft rubber insert provided between the ductwork and straps.

The drop rods shall be threaded and screwed into suitable fixings "Rawlsets" "Redheads" or similar to approval. The bottom of the suspension rods shall be threaded at least 76 mm to allow for height adjustment and when finally located at level, locknuts shall be fitted, with the protruding ends of the drop rods cut back as necessary.

57.4 TELESCOPIC EXTRACTION HOODS/ ARMS

The Contractor shall supply and install a number of telescopic extraction hoods/arms over the welding benches in the metal fabrication room and welding workshop in building No 1, as shown on the drawing.

The telescopic extraction hoods/arms shall be as GEOVENT "COMPACT Arm" model, Ref: 01-700 or equivalent manufacture as supplied by Messrs Harold Engineering Ltd, Oranmore, Co Galway (Tel No: 091-795900), which shall be suitable for a welding application with a duty of approx. 800 m³/hr, complete with approx. 2.0 metres long telescopic hose manufactured from flame retardant PVC outer sheath with spring steel wire and balanced counterweight system, wall mounted fixing bracket, flange to duct adapter, swivel joint, and metal hood with safety mesh and integral LED light, and shut off damper.

57.5 FUME EXHAUST HOSE REELS

The Contractor shall supply and install a number of spring recoiled fume exhaust hose reels in the mechanics workshop in Building No 2 to replace broken fume exhaust hose reels as shown on the drawing.

The spring recoiled fume exhaust hose reels shall be as GEOVENT GTS-1000-10-125 model, Ref: 04-708 or equivalent manufacture as supplied by Messrs Harold Engineering Ltd, Oranmore, Co Galway (Tel No: 091-795900), which shall be suitable for vehicle fume exhaust application complete with approx. 10.0 metres long x 125 mm dia NR-CP EPDM/PP coated hose and nozzle, suitable for temperatures from -40°C to + 150°C, including the provision of a matching 1000 mm wide spring retractable drum and frame, and shut off damper and "Clicklock" system.

57.6 FUME EXTRACTION FANS

The Contractor shall supply and install a number of high-volume fume extraction fans to replace a number of the existing fume extraction fans, which shall be mounted on Uni-strut cantilever supports as detailed on the drawings and connected to the galvanised sheet metal ductwork systems. The fume extraction fans shall be as GEOVENT MEF range, Model MEF-450-3 (ART: 35-708) or equivalent manufacture, as supplied by Messrs Harold Engineering Ltd, Oranmore, Co Galway (Tel No: 091-795900), which shall be suitable for a welding application with a duty of approx. 7500 m³/hr @ 2300 Pa, complete with inlet and outlet flanges, **matching GEOVENT IP55 soundproof box /weathered enclosure**, hot-dipped galvanised steel mounting brackets complete with anti-vibration mountings, and 7.5 kW fan motor, suitable for outdoor installation and a 380 volt, 50 Hz 3-Phase Electrical supply.

The new fume extraction fans shall be supplied with a matching Emerson Commander SK Invertor Drive Model Ref: SKB34-00075, which shall be handed over to the Electrical Contractor for erection and connection.

The Variable frequency Invertor Drive shall be handed over to the Electrical Contractor for erection and connection adjacent to the fume extract fan internally within the building and shall be wired to allow remote operation of the fume extract fan from an on/off switch at the local electrical sub-distribution centre in the workshop.

The Contractor shall include in his tender for the commissioning of the Variable frequency Invertor Drives by the Specialist Suppliers to provide the necessary flow rates to each of the fume extraction systems, and for issuing a commissioning certificate to the Employers Representative.

57.7 “METRON” DOWN-DRAFT TABLE

There is an existing “METRON” downdraft table in the welding workshop in Building No 1, Model Ref: AMSFM (2000 mm x 800 mm) Type: W000371222 which shall be retained.

The LEV report (Extraction System No 13) has identified the following defects which require to be addressed as part of this Contract:

- There is no detectable airflow through the down-draft table.
- The filters in the table were blocked
- There is no HEPA filter provided.

The Contractor is therefore requested to arrange with the original specialist suppliers, Messrs Metron Welding, Baldonnell Business Park, Dublin, Tel No: 01-4660500, Email Mr Dermot Crowley, dermot@metron.ie to carry out the following remedial works to the down-draft table as necessary:

- ✓ Replace all of the existing filters in the down-draft table
- ✓ Supply and installation of a new matching HEPA Absolute filter box within the down-draft table
- ✓ Commission and set the table to work as necessary.

The Contractor shall include in his tender for the commissioning and certification of the down-draft table by the Specialist Suppliers, and for issuing a commissioning certificate to the Employers Representative.

57.8 “PLASMA” DOWN-DRAFT TABLE

There is an existing plasma downdraft table in the metal fabrication workshop in Building No 1, which shall be retained, and the LEV report (Extraction System No 5) has identified that there is no filtration system provided on this table which requires to be addressed as part of this Contract.

The Contractor shall include in their tender for the supply and installation of a tower all-in oneself cleaning cartridge filter unit complete with built-in fume extraction fan, including all associated alterations and additions to the existing fume extraction ductwork system as specified below and as indicated on the drawings.

The tower filter unit shall be as GEOVENT GFB2 Geofilter, Model GFB2 Tower 9-3, c/w MEF 450-3 fume extraction fan (ART: 15-472) or equivalent manufacture, as supplied by Messrs Harold Engineering Ltd, Oranmore, Co Galway (Tel No: 091-795900), which shall be suitable for a plasma down-draft table application with a duty of approx. 5400 m³/hr @ 2300 Pa, complete with in-built cartridge filters, with anti-vibration mountings, and 7.5 kW fan motor, suitable for a 380 volt, 50 Hz 3-Phase Electrical supply.

The fume extraction fan shall be supplied with a matching Emerson Commander SK Invertor Drive Model Ref: SKB34-00075, which shall be handed over to the Electrical Contractor for erection and connection.

The Variable frequency Invertor Drive shall be handed over to the Electrical Contractor for erection and connection adjacent to the fume extract fan internally within the building and shall be wired to allow remote operation of the fume extract fan from an on/off switch at the local electrical sub-distribution centre in the workshop.

The Contractor shall include in his tender for the commissioning of the Variable frequency Invertor Drives by the Specialist Suppliers to provide the necessary flow rates to each of the fume extraction systems, and for issuing a commissioning certificate to the Employers Representative.

57.9 ATTENUATORS

The Contractor shall supply, deliver, erect and connect in-line attenuators in the fume extraction ductwork, to the sizes as detailed in the mechanical services equipment schedules (Schedule No 4, Volume No A.2.3.1.3), as detailed in the locations shown on the drawings.

The Attenuators shall be selected to match the new fume extraction fans and shall be the Formula Air AAFA attenuators, **complete with non-shedding acoustic material** as supplied by Messrs Harold Engineering Ltd, Oranmore, Co Galway (Tel No: 091-795900) or equivalent manufacture.

57.10 BALANCING AND VOLUME CONTROL DAMPERS

The Contractor shall supply, deliver, erect and adjust balancing and volume control dampers in the ductwork to the sizes and in the locations indicated on the drawings.

Manual balancing and volume control dampers shall be Model A Series 900 as manufactured by NCA Manufacturing Ltd., (Irish Agents: Messrs Lindab (Ireland) Ltd, Unit 2B, Nangor Road Business Park, Dublin 12. Tel No: 01-4568200, Fax No: 01-4568210) or equivalent manufacture. Dampers shall have low profile aerofoil blades and concealed linkage outside of the airstream.

57.11 FLEXIBLE CONNECTIONS

The Contractor shall supply and fit flexible duct connections in positions indicated on the drawing. The material used must be capable of withstanding the specified conditions of temperature and pressure and must maintain an even section when fixed and operating. The flexible connection shall be suitable air tight rubber impregnated fabric or similar to approval.

57.12 PAINTING

All exposed metalwork, etc., shall be thoroughly cleaned and painted with one base coat of rust inhibiting paint and two coats of an approved colour finishing paint.

57.13 COMMISSIONING

The Contractor shall be responsible for the starting up of the extract ventilation system and the setting up and balancing of the air quantities passing through the fume extraction arms and down-draft tables provided under this section. He shall produce the following data for system review: -

- (a) **Record the flow rates and static pressures of each of the LEV systems (i.e. fume extract fans, extraction arms and down-draft tables), prior to the works taking place, to enable the LEV systems to be re-commissioned to the original design conditions.**
- (b) Re-commission the LEV systems to the original flow rates and static pressures as recorded in (a) above.
- (c) Running and rated fan speeds.
- (d) Fan running current under design load and rated motor current.
- (e) Fan total pressure under design load.
- (f) Static pressure drop across ductwork systems under design load.
- (g) Noise levels in occupied spaces.

Tabulated results shall be provided for each plant item laid out separately in a format to be agreed by the Employers Representative so as to demonstrate that the systems are operating correctly and in accordance with the design.

The Contractor shall provide all reasonable assistance to the Employers Representative including the use of all necessary instruments, ladders, etc., to check the test results provided by the Contractor.

57.14 TESTING

The Contractor shall include in their tender for testing all the equipment covered in this section. Testing may, if necessary, be carried out in sections and the Contractor shall be allowed no extra on account of this. Tests shall cover the air tightness of the plant, plenums and all ductwork, connections, etc., including the correct operation of all motors, and the variable speed controllers, etc.

The ductwork installation, including all associated plenums and ductwork connections, etc., shall be tested for leakage in accordance with the requirements of DW 143 for a Very High Pressure (Class D) system.

The tests shall also include the adjustment / commissioning of the variable speed drives on the Fume Extraction Fans to ensure that they are delivering the required extract ventilation from the fume extraction systems as per the original design conditions.

The Contractor shall be held responsible for the efficient working of the system (faulty design excluded) and for defects arising from faulty materials and workmanship.