

WATER SUPPLIES DEPARTMENT
STANDARD SPECIFICATION E-61-02
VENTILATION FANS FOR PLANT ROOMS

1. GENERAL

1.1 Scope

This Specification covers the supply and testing of roof extraction fan, wall-mounted propeller fan and ancillary equipment for ventilation purposes in Water Supplies installation.

1.2 Standard

The equipment shall be designed, manufactured and tested in accordance with the latest edition of the relevant IEC Standards.

Standard manufactured and mass produced equipment shall be supplied.

1.3 Works Testing

The Contractor shall carry out functional check and insulation test on all fans. Verification tests for running load current, power consumption, power factor and running speed on each type of the ventilation fan shall be carried out.

2. ROOF EXTRACTION FAN

2.1 Fan Design

Roof extraction fan shall be suitable for operation with or without extraction duct. The fan shall be designed to sit horizontally on concrete roof curb and mounted on resilient mounting pads supplied with each fan to reduce vibration.

The fan shall be fitted with an integral weather cap and a back draught gravity shutter to prevent water ingress. Shutter shall be automatically opened by the fan draught and closed by gravity.

Roof extraction fan shall be manufactured from material with good resistance to atmospheric corrosion. The weather cap, unit body and weathering skirt shall be aluminium or ultra violet stabilised, flame retardant fibreglass reinforced resin. The weather cap shall be able to withstand adverse climatic conditions including direct exposure to solar radiation for prolonged periods and strong wind up to 200 km/hour without any damage or deformation.

Impeller shall be aluminium. The mounting frame shall be galvanised steel and of rigid construction. Shutter shall be moulded polypropylene or aluminium.

2.2 Fan Motor

Motor shall comply with the following: -

- (a) Type : 380V, 50 Hz three-phase squirrel cage induction motor
- (b) Duty : S1 duty
- (c) Standards : BS EN 50347 or equivalent and IEC 60034
- (d) Enclosure : Totally enclosed, IP54 to IEC 60529
- (e) Insulation : Class F or class B design with temperature rise not exceeding the limits applicable to class B to IEC 60034 during operation
- (f) Starting method : Direct-on-line
- (g) Bearing : Pre-lubricated and sealed for life

2.3 Technical Performance

The dimensions, air delivery output and maximum sound pressure level of the fan with gravity shutter shall comply with the requirements as listed in the table below. The sound pressure level shall be established from tests in accordance with BS 848-2 or equivalent. The air delivery rate shall be established using the chamber method to BS 848-1 or equivalent.

| Fan Ref. No. | Hole Opening for Fan | Curb External Dimension | Max. Motor Speed (rpm) | Minimum Output at Static Head (m ³ /s) | | Maximum Free Field Sound Level at 3m from discharge outlet (dBA) |
|--------------|----------------------|-------------------------|------------------------|---|--------|--|
| | | | | 50 Pa | 100 Pa | |
| F7 | 700 x 700 | 900 x 900 | 1000 | 2.2 | 1.7 | 58 |
| F8 | 800 x 800 | 1000 x1000 | 750 | 2.9 | 2.4 | 60 |
| F10 | 1000 x1000 | 1200 x1200 | 750 | 4.7 | 3.8 | 62 |

3. PROPELLER FAN

3.1 Fan Design

Propeller fan shall be suitable for wall mounting on an anti-vibration diaphragm plate. Impeller shall be contoured for smooth air flow and to reduce sound level. Impeller shall be aluminium or fibreglass reinforced resin. Aluminium impeller shall be coated with epoxy paint for protection. The completed rotating element shall be dynamically balanced after assembly.

3.2 Fan Motor

Motor shall comply with the following: -

- (a) Type : 220V, 50 Hz single-phase squirrel cage induction motor
- (b) Duty : S1 duty
- (c) Standards : BS EN 50347 or equivalent and IEC 60034
- (d) Enclosure : Totally enclosed, IP54 to IEC 60529
- (e) Insulation : Class F or class B design with temperature rise not exceeding the limits applicable to class B to IEC 60034 during operation
- (f) Starting method : Direct-on-line
- (g) Bearing : Pre-lubricated and sealed for life

3.3 Ancillaries

The following ancillary equipment shall be provided with each fan: -

- (a) Diaphragm plate : The plate shall be galvanised steel coated with epoxy. The plate shall be drilled for ready fixing. For P5 fan, the plate circular opening shall preferably have a belt mouth to improve fan efficiency
- (b) Wire guard : The wire mesh shall be fabricated from stainless steel and shall be sized to prevent accidental contact with moving parts. The guard shall be provided at the motor side
- (c) Louver shutter (if specified) : The louver shall be opened by the fan draught and closed by gravity when the fan stops. The shutter shall comprise aluminium louvers mounted in an aluminium frame and fitted with foam sealing strip
- (d) Wall cowl (if specified) : The cowl shall be supplied to protect the fan outlet from strong winds and rains. The cowl shall be of moulded fibreglass reinforced plastic and of such shape to permit minimum resistance to air flow

3.4 Technical Performance

The dimensions, air delivery output and maximum sound pressure level of the fan with gravity shutter shall comply with the requirements as listed in the table below. The sound pressure level shall be established from tests in accordance with BS 848-2 or equivalent. The air delivery rate shall be established using the chamber method to BS 848-1 or equivalent.

| Fan Ref. No. | Impeller Diameter (mm) | Max. Motor Speed (rpm) | Max. Input at Full Speed (Watt) | Minimum Output at Static Head (m ³ /s) | Maximum Free Field Sound Level at 3m from discharge outlet (dBA) |
|--------------|------------------------|------------------------|---------------------------------|---|--|
| | | | | 50 Pa | |
| P5 | 450 | 1500 | 225 | 0.8 | 58 |
| P6 | 600 | 1000 | 350 | 1.5 | 60 |
| P8 | 800 | 750 | 500 | 2.7 | 60 |
| P10 | 1000 | 750 | 1100 | 5.2 | 62 |

4. INFORMATION TO BE SUBMITTED

Catalogues, general arrangement and wiring connection diagrams and installation, operation and maintenance manuals of the equipment shall be submitted for approval.

Conformity certificates shall be submitted prior to despatch of the equipment.