Ventilation and Odour Control

The aim is to prevent odour nuisances to neighbours, when kitchen equipment is operating under normal circumstances.

The outlet location should also take into account the general wind direction and the distance and configuration of nearby premises, particularly their openable windows.

To achieve these objectives the odour control system shall include an adequate level of:

1. Odour control; and
2. Stack dispersion.

The overall performance of the odour abatement system will represent a balance of 1 and 2.

Discharge stack

The discharge stack shall:

1. Discharge the extracted air not less than 1m above the roof ridge of any building within 20m of the building housing the commercial kitchen.

2. If point 1 above cannot be complied with for planning reasons, then the extracted air shall be discharged not less than 1m above the roof eaves or dormer window of the building housing the commercial kitchen. Additional odour control measures may be required.

3. If points 1 or 2 cannot be complied with for planning reasons, then an exceptionally high level of odour control will be required.

The normal practice of venting through the wall and up a discreet rear elevation are firstly undesirable due to the buildings listing and further hampered due to the 360 degree open aspect of the “theatre” of the site due to its location within the gorge and public viewing points on all sides.

There are five potential ducting routes all with their own benefits and disadvantages, appendix B shows each route on the elevation and section plans.

1. Traditional ducting out through the currently blocked up window in the storage area and up the east elevation facing the weir. Painted matt black to provide the least visual presence possible. Option 1 is shown in magenta on appendix B.

2. Traditional ducting out through the wall below currently blocked up door in the west elevation as it meets the link block and up the North face of the link block to roof level

Painted matt black to provide the least visual presence possible. Option 2 is shown in red on appendix B.

3. Internally ducted through the store area up through the toilets and out of the west elevation at ground floor level and running up the west elevation to one side of the deck linking the old mill to the workshop block again painted matt black. Option 3 is shown in blue on appendix B.

4. Internally ducted through the store and then out of the work areas as ducting suspended from the ceiling running through a new opening in the wall above the doorway between the old mill and the link block and all the way along the ceiling to the existing hole created for the garment chute running two levels up in the link block which previously allowed towels to be finished in the top floor of the old mill and bundled and dropped through this vertical chute to yard level for dispatch. Once the ducting has risen to floor 2 of the link block [the third storey of this building] the ducting will be similarly to the ground floor suspended from the ceiling to run from the position of the vertical chute directly to the south wall and along this face to the south-west corner where a new opening will be required in the wooden floor to run up to the top floor of the link block and then at the top of the concrete block lift plant room enclosure travel through another new opening and exit through the flat roof of the redbrick lift shaft addition to the link block with the discharge finishing below the level of the parapet to hide it from view. Option 4 is shown in yellow on appendix B.

5. The proposed alternative ducting below ground to the retaining wall above the weir taking advantage of the relative isolation and level differences of the site to discharge in an innovative fashion to satisfy all aspects of the differing statutory requirements with the least impact on the heritage asset. Option 5 is shown in green on appendix B.

Each possible route has its draw backs the first three require significant external ducting runs in highly visible public aspects hence have been discounted due to the listing requirements of the building.

The fourth option would normally be the best solution to comply with the requirements in a quasi-traditional manor. However it relies on the openings created by the existing towel chute which in reality are unwanted intrusions on the open plan scale and visual aspects of the link block floor pans. Further additional openings are required again in highly visually obtrusive positions.

Hence our suggested alternative of utilising the fact we have no direct neighbours and are sited within a gorge which naturally channels prevailing winds along its length allows us to take advantage of the dramatic falling ground levels as you travel from south to North through the buildings and duct a ceiling ventilation system in the kitchen area almost a storey above the main terrace area by the river underground at the rear of the building and out through a retaining wall over 9m above the river level.

Risk Assessment for Odour

Odour control must be designed to prevent odour nuisance in a given situation. The following score methodology is suggested as a means of determining odour control requirements using a simple risk assessment approach.

Impact Risk	Odour Control Requirement	Significance Score*
Low to Medium	Low level odour control	Less than 20
High	High level odour control	20 to 35
Very high	Very high level odour control	More than 35

* Based on the sum of contributions from dispersion, proximity of receptors, size of kitchen and cooking type:

Criteria Score	Score	Score	Details
Dispersion	Very poor	20	Low level discharge, discharge into courtyard or restriction on stack.
	Poor	15	Not low level but below eaves, or discharge at below 10 m/s.
	Moderate	10	Discharging 1m above eaves at 10 -15 m/s.
	Good	5	Discharging 1m above ridge at 15 m/s.
Proximity of receptors	Close	10	Closest sensitive receptor less than 20m from kitchen discharge.
	Medium	5	Closest sensitive receptor between 20 and 100m from kitchen discharge.
	Fair	1	Closest sensitive receptor more than 100m from kitchen discharge.
Size of kitchen	Large	5	More than 100 covers or large sized take away
	Medium	3	Between 30 and 100 covers or medium sized take away.
	Small	1	Less than 30 covers or small take away.
Cooking type (odour and grease loading)	Very high	10	Pub (high level of fried food), fried chicken, burgers or fish & chips.
	High	7	Kebab, Vietnamese, Thai or Indian.
	Medium	4	Cantonese, Japanese or Chinese.
	Low	1	Most pubs, Italian, French,

Hence our proposals would score 28, as the dispersion is very poor [20], the proximity of receptors is medium [5], the size of the kitchen is medium with 60 covers [3] and the cooking type is low [1] for normal pub food. Hence the impact risk is high requiring a high level of odour control.

Odour arrestment plant performance

Low to medium level control may include:

1. Fine filtration or electrostatic precipitation (ESP) followed by carbon filtration (carbon filters rated with a 0.1 second residence time).

2. Fine filtration followed by a counteractant/neutralising system to achieve the same level of control as 1.

High level odour control may include:

1. Fine filtration or ESP followed by carbon filtration (carbon filters rated with a 0.2-0.4 second residence time).

2. Fine filtration or ESP followed by a UV ozone system to achieve the same level of control as 1.

Very high level odour control may include:

1. Fine filtration or ESP followed by carbon filtration (carbon filters rated with a 0.4-0.8 second).

2. Fine filtration or ESP followed by carbon filtration and by a counteractant/neutralising system to achieve the same level of control as 1.

3. Fine filtration or ESP followed by a UV ozone system to achieve the same level of control as 1.

4. Fine filtration or ESP followed by wet scrubbing to achieve the same level of control as 1. Maintenance must be carried out to ensure these performance levels are always achieved.

CONCLUSION

The innovative ventilation scheme balances the heritage requirements of the building with the requirement to control odour and noise to a high level as demonstrated by the above risk assessment and the attached resulting specification [Appendix A]

References:-

DEFRA Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems 2005

Health and Safety Executive Ventilation of kitchens in catering establishments. Catering Information Sheet No 10 (rev1)

The Building Regulations Approved Document F – Ventilation (2010 Edition)

KITCHEN-AIR LTD
18 KELVIN ROAD
THORNTON-CLEVELEYS
LANCASHIRE
FY5 3AF

Tel: 01253 866196 Fax: 01253 200446

E-mail: info@kitchenair.co.uk www.kitchenair.co.uk

Restaurant Fire Suppression Systems

Daniel Cunningham
Chemquip Ltd
Torr Vale Mills

27th Nov 2012

Dear Daniel,

Re: Quotation Ref: E9851-12- Cotton Mill Refurb, Buxton Area Kitchen Ventilation.

Thank you for the above enquiry, we have pleasure specifying and quoting the following kitchen ventilation system for the above site as requested.

To manufacture, supply and install the following kitchen ventilation system and components in line with the HVCA DW/172 Specification For Kitchen Ventilation Systems and the information provided.

Item 1. Main Canopy.
1 Number st/st wall mounted combination canopy measuring up to 5000 x 1500 x 500 mm.
Manufactured from 304 grade 1mm thick satin polished stainless steel and incorporating:
Condense collection channel all round.
Full-length rear filter bank with up to 9 number removable stainless steel baffle type filters with 2 Number removable grease collection draws.
1 Number full-length integral insulated fresh air supply plenum with perforated canopy face mounted diffusers, 2 Number recessed high temperature IP65 light units.

Item 2. Extraction System.
Comprising of: Galvanised steel ductwork up to 10 metres long. Exterior ductwork to be buried underground, swaged for extra rigidity and PVC coated for protection. Ductwork termination to be open mesh grille type on cliff face beside the river.
2 Number canopy connection spigots, and 1 Number single phase 240V MUBT acoustic duct fan complete with transformer speed controller.
Extraction rate of: 1.25 Cubic meters per second.

Item 3. Make-up Air System.

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Restaurant Fire Suppression Systems

Comprising of: Galvanised steel ductwork up to 10 metres long. Exterior ductwork to be buried underground, swaged for extra rigidity and PVC coated for protection. Ductwork termination to be open mesh grille type on cliff face beside the river.
1 Number filter box with disposable bag type filter.
2 Number canopy connection spigots, and 1 Number single phase 240V MUB acoustic duct fan complete with transformer speed controller.
Extraction rate of: 1.05 Cubic meters per second.

Item 4. Gas Interlock System.
Comprising of: 1 Number alarm control panel, fan run sensors, 2 number remote emergency stop buttons and a gas solenoid valve. (Please note these items are supply only and must be installed by your own site electrician and gas safe register engineer).

Optional Item 5.
1 Number 20KW Three phase electric heater battery with built in automatic controls to the make up air system as recommended by HVCA/DW172 to temper the incoming air to 10 Deg C in the winter months.

Optional Item 6.
Odour control to the extraction system comprising of: 1 Number Xtract 2100 Ozone injection unit, flexible connections and pre-filter.

Optional Item 7. Stainless Steel Wall Cladding.
Stainless steel wall cladding measuring 5000mm x 2000mm to rear under side wall of the main canopy. Manufactured from 1mm 304 Grade satin polished stainless steel and complete with bright polished jointing strips and end caps.

Optional Item 8. Dish Washer Canopy.
1 Number stainless steel condense canopy measuring 1100 x 1100 x 500 mm manufactured from 304 grade 1.2mm thick satin polished stainless steel incorporating: Removable condense run off baffle plate and rear drain off point for connection to waste by others.

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Restaurant Fire Suppression Systems

All excavation and ground works are to be completed by the clients own contractors.
All electrical wiring, plumbing and builders work must be completed by the client's own contractors.
Pre-manufacture drawing will be provided for approval once a purchase order has been received and a site survey completed.
Estimated completion date would be 4 weeks from receipt of a purchase order and 3 weeks from approval of drawings.

All prices are firm for a period of 60 Day and are subject to site survey.
A deposit or pre-payment may be required to secure this order dependent on credit status.

We trust that the forgoing is in accordance with your requirements,

Regards,

Darren.

Darren Sarjantson
Operations Manager
Kitchen-Air Ltd
Tel. 01253 866196
Fax. 01253 200446
Mobile: 07761376632
Email: info@kitchenair.co.uk

MUB/T 042 450E4

Item no. 33658

Document type: **Product card**
Document date: **2012-11-27**
Generated by: **Systemair Online Catalogue**

Description

- Up to 120°C medium temperature, continuous operation
- Multi-functional use, e.g. for kitchen exhaust air
- Modular system
- Pre-assembled isolator is standard
- Low sound level
- Easy to maintain and reliable
- Motor outside the air stream

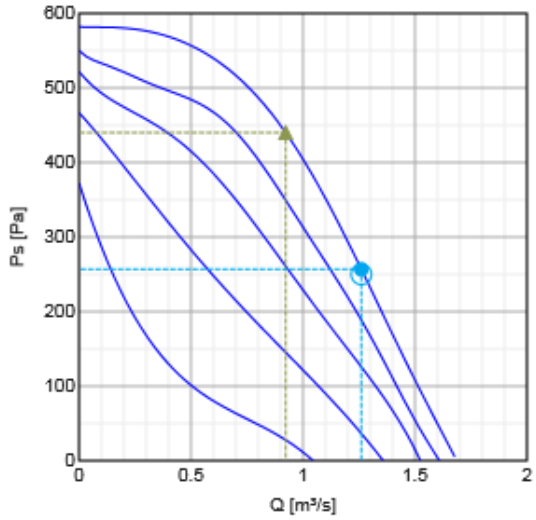
All MUB/T fans have impellers with backward curved blades, manufactured from aluminium, and IEC standard motors outside the air stream with efficiency class IE2 for all 400V three phase motors from 0.75 kW. The MUB/T fans are suitable for medium temperatures up to 120°C continuously. Motor protection by cold conductors or thermal contact, to be connected to an external motor protection device.
The casing consists of an aluminium frame with fibreglass reinforced plastic corners and double skin, galvanised steel panels with a 20 mm mineral wool insulation. Panels are removable, allowing flexible ventilation solutions - the air direction can easily be changed. With quick lock access door. The MUB bottom panel is shaped as a grease tray and incorporates a pre-mounted 1" drain plug. An isolator switch is mounted on the casing.
Several filter modules like f.e. activated carbon- or aluminum filters are available, calculated individually on the working point.

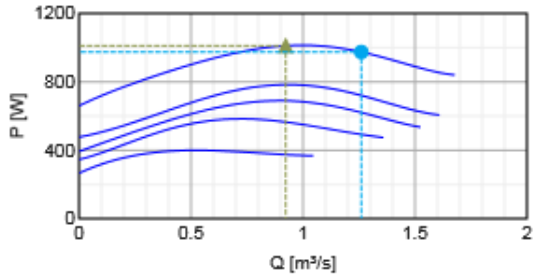
Technical parameters

Parameter	Value	Unit
Voltage	230	V
Frequency	50	Hz
Phase	1	~
Power (P1)	1014	W
Current	5.3	A
Starting current	18	A
Max. airflow	1.68	m³/s
Fan impeller speed	1430	r.p.m.
Max. temperature of transported air	120	°C
Sound pressure level at 3 m	50	dB(A)
Weight	53	kg
Insulation class, motor	F	
Enclosure class, motor	54	IP
Capacitor	30	µF

Diagrams

Diagrams





Hydraulic data

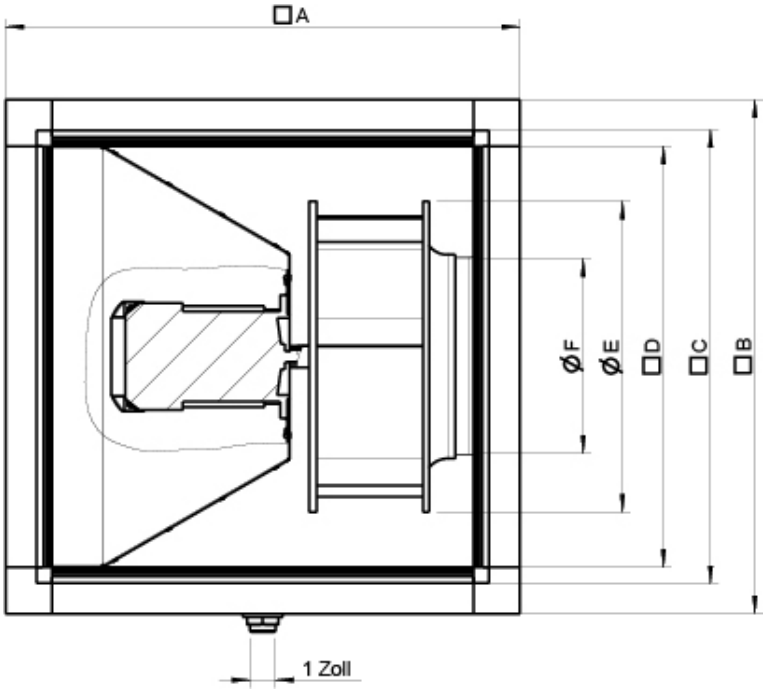
	Required point		Working point						
	Q [m³/s]	Ps [Pa]	Q [m³/s]	Ps [Pa]	P [W]	n [r.p.m.]	I [A]	SFP [kW/m³/s]	U [V]
Max efficiency			▲ 0.922	▲ 440	▲ 1011	1406	4.5	1.1	230
User	○ 1.26	○ 250	● 1.26	● 257	● 974	1414	4.38	0.773	230

Acoustics

		Mid-frequency band, Hz								
	Hz	Tot	63	125	250	500	1k	2k	4k	8k
LwA Inlet	dB(A)	72	59	61	65	67	66	63	48	51
LwA Outlet	dB(A)	74	61	63	67	69	68	65	60	53
LwA Surrounding	dB(A)	57	44	46	50	52	51	48	43	36

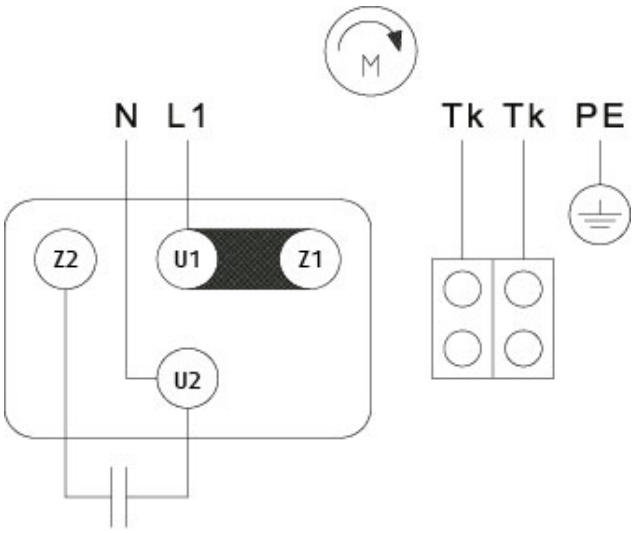
Measuring point: qv = 0,88 m3/s, Ps = 470 Pa

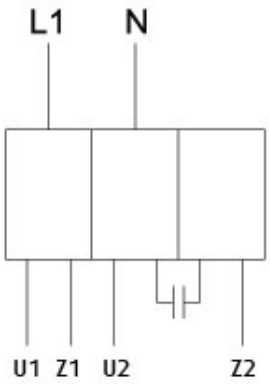
Dimensions



	□A	□B	□C	□D	øE	øF
MUB/T 042 450E4	670	670	590	548	454	286

Wiring





Accessories

Electric accessories

REU 7 Speed control (5007)
RTRE 7 Speed control (5011)
SDM Service Door MUB 042 comp. (32572)
S-ET 10 Motor Protection (5154)
TES 070A5 Speed control (9514)

Accessories

CCM inlet MUB042 d400 (311780)
CCM inlet MUB042 d500 (311781)
CCM outlet MUB042 d400 (311682)
CCM outlet MUB042 d500 (311683)
CCMI outlet MUB042 d400 insul. (311562)
CCMI outlet MUB042 d500 insul. (311565)
FGV 042/586-586 flex. conn. (4605)
M-SG 042/588x588 (301345)
SDM Service Door MUB 042 comp. (32572)
SRKG 042/588-588 shutter valve (4868)
UGS 042/500 adapter flex. (4357)
WSD 042 (730x730) (300689)
WSG 042 weather protec. guard (4362)

MUB 042 450E4-A2 MULTIBOX

Item no. 2124

Version: 50 Hz - 90° airflow

Document type: **Product card**
Document date: **2012-11-27**
Generated by: **Systemair Online Catalogue**

Description

- Speed-controllable
- Modular system
- Integral thermal contacts
- Low sound level
- Flexible airflow direction due to removable panels
- Installation in any mounting position
- Maintenance-free and reliable

The MUB fans size 450 have impellers with backward curved blades, manufactured from aluminium. The MUB 450 is equipped with external rotor motors, fully speed controllable. The three phase motors are D/Y connected for two speed operation. Motor protection is done by thermal contacts, which have to be connected to an external motor protection device. The casing consists of a corrosion-resistant aluminium frame with fibreglass reinforced plastic corners of PA6; highly shock-resistant. The double skin panels are manufactured from galvanised steel with 20 mm mineral wool insulation. To avoid condensation the profile is provided with a separate chamber to fix screws. The Multibox fans are delivered for straight through airflow but can easily be rebuilt due to removable panels. This allows flexible ventilation solutions. The MUB can also be used as extract- or supply air unit in air handling units. Installation in any mounting position is possible.
MUB with additional modules (filters, heaters etc.) are available as air handling units "K025, K042 or K062" on request!

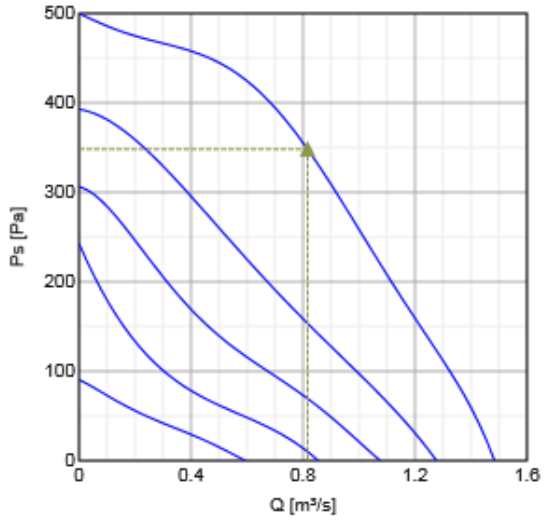
Note! Motors marked with E (e.g. E4-A2) is 1-phased

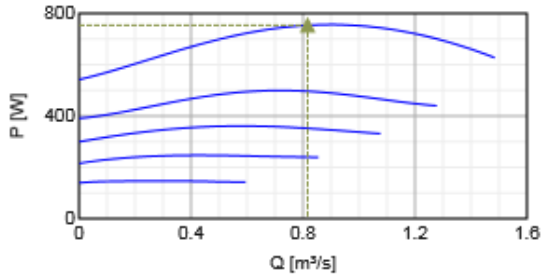
Technical parameters

Parameter	Value	Unit
Voltage	230	V
Frequency	50	Hz
Phase	1	~
Power	756	W
Current	3.33	A
Max. airflow	1.48	m³/s
Fan impeller speed	1249	r.p.m.
Max. temperature of transported air	60	°C
Max. temperature of transported air when speed-controlled	60	°C
Sound pressure level at 1 m	52	dB(A)
Weight	52.5	kg
Insulation class, motor	F	
Enclosure class, motor	54	IP
Capacitor	16	µF

Diagrams

Diagrams





Hydraulic data

	Working point						
	Q [m³/s]	Ps [Pa]	P [W]	n [r.p.m.]	I [A]	SFP [kW/m³/s]	U [V]
Max efficiency	▲ 0.816	▲ 348	▲ 754	1251	3.32	0.923	230

Acoustics

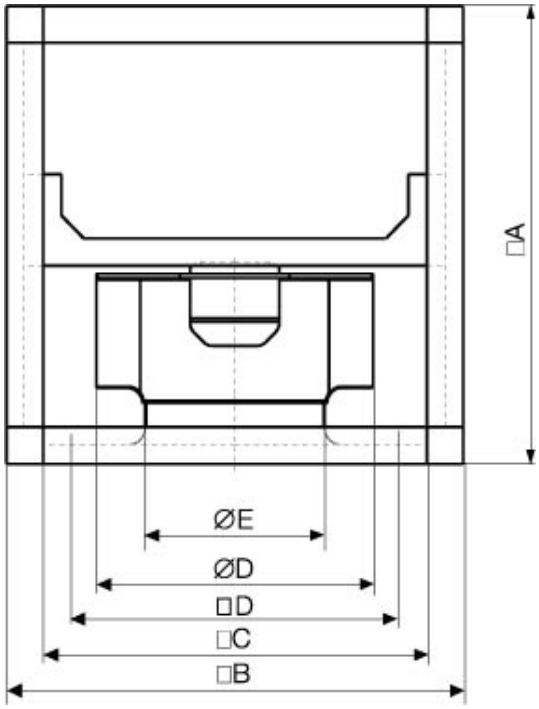
Mid-frequency band, Hz

Hz		Tot	63	125	250	500	1k	2k	4k	8k
LwA Inlet	dB(A)	75	62	64	68	70	69	66	61	54
LwA Outlet	dB(A)	77	64	66	70	72	71	68	63	56
LwA Surrounding	dB(A)	59	46	48	52	54	53	50	45	38

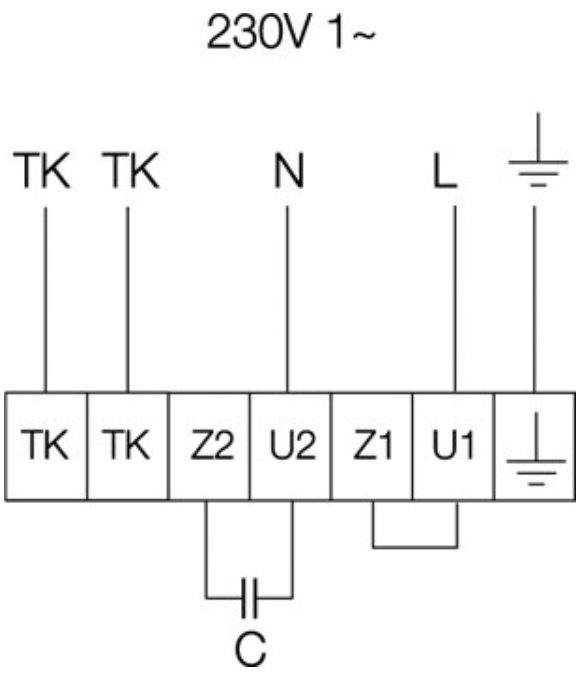
Measuring point: qv = 1,06 m3/s, Ps = 250 Pa

Dimensions

	□A	□B	□C	□D	øD	øE
MUB025 355	500	500	420	378	355	224
MUB042 400	670	670	590	548	404	253
MUB042 450	670	670	590	548	454	286
MUB042 499	670	670	590	548	504	321
MUB042 500	670	670	590	548	504	321



Wiring



Accessories

Electric accessories

REE 4 Speed control (5317)
REU 5 Speed control (5006)
REV-5POL/05 ON/OFF (33979)
RTRE 5 Speed control (5010)
S-ET 10 Motor Protection (5154)

Accessories

CCM inlet MUB042 d400 (311780)
CCM inlet MUB042 d500 (311781)
CCM outlet MUB042 d400 (311682)
CCM outlet MUB042 d500 (311683)
CCMI outlet MUB042 d400 insul. (311562)
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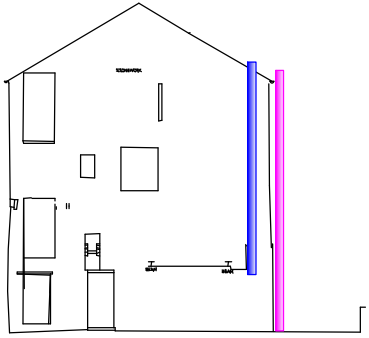
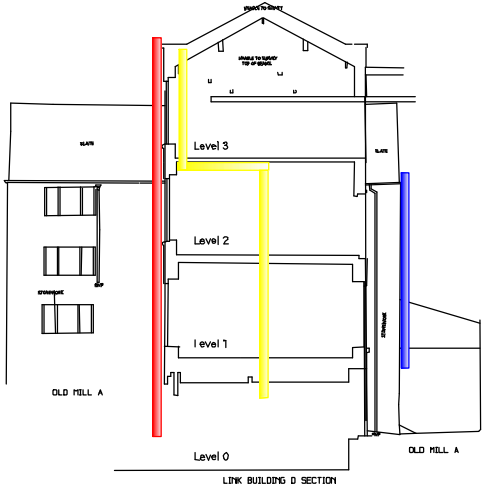
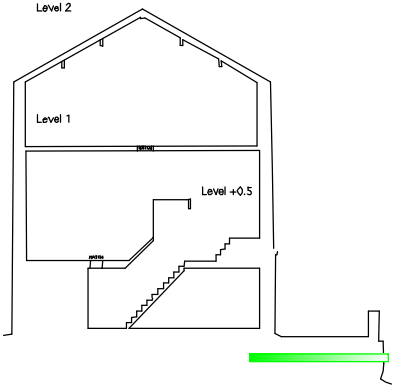


OLD MILL BUILDING A SOUTH ELEVATION

OLD MILL BUILDING A EAST ELEVATION



OLD MILL BUILDING A WEST ELEVATION / LINK BLOCK BUILDING D SECTION



OLD MILL BUILDING A SECTION A1

TORR VALE MILL: VENILTATION AND ODOUR CONTROL STATEMENT

APPENDIX B