FUME CUPBOARD SPECIFICATIONS

The contractor shall supply and install the fume cupboards as shown on the drawings and in accordance with the following specification. The cupboards shall be of the Labrocare“ type manufactured and supplied by Thermoplastic Engineering Ltd.

All Labrocare“ fume cupboards shall be completed with Brinkmann“ exhaust systems comprising of PVC centrifugal fan, ductwork, discharge cowl and supports.

It is the responsbility of the contractor to ensure that all fume cupboards and exhaust systems conform to the requirements of AS2430.3, AS/NZS2243.8 (2001) and AS3000.

SERVICES

Electrical Services:

The electrical service outlets, lighting and controls shall be in accordance with AS3000, for area classifications specified in AS2430.3 for laboratory fume cupboards, and the requirements of AS/NZ2243.8 (2001).

GPO s are to be located on the outside face of the fume cupboard and are to have RCD protection.

The fume cupboard Microprocessor control panel shall be located on the outside face of the fume cupboard and shall include the exhaust system start, gas and power start, light on/off, emergency shut down and a visual light to indicate power is live to the fume cupboard.

Other (piped) Services:

The outlets to other services (e.g. gas, water) shall be finished in polycoat powder lacquer, and shall be located inside the fume cupboard and be colour coded to match control valves in accordance with AS 1345 or DIN 12920.

All pipework between control valves and outlets shall be pre-plumbed and tested by the fume cupboard supplier.

Controls:

All services, other than electrical, shall be individually controlled and the controls shall be located on the outer face of the fume cupboard and not protrude beyond the line of the face of the fume cupboard. Controls should be colour-coded in accordance with AS1345 or DIN 12920.

Fume cupboard control and isolation systems to be operated by either a Siemens PLC (Programmable logic) controller or by a EcoAir system. In accordance with AS/NZS 2243.8 (2001), the unit shall include battery back-up that is automatically charged when the fume cupboard is running.

ENERGY CONSERVATION

Auxiliary Air Supply - not acceptqble (refer clause: 3.1.5.1 AS2243.9).

Variable Flow Systems - refer Section 2: P3 /.

FIXED VOLUME FUME CUPBOARD

Operation:

The quantity of air extracted from the conditioned air space through each fume cupboard shall remain constant.

The quantity of air through the open sash of the fume cupboard shall be modulated to maintain an average air velocity of 0.5m/s across the open sash in any sash position. As the sash is lowered it will open up a bypass baffle at the top of the fume cupboard, allowing air to flow into the top of the fume cupboard thus balancing the fume cupboard.

FIXED

The sash shall be easily moveable vertically rising panels, glazed with armour plate glass. The sash to be counterbalanced by a one piece balanced weight, supported by cables running through a stainless steel ball bearing pulley. The bottom of the sash will have a full width pull handle of a type that will minimise the airflow disturbance across the sash opening. To be made from 32mm diameter stainless steel pipe and finished in powder coat Flame Red PE 5490077.

Maximum Working Sash Opening:

To reduce the volume of air exhausted from the laboratory the fume cupboards maximum working sash opening shall be limited to 500mm by a physical stop preventing the sash being opened further. In accordance with AS/NZS2243.8 (2001) it shall be possible to open the sash to 730mm by means of key lock which shall automatically reset when the sash is lowered below the 500mm maximum working sash opening level.

Minimum Sash Opening:

Stops shall be fitted to provide a minimum opening of at least 50mm below the sash.

Design of Sash Opening:

The sash opening shall incorporate aerodynamic features to promote non-turbulent entry of room air into the fume cupboard working chamber.

BAFFLES

Internal removable air distribution baffles shall be fitted to the rear and top of the fume cupboard chamber. An anti-roll baffle shall be fitted to the top front of the fume cupboard chamber toensure scavenging of fumes from behind the sash. The baffle fasening system shall also serve as fixing points for Labzone laboratory equipment scaffold.

LIGHTING

Light capable of providing illumination at the work surface shall not be less than 600 lux and shall be located outside the fume cupboard working chamber behind a 5mm non-opening transparent or translucent panel, sealed from the interior chamber. For cleaning or replacement a three-pin plug will be provided.

SINK

The work surface is to be provided with sinks as specified in the Fume Cupboard Schedule.

FUME CUPBOARD SPECIFICATIONS (Continued)

CONSTRUCTION

The fume cupboard shall not have wall cavities but be of single wall construction.

CONSTRUCTION

The chamber, baffles and floor should be constructed from non-porous white rigid PVC.

The fume cupboard floor shall be Trespa Top Lab Plus or a similar material recommended by Thermoplastic Engineering Ltd. (Perchloric use - the floor shall be 10mm armour toughened glass). The sash whether acrylic or glass must be suitable for the application.

EXHAUSTS

Exhausts from different fume cupboards shall not be combined.

FAN

The fan shall be the Brinkmann“ centrifugal tyoe made from corrosion resistant materials. The impeller shall be a one piece 36 blade polypropylene construction, statically and dynamically balanced. Tha casing shall be either PVC or Polypropelene. The pedestal shall be galvanised steel. A drain point shall be provided in the fan cowling.

FAN STACK DISCHARGE

A velocity Advanced Air cowl shall be fitted to the fan stack discharge to maintain a maximum fume discharge velocity of 10m/s.

UPVC DUCTWORK

Fume cupboard exhaust ductwork and associated vertical discharge cowls shall be made from light weight corrosion resistant unplasticated polyvinyl chloride (UPVC).

Circular ductwork with a minimum wall thickness of 3mm should be used where possible. Blends should be of moulded radiused construction with a minimum wall thickness of 2.5mm. Duct is to be joined via spigots or sockets with an approved solvent or hot air welding. All fabricated ductwork whether rectangular or circular, shall be hot air welded. All joints are to be air tight.

The construction and installation is to be strictly in accordance with AS/NZS2243.8 (2001).

SCHEDULE OF FUME CUPBOARD

The attached schedule details the fit-out requirements of each fume cupboard.

OPTIONAL
FUME CUPBOARD MOUNTING

All fume cupboards shall be mounted on Labzone white powder coated steel under bench with under bench cupboard complete with doors, handles and shelves. Infill panels above the fume cupboard to ceilling shall be provided by the builder and adequate access panels shall be provided for servicing of fume cupboard light, controls and sash movement systems.

VARIABLE FLOW SYSTEMS

The variable flow system shall be Aircare s Xtracare VSS“ or Ecoair“, and the fan inverter shall be a PDL s Xtravert.

The fan inverter shall indirectly work off sash position and incorporate a pressure transducer that monitors the duct pressure and compares the sash position against the expected duct pressure and if the pressure is below what is expected (in any sash position) the fume cupboard shall initiate the emergency shutdown procedure. Provision may be made to boost the exhaust flow rate above the face velocity requirements in accordance with AS/NZS2243.8 (2001) by a manual override control.

FUME ELIMINATOR

The Contractor shall supply the Thermoplastic Engineering Ltd, Advanced Air“ Eliminator.

Description:

The fume eliminator shall be for horizontal air flow and shall be the Advanced Air“ manufacture deflector blade design incorporating packs of hooked panel blades. Wide angle, full coverage, corrosion resistant water spray jets (with solenoid control valve) shall be positioned in the inlet duct of the eliminator. Inlet and outlet transitions shall be designed to achieve good flow distribution across the whole blade area. Materials of construction should be either PVC or Polypropylene. No tools shall be required for access for inspection and clean down of the blade pack. Water to the jets shall be arranged to turn on and off with the exhaust fan.

FUME WET SCRUBBER

The Contractor shall supply the Thermoplastic Engineering Ltd, Advanced Air“ Scrubber.

Description:

The fume scrubber should be designed to either fit directly onto the top of the fume cupboard (to eliminate ducting) with the exhaust gases passing vertically up through the scrubber, or
where site space restrictions do not permit the installation of a vertical scrubber on top of the fume cupboard, a horizontal roof mounted scrubber can be used. In either case the scrubber shall be of the packed design.

Vertical Scrubber:

The scrubber shall be designed to fit directly onto the fume cupboard exhaust outlet. The exhaust air shall pass up through a packed bed of polypropylene pall rings. Inlet and outlet transitions shall be designed to achieve good flow distribution across the whole section of the packed bed. Immediatley above the packed bed will be wide angle, full coverage, corrosion resistant water spray jets with solenoid valve. A transparent windoe shall be incorporated into the scrubber body, providing a view of the working water spray jets. Above the sprays there shall be a mist eliminator bank effective to 99%‡15 of the saturated exhaust air before it enters the duct. Water to the jets shall be arranged to turn off with the exhaust fan.

FUME CUPBOARD SPECIFICATIONS (Continued)

Horizontal Scrubber:

The Fume Scrubber Shall be a Advanced Air self contained fume wet scrubber and mist eliminator as manufactured by Thermoplastic Engineering Ltd. The scrubber shall be designed to fit in the horizontal duct. Inlet and outlet transitions shall be designed to achieve good flow distribution across the whole cross section of the pached bed. The exhaust air shall pass horizontally through a packed bed of polypropylene pall rings. Immediately above the packed bed will be wide angle, full coverage, corrosion resistant water spray jets (with solenoid control valve). Positioned immediately on the downstream side of the packed bed shall be a mist eliminator comprising a pack of hooked panel blades. No tools shall be required for access for inspection and clean down of the packed bed and mist eliminator blade pack. Water to the jets shall be
arranged to turn on and off with the exhaust fan.

Spray Water Recirculating Tank:

A water recirculating tank shall be positioned on the underside of the fume eliminator or horizontal wet scrubber. The recirculating tank shall incorporate a level float connected to the water supply and a 240 Volt pump providing water at pressure to the sprays. The tank shall include an inspection window in its side. Connection between the eliminator or scrubber and the water recirculating tank shall be by hand toggle clamps.

Baffle Wash Down Facilities:

Water sprays shall be positioned behind the cupboard baffles and be arranged to activate on fan shut down. The cupboard work surface should have an integral trough/slump to collect wash down water.

HEAT SHIELDS

Heat shields or heat resistant baffles, where fitted, shall be designed to provide adequate protection for the inner surfaces of the fume cupboard. They shall be easily removable for cleaning. Heat shields shall not be positioned so that they compromise the safe and efficient operation of the fume cupboard.

FIRE SPRINKLERS

Shall be the responsibility of the fire sprinkler system contractor and installed in accordance with AS/NZS 2243.8 (2001).

THERMAL DETECTOR

A thermal detector shall be located in the exhaust throat of the fume cupboard, shall be corrosion resistant and should activate at a temperature not more than 60ßC.