

# INSTALLATION AND MAINTENANCE MANUAL

## NEXT-AHU™



## VERSION V2008.1

### Air Change Manufacturing Pty Ltd

ACN 121 537 620  
A wholly owned subsidiary of Air Change Pty Ltd  
Refrigerant Trading Authorisation No AU07780

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# INSTALLATION INSTRUCTIONS FOR AIR-CHANGE HEAT/ENERGY RECOVERY OUTDOOR AIR HANDLING UNIT




## 1 INTRODUCTION

### 1.1 Safety Considerations

 **IMPORTANT**  
**DO NOT LEAVE HEAT EXCHANGER EXPOSED TO DIRECT SUNLIGHT.**  
Prolonged exposure to UV light can cause severe damage to the structure of the heat exchanger, and will void the warranty.

 **WARNING**  
Improper installation, service, maintenance or use can cause explosion, fire, electrical shock or other conditions which may cause personal injury or property damage and will void the warranty. Check with Air Change Manufacturing or nearest Air Change Manufacturing dealer for any information required on this equipment.

 **DANGER**  
Electrical shock can cause personal injury or death. Before performing any work on this equipment, the electrical supply must be turned off at the electrical service box to avoid the possibility of shock, injury or damage to equipment.

**Note:** There may be more than one power supply circuit.

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## 1.2 Note to Installer

- Only trained and qualified personnel should install, repair or service air conditioning equipment. Untrained supervised operatives can perform basic maintenance functions such as cleaning or replacing filters. Service personnel must perform all other operations.
- Installing and servicing air conditioning equipment can be hazardous due to electrical and mechanical components.
- When working on air conditioning equipment, observe precautions in all literature, tags and labels attached to or shipped with unit. Follow all safety codes and guidelines. Wear safety goggles, work gloves and any protective clothing.
- All work must comply with relevant SAA wiring rules and local authority codes. Installers must ensure that all statutory regulations and by laws have been addressed.
- Installers must ensure that the structures built to take the units have been suitably constructed for the purpose, all safety precautions have been applied prior to installation, and all preparation work has been constructed and suitably sized for its purpose.

## 1.3 Inspection and Unpacking

- The unit should be inspected upon delivery for possible external damage incurred during transport. If damage is evident it should be noted on the freight docket and the Air-change sales office contacted. A claim should be lodged with shipping company within three (3) days if shipment is aged or incomplete.
- **If major damage is apparent, do not lift unit on to site without prior approval from Air-change.** The unit was tested and inspected prior to packing and was in perfect condition at that time.
- Check unit rating plate to ensure the correct unit matches the job specifications.

## 1.4 Unit handling

- Protective crating or packaging and the skids should not be removed until the unit is at the point of installation. When removing packaging or crating, be careful not to damage, scratch or dent the unit. After removal of packaging or crating, all removable access panels should be opened to inspect for unit internal damage.

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#### 1.4.1 Lifting with a Forklift

- Exercise extreme caution when lifting with a forklift. Do not exceed the height limit of the forklift and never allow fork to lift against the bottom panel of the unit.
- Make careful consideration of the unit's centre of gravity and distribute the weight equally on both forks. Test load to see if the weight is equally distributed. Do this by lifting the unit a few centimetres off the floor and holding it there before lifting any further or before transporting the unit.
- Larger units which have a width greater than the length of the fork tines will need to have extended slippers added to the fork tines.

#### 1.4.2 Lifting with a Crane

- **NOTE: All units should be lifted into position using slings.**
- Where units have to be lifted into position, installers must check unit weight is within the tolerance of the safe working capacity of the lifting equipment.
- When preparing to move the unit always determine the unit's centre of gravity in order to equally distribute the weight.
- Spreader bars must be used between slings to prevent crushing the frame or panels. Spreader bars and/or pipe are not supplied with units.
- Spreaders whose length exceeds the largest dimension across the unit should be across the top of the unit.

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## 2 INSTALLATION

### 2.1 Location

#### 2.1.1 General

- The NEXT-AHU™ is designed as a stand alone ventilation or air conditioning system. The NEXT-AHU™ is marked with stickers “Outdoor Air” “Supply Air”, “Return Air” and “Exhaust Air” showing the air path through the unit.
- Exhaust air should be directed in a clear path without obstacles to atmosphere.
- Fresh Supply inlet should be clear of any polluted air from other units, exhaust fans, etc.

#### 2.1.2 Level and suitable base

- These units are primarily designed to be fitted on a suitably reinforced support base of sufficient strength to adequately take the full operating weight of the equipment.
- The unit must be mounted on a level base and any slope should not exceed +5mm over the unit's dimensions in order to ensure proper condensate drainage (HRV units).
- On rooftop applications, locate unit at least 6” (152mm) above roof surface. Place unit above load bearing wall. Arrange supporting members to adequately support unit and minimise transmission of vibration to building.

#### 2.1.3 Suspending the unit

- Before suspending the unit, check the supporting beams to be used to verify that it has sufficient load carrying capacity to support the weight of the unit.

#### 2.1.4 Access for maintenance

- The unit must be mounted so that maintenance personnel can gain access to all parts of the unit and be able to remove fans, heat exchangers or coils via access doors as required. Note: see attached dimensional data drawing.
  - Minimum space requirements:
  - 600mm for electrical access;
  - 1000mm from fresh air Inlet;
  - 1500mm from all Access doors on the unit in accordance with the design and construction to allow servicing or removal of parts.

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### 2.1.5 Ductwork considerations

- The unit must be situated close to the point of use to prevent unnecessary long runs of ductwork.

### 2.1.6 Fresh air inlet precautions

- The exhaust discharge should be directed away from any windows that can be opened.
- Location of the fresh air inlets should adhere to the Australian Standards 1668.2 Code.
- The fresh air intake should be positioned clear of any objects which could obstruct the airflow and be away from any exhaust discharge ducts from the unit or any adjacent equipment.
- Fresh air inlet should be fitted with a weather shelter and inlet and exhaust points should be minimum 6m apart. See picture below.



### 2.1.7 Plant room or roof space installation

- When a unit is fitted into a plant room, the external louvre or ducting feed system must have sufficient free area to prevent negative pressure build-up in the plant room. Should any unit be mounted inside a plant room, please contact Air-change to ensure discharge exhaust fan can handle additional external duct static.

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### 2.1.8 Noise levels

- Do not sit unit adjacent to sleeping quarters unless background noise levels have been checked and permitted by the appropriate authority.
- It is recommended that rubber supporting or vibration absorbing pads be used to support the unit to minimise any vibration being transmitted into the building structure. We recommend wafer pads be used under the frame. We also recommend flexible couplings be fitted to the supply and return ducts to reduce vibration transfer.

## 2.2 Drainage (unit with Sensible Heat Exchanger only)

 **IMPORTANT: External drip trays are mandatory for units installed in plant rooms or inside roof space. Drainage from the unit and external drip tray is the responsibility of the installing contractor. Air-change will not accept any liability for any water damage resulting from incorrect installation.**

- Unit with Sensible Heat Exchanger to be trapped (standard “U” trap). Prior to start up, charge the external U trap by pouring several litres of water into the main drain tray, allowing run off to seal the drain outlets to prevent outside air being drawn into the unit.
- The unit should be installed with a positive fall to ensure water drains away freely through drain holes provided. Drain lines must be as large as or larger than the fitting to which the line is being connected. Ensure that drain lines are fitted to both the dump outlet as well as the overflow outlet (if necessary). Drain line should have a minimum fall of 20mm per m length.
- If drain lines are to be extended from the inside to the outside of the building they must be extended beyond the walls of the building to eliminate the possibility of damage caused by drain water running down the exterior surface of the building wall.
- When lines are exposed to freezing temperatures or when they are subject to the formation of condensation, the drain lines should be insulated.

## 2.3 Phase Rotation

- All 3 phase motors are phase connected in the factory. If opposite direction is required, swap any two phases at the mains terminal block.

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## 2.4 Filters



**IMPORTANT: Never operate unit without filters fitted to the return and fresh air intakes with blower access panels removed.**

- Filters are not supplied and are fitted by the installer to the customer's requirements. If special high efficiency particulate arrestance filters are to be used, a check should be made with your agent that the correct fans have been specified at tender stage to accommodate the excess static pressures. Return air filters should be fitted as part of the return air ducting and should be sized according to general good practice.
- 50mm Panel filters are recommended.
- NOTE: If these units are being used during construction when adhesive, sealers, ducts, new and used carpets are being installed make sure all equipment is fitted and adequately protected. We recommend using disposable or temporary filters during commissioning and during pre-hand over running.

## 2.5 Electrical/Electronic Connections

- For Power requirements and voltages, see specifications of unit.
- The electrical diagram is attached to the door of the electrical box on the unit.

### 2.5.1 Mains power supply and fusing

- A power supply rated at 415v +/- 10% 3 phase or 240v +/- 10% 1 phase, 50Hz is required to operate the machine within manufacturer's tolerances.
- Mains cables and control circuit wires are to be connected as per wiring diagram.
- All wiring must comply with relevant local wiring rules.
- The units require a mains circuit breaker or HRC fusing capable of handling the full load of the unit and selected in accordance with SAA Wiring Rules to be fixed external to the unit.
- A mains switch is fitted to the electrical board inside unit.

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### 2.5.2 Electrical Connection and Supply Size Precaution:

- We recommend an isolator be mounted externally to the unit (not supplied) and a suitably sized fuse mounted back at the distribution board to provide local isolation during service and maintenance periods.

## 2.6 Ducting

- Flexiduct ducting is recommended for use with all Air Change Manufacturing systems.
- Ducts should be insulated in accordance with ASHRAE Standard 90.1
- Fan inlet conditions can affect the fan performance, particularly ducting elbows which can cause non-uniform inlet flow and swirl at the inlet. To reduce losses due to fan system effect, adequate length of straight duct between elbow and fan inlet should be provided or turning vanes used in the elbow.
- Poor fan outlet conditions can affect the fan performance, particularly the effective duct length. For 100% recovery, the duct must meet requirements for 100% effective duct length.



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## 3 SYSTEM COMPONENTS

### 3.1 Requirements

- If specified for corrosive air applications, the required components are coated with corrosion resistant materials selected by Air Change Manufacturing. Upon request specifications of the treatments used can be supplied.

### 3.2 System Components

- The unit employs up to 50% outside air and comprises of the following components:

#### 3.2.1 Cabinet

- Prefabricated wall and ceiling panels of stressed skin insulated sandwich construction consisting of metal internal parts and external skins bonded under pressure with thermosetting adhesive to a core of rigid cellular insulation.
- Insulation is a single layer of rigid polystyrene sheet to AS 1366.3 Class SL continuous without voids, free of line faults through or across the sheet.
- Purpose built UV treated polymer joiners are used to insulate against heat loss through the body of the unit. The cabinet is fully weatherproof and designed for outdoor use.
- Galvanised steel construction on base.
- Air Change Manufacturing units are designed with extremely large access doors to ensure that all parts are accessible for servicing and replacement.

#### 3.2.2 Fans

- Supply and exhaust fans are fabricated from galvanised steel. A range of fans are used to suit the size of unit (refer to attached schematic).
- NEXT-AHU™ units use VSD controlled direct drive via a flexible coupling on both supply and exhaust fans and have a maximum operating pressure of 1200 Pa. This eliminates the need for belts and pulleys.

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### 3.2.3 Heat Exchanger

- The enthalpy heat exchanger uses counter flow with transfer media between moulded plastic air guiding frames for a very high efficiency and long life.
- There is no cross contamination between the air paths.



- The Energy Reclaim (enthalpy) counter flow enthalpy heat exchanger incorporated into the unit will reclaim up to 75% of the energy (under normal operating conditions) from the space return/relief air to outside air, i.e. to pre-treat the outside air. This results in a saving of up to 75% on the cost of heating or cooling the outdoor air.
- The Heat Reclaim (sensible) counter flow heat exchanger incorporated into the unit will reclaim up to 80% of the heat (under normal operating conditions) from the space return/relief air to outside air, i.e. to pre-treat the outside air. This results in a saving up to 80% on the cost of heating or cooling the outdoor air. (Typical use is in swimming pools)

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**IMPORTANT: DO NOT ATTEMPT TO CHANGE THE LENGTH OF THE HEAT EXCHANGER BY REMOVING END PLATES AND PLASTIC PLATES.**

**This can mean that the media between the plates is dislodged from its position and therefore will cause lack of performance through increased pressure drop through the heat exchanger or damage to the Sensible media. Any tampering with the heat exchanger may invalidate our warranty and Air-Change will not be held responsible for lack of performance or pressure drop.**

**If the heat exchanger is the incorrect length, please return to Air-change for a replacement unit.**

- Heat Exchangers are constructed of plastic moulded plates with media between each plate. The heat exchanger has been secured by end plates under pressure.
- Enthalpy heat exchanger has end plates and corner/middle fixings of galvanised steel and non-washable enthalpy media between the plates.
- Sensible heat exchanger has end plates and corner/middle fixings of powder coated aluminium with sensible Mylar media between the plates.

### **3.2.4 Electrical**

- Electrical diagram is attached to the inside of the Access door.
- Electrical switchboard incorporated in the unit is fully internally wired and housed within the compressor enclosure. It is of industrial standard and conforms to Australian Standards and specific state electrical authorities.
- All wiring is independently colour coded.
- Main power entering the system is protected by an isolation switch inside the unit. Circuit breakers, contactors and overloads are used on the three phase fan motors to ensure maximum protection at all times.
- Single phase fan motors are internally protected and there is no need for external overloads.
- Internal controls are 24V a.c.

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- The units employ dampers which can be used to adjust airflow, or operate under Economy Cycle mode. For control of motorized dampers please refer to the electrical diagram.

### **3.2.5 Variable Speed Drive (VSD)**

- NEXT-AHU™ units employ ABB VSD's to adjust and maintain fan motor speed.
- Because of the need for cooling, there must 100mm free air passage above and below the VSD's. A small grill between the Compressor compartment and the negatively pressurised Exhaust-Air compartment allows air to be drawn over the VSD's, removing heat generated. Care must be taken not to allow any debris to block this air passage.
- See VSD manual for instructions on speed adjustment.

### **3.2.6 Corrosion Resistance (OPTIONAL)**

- Full corrosion protection throughout the entire unit to suit tropical conditions.
- All internal panels are painted with chlorinated rubber, and drip trays, supports, electrical box and heat exchanger endplates are all powder coated.
- Galvanised steel base supports provide a solid foundation for the unit and easy mounting on site (coated with chlorinated rubber).
- Coils are copper piping with aluminium fins and are protected with Austkote, a high performance two pack polyurethane epoxy finish for corrosive air applications.
- Fans are protected using anti-corrosion paints and motors are tropic proofed from their manufacturer.
- All shafts and fasteners will be manufactured from stainless steel.

### **3.2.7 Hot / Cold Water Coils (OPTIONAL)**

- If applicable coils can be mounted internal to the unit
- Hot and cold water coils constructed of copper tube and aluminium fins.
- The velocity through the coils has been designed for less than 2.5 for low-pressure drop and high efficiency and coils have a baked resin coating for corrosion protection.

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- Test pressure for coils should not exceed 2200 kPa (22 bar).
- Multiple coils are separated to allow for cleaning on both faces
- See service and maintenance for coil for access.

### **3.3 Schematic Dimensional Data and Wiring Diagram - Following pages**

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## 4 OPERATIONS

### 4.1 Start-up Procedures



**Caution: Start up to be conducted by qualified service engineers familiar with such equipment.**

#### 4.1.1 Start up -General

- UNITS WITH SENSIBLE HEAT EXCHANGER ONLY - Ensure that drain lines are fitted to both the dump outlet as well as the overflow outlet (if necessary).
- Check all duct work connections are clean and clear of any obstruction. Ensure all relevant dampers and fire dampers are open or at the correct setting.
- Ensure Filters are fitted on Return-air and Outside-air inlets, temporary start up filters may be used to protect against builders dust etc. entering system, but must be replaced after start up has been completed.
- Check that sufficient electrical power is available.

#### 4.1.2 Unit air flows

- Check air flows are to specified requirements. Ensure the supply air quantity is balanced with the return air, both static pressure and air flows, with an approximate allowance of 5% more supply air than return air to provide a slight space pressurisation. Airflows can be adjusted on direct driven fans by changing the fan speed. Direct coupled fans can be adjusted via the Variable Speed Drives.

### 4.2 Electrical Drawing

- Refer attached Electrical Schematic, if applicable, drawings show a typical panel layout and external wiring harnesses.
- Please refer to the actual wiring diagram supplied with the unit for "as built" wiring information.

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## 5 SERVICE & MAINTENANCE

### 5.1 Heat exchangers - Air Change Manufacturing Sensible & Enthalpy

 **IMPORTANT:** Return and Fresh air filters must be changed/cleaned regularly to ensure airflow is unrestricted. Heat exchanger warranty may be voided if filters are not cleaned according to maintenance schedule and if proper filtration standards are not adhered to.

**NOTE:** Air Change Manufacturing can provide a heat exchanger replacement service on request.



**WARNING:** Switch off unit before attempting to remove parts for cleaning.

#### 5.1.1 Sensible Heat exchanger Maintenance

- **Sensible Heat exchanger** has a clear Mylar Heat exchange media between the plates which can be wiped over the face with damp cloth or gently hosed clean.

#### 5.1.2 Enthalpy Heat exchanger Maintenance



**IMPORTANT: DO NOT WASH THE ENTHALPY HEAT EXCHANGER**

- **The Enthalpy Heat exchanger** has a brown paper-based enthalpy exchange media between the plates which can be vacuumed or brushed gently.
- Compressed air can be used to clear the internal faces of the heat exchanger media. Inlets for the heat exchanger can be accessed as per photo shown below

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**Access to Heat  
Exchanger face Internal**

- Hot air at **120°C** should be run through the heat exchanger for a period no less than **five minutes** in cases where dis-infection of HVAC systems is required.

## 5.2 Fan Motors



**WARNING: Always disconnect line voltage before servicing electrical equipment. Ensure there are no loose electrical connections at services intervals.**

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### 5.3 Coil Cleaning and Inspection



**Removable Panels for  
Coil Access**

- Coils are accessed via panels internal to the unit.
- Panels need to be removed and coil cleaned from above via a high pressure spray or hose.

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- To allow for cleaning and inspection of multiple coils, access is provided in between.

## **5.4 Maintenance Schedule**

### **5.4.1 General**

- Air-change systems are designed for easy maintenance, with highest quality materials and components used throughout.
- Preventative maintenance programs will vary according to actual working conditions and location and hours of usage by the client.
- Air-change are pleased to provide expert advice on special service requirements for particular installations.

 **IMPORTANT: Failure to carry out regular maintenance with a licensed and reputable refrigeration company may render warranty claims invalid if faults have been caused by lack of proper maintenance. Air-change may request to see the maintenance schedule carried out.**

### **5.4.2 Monthly Maintenance Schedules.**

- The type of filter and frequency of cleaning should be addressed by the installing contractor to suit the customer's requirements. Air-change does not supply the filters.
- Filters should be inspected frequently immediately after installation to confirm the frequency of cleaning needed for the particular location. Regular change/clean of filters is necessary to ensure normal operating conditions.

**The following is a guide until frequency according to usage is established.**

- **Bag Filters:** Bag filters should last 3 to 6 months after which they should be cleaned or replaced where necessary. Pre filters can be used in front of bag filters to collect the larger particles leaving the bag filter to catch the fine dust.
- **Disposable corrugated filters:** Ordinary disposable corrugated filters should last for one month in normal commercial use, but can last longer depending on usage.
- **Cleanable filters:** If filters are cleanable, the filters should be cleaned once a month and the filter media should be replaced every 12 months.

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### 5.4.3 Three-Monthly Checks

- Repeat the Monthly Schedule
- Clean Heat Exchanger (see section 5.1)
- Check blower wheels for dirt build-up and tightness on shaft
- Check all cabinet panels for correct fitting, alignment and seals, and clean cabinet as required. Ensure no insulation has been detached from panels.
- All electrical terminals should be checked for tension on each maintenance visit with main switch off.
- Inspect coils for build up of dirt or dust (section 5.3)

### 5.4.4 Annual Maintenance

- Repeat monthly and three-monthly checks
- Check cabinet for any paint chips or abrasions and treat accordingly.
- Measure and record the amperage of each motor against nameplate details.
- Record voltages between phases and amperage at each phase.
- Clean coils with high pressure spray (section 5.3)

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## 6 TROUBLE SHOOTING GUIDE

PROBLEM	PROBABLE CAUSE	CORRECTION METHOD
Lock out due to electrical trip	Voltage problem	Check phase voltage and rectify
	Insulation breakdown	Replace faulty component
	Loose terminals	Tighten or replace as necessary
Tripped circuit breaker	Dirty contactor contacts	Clean and/or replace
	Short circuit	Trace and correct
	Earth leakage or over heating cables due to high load	Megger and replace as necessary
	Power fluctuations	Contact electricity supplier
Lack of air flow	Blocked filters	Clean or replace filters
	Fans stopped	Check electrical

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## 7 WARRANTY INFORMATION, TERMS & CONDITIONS

- Failure to carry out regular maintenance with a licensed and reputable refrigeration company may render warranty claims invalid if faults have been caused by lack of Maintenance. Air-change may request to see the maintenance schedule carried out.
- Management will need to keep records provided by service companies, which will detail the service done to each unit. This record is a summary of your service documentation for easy reference for management in case of a warranty claim.
- Your equipment is a major investment and will last for many years if properly maintained and serviced.
- Air Change Manufacturing Pty Ltd will only accept a completed warranty card [issued in each manual] or a copy of the original invoice complete with matching serial numbers as proof of purchase. This information must be verified before the authorisation of any warranty claims. We also require details of servicing with all warranty claims.

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## 8 TECHNICAL DATA - TABLES

### Heat Exchanger Data

Specification	Small Heat Exchanger	Large Heat Exchanger
Height	710mm	1290mm
Depth	330mm	640mm
Width	645mm	650mm
Weight	25kg/m	75kg/m
Pressure Drop	150Pa @ 750 L/s per metre up to 250Pa @ 1000L/s per metre	120Pa @ 1000L/s per metre up to 150Pa @ 1700L/s per metre
Reclaimed Heat	Enthalpy Heat exchanger - up to 75%. Sensible Heat Exchanger - up to 80%	Enthalpy Heat exchanger - up to 75%. Sensible Heat Exchanger - up to 80%
Insulation	5mm thick black poly-ethylene with adhesive backing, fire resistant	5mm thick black poly-ethylene with adhesive backing, fire resistant
Material	Poly-propylene solvent resistant	High impact poly-styrene solvent resistant
Temperature Range	Plates withstand a temperature range of (minus 50) <sup>o</sup> C to 150 <sup>o</sup> C	Plates withstand a temperature range of (minus 50) <sup>o</sup> C to 120 <sup>o</sup> C
Transfer Media	Enthalpy media - moisture permissable. Exchanges moisture and temperature. Sensible Media - Mylar. Exchanges temperature only	
Maintenance	Supply and exhaust air must be filtered to avoid particles entering the heat exchanger	

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## Sandwich Panel Data

<b>Skins</b>	
CRP Colorbond	0.6mm
Australian Standard	AS 2728 Category 2 and/or 3
Substrate	ZINCFORM <sup>®</sup> G300 BFC Z275 1
Pretreatment	Corrosion resistant proprietary conversion coating
Primer Coat	Universal corrosion inhibitive epoxy primer. Nominal thickness 5um each side.
Finish Coat	Custom formulated system. Nominal thickness 20 um on the top or weather side. The standard colour is off white.
Backing Coat	Custom formulated Foam Grey, specially designed to facilitate adhesion to foam cores. Nominal film thickness 5 um
Gloss	Nominal 25% (60 <sup>0</sup> )
<b>Dimensions</b>	
Width	Standard 1200mm (coverage)
Length	To design requirements (limited by handling/transportation consideration)
Thickness	Standard 50mm
Weight	11.3 kg/m
<b>Panel Spans</b>	
Walls	5400mm
Ceilings	3000mm
<b>Insulation Factors</b>	
U Value	0.76 W/mK
R Value	1.32 m/Kw
<b>Fire Hazard Properties</b>	
Ignitability Index	0 (scale 0 - 20)
Spread of Flame Index	0 (scale 0 - 10)
Heat Evolved Index	0 (scale 0 - 10)
Smoke Developed Index	0 (scale 0 - 10)

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