



# Dampco

PROPERTY DRYING AND VENTILATING EXPERTS

PO Box 120 Ivanhoe, Victoria 3079  
Tel 1300 382 826 Office (03) 9499 8600 Fax (03) 9499 8700  
Email ask@dampco.com.au www.dampco.com.au  
Dampco Damp Services Pty Ltd trading as Dampco ABN 85 159 119 409



## MOISTURE & MOULD REMEDIATION, IDENTIFICATION & REPAIR EXPERTS

✓ **FURTHER INSPECTION REQUIRED**

✓ **long term recommendation**

■ < Works not included > **N/A TO THIS PROPERTY**

■ < Works included > ✓ **long term**

ITEMS MARKED ■ INCLUDED | ITEMS MARKED ■ NOT INCLUDED | ITEMS MARKED ■ RECOMMEND ONLY

**SYMBOLS USED**

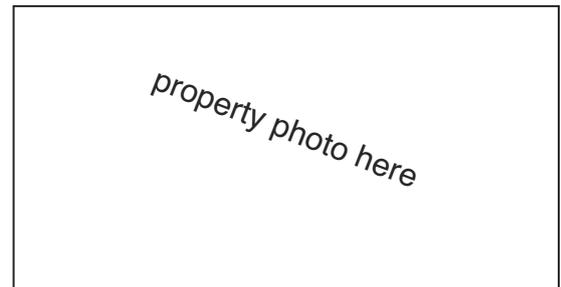
 < Electrical hazard

 ^Unsuited to habitation in present condition

**PROPERTY OVERVIEW - address here**

**Client: name here**

**Inspection date:** Tuesday, July 17, 2012 at 2.00pm (approx)  
**Heating and cooling:** no **Floor coverings:** timber  
**Foundations:** foundations **Subfloor access:** 400mm  
**Construction:** Single storey brick **Active passive vents:** **YES**  
**Insurance Claim:** **NO**  
**Weather:** Fine and clear, 19°C approximately  
**CURRENT COURT OR VCAT ORDERS:** **NO**



**ISSUE** ACTION REQUIRED LOW  MODERATE  EXTREME

Dampco was asked to inspect the above property due to issues with regard to dampness in the subfloor and mould and condensation in the property (see photos at rear). Our inspection has confirmed significant subfloor moisture and mould generation due to poor ventilation and excess moisture. Internally, condensation issues and some mould growth has occurred.

**AFFECTED AREAS** Dwelling | Subfloor

**Bedroom** - Mould growth and elevated moisture levels. **RATING:** HIGH.  
**Rest of dwelling** - Condensation occurs when property is at its coldest for the day, in the early mornings. **RATING:** HIGH.  
**Subfloor** - Rising damp and elevated moisture levels. **RATING:** EXTREME.

**CAUSE OF MOISTURE DAMAGE**

**OVERVIEW**  
The causes of rising damp, mould and condensation in all properties can generally be broken into two distinct areas:  
**1. Specific Events** - Where moisture enters the building envelope via floods, storms, pipe leakage etc. and overwhelms the buildings' ability to void itself of vapourised moisture.  
AND/OR  
**2. General Property Condition** - Where moisture enters the building envelope via seepage or rising damp from subfloor or through horizontal porous surfaces (party walls etc), or remains in the building envelope via a lack of ventilation and/or a lack of heating (the presence of moisture is the most significant cause of mould and condensation).

**THE FOLLOWING IS APPLICABLE TO ALL JOBS UNLESS OTHERWISE STATED**

**1. GUARANTEE** - A written 12 month guarantee is supplied on completion of all mould remediation works. Dampproofing - 10 year warranty.

**3. PAINT DISCOLOURATION** - Paintwork may still be stained following mould remediation work on both porous and non porous surfaces, but most commonly on porous surfaces like Gyprock plaster. In this instance, it is recommended that the surface be painted with a mould retardent additive mixed into the paint. This service is offered as an option.

**5. VENTILATION AND HEATING** - Both hold the key to successful mould remediation. Please refer to the last page of this report.



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### DRYING EQUIPMENT

*Computerised internal dryers for the fastest internal and structural drying in Australia! >*



*Heaters >*



*< Trailer mounted diesel heaters*



*Crawl space dehumidifiers >*



*Room dehumidifiers >*



*Airmovers >*



**i) Moisture seepage** from an overly wet subfloor, or via porous slabs or brick walls, or due to the affected area being below ground level with moist soil butting up to the dwelling, will manifest itself in deteriorating plaster and render, bubbly paintwork, calcium deposits on brick or concrete walls).

**ii) A lack of ventilation** means that the naturally built up moisture (caused by everyday circumstance like breathing, cooking, heating, showering, clothes washing and drying) cannot escape the building envelope, and as the atmosphere becomes over saturated with moisture, it begins to settle on cold surfaces in the dwelling. A lack of meaningful heating further reduces the atmosphere's ability to suspend or carry moisture in the air. As a result, moisture falls from the atmosphere and settles on the coldest surfaces in each room as the dew point (a volatile temperature level determined by ambient temperature and humidity, below which the internal atmosphere can no longer carry moisture vapor, which then falls from the atmosphere and settles on the coldest surfaces in the room) is breached.

#### What can cause a lack of ventilation?

This can be due to a lack of overall natural ventilation via open windows and doors and/or natural leakage points, or due to a sudden change in the circumstances of the building (new windows, new roof, insulation etc) which has closed natural leakage points.

Regardless of the reason for the moisture build up, the building lacks the capacity to void itself of the moisture - hence the condensation generation and visible mould growth.

### THIS PROPERTY

Property condition: Specific event and property condition

Based on our inspection of the property, the adverse environmental issues in the dwelling and the subfloor responsible for the mould and fungal growth are deemed to have been caused by the following:

**i) Internal - Lack of ventilation and low core temperature of dwelling**

**ii) Subfloor - Water ingress (unknown source) and poor ventilation**

**i. Lack of ventilation and low core temperature** - Reduced ventilation due to colder weather and not enough heat are the major contributors to condensation in any dwelling. As the colder weather arrives and properties are less ventilated naturally via open windows and doors, the internal moisture caused by everyday activities (cooking, heating, breathing, showering all create moisture) in the dwelling becomes excessive and trapped internally and the property is unable to void itself quickly enough to avoid the onset of condensation. If a property lacks central heating or the occupants allow the core

### INSPECTION EQUIPMENT

*Wall cavity inspection camera >*



*< Subfloor and roof cavity inspection camera*

*Infra Red thermal imaging cameras can locate damp areas behind walls and ceilings >*





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### THE FOLLOWING IS APPLICABLE TO ALL JOBS UNLESS OTHERWISE STATED

- 1. GUARANTEE** - A written 12 month guarantee is supplied on completion of all mould remediation works.
- 3. PAINT DISCOLOURATION** - Paintwork may still be stained following mould remediation work on both porous and non porous surfaces, but most commonly on porous surfaces like Gyprock plaster. In this instance, it is recommended that the surface be painted with a mould retardent additive mixed into the paint. This service is offered as an option.
- 5. VENTILATION AND HEATING** - Both hold the key to successful mould remediation. Please refer to the last page of this report for detailed information on ventilation and for information on both our 'Try before you Buy' and our rental scheme.

temperature of the dwelling to drop too low, condensation often occurs in the coldest hours of the day - early morning. This is when the dew point (the temperature at which the internal atmosphere can no longer carry moisture vapour and it falls from the atmosphere and settles on the coldest surfaces in the room) is regularly breached, causing mould and condensation to form. If buildings are not ventilated, the built up moisture is retained in the rooms until condensing on the windows and cold surfaces as the temperature drops below the dew point.

**ii) Water ingress and poor ventilation** - Ground water in the subfloor indicates some water breach at some stage and the long term growth of mould and fungi in the subfloor indicates a long term issue with ventilation.

### MOISTURE READINGS (UNDERSTANDING THEIR SIGNIFICANCE)

#### OVERVIEW

Why are moisture readings important? Moisture readings provide a snapshot of the health of the property, providing evidence of all moisture issues and pinpointing the affected areas. The readings corroborate visual inspection. In this property, the most relevant moisture readings are the **Surface Moisture levels** and **Humidity** levels (see below).

#### HUMIDITY LEVELS

Both internal and external 'absolute humidity' levels and 'relative humidity' levels should be at or close to parity. Internal relative humidity levels should be between 40 - 60% for a comfortable and healthy indoor environment, subject to the temperature. How do they become elevated? In one of two ways - either through moisture entering the property (water damage, leaking pipe etc) or through naturally built up moisture caused by living in the dwelling (breathing, eating, cooking, heating, washing etc) being unable to void itself from the property - a lack of ventilation. Excessive moisture causes condensation and condensation causes mould growth.

If the absolute humidity levels and relative humidity levels are highly elevated and mould and condensation are present but there is no sign of obvious moisture entering the property (signs of this are calcium lines or deposits on brick or plaster surfaces and/or deteriorated plaster walls or water marks on sheet plaster walls), this indicates that naturally created moisture is trapped in the dwelling and a lack of ventilation is the primary issue.

Signs of moisture entry into the dwelling can be calcium deposit marks (efflorescence) on bricks or plaster walls, plaster deterioration (cracks, lumps etc) and moisture and/or water marks on sheet plaster. These signs indicate that moisture entering the property is the primary issue and the solutions lie in either remedying the reason for the moisture intrusion into the dwelling, or, if access to the problem area is impossible (low lying subfloors), isolating the affected area from the building envelope by creating a barrier between the two - damp course treatment or waterproof slurry.

### DRYING EQUIPMENT

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Dustrak II airborne particulate monitor detects airborne mould spores and particulate density >



### DEW POINT

This is the level at which the internal atmosphere can no longer carry the moisture vapour, which then fall onto the coldest surfaces in the room (windows or walls, ceiling etc), forming condensation and visible mould growth. The dew point is always lower than the temperature, so if the room temperature reaches the dew point, condensation will form. Thus, the temperature of the property should always be maintained above the dew point at all times. If the dew point is low and there is condensation and mould growth this is a sign that the property is typically underheated.

### TEMPERATURE

The core temperature of the dwelling is significant as it effects the dew point and the humidity levels of the dwelling. If it is kept too low, the dew point will be easily reached, causing condensation.

### MOULD SPORES

Whilst not a strict moisture reading, the mould spore (particulate) count is relevant as they indicate the presence of mould. The higher they are, the more mould is being generated inside the dwelling and the greater likelihood that mould will form due to moisture issues in the property (moisture + mould spores = mould growth).

### MOISTURE LEVELS IN THIS PROPERTY

PASS ● ACTION REQUIRED ● FAIL ●

#### Summary

The issues in the dwelling are caused by moisture seepage, and the relevant moisture readings confirm this with the most relevant readings being **Surface Level** moisture.

#### Humidity

As demonstrated by the disparity between the internal and external absolute humidity levels (below), there is a small amount of built up internal moisture trapped in the property. The absolute humidity levels are highly elevated in the affected area, potentially causing condensation and mould issues to occur and adverse health conditions.

#### Mould spores

The mould spore count was also slightly elevated at above acceptable standards.

#### Surface moisture levels

The surface moisture levels are highly elevated in all the affected rooms.

#### Dew point

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### MOULD REMEDIATION EQUIPMENT



*Air scrubbers remove airborne particulates from the indoor atmosphere >*

*< Foggers emit a dense 'fog' which permeates all porous surfaces and sanitises them, helping to destroy mould. They are also used to seal surfaces to discourage further mould growth.*



If the dew point is low and there is condensation and mould growth this is a sign that the property is typically underheated. The current dew point is low, but not so low as to be a sign that the heating is not being used at all and that the core temperature of the building is dramatically low. It does indicate that the core temperature of the building should be raised via heating.

**Conclusion** - There **are** internal environmental issues which require addressing.

#### ● RELATIVE HUMIDITY

UNTESTED  Low  Moderate  High  Extreme

Internal 57.9% @18.8°C | External 43.3% @ 13.8°C. **CONCLUSION** - Moderate to high humidity levels. **Action required.**

#### ● ABSOLUTE HUMIDITY (g/kg)

UNTESTED  Low  Moderate  High  Extreme

Internal 7.7 g/kg | External 7.0 g/kg - Levels differ by > 20% when these levels should be at parity in a balanced environment.

**CONCLUSION** - **No action required.**

#### ● DEW POINT | CONDENSATION

UNTESTED  Low  Moderate  High  Extreme

Internal 13.3° | External 8.0°. **CONCLUSION** - Once the indoor temperature falls below 11.3°C, moisture vapour will begin to settle on the coldest surfaces in the dwelling, creating condensation and visible mould growth. **No action required.**

**Condensation limits:** Surfaces are dangerously close to the dew point temperature (within 4°C) meaning that the chances of condensation forming are extremely **HIGH**. **Heating levels need to be increased throughout property.**

#### ● SURFACE MOISTURE LEVELS

UNTESTED  Low  Moderate  High  Extreme

20 - 99%. **CONCLUSION** - **HIGHLY** elevated moisture readings. **Action is required.**

#### ● MOULD SPORES

UNTESTED  Low  Moderate  High  Extreme

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*Dustrak II airborne particulate monitor detects airborne mould spores and particulate density >*

.104mg/m3. **CONCLUSION** - These internal readings are **MODERATELY** elevated, more than double the external count. **Action is required.**

### ● SUBFLOOR MOISTURE READINGS

Not taken

Relative humidity

Low  Moderate  High  Extreme

Absolute humidity (g/kg)

Low  Moderate  High  Extreme

Dew Point

Low  Moderate  High  Extreme

Surfaces moisture levels

Low  Moderate  High  Extreme

### TREATMENT

(ITEMS MARKED ■ INCLUDED. ITEMS MARKED ■ NOT INCLUDED ITEMS MARKED ■ RECOMMEND ONLY)

The treatment required to relieve any property of adverse atmospheric conditions is twofold:

**■ Short term:** (Definition) The short term treatment involves reversing the existing conditions that have caused the mould and/or condensation issues and remediating the mould and/or condensation that is currently affecting the property. While this treatment will restore the stability of the property, in many instances it will NOT permanently alter the atmospheric conditions that have caused the issue.

**■ Long term:** (Definition) The long term solutions are designed to permanently rid the property of the reasons behind the adverse atmospheric conditions that have brought about the mould and/or condensation.

### OVERVIEW OF TREATMENT REQUIRED

#### SHORT TERM

To achieve the goal of repairing the indoor environment by removing all damaged plaster, mould growth and condensation, the following will be required in the following order:

**1. Subfloor dryout:** Ideally the subfloor should be dried and ventilated if required. The drying is achieved by using high powered diesel fired equipment designed to dry subfloor crawlspaces by pumping large volumes of heated air into the subfloor, evaporating surface moisture. This drying is carried out in conjunction with internally installed dehumidifiers which remove the evaporated moisture from the subfloor and the dwelling.

**2. Subfloor clean** - Contaminated brick work will be scrubbed clean by hand after initial soaking with Microban and then the entire subfloor will be fogged with our antimicrobial Fungistat.

**DRYING EQUIPMENT**

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*Heaters >*

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**3. Mould remediation:** All affected areas of the dwelling will be remediated for mould growth. The entire affected area is initially vacuumed using hand held or truck mounted HEPA filtered vacuum cleaner to remove loose dust and mould spores. All mould affected surfaces are then cleaned by hand using either naturally fermented vinegar and/or Microban, the world's leading anti microbial, mould control product for environmental protection and is used as a Disinfectant, Mildewcide, Bacteriostat, Fungistat, Deodorizer, Anti-Microbial following mould infestation, flood or fire damage and is used extensively throughout the world in sterile and health critical environments like hospitals, morgues, schools etc. Mould remediation also includes the removal of airborne mould spores from the indoor environment through the use of airscrubbers which pass the indoor air through HEPA filters, cleansing the air by removing airborne particles.

**4. Drying:** Once initial mould remediation has been completed, drying is commenced to reduce the elevated internal moisture levels to normal levels, removing the excessive moisture from dwelling. This is achieved by raising the core temperature of the building using portable heaters to increase the core temperature of the affected area, thereby promoting moisture evaporation, airmovers to move the air and dehumidifiers to convert moisture vapour to liquid and remove it from the building envelope. Drying the property removes excessive moisture from the air (thereby removing the causes of condensation - condensation is removed by drying, ventilating and heating the property).

**5. Painting:** All replastered surfaces and any mould affected areas that retain any staining from the mould growth will be painted with colour matched paint including mould retardant additives.

### LONG TERM

1. Subfloor - The addition of a ducted subfloor ventilation system will stabilise the crawlspace and maintain a dry subfloor atmosphere in the long term.
2. Internal - Install room ventilation in dwelling to remove built up moisture.

### SUMMARY OF TREATMENT REQUIRED

#### IMMEDIATE

END RESULT: stabilise, remediate and provide immediate solution

#### INTERNAL

1. Commence drying subfloor used diesel fired equipment pumping warm air through sub floor.
2. Install airscrubbers to remove remaining mould spores from dwelling.

### INSPECTION EQUIPMENT

Wall cavity inspection camera >



< Subfloor and roof cavity inspection camera

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*< Foggers emit a dense 'fog' which permeates all porous surfaces and sanitises them, helping to destroy mould. They are also used to seal surfaces to discourage further mould growth.*



3. Remediate all mould affected areas of dwelling by treating with Microban (all surfaces of the affected area are treated by hand and the entire area is then 'fogged' so that areas not accessible by hand are also treated), the world's leading anti microbial, mould control product for environmental protection and is used as a Disinfectant, Mildewcide, Bacteriostat, Fungistat, Deodorizer, Anti-Microbial following mould infestation, flood or fire damage and is used extensively throughout the world in sterile and health critical environments like hospitals, morgues, schools etc.
4. Commence drying of all affected surface areas using portable heat sources to raise the core temperature of the building and promote evaporation, airmovers for airmovement and dehumidifiers to convert moisture vapour to liquid form and remove it from the internal atmosphere.
5. Clean subfloor by hand scrubbing of all affected accessible surfaces. Fog entire subfloor with antimicrobial fungistat.



### TEST EQUIPMENT

*< Moisture detecting equipment locates and measures moisture >*



*Dustrak II airborne particulate monitor detects airborne mould spores and particulate density >*



6. Re paint all affected surfaces and any surfaces which have retained any stains from mould growth using colour matched paint and mould retardent additives.
7. Handover property. Exit report.

### LONG TERM

**END RESULT: permanent, guaranteed solution**

8. Subfloor - The addition of a ducted subfloor ventilation system will stabilise the crawlspace and maintain a dry subfloor atmosphere in the long term.
9. Internal - Install room ventilation in dwelling to remove built up moisture.

### TREATMENT REQUIRED (DETAIL)

This section provides detailed information on and an explanation of all services which are required to remediate this property, both in the short term and permanently.

### INTERNAL

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### ■ Site preparation

- i) Internal area to be vacuumed with HEPA vacuum cleaner to remove loose mould and dust particles in affected areas.
- ii) Particulate testing to determine amount of airborne particulates prior to air scrubbing and air cleansing.
- iii) Isolation of affected areas by air curtain or 'tents'.

### ■ Daily humidity, moisture and dew point monitoring

Utilising our purpose specific equipment which is left on site, we are able to constantly measure the critical moisture readings of the dwelling including humidity, temperature and dew point for the duration of the works. This allows us to know when the property has been returned to a normal environment and that the causes of the adverse environmental symptoms have been repaired.

### ■ Mould and Bacteria Sample Analysis and Testing

THIS IS A REQUIREMENT FOR ALL INSURANCE CLAIMS AND GOVT/EDUCATIONAL ESTABLISHMENTS WHERE EMPLOYEES AND/OR MINORS ARE PRESENT.

Taking samples of visible mould and having them analysed can determine both the extent of the contamination and the types of moulds or fungus present. In many instances the analysis of the mould present in a property is not necessary, but if required, we will take samples of visible mould and forward them to a laboratory for testing and analysis. Generally this will take place before and after mould remediation with the final analysis proving the effectiveness of the mould remediation works performed.

### ■ Airborne Particulate Sampling and Testing

THIS IS A REQUIREMENT FOR ALL INSURANCE CLAIMS AND GOVT/EDUCATIONAL ESTABLISHMENTS WHERE EMPLOYEES AND/OR MINORS ARE PRESENT.

Airborne particulates in any building are made up of several different types of particulates - from mould spores, dust mites, pollen, carbon, skin flakes, fibres etc - and our particulate monitors can determine the amount of airborne particles in any property. The reduction of airborne contaminants within the building envelope to an acceptable standard is of paramount importance to all occupants. Our pre and post remediation testing will demonstrate the success of the remediation program undertaken.

### DRYING EQUIPMENT



*Crawl space dehumidifiers >*



*Heaters >*



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### ■ Airborne particulate monitoring

Utilising our purpose specific Dustrak II Particulate monitor, we are able to measure the amount of airborne particulates in the air of the property. Our before and after readings will ensure that your property has the minimum of airborne particles and mould spores left in the air after completion of our works.

### ■ Mould remediation (Antimicrobial treatment)

All affected areas of the property are initially treated with Microban (all surfaces of the affected area are treated by hand and the entire area is then 'fogged' so that areas not accessible by hand are also treated), the world's leading anti microbial, mould control product for environmental protection and is used as a Disinfectant, Mildewcide, Bacteriostat, Fungistat, Deodorizer, Anti-Microbial following mould infestation, flood or fire damage and is used extensively throughout the world in sterile and health critical environments like hospitals, morgues, schools etc.

### ■ Dryout (Internal)

All affected areas will be heated and dried using specialist dehumidification equipment, which will take place in all affected areas of the property utilising commercial grade equipment including dehumidifiers, air movers, portable heaters and airscrubbers. The equipment used to dry the property can also include portable dryers which control the indoor temperature at the required range of 20°C to 29°C for optimum drying of a damp building) in addition to the dehumidifiers, airmovers, airscrubbers and temporary exhaust evacuation fans. Condensation is reversed via ventilation of the affected area.

### ■ Temporary ventilation - negative pressurisation

In properties where ventilation is an issue we install temporary portable ventilators to void the property of built up moisture by placing the area under negative pressure. This assists in the drying process and removes harmful moisture and particulates from the indoor atmosphere.

### ■ Visible mould remediation

Visible mould is remediated by hand cleaning all affected surfaces using purpose specific mould remediation cleaning agents which not only remove the visible mould but apply a mould retardent layer to all porous surfaces. The entire property is finally 'fogged or coated' with our mould retardent fungicide which discourages any future mould growth.

### ■ Invisible mould remediation

All mould spores (invisible mould) are treated by our air cleansers and also by the 'fogging' of our proprietary fungicide throughout the property. This guarantees the removal of all mould whether visible or not - whilst the drying procedure ensures that the conditions that enabled the mould to prosper in the first place are no longer present.

Invisible mould remediation is provided with our airscrubbers which, using HEPA filters, cleanses the indoor air by pulling

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the air through the filters, trapping micron sized airborne particles which include mould spores.

### ■ Plaster/render/mortar repairs

If solid plaster has been contaminated by moisture, the affected areas of the plaster walls will be cut out to expose the brick wall for drying purposes. Some plaster repairs may be required after mould remediation. This will involve removing any contaminated plaster and render and then reinstating and painting where required. Mortar repairs may also need to be affected, if mortar has become contaminated or eroded by mould, moisture or fungi.

### ■ Plaster repairs - sheet

All contaminated porous sheet plaster will be either removed and replaced after cavity drying is complete, or, in some instances of lesser contamination, the affected areas will be sanded back to remove all final residue of mould contamination. In this instance, the affected areas of sheet plaster will be removed and after drying has been completed in the wall cavity behind, replaced.

### ■ Waterproofing - membrane or slurry

If solid plaster or an external brick or rendered wall has been contaminated by moisture, the affected areas of the plaster walls will be cut out to expose the brick wall for drying purposes. Once the wall has been exposed and dried, a concrete slurry will be applied to the wall before re plastering. The slurry or membrane effectively eliminates creates a barrier against moisture damage. The slurry is used when moisture is penetrating a wall from the other side as opposed to from underneath.

### ■ Tile works - walls or floor

If water is leaking from the shower recess, the tiles may require removing and then replacing. First they are removed, and the brick wall is exposed for drying purposes. Once the wall has been dried then new tiles are laid, usually following the installation of a moisture membrane. If floor tiles are compromised by moisture, they will require lifting, the floor below will be dried and then new tiles laid.

### ■ Bathroom - Seal leaks

Often shower recesses can leak without the tiles being damaged and the cause of the leak is generally via a poorly sealed shower screen. In this instance, we will reseal the screen and then test for water tightness.

### ■ Damp course - internal

If solid plaster has been contaminated by moisture, it is often required that a damp course be installed to create a barrier

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## MOISTURE & MOULD REMEDIATION, IDENTIFICATION & REPAIR EXPERTS

between the internal building envelope and the subfloor. This is particularly important if the property is low lying and sub floor ventilation is inadequate or compromised. The damp course is injected into the mortar course at an appropriate level and along the length of the contaminated plaster in all affected areas and provides a water resistant chemical barrier. The product spreads throughout the mortar creating a waterproof barrier which prevents moisture wicking up through the porous brick walls. This can be installed either from inside the property or externally, subject to access.

### ■ Joint sealing

When applying waterproof sealant to walls, a joint sealant or water plug is required to stop joint seepage. This is applied to all joints between walls and floor in the affected area.

### ■ Ozone treatment

Ozone is a professional steriliser which alters the molecular structure of the oxygen in a confined area and is used for extreme odour remediation and is also very effective at destroying mould spores when combined with traditional mould remediation. It is not required in all instances of mould remediation. It is extremely useful when clothing, mattresses and other household items have been contaminated with mould growth.



**TEST EQUIPMENT**

*< Moisture detecting equipment locates and measures moisture >*

*Dustrak II airborne particulate monitor detects airborne mould spores and particulate density >*

### ■ Odour remediation

The property requires remediation for odour caused by all attendant mould and mildew. Using Vapor Shark and/or Hydroxil equipment - which contain a proprietary blend of natural oils which neutralises odour - a neutralizing dry vapour is diffused throughout the affected area and penetrates all porous surfaces.

### ■ Tile cleaning

If contaminated by mould, the tiles in shower recess and bathroom require mould remediation. Initially they are sprayed with purpose specific tile and grout mould cleaner, left to self agitate and then scrubbed by hand. Inspection with Infra red thermal imaging camera is also carried out to ensure the integrity of the tiles against leaks.

### ■ Concrete flooring works



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If the property has a concrete slab which is damp, the slab will be dried down to acceptable moisture levels < 66%. In this instance the slab will be remediated for mould and then dried.

### ■ Timber flooring works

If damp, timber flooring will require drying or replacement. If the timbers are warped due to exposure to moisture the floor will require either replacement or sanding and resealing after drying. In this instance the floorboards will require removal and disposal thereof. All contaminated battens will be removed. Once the area has been dried, a new timber floor will be laid over battens. The timber to be supplied is tasmanian Oak, kiln dried and kept in situ to cure for the required period of time. Once the timber floor has been laid, it will be completed with sanding and sealing.

### ■ Additional building services

Remove and replace skirting boards.

### ■ Painting services

Some staining may remain after mould remediation and in these instance painting will be required. Using modern paint colour matching techniques and mould remediation additives we will paint all affected areas as quoted. If plaster has been sanded or patched, we will paint these areas as well.

### ■ Carpet remediation and cleaning

This involves lifting the carpet and underlay and often replacing contaminated underlay and even smoothedge after the floor has been dried and remediated for mould growth. The backing and fibres of the carpet are cleaned, the floor beneath the carpet is dried and then the carpet and underlay is relaid. In this instance the carpet will be lifted so that access can be gained into the subfloor via the floorboards beneath the carpet. Once the work has been completed the carpet will be relaid and then cleaned.

### ■ Curtain and/or blind remediation and cleaning

Mould affected curtains, and blinds will require mould remediation. If a non porous surface, cleaning will be undertaken with ultrasonic cleaning. If porous material, the curtains will be vacuumed and then hand cleaned front and back.

### ■ Passive vent installation

Passive vents are an ideal way of ventilating an underventilated property and if none exist or the existing ones are blocked,

### INSPECTION EQUIPMENT

Wall cavity inspection camera >



< Subfloor and roof cavity inspection camera

Infra Red thermal imaging cameras can locate damp areas behind walls and ceilings >





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## MOISTURE & MOULD REMEDIATION, IDENTIFICATION & REPAIR EXPERTS

then installing new ones will greatly assist to ventilate a property. In this property, passive vents should be fitted to the bedroom and bathroom.

### ■ Passive vent cleaning or repair

Internal passive vents often become blocked up by dust and debris over time and cease functioning properly. Using compressed air, we clear the passive vents and return them to full service. If the vents are blocked, we can repair them. In this instance, the vents will require opening up externally as they do not penetrate externally and are therefore useless.

### ■ Inspect, vacuum, test

Final inspection, surfaces and floors vacuumed with truck mounted HEPA vacuum; moisture & Airborne Particulate testing.

## EXTERNAL AND SUBFLOOR

■ INCLUDED | ■ NOT INCLUDED | ■ RECOMMEND ONLY

### ■ Subfloor inspection

In some instances, where subfloor access is restricted, it may be necessary to access the subfloor to determine if drying and/or ventilating is required. This may involve removing floorboards for inspection purposes.

### ■ Subfloor drying/wall drying

Drying of the crawl space will be achieved by using our gas or diesel fired hot air forced heating units which pump large amounts of warm air into the crawl space, drying the subfloor very quickly. Dehumidifiers and airmovers are used in conjunction with the diesel fired heaters. If wall has been excavated for waterproofing purposes then the wall requires professional forced drying prior to the application of any waterproofing products.

### ■ Efflorescence (Calcium deposit) remediation

The property requires cleaning of calcium deposits caused by rising damp from the subfloor into the building envelope. Calcium deposits are cleaned from the affected areas by hand, using purpose specific cleaning agents and scourers.

### ■ Deep ground dryout

If applicable to this site drying of the soil in the crawl space will be undertaken. We drill down into the soil up to 1 metre and pump warm air through the soil, testing moisture levels for the duration of the drying process, which is typically 2 - 3 weeks.

### ■ Subfloor fogging

Involves 'fogging' our fungicide throughout crawl space, eliminating visible mould colonies and also neutralising mould

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spores. This process is used as a stand alone crawlspace remediation service, or in conjunction with subfloor cleaning remediation where access allows.

### ■ Subfloor cleaning and mould remediation/wall cleaning

Fungal growth will be removed from structural timbers and stumps and all structural timbers will be cleaned and treated with mould retardent (where accessible). Soil contaminated by fungal growth/yellow cake is treated with Microban and soil is tilled by hand.

### ■ Ozone or Hydroxyl treatment - subfloor

Ozone is a professional steriliser which alters the molecular structure of the oxygen in a confined area and is used for extreme odour remediation and is also very effective at destroying mould spores when combined with traditional mould remediation. It is not required in all instances of mould remediation. It is extremely useful when clothing, mattresses and other household items have been contaminated with mould growth.

### ■ Odour remediation - subfloor

The property requires remediation for odour caused by all attendant mould and mildew. Using Vapor Shark equipment - which contain a proprietary blend of natural oils which neutralises odour - a neutralizing dry vapour is diffused throughout the affected area and penetrates all porous surfaces.

### ■ Roof cavity dryout

If applicable to this site drying of roof cavity is required following a roof leak. Removal of roof cavity moisture and condensation - including the replacement of moisture affected insulation - must be completed to eliminate mould and condensation issues internally.

### ■ Roof repairs

If applicable to this site we will repair any leaks from the roof, flashing, tiles, slate or tin.

### ■ Roof cavity cleaning

Often there is a large amount of built up dust (can include lead, asbestos, dust mites, etc) in the roof void, and contamination from rodents and possums. If required, we vacuum out the roof space and then re insulate where necessary. We have HEPA filtered truck mounted asbestos rated vacuum cleaners designed for this purpose. Often when roof voids are flooded or leak, the existing insulation will require removal for health reasons and also in order to dry any damp plaster ceiling.

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### ■ Insulation installation

Following roof cavity cleaning, we can install new insulation into the roof void.

### ■ Environmental cleaning

Advanced cleaning designed to essentially sterilise a dwelling, the property requires vacating for the duration of the cleaning process which will typically take 3 days for a normal property (see [www.enviroairexchange.com.au](http://www.enviroairexchange.com.au) for more information).

### ■ Damp course - external

Injection of resin based product provides effective water resistant chemical barrier between any subfloor moisture and internal solid walls. This work can be undertaken either in the crawl space or the first mortar course of any brick wall internally.

### ■ Wall cleaning and treatment

Mould and alga growth on any external wall requires soaking with Microban and then scrubbing by hand to remove all mould residue. Generally the wall will then be sprayed with a mould retardent which encapsulates any mortar, concrete sheet or other porous material used in wall construction.

### ■ Gutter and downpipe repair or replacement

Gutters and downpipes are major contributors to moisture contamination on external walls. Generally we will replace any gutters or downpipes that are rusted out or not functioning due to general deterioration. In this instance approximately 11 lineal metres of gutters require replacement and 6 lineal metres of downpipe.

### ■ Damp membrane and/or moisture sealant

Fitting of waterproof membrane to external wall exposed to soil to create a barrier between wall and soil to floor level of basement. Internally in the subfloor, a sealant can be applied to any external facing cavity walls to reduce or eliminate moisture intrusion through the porous wall. In this instance, the sealant would be applied to the subfloor cavity wall after cleaning. This will repel any future moisture from the brickwork and mortar, allowing the ventilation system time to stabilise the subfloor environment.

### ■ Joint sealing

#### DRYING EQUIPMENT

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Heaters >



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All joints between wall and floor where moisture seepage is occurring will be sealed using professional sealant products to ensure no seepage through the joint between wall and floor.

### ■ Ductwork repair or replacement

Water damaged ductwork in the subfloor will always require replacement as it is incapable of being dried and all attendant odours cannot be removed by cleaning. Our company can expertly replace all damaged ductwork using the strongest flexible ductwork available. In this instance, obsolete ducting will be removed and disposed of.

### ■ External passive vent cleanout (if required) or repair

Often existing passive vents are blocked or even covered over. If required, we will unblock and/or uncover passive vents as required. In this instance, the passive vents will be cleaned out and made functional.

### ■ External passive vent/eave vent installation

Passive vents are an excellent way of providing airflow either in the subfloor or in internal rooms of a property. We can, where possible, supply and install passive vents in either the subfloor or internally. Eave vents are often required if condensation is developing in the roof void.

## VENTILATION SYSTEMS | HEATING

■ INCLUDED | ■ NOT INCLUDED | ■ RECOMMEND ONLY

### ■ Install bathroom/laundry/kitchen exhaust fan

Changing an underperforming exhaust fan or adding a new one will make an enormous difference to the ventilation of any property. Adding an oversized exhaust fan with a time delay switch added will also evacuate surrounding rooms provided that the bathroom door is left open while the fan is operational. In this instance an exhaust fan should be added to the laundry.

### ■ Increase internal ventilation

The property requires additional ventilation and the first step towards achieving this is to increase the natural ventilation provided to the property each day. There are three ways in which ventilation can be increased:

**A) Manual ventilation** - Simply, this means instituting an everyday ventilation program using existing leakage points (windows and doors) coupled with a daily ventilating regime that is governed by a supplied (PDF format) floor plan ventilation program layout and a supplied monitor which tracks relative humidity, temperature and dew point, alerting the occupant to approaching dangerous temperature limits.

OR

**B) Mechanical, portable ventilation** - This involves installing a portable ventilation system which is an exhaust fan mounted in a stainless steel box switched by a timer. One end of the fan is a duct which must be positioned so it will



< Moisture detecting equipment locates and measures moisture >

**TEST EQUIPMENT**



*Dustrak II airborne particulate monitor detects airborne mould spores and particulate density >*





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exhaust out of a door or window. The timer is set for two hours a day ( more or less subject to ongoing moisture checks) and the machine can be moved from room to room as suits. Our daily ventilation program includes a pdf layout which provides detailed information of compulsory ventilation room by room and is given to occupants of dwelling.

OR

■ **C) Mechanical, fixed ventilation** - A fixed in wall ventilation system will ensure that there is a permanent and fixed solution which is not subject to the input of any occupant. This is fixed to the wall and switched via a pre set timer which is subject to ongoing moisture checks.

There are three options for mechanical fixed ventilation:

**i) Install wall mounted single room exhaust fans**

Ideal for single room evacuating of moisture and/or odour in apartments where there is no roof cavity space, these fans are fitted to a window or through the brick wall of apartments or flats and can evacuate any size room in minutes. This room will require two of these ventilation fans controlled with a standard on/off switch.

OR

■ **ii) Install multi room mechanical ventilation system**

If applicable to this site, an in room ventilation system is designed to evacuate a room or multiple rooms of stale and moist air. These are installed either in the wall, window or ceiling of the property, exhausting externally of the living areas through the roof or eaves and switched by either a thermostat, timer or hygrometer.

OR

**iii) Positive input ventilation system - ducted through roof cavity or wall mounted (apartments/flat roof)**

Positive input ventilation systems are designed for properties that are afflicted by condensation, causing mould growth. These systems introduce air into the living areas of the property which both dilutes the moisture laden internal air and pushes the internal air out from the building envelope, leaving fresh and dry air internally, eliminating the moist air from the building and eliminating condensation. Where there is no roof cavity, wall mounted positive input systems will eliminate condensation from any property.

■ **Install subfloor mechanical ventilation system**

The subfloor mechanical ventilation system is designed to remove stale and moist air from the subfloor and replace it with fresh external air. Utilising a minimum of 2 underfloor fans (39 decibels per fan or 29 decibels per fan with silencer fitted), subject to the m3 of the area in question, a cycle of fresh air in and stale air out is created.

The minimum suggested air changes per hour is 4 but we prefer to operate on 6 air changes per hour. This equation is as follows:

Area to be evacuated = 120m<sup>3</sup>

Airchanges per hour = 6

Required evacuation per hour (m<sup>3</sup>) = 720m<sup>3</sup>

**Ventco 250mm fan capacity = 880m<sup>3</sup> p/hr**

This system will require 1 internally mounted 200mm fan in the crawl space to evacuate the entire crawl space at 6



**TEST EQUIPMENT**

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## MOISTURE & MOULD REMEDIATION, IDENTIFICATION & REPAIR EXPERTS

airchanges per hour and 1 internally mounted 200mm fan to inject crawl space with fresh air.

### ■ Install in roof mechanical ventilation system ([www.ventco.com.au](http://www.ventco.com.au))

If applicable to this site, we will install a mechanical ducted ventilation system which is operated by either an electronic timer or a hygrometer( humidity metre) which will evacuate stale air from the roof cavity of the property on demand.

### ■ Install Airmaster Enviro Air Exchange system ([www.enviroairexchange.com.au](http://www.enviroairexchange.com.au))

This system offers permanent cleansing of any indoor environment by extracting the indoor air into a roof mounted triple filtered (two x HEPA for airborne particles and 1 x charcoal filter for VOC's) extraction unit, and then re entering the filtered air into each room of the property (excludes wet areas).

### ■ Install central heating system or increase overall heating

If applicable to this site, a ducted central heating system can be installed either in the subfloor (subject to access) or through the ceiling. Our installations are all undertaken by licensed tradespeople and all appropriate certificates are supplied.

### ■ Install subfloor external brick mounted ventilation fans(s)

If the subfloor is inaccessible, the next best alternative to a ducted subfloor ventilation system is the installation of externally mounted Ecofans in place of either bricks or passive vents. These will draw moisture laden air from the subfloor and assist in keeping the subfloor dry. Switched via externally mounted waterproof timers and 2 will be fitted.

### ■ Add dryer exhaust

Venting the clothes dryer will dramatically reduce the moisture build up in the bathroom and aid in the ventilating of the bathroom. We add ducting to the external vent of the clothes dryer and exhaust it externally (subject to model of dryer).

## TIME TO COMPLETION

7 - 10 days subject to drying times

## SCOPE OF RECOMMENDED WORKS (SHORT AND LONG TERM)

### Equipment required

Mould remediation - Two internal heaters, two de-humidifiers, three air-movers and one air-scrubber. Dustrak II particulate counter. Vapourshark odour remediation equipment; Odour remediation equipment.

### DRYING EQUIPMENT

Crawl space dehumidifiers >



Heaters >



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Room dehumidifiers >



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**Day 1** - Remediate subfloor by hand scrubbing; commence drying subfloor; Vacuum all affected area and surfaces; remove all affected plaster and skirting board as required; remediate all mould affected areas; install airscrubbers for mould spore removal; commence drying internally; dry all affected internal areas using dehumidifiers, portable heaters and airmovement.

**Days 2 through 5** - Continue until all areas are dry;

**Days 5 through 7** - Install subfloor and internal ventilation systems as required.

**Days 7 through 10** - confirm moisture levels of all areas; paint all required surfaces using colour matched paintwork and mould retardent additives; handover property; exit report.

### COSTINGS OF ALL WORKS

valid for 30 days

#### SHORT TERM

1. Commence drying subfloor used diesel fired equipment pumping warm air through sub floor.
2. Install airscrubbers to remove remaining mould spores from dwelling.
3. Remediate all mould affected areas of dwelling by treating with Microban (all surfaces of the affected area are treated by hand and the entire area is then 'fogged' so that areas not accessible by hand are also treated), the world's leading anti microbial, mould control product for environmental protection and is used as a Disinfectant, Mildewcide, Bacteriostat, Fungistat, Deodorizer, Anti-Microbial following mould infestation, flood or fire damage and is used extensively throughout the world in sterile and health critical environments like hospitals, morgues, schools etc.
4. Commence drying of all affected surface areas using portable heat sources to raise the core temperature of the building and promote evaporation, airmovers for airmovement and dehumidifiers to convert moisture vapour to liquid form and remove it from the internal atmosphere.
5. Clean subfloor by hand scrubbing of all affected accessible surfaces. Fog entire subfloor with antimicrobial fungistat.
6. Re paint all affected surfaces and any surfaces which have retained any stains from mould growth using colour matched paint and mould retardent additives.
7. Handover property. Exit report.

**TOTAL SHORT TERM WORKS = \$2,950\***

#### LONG TERM

**8. Subfloor ventilation** - The addition of a ducted subfloor ventilation system will stabilise the crawlspace and maintain a dry subfloor atmosphere in the long term.

**\$2440**

**9. Internal ventilation** - Install room ventilation in dwelling to remove built up moisture. Ducted throughb the ceiling the system introduces fresh air into the dwelling and removes stale air on a permanent cycle, permanently repairing the internal atmosphere.

**\$2900**

( site photos below - END REPORT - site photos below )

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**MOISTURE & MOULD REMEDIATION, IDENTIFICATION & REPAIR EXPERTS**



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## MOISTURE & MOULD REMEDIATION, IDENTIFICATION & REPAIR EXPERTS

### UNDERSTANDING THE ROLE VENTILATION AND HEAT PLAY IN MOULD GROWTH AND CONDENSATION FORMATION

Ventilation and heat - the lack of it and the addition of one or both - will dramatically affect the indoor environment and the ability to develop both mould and condensation. The two combined provide the best defence against mould and condensation. Generally, if a property is poorly ventilated and has excessive moisture, mechanical ventilation is required to rid the property of the excessive moisture in the first instance. Essentially mould growth occurs when mould spores - invisible particles often airborne - meet moisture and a food source. Common food sources found in dwellings are cellulose in nature - plaster or paint. Eliminating moisture is the fastest and most effective way of eliminating existing and ongoing mould.

#### Heat

Adding heat to a dwelling assists ventilation to deal with moisture. This is because air that is heated is able to carry or suspend more vapour than cold air. As air cools it loses its ability to suspend vapour and the vapour (moisture) that is no longer able to suspend itself in air then ends up settling on the coldest surfaces in the dwelling (windows, ceilings, skirting boards etc) thereby creating both mould growth and condensation. If air is heated it can hold more moisture and at the same time dry the air, reducing the moisture in the air.

#### Ventilation

All air carries moisture in it and moisture, or too much of it, is the prime cause of mould growth and condensation formation. Without moisture, mould cannot grow and condensation cannot form. So it makes sense to remove excessive moisture from the indoor atmosphere - and the way to do that is by ventilating the property.

Ventilation can be added mechanically or manually.

#### Manual ventilation

Ventilating by opening windows and doors regularly - is the best form of ventilation but in serious cases it is not generally sustainable as a means of reversing a poorly ventilated dwelling. Often it is a good idea to experiment with manual ventilation and if it is found to be insufficient then you can consider installing a mechanical ventilation system.

#### Mechanical ventilation

Mechanical ventilation is provided by electrically powered fans which can evacuate a room or multiple rooms, removing stale, moisture laden air and introducing fresh air to the dwelling. This cycle of old air out and fresh air in prevents the build up of excessive moisture and inhibits or stops the growth of mould in any dwelling.

#### Try before you buy

Dampco hires out portable mechanical ventilation systems and many people hire a system from us to see for themselves the effect a ventilation system has on a property.

### THE FOLLOWING IS APPLICABLE TO ALL JOBS UNLESS OTHERWISE STATED

- 1. GUARANTEE** - A written 12 month guarantee is supplied on completion of all mould remediation works. Dampproofing - 10 year warranty.
- 3. PAINT DISCOLOURATION** - Paintwork may still be stained following mould remediation work on both porous and non porous surfaces, but most commonly on porous surfaces like Gyprock plaster. In this instance, it is recommended that the surface be painted with a mould retardent additive mixed into the paint. This service is offered as an option.
- 5. VENTILATION AND HEATING** - Both hold the key to successful mould remediation. Please refer to the last page of this report.