DRYSCAN
Infrared Inspections

DryScan Limited
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6th March 2012

Joe Blogs
8 Anywhere
Auckland

Contact: Joe Blogs
Email:
Phone:

To Whom It May Concern:

DryScan Limited was engaged to complete a Pre-Purchase Scan only moisture ingress thermal imaging inspection for Joe Blogs at 8 Anywhere, Auckland.

This report unless otherwise stated covers moisture ingress issues within the entire building envelope, internal and external. It has been prepared to the best of our ability and knowledge with the information made available to us at the time. It does not cover areas that were inaccessible at the time of the investigation.

This report is a guide only and identifies the presence of any thermal anomalies and any areas that may have sustained moisture damage as a result of these anomalies. A full, in depth moisture ingress inspection possibly requiring an invasive investigation may be required if major moisture ingress issues have been identified. This report does not check for structural failures and is not to be used as a road map for remedial work and whilst we have taken every care to comment on all aspects of the building, we do not make assumptions for areas of the building that cannot be sighted or are inaccessible at the time of our inspection. Some issues may also have been disguised at the time of our inspection in order to prevent their detection. DryScan Ltd was not required to check any council files related to the above property.

DryScan Ltd nor any subsidiary companies or employees of it undertake to accept any liability in the preparation of this report or the conclusion of any structural or remedial work undertaken by the owners or management.

Acceptance of this report is also acceptance of the conditions contained within.

We trust you find this report useful and that our service has met your expectations. If for any reason whatsoever you are disappointed with any facet of our service please let us know, as this is the only way we can make the necessary improvements.

Please do not hesitate to contact us if you have any queries with regard to the attached report.

Regards,

Bryce Hall
Thermographer /Director
DryScan Limited

Report Guidelines

This report is designed to inform clients of any areas of elevated moisture, thermal anomalies or other signs of moisture ingress that may lead to deterioration or failure; it is not a guarantee against failure.

Where possible we gather information by observing infrared images which help us to identify the presence of any abnormal patterns of infrared radiation otherwise known as thermal anomalies within the building envelope, which in turn may enable us or any remedial experts to identify the location of any present or future issues and to allow such remedial teams to undertake the necessary repairs and locate directly areas that may have sustained damage. A full invasive inspection may be required by the remedial teams to check for structural damage where moisture levels are excessive.

DryScan Ltd is not responsible for determining what remedial work should be undertaken and recommends that any faults are addressed by suitably qualified persons. If at the conclusion of any works DryScan Ltd is requested to re-inspect, we will require producer statements from the contractors undertaking the repairs for their work, as we cannot make assumptions on areas of the building that cannot be sighted.

DryScan Inspection Process

Internal – In each room every wall and ceiling where possible including every top and bottom plate are checked using a high resolution 640 x 480 pixel image DryScan Infrared thermal imaging camera detector and a Carroll and Carroll non-invasive moisture meter. Our technicians carry probe moisture meters that can be employed on request in areas where the non-invasive meters are getting increased readings to check the moisture levels of the framework.

External – An external check is also undertaken looking particularly at areas where common problems occur such as decks and balustrades, penetrations through the external cladding, flashing details and ground clearance. The outside of the dwelling, walls and roof where possible is checked for any visible defects particularly in areas where there are increased moisture levels or other thermal anomalies internally.

Effects of moisture on timber

Almost all building materials deteriorate when they are exposed to moisture over time. Moisture causes fungal decay and mould in timber. Also chemicals from corroded metal fixings can cause damage to timber.

Types of rot	Conditions
Dry rot	- spore germination 28-30% moisture content - optimum growth 30-40% moisture content - minimum moisture content for continued growth 20% - requires high humidity and acidity for establishment
Wet rot	- optimum growth 50-60% moisture content - minimum moisture content for continued growth 30% - high moisture required / sensitive to drying - tolerant to many preservatives
Soft rot	- prefers high moisture

Moisture content readings

Acceptable levels of moisture are generally below 20%; anything above this level can cause damage to building elements over time and may require further investigation. The New Zealand Building Code - NZS3602 prescribes the maximum allowable moisture content level for untreated timber as 18% and for treated timber as 20%. For the purposes of this report, where moisture levels in excess of 20-30% are found, we generally recommend that a further invasive investigation is undertaken to check the structural integrity.

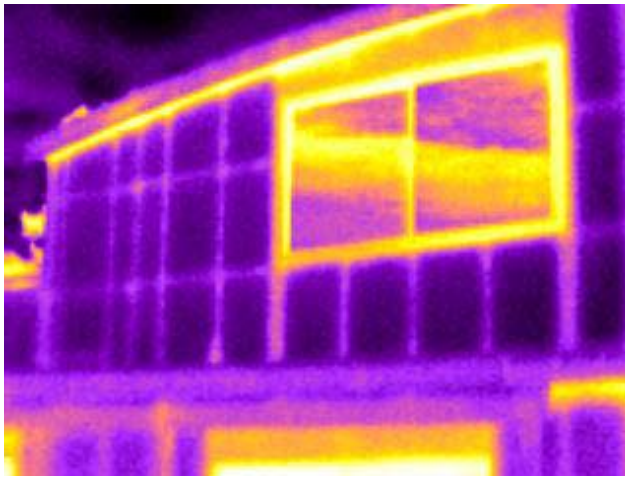
Unless otherwise stated moisture readings taken are non-invasive, so they are not the exact moisture readings of the framework.

Moisture content in timber	
<18%	decay is highly unlikely
18-30%	less than the fibre saturation point of 30% - decay is unusual except for dry rot
>30%	close to wood saturation - decay is common – timber will usually require removal

Interpretation of Infrared Images

Infrared technology uses the part of the light spectrum the human eye cannot see. All objects emit infrared light/radiation and temperature has a large effect on this. The infrared cameras are sensitive to the slightest variations in infrared light / temperature and therefore have the ability to see what we and normal cameras cannot. The camera converts this infrared radiation electronically into an image that is visible to us. In effect we are seeing the temperature of the image hence the term “infrared thermography”.

Examples: [these are NOT the subject property]



This image shows the cameras ability to show internal framework.

We can see the coloring (temperature) is consistent and even throughout the wall.

This is considered a normal temperature distribution and would indicate that there are no thermal anomalies present and there is no cause for concern.

This image shows a significant difference and inconsistent distribution in colour / temperatures which would indicate the presence of a thermal anomaly and would require further investigation.

Here the internal wall framing is visible, with warmer areas being highlighted in yellow and colder areas in purple.

The colder / purple areas in the upper corner would be an area of concern and a recommendation for further investigation would be expressed.

NOTE: The purple colour is not always an indication of moisture as the colour is dependant on the ambient conditions. Moisture can also be indicated by a lighter shade of colour.

Inspection Equipment

DryScan Infrared Inspections thermographers use non contact high resolution, high performance 640 x 480 pixel image infrared cameras which offer a 45% higher performance than most traditional infrared detectors. They are equipped with the highest level of thermal sensitivity currently available in an uncooled infrared camera. With the thermal sensitivity of our cameras being 0.060 degrees Celsius at 30 degrees C, this means that at 30 degrees C, the infrared camera can differentiate between temperatures that are only 0.060 degrees apart. It is this thermal sensitivity that gives DryScan Infrared's cameras their excellent image definition and crispness and enables us to more accurately pin point a hot spot or thermal anomaly, giving clearer definition of thermal variation across the target.

DryScan thermographers are also equipped with Carrel & Carrel non invasive moisture meters which are used in conjunction with our infrared cameras, particularly in areas where the camera has identified the presence of a thermal anomaly. These digital meters measure how much water is present in timber and is expressed as a percentage of moisture content. Our thermographers also carry invasive probe moisture meters which involve the driving of two probes through the plasterboard or timber surface enabling the operator to collect accurate moisture content readings. This method is usually employed in areas of concern in which high moisture readings have been obtained using non-invasive methods, or when requested by the homeowner.

For the purpose of this report, all moisture readings shown are taken from the non-invasive digital meters unless otherwise specified.

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Pre-Purchase Scan Only
Thermal Imaging Inspection
For: Joe Blogs

Site Information

Date of Inspection:	6 March 2012
Thermographer:	Bryce Hall
Property Address:	8 Anywhere
Property Description:	A detached two storey dwelling
Exterior Cladding:	Rendered Brick and Harditex mix
Roofing Material:	Concrete tiles
Joinery:	Alloy

Weather conditions

Weather:	Fine

Scope of work

Moisture ingress Scan Only inspection on the entire dwelling

Summary

This dwelling was built in 1972 with alterations in 1989 and 2007; it appears to be of well constructed and in good condition with some signs of abnormal or high moisture content levels.
The main contributing factors to the increased moisture levels are a possible roof failure above the south east bedroom, south wall, and tracking down to give moisture readings of 62% on the right side of the window. The rest of the interior had moisture readings of 9 to 18% with an average of about 13%. A visual inspection of the exterior found a number of remedial items that will need attention in the near future. Minor crack in the upper west side new plaster cladding, a number of broken and cracked roof tiles and all the gutters need clearing of tree leaves.

Conclusion

In conclusion, our inspection showed that this dwelling is generally in good condition with one area in the bedroom of concern with regard to moisture ingress at the time of our inspection that will need further investigation to find the source of the leak and a number of remedial items the need attention.

Once all the necessary remedial work has been completed we can come back to reassess the dwelling and confirm that we can see no further issues with respect to moisture ingress. There is a charge for this service.

We recommend that a regular monitoring and maintenance programme is undertaken. Most building elements will require maintenance to achieve their expected durability. The extent and nature of that maintenance will depend on the material or system, its geographical location and position within the building. The manufacturers' specifications will outline what maintenance should be undertaken.

Policies adopted by DryScan Ltd

1. **Purpose of Report**
   This report has been prepared for the client following an above ground infrared inspection of the building and/or its services. It provides general comments on the condition of the building and services at the time of our report.
2. **Visual Inspection**
   whilst all care to record any irregularities or defects in the building envelope apparent from the infrared imaging, it is important to note that this is a thermal report only. DryScan Ltd is not responsible if we are unable to access any part of the building services or property to carry out a thermal investigation.
3. **Structural Survey**
   This report is not a structural survey. DryScan Ltd does not open up, uncover, dismantle or undertake any internal inspection of the building, services or chattels. We do not make any representation as to the soundness of the structure of the building services or chattels, or unless otherwise stated, the existence of any rot, mould, moisture, borer or other pest infestation.
4. **Title and boundaries**
   DryScan Ltd has not undertaken a search of the title to the property or a survey of the property and unless otherwise stated it is assumed that all improvements lie within the title boundaries.
5. **Compliance with statute/regulations/requisitions by territorial or other relevant authorities**
   DryScan Ltd makes no representation that the building complies with the requirements specified under the Building Act 1991, Health and Safety in Employment Act 1992, Evacuation of Building Regulations 1992 or the Disabled Persons Community Welfare Act 1975.
6. **Contamination or Hazards**
   this report is not a site or environment report and DryScan Ltd makes no representation as to the existence of any contaminant as defined in the Resource Management Act 1991 or any hazard as defined in the Health and Safety in Employment Act 1992.
7. **Chattels**
   DryScan Ltd does not check the appliances, equipment or any other chattels to see if they are operational and makes no representation as to the condition, quality or efficiency of any such appliance, equipment or other chattels. DryScan Ltd does not check the operational efficiency of electrical equipment, dishwashers, swimming pools or burglar systems.
8. **Publication**
   Neither the whole nor any part of this infrared report or any reference to it may be included in any published document, circular or statement without first obtaining the written approval of DryScan Ltd.
9. **Responsibility**
   DryScan Ltd responsibility in connection with this report is limited to the client to whom it is addressed and is limited in liability to the full cost of the report. Acceptance of this report is deemed to be acceptance of these enclosed conditions.
10. **General**
    Nothing contained in this statement of policies, shall be deemed to exclude or restrict any rights or remedies the client may have under the Fair Trading Act 1986 or the Consumer Guarantees Act 1983. If any provision in this statement of policies is illegal, invalid or unenforceable, the validity and enforceability of the remaining provisions will not be affected.
11. **Further Imaging**
    DryScan Ltd will undertake further imaging, or if requested a more detailed report at a quoted cost or we can refer you to other competent persons to undertake further structural investigations.
12. **Term of the Infrared Report**
    This report has been prepared on the basis of thermal imaging carried out on the date of the investigation. As building materials can deteriorate over time and weather conditions affect moisture levels, it is valid for the date of the inspection.
13. **Rotting, leaking homes**
    this report is a thermal/infrared imaging report. It shows inconsistencies with temperature distribution within the inspected area/s. Invasive techniques are required to ascertain conclusive evidence of the type/s of mould and/or percentage of moisture in any areas of concern.
14. **Disclaimer**
    this report shall only be used as a reference to show that there are irregularities within the building. Further investigations carried out at the discretionary right of the person/s that authorized this report. DryScan Ltd makes no claim to there being moisture or mould within the structure as to verify this requires an invasive inspection by a qualified inspector within NZ.
15. **Public Liability Insurance**
    DryScan Ltd is covered by Public Liability Insurance.