

Methods for Determining Moisture in Fiberglass Hulls

By Captain John Banister, SA Suenos Azules Marine Surveying and Consulting

I have been a full time marine surveyor now for five years with an extensive history in boats and, yes, I have even worked in boatyards and have experience in laminating fiberglass. I am an independent marine surveyor. I am very honest with my clients. Moisture meters can be a useful tool for the surveyor, but they can also be misleading.

Moisture meters only pick up conduction. That means that any water, metal, or even certain elements will make the moisture meter read something. Below the waterline, there is anti-fouling paint - most contain copper or some other metal composite anti-fouling agent. The moisture meter will pick this up and read high, so I do not use the moisture meter for anything below the waterline. Also, some topside paints will contain metal composites which will also read high on the moisture meter. If you are getting high moisture readings everywhere on the topsides, let's not be naive. Start asking the owner if the topside was painted and, if so, what paint was used. Refer to the paint label or MSDS sheet to search for the components of that paint.

It's not enough to just slap the moisture meter on the boat and, when it reads high in a few places, say, "the boat's hull has water in it" and without any other testing, walk away. I use four methods to determine moisture in the hull: 1. visual inspection, 2. phenolic hammering of the hull (i.e. percussion testing), 3. moisture meter testing, 4. infrared thermal imaging. With the combination of these four methods, you can make a pretty good determination of the hull and if there is or is not moisture trapped in the hull.

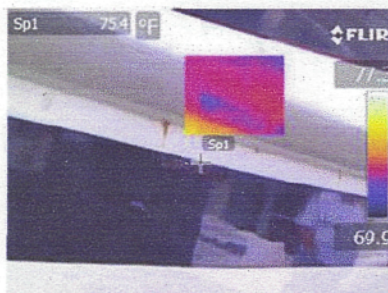
However, I strongly suggest that any use of the thermal camera be done by a surveyor that has at least a level one thermography certification from a reputable training center. There is a science to it and the surveyor needs to distinguish between actual anomalies consistent with water versus reflective and temperature related anomalies. You cannot just point and shoot the thermal imaging camera. Each image needs to be tuned properly for analysis. I have only recommended core sampling twice in all of the vessels I have surveyed. Both were to confirm the findings of core moisture / damage from two very stubborn insurance companies that argued there was no damage to the core after testing and thermal imaging. Both times they were wrong and the core showed moisture and damage.

I do not think core sampling needs to be done on most boats with moisture / core issues. We are in the 21st century, ladies and gentleman. We have all kinds of non-intrusive technology that outperforms moisture meters alone and takes all of the suggestive work out of marine surveying (such as thermal imaging). I do not rely solely on thermal imaging, but it is one of the tools I use out of the four methods to prove or disprove the presence of water or core damage in the hull. The main reason I believe that more surveyors are not using thermal imaging is twofold: 1. the older surveyors, in my experience, cling to their own methods and are unwilling to consider other testing methods; 2. thermal imaging is expensive and the certification classes are not easy.

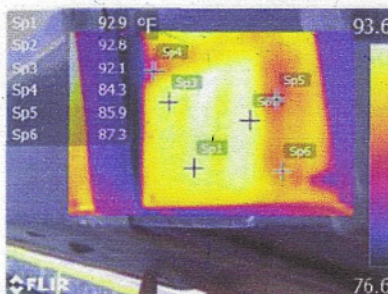
Currently, I hold a level two thermography certification through ITC and own two thermal imaging cameras (the Flir i5 and the E50 cameras). My total investment in thermal imaging since I got into it about four years ago is approximately \$15,000.00, between certification courses and the purchase of the cameras. I would not survey without them, but I would not solely rely on them either. However, when I use all four methods, I am about 99% - 100% confident of my findings on the condition of the hull.



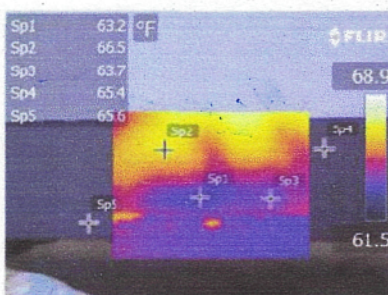
Moisture meter readings on the hull of a sailboat



"Picture in picture" thermal imaging on trapped water near the chine on a fiberglass power boat



"Picture in picture" thermal image of a fiberglass patch under the gel coat with residual trapped water around the patch



Trapped water under the fiberglass near the hull bottom (no blistering was seen yet)

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