

Keywords: paper moisture meter, biofuel moisture meter, infrared moisture meter

Installation Issues for Requiring Conditions

General

Infrared moisture meters are used more and more in very requiring positions in various production machines. Often, the ambient temperature is very high and sometimes there is a lot of dust or particles (dry or moist) flying with the web or material on the conveyor. In worst cases, the air may contain aggressive gases and fumes too. To keep the meter running without interruptions and to minimize servicing needs, the meter should be protected with some means. For the absolutely worst positions, the meter itself can be built with AISI316 or equivalent casing for extended protection. This technical note instructs on how to arrange an economical solution by using some low-cost standard box for covering the meter. The boxes main function is to create a local climate for the meter to better survive and to keep it clean. It is highly important to use an air purifier filter before letting the pressurized air to the meter. The oil vapor flowing in the tubing is harmful for any electronic parts.

Hot Positions

The first picture (Fig. 1) shows the meter fastened inside a standard ABS box (max 80C). The box can be made of iron plate for higher temperatures or stainless steel for best durability and immunity (higher cost too). When selecting the proper box, observe both the maximum temperature and its ability to withstand in aggressive environments. The box having good fastening holes or flanges is a plus. ABS boxes are easy to machine and stainless steel boxes are notoriously hard. This box design does not give sufficient protection against dust or flying dirt. The boxes air flow must be sufficient to keep the meter cool enough and should be adjusted experimentally. The meter's air flow should not exceed 2L/s.

Dusty Positions

Fig. 2 shows the box needed when there is dust or flying dirt in the air. The box gives a good protection in hot conditions too. The opening is wider but the box is much deeper to better protect the meter. Selecting the boxes deepness is left as an exercise for the engineer according to his/her special application. The boxes air flow must be sufficient to keep the dust away and should be adjusted experimentally. The meter's air flow should not exceed 2L/s.

Notes

The bottom opening must be wide enough to allow free working of the meter without obstructing the light beams going out/in. If this is not observed, the meter may have false readings due to unexpected reflections from the walls. Also, the IR thermometer's viewing angle must be free. Else it will measure the temperature of the boxes wall. Refer to mechanical drawings of the meter and experiment with the meter when installing it to the box. No change to the moisture reading nor the web temperature should be observed when the box is used while measuring a test target.

Try to install the meter for the working distance which is marked as nominal distance (e.g. 200 mm with a range of 180 to 380 mm). Installing at the minimum distance gives no tolerance against web vibrations at all. This fact is especially important for conveyor systems where material height varies continuously. The working distance must never fall below the indicated minimum. The worst case height of the material on conveyor must be known or limited mechanically to prevent this (use a plow). Else the moisture reading will be badly distorted.

Fixing the box over a running web or conveyor must be done securely and keeping safety in mind. **No loose bolts or parts are allowed in any conditions.** Use metal parts inside the box for mounting the meter securely with Nylon locking nuts.

The same thoughts should be followed when selecting protection for the meter when installed to a scanner system. Usually the cover is integral and tailored to the application.

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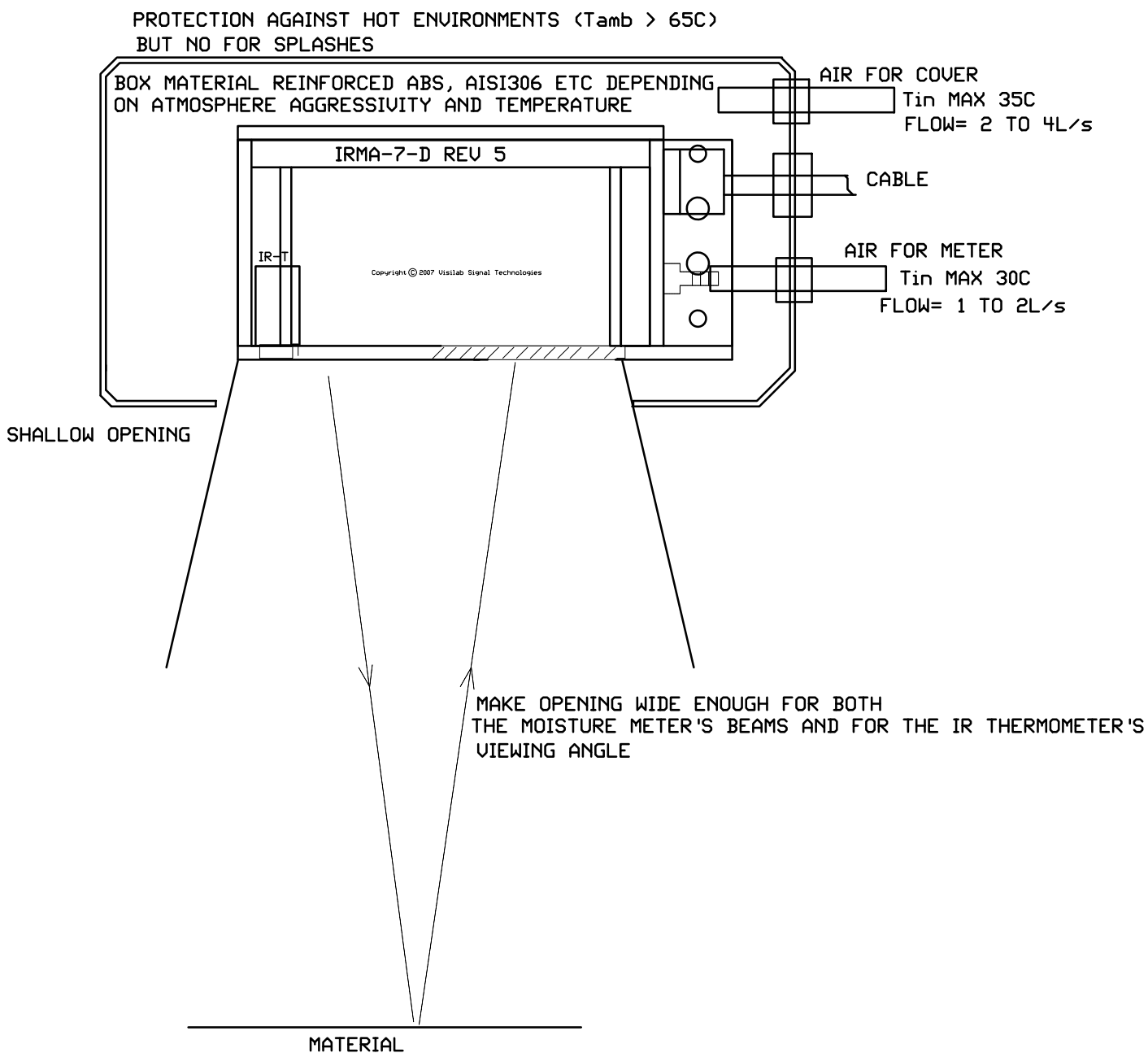


Figure 1. Protection against hot environments by using a standard box. An opening is machined or sawed to the bottom. Drawing is not to scale.

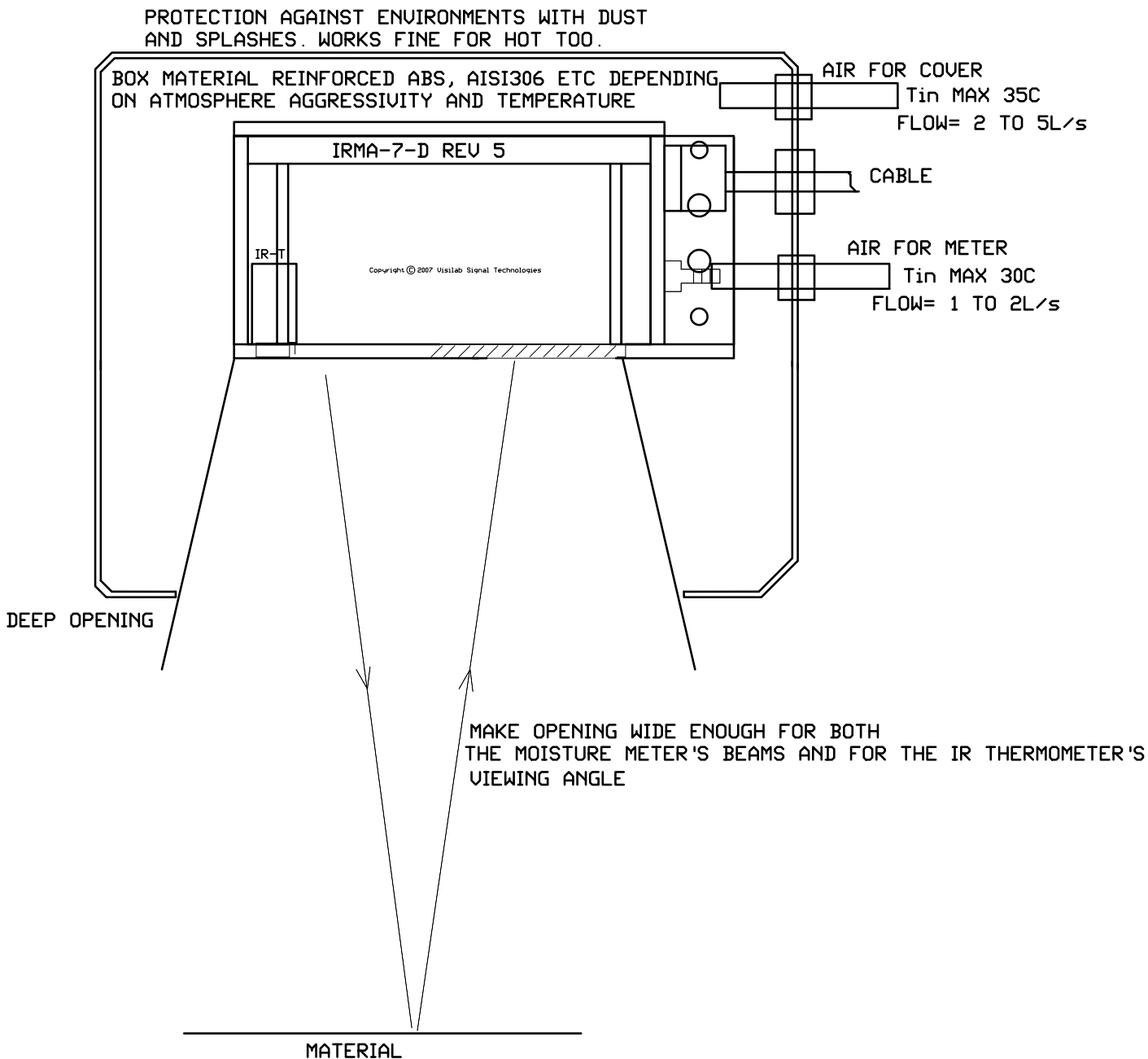


Figure 2. Protection against dusty environments by using a standard box. An opening is machined or sawed to the bottom. Drawing is not to scale.