# 2501 Series - Hot Industry Crane Scale Application

Hot industry crane scale applications require special features in order for the scales to function reliably in these hostile environments. The severest task for the crane scale is weighing a ladle containing molten metal. In the case of steel, the temperature of the molten metal exceeds 1000ºC (1800ºF) and there is a great deal of direct heat radiation. There is little chance of an extension cable surviving in this environment. The extension cable is usually required when using a remote readout. This means that the crane scale should be 1) either with a large display integrated with the load cell, or 2) a remote wireless (RF) indicator type. The former is not popular because there are critical times when reading the scale is essential and rising smoke frequently obscures the display in a way that makes it impossible to read the weight. In these circumstances the RON 2501 provides the ideal solution for weighing hot ladles in a foundry.

The RON 2501 includes an internal thermometer (optional) that transmits the load cell interior temperature to the indicator. The limit is 80ºC (175ºF). The ambient temperature in the ladle weighing location is many hundreds of degrees Celsius. In order to delay the rise in interior load cell temperature and prevent it reaching the limit of 80ºC (175ºF), a special fiber heat shield is supplied. This shield covers the load cell's electronic housing and delays the temperature increase inside the load cell where the electronic boards including the R.F. transmitter are located. This shield only delays the temperature rise, it cannot prevent it. If the RON 2501 system with the heat shield is used in an ambient temperature of 90ºC (195ºF) for a long enough period of time, the internal temperature will rise to 90ºC (195ºF) which is above the system's working temperature limit.

However, the system will function in much higher temperatures provided that it is exposed for short periods of time, short enough not to reach the interior temperature limit, followed by cooling to the lowest ambient temperature locally available. The temperature will decrease slowly because the insulating jacket delays the decrease of the load cell internal temperature.

If the load cell is placed in a well-ventilated location (e.g. opposite a fan), the rate of cooling will be increased. What is required is a cycle

with a short heat exposure time and a cooling phase long enough for the interior temperature to remain below the 80ºC (175ºF) limit. This procedure will solve the problem of weighing hot foundry ladles. The heat shield package also includes a radiation shield consisting of a metal plate that protects the load cell electronic housing from the heat radiating from the molten metal.

Some ways of improving conditions during the heat exposure phase:

*****The distance between the load cell and the heat source should be as great as possible. There are cases where it is possible to install the load cell above the crane hoist. In this instance, the distance from the heat source is greater and consequently the load cell shielding is also improved.

*****Whenever possible, the foundry ladle should be covered in order to decrease the ambient temperature and direct heat radiation.

*****In some cases, drops of molten metal spray from the ladle. Use suitable means to protect the load cell and prevent molten drops of metal from hitting the heat shield jacket and, in particular, to prevent them from adhering to the jacket. This will avoid damage to the jacket which can affect its insulation properties.

The heat shield jacket is produced by a leading firm using fibber (JT650G1) having heat protection of 500ºC (940ºF) in continuous use and 600ºC (1150ºF) for short periods.