Understanding Rating Codes Leads to Longer Load Cell Life

It's no secret that misuse of a product can cause major cost and safety problems, and load cells are no exception. It's not that operators intend to damage load cells, it's often simply a matter of not reading the fine print. In addition, the rating systems some load cell manufacturers use to describe the water-sealing qualities of their products can be confusing.

No Industry Standard

In a nutshell, the problem is that our industry doesn't have regulations or a uniform rating system for load cell sealing systems. Consequently, load cell makers must either institute their own rating system or adopt a system not designed for load cells. Some manufacturers have chosen the second strategy, rating their load cells by the NEMA or IP systems. By themselves, neither system fully describes a load cell's sealing qualities.

Both NEMA and IP systems were designed to rate enclosures, not load cells. Neither deals with the effects of internal condensation in a load cell cavity, or moisture entry at the cable. Since most water damage occurs in these areas, the ratings are misleading. Worse yet, corrosion protection is not even mentioned in the IP system, and the NEMA system only applies to external corrosion. These ratings are much too limited to relate to the inner structure of load cells and the effects of chemical corrosion on load cell performance.

Inadequate Testing

Furthermore, the tests used to establish NEMA or IP rating codes don't reflect real-world conditions load cells endure. Immersion tests done at two meters or less do not mean a cell will handle high-pressure water jets, and vice versa. For instance, a NEMA rating for immersion in water (NEMA 6 or 6P) may not stand a 40 psi high-pressure washdown application (NEMA 4). Conversely, the IP66 rating for high-pressure water jets doesn't mean immersion, and the IP67 or 68 ratings for temporary or long-term immersion are unsuitable for strong water jets. To their credit, some manufacturers give a dual code, such as IP66/IP68, to rate cells which can handle both high-pressure washdown or constant immersion.

Rating Code	Load Cell Environmental Protection
EP	Dustproof, not protected from moisture or water
IP65	Dustproof, protected from splashes and low-pressure jets
IP66	Dustproof, protected from strong water jets
IP67	Dustproof, protected from temporary immersion in water 1 meter deep for 30 minutes
IP68	Dustproof, protected from continuous immersion in water under more severe conditions than IP67
IP66/IP68	Dustproof, protected from strong water jets and/or constant immersion

A Logical Rating System

The system now used at Rice Lake Weighing Systems takes care of many of these problems. All load cells are divided into three main classes: Environmentally Protected (EP), Welded (W), and Hermetically Sealed (HS). EP cells have a potted and/or physically-protected cavity for use in dry applications only. W cells incorporate a "welded cup" at the strain gauge area and are often mistakenly termed HS cells. While they can handle spray, the cable entry area is protected by only a redundant seal, and consequently will not tolerate washdown or complete immersion. True HS load cells feature a welded gauge area and usually a glass-to-metal seal at the cable entry area, and are meant for wet environments. All three classes may have special construction materials, such as stainless steel or epoxy coatings, to handle chemical corrosions.

As I mentioned before, wetness comes in many forms. To guide customers in the selection of HS cells, we have added IP numbers to show the kind of additional water protection an HS cell has. (The Rating Code chart summarizes the codes you may see on load cells offered by Rice Lake Weighing Systems.)

Maintenance and Service Tips

Load cells in wet applications can be protected by adding guards or shrouds to keep high-pressure water jets off the cell. Another safeguard is to leave a downward drip loop in the cable just before the load cell. This strategy prevents water from running down the cable and wicking into the cable entry area.

Since materials used in cell construction will react with some chemicals used in applications, protecting the cell from product exposure becomes a consideration. Rice Lake Weighing Systems offers a clear polyurethane varnish called SURVIVOR Coat that can be applied to many standard cells. SURVIVOR Coat creates a resilient chemical barrier that can also be applied to load cell mount assemblies to provide complete module protection.

The best advice I've learned? Buy load cells from an established company, know their rating system, and *always* read the fine print.

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