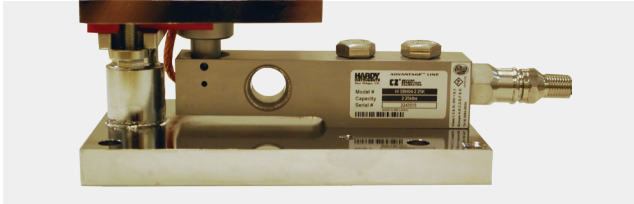


Safe, Easy Solutions for Weighing in **Hazardous Areas**



Products for Classified Areas

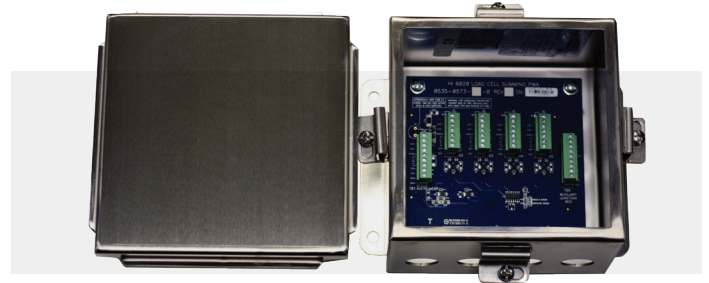


FM Certified Sensors

IS Sensors, Class I,II,III, Div. 1,2,3

1 Klb to 660 Kilbs | IP 67/IP68 (up to 2m water depth) / IP69k

Intrinsically Safe (Entity) for use in Class I, II, III, Division 1, Groups A, B, C, D, E, F and G; Temperature Class T4 Ta = 40°C; when installed per Control Drawing 0594-0005 in Hazardous (Classified) Locations



IEC & ATEX, Class I,II,III, Div. 1,2 Junction Boxes & Summing Cards

1 to 4 Load Cells per box | Up to 2 boxes using a TB6 Auxiliary Port

- HI6020IT-SSX-Y and HI6020JB-SSX-Y: USL/CNL Class I, II, III, Div 1 Groups ABCDEFG intrinsically safe per drawing 0594-0007 and 0594-0008
- HI6020JB-SSX-Y-EX and HI6020IT-SSX-Y-EX models: ATEX & IECEx Ex ia IIC T4 intrinsically safe per drawing 0594-0011 and 0594-0012 ATEX Certificate No. DEMKO 17 ATEX 1819; IECEx Certificate No. IECEx UL 17.0009



FM Certified, Class I,II,III, Div. 1,2 Floor & Bench Scales

5 lb to 10,000 lb capacity | Intrinsically Safe Summing Card

- Integrated Load Cells: Intrinsically Safe (Entity) for use in Class I, II, III, Division 1, Groups A, B, C, D, E, F and G; Temperature Class T4 Ta = 40°C; when installed per Control Drawing 0594-0005 in Hazardous (Classified) Locations
- Integrated Summing Card: For Class I and II, Division 1 Hazardous (Classified) Locations, and Class 1, Zone 0 and 2 Groups IIC, Zone 20 and 22 Groups IIIC, power must be supplied through intrinsically safe barriers per control drawing 0594-0010



Hazardous Class I,II,III, Div. 2 Weighing Instruments & Weight Modules

High Performance | High Resolution | Optional Displays & Enclosures

- Hazardous: Class I, II, III/Div2
- Safety: CE, UL & CUL
- Optional Display panels up to IP66
- Type 4 and 4X Enclosures, Panel Mount Wall Systems and Integrated Panel Solutions or Plug into Backplane of PLC/PAC
- Low voltage instruments powered in safe area
- C2® permits calibration from safe area with no need for test weights
- INTEGRATED TECHNICIAN diagnoses weighing system faults from the instrument located in the safe area

Certifications are available for download on each respective product page at www.hardysolutions.com



Industrial
Manufacturing

About Hazardous Areas: A Primer

EXAMPLES OF INDUSTRIES WHERE HAZARDOUS CONDITIONS MAY EXIST



Chemical &
Petrochemical
Manufacturing



Food & Beverage
Manufacturing



Pharmaceutical
& Biotech



Consumer
Packaged Goods

Introduction

Weighing equipment used in areas where there may be explosive concentrations of vapors or dust must be equipped with special wiring and other intrinsically safe electrical components. Hazardous (classified) locations might exist in any manufacturing location with vapors, dust or flyings, but are common in large bakeries (flour), plastics manufacturing plants (vapors or dust), chemical plants (vapors), paint-finishing locations (vapors), and grain silos (dust or flyings), to name just a few. Other examples include locations where vehicles are fueled or any transfer mechanisms for inherently hazardous materials.

Reducing Risk in Hazardous Areas

Preventing explosions is commonly done by eliminating one of the three elements in the triangle of fire. Some manufacturing sites can eliminate either Oxygen or Flammable Material, but in most cases it is easiest to eliminate an ignition source. Common Ignition sources can be electrical sparks, hot surfaces or electromagnetic fields.

Intrinsic safety (IS) is a protection technique for safe operation of electrical equipment in hazardous areas by limiting the energy, both electrical and thermal, available for ignition. When electrical equipment is used in hazardous areas, there are different regulations concerning equipment manufacturing and safety that reduce the ignition source risk. Many of these regulations are local to specific countries. Manufacturers must adhere to these regulations and provide the appropriate level of protection depending on the classification of the hazardous area. Materials ignite at different temperatures. Mitigation of risk depends on the hazardous material and the manufacturing application taking place in the hazardous zone.



The Triangle of Fire

It is important to understand area classifications and associated zones to determine the level of protection required to reduce the appropriate level of risk. These zones are dependent on whether the flammable material is gases or vapors, dusts, or another type of material.

Regulatory Agencies

In North America, the most widely used hazardous location classification system is defined by the **National Fire Protection Association (NFPA) Publication 70, National Electric Code® (NEC) in Articles 500 to 506**. These regulations specify the type of hazardous substances that are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

The NFPA establishes area classifications based on Classes, Divisions and Zones that when combined delineate the hazardous conditions of a specific area. This classification method provides a description of the hazardous material, and the probability that it is present, so that the appropriate equipment is safely installed and operated. The Occupational Safety and Health Administration (OSHA) has adopted these hazardous classifications from the NEC and they are defined in the 29 Code of Federal Register (CFR) 1910.399.

Almost all developed countries are members of the **International Electrotechnical Commission (IEC)**. Positive pressure enclosures, or “welding habitats” work on the principle of overpressure. This protection principle is regulated by IEC standard 60079-13:2017. The IECEx certification scheme is regulated by the IECEx 02 IEC System for Certification to Standards relating to equipment for use in Explosive Atmospheres (**IECEx System**) IECEx certification is compulsory to operate electrical equipment in explosive atmosphere in most Countries outside Europe. Australia, New Zealand, UAE, Malaysia, and the Philippines accept IECEx certification directly.

ATEX certification is the national certification standard of the European Union, and mandatory to operate equipment in explosive atmospheres in Europe. Certification is based on the ATEX directive 2014/34/EU with all equipment requiring a proper manufacturer’s EU Declaration of Conformity. For Zone 1 welding habitats this EU Declaration of Conformity must be based on a Notified Body issued EU-Type Examination Certificate for pressurized habitats (rooms) EN 60079-13.

Definitions of Hazardous Locations

Class I Locations: Class I locations are those in which flammable gases or vapors are present in the air in quantities sufficient to produce explosive or ignitable mixtures. Class I locations are further subdivided into two Divisions and three Zones.

Class I, Division 1: There are three different situations that could exist to classify an area as a Class I, Division 1 location:

1. Ignitable concentrations of flammable gases or vapors under normal operating conditions.
2. Ignitable concentrations of such gases or vapors may exist frequently because of repair or maintenance operations or because of leakage.
3. Breakdown or faulty operation of equipment or processes might release ignitable concentrations of flammable gases or vapors, and might also cause simultaneous failure of electric equipment.

Class I, Division 2: One of the following three situations must exist for an area to be considered a Class I, Division 2 location:

1. Volatile flammable liquids vapors or flammable gases are handled, processed or used, but the hazardous materials will normally be confined within closed containers or closed systems from which they can escape only in the event of accidental rupture, breakdown of containers or systems, or from abnormal operation of equipment.
1. Ignitable concentrations of gases or vapors are normally prevented by positive mechanical ventilation, which might become hazardous through failure or abnormal operations of the ventilating equipment.
2. Adjacent to a Class I, Division 1 location, where ignitable concentrations of gases or vapors might occasionally be transmitted unless prevented by adequate positive-pressure ventilation with safeguards against ventilation failure.

Zone Definitions: Zones take into account different dangers from potentially explosive atmospheres. Zone 0 is the most hazardous, and Zone 2 is the least hazardous.

Zone 0: Everywhere that ignitable concentrations of flammable gases or vapors are:

1. Present continuously and/or Present for long periods of time

Zone 1: Everywhere that ignitable concentrations of flammable gases or vapors are:

1. Likely to exist under normal operating conditions
2. May exist frequently because of repair, maintenance operations, or leakage

Zone 2 Everywhere that ignitable concentrations of flammable gases or vapors are:

1. Not likely to occur in normal operation
2. Occur for only a short period of time
3. Become hazardous only in case of an accident or some unusual operating condition

Class II Locations: Class II hazardous locations are areas where combustible dust, rather than gases or liquids, may be present in varying hazardous concentrations. Class II locations are further subdivided into two divisions.

Class II, Division 1: One of the following three situations must exist:

1. Where combustible dust is present in the air under normal operating conditions in such a quantity as to produce explosive or ignitable mixtures. This could be on a continuous, intermittent or periodic basis.



**Class I
Flammable Gases or
Vapors**



**Class II
Combustible Dust**

- Where an ignitable and/or explosive mixture could be produced if a mechanical failure or abnormal machinery operation occurs.
- Where electrically conductive dusts in hazardous concentrations are present.

Class II, Division 2: One of following two situations must exist:

- Combustible dust will not normally be in suspension in the air in quantities sufficient to produce explosive or ignitable mixtures, and dust accumulations will normally be insufficient to interfere with the normal operation of electric equipment or other apparatus, but combustible dust may be in suspension in the air as a result of infrequent malfunctioning of handling or processing equipment.
- Resulting combustible dust accumulations on, in or in the vicinity of the electric equipment may be sufficient to interfere with the safe dissipation of heat from electric equipment or may be ignitable by abnormal operation or failure of electric equipment.

Class III Locations: Class III hazardous locations contain easily ignitable fibers or flyings, but the concentration of these fibers or flyings are not suspended in the air in such quantities that would produce ignitable mixtures. Class III locations are further subdivided into two divisions.

Class III, Division 1: Easily ignitable fibers or materials producing combustible flyings are handled, manufactured or used.

Class III, Division 2: Easily ignitable fibers are stored or handled, other than in the process of manufacturing.



Class III
Fibers or Flyings

These classifications are designated by regulatory agencies. **Hardy doesn't classify, but does deliver solutions that comply with regulatory requirements.**

IS Barriers Recommended For Use with Hardy Weighing Equipment

Intrinsic Safety Barriers are essential components of an intrinsically safe application. These devices limit current, voltage, & total energy delivered to a sensor or summing card located in a hazardous area. When used in areas with hazardous chemicals, gases or other ignitable atmospheres, limiting the energy helps prevent any possible fires & explosions.

Intrinsic Safety Barriers Approved For Use In Hardy Systems (US/Canada)										
Component Description	Supplier	Model	Class	Division	Group	U _o (V)	I _o (mA)	P _o (mW)	C _o (uF)	L _o (mH)
IS Barrier Type 1 (excitation)	MTL	7766Pac	I,II,III	1	AB	12.0	157.0	471.0	1.41	1.47
					CE				9.00	4.40
					DFG				36.00	11.00
IS Barrier Type 2 (signals & sense)		7761Pac	I,II,III	1	AB	9.0	26.0	225.0	4.90	56.00
					CE				40.00	208.00
					DFG				500.00	419.00
IS Barrier Type 3 (C2)		7710+	I,II,III	1	AB	10.0	200.0	500.0	3.00	0.91
					CE				20.00	2.72
					DFG				100.00	7.25
IS Barrier Type 1 (excitation)	Pepperl+Fuchs	Z966.H	I,II,III	1	ABCD	12.0	164.0	492.0	1.41	1.38
					EFG				4.23	4.14
					DFG				11.28	11.04
IS Barrier Type 2 (signals & sense)		Z961.H	I,II,III	1	AB	8.7	25.0	54.4	4.9	57.0
					CE				14.7	171.0
					DFG				39.2	456.0
IS Barrier Type 3 (C2)		Z710	I,II,III	1	AB	9.56	195.0	466.1	3.0	0.86
					CE				9.0	2.58
					DFG				24.0	6.88
IS Barrier Type 1 (excitation)	Stahl	9002/11-130-360-001	I,II,III	1	ABE	13.0	321.0	1040.0	1.0	0.19
					CDFG				6.2	1.6
IS Barrier Type 2 (signals & sense)		9002/10-187-020-001	I,II,III	1	ABE	9.33	20.0	50.0	3.9	90.0
					CDFG				29.0	330.0
IS Barrier Type 3 (C2)		9001/01-086-150-101	I,II,III	1	ABE	8.6	150.0	322.5	6.2	1.3
					CDFG				55.0	7.0

Weighing Solutions for Hazardous Conditions

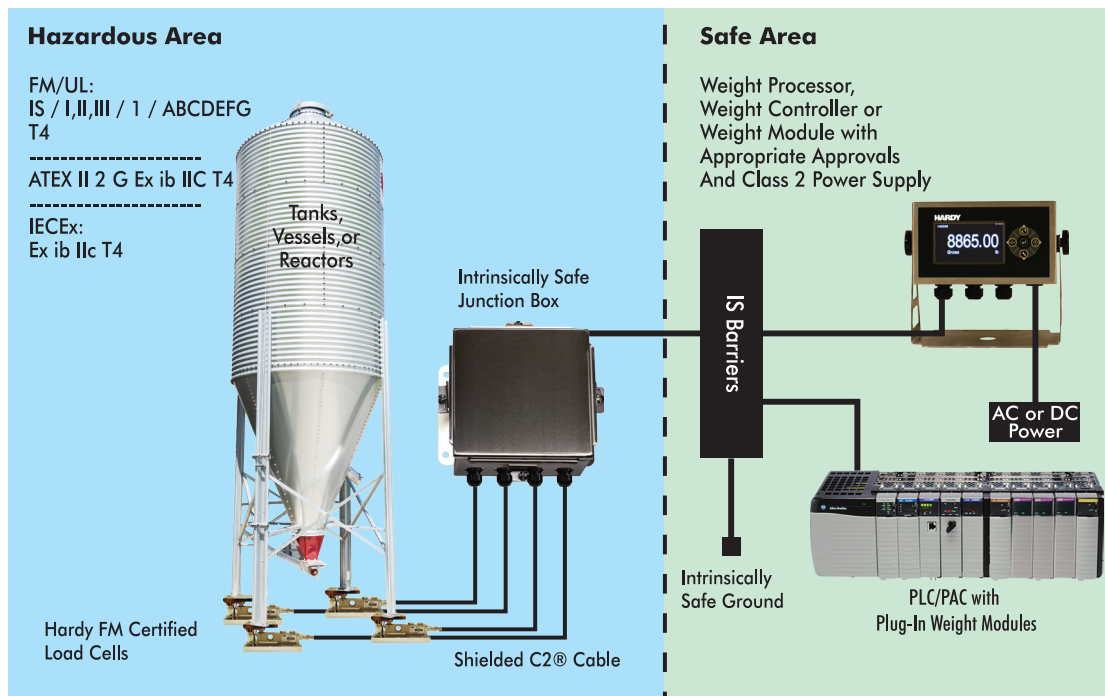
Designing Safety into a Weighing System

Intrinsic safety (IS) is a protection technique for safe operation of electrical equipment in hazardous areas by limiting electrical and thermal energy, available for ignition to safe levels.

For potentially hazardous Class I, Div. 1 environments, Hardy Process Solutions has designed safety into its components with an appropriate level of protection for different applications. Hardy recommends using intrinsically safe low-energy components in hazardous areas (including load cells, scales, and summing boxes) and limit power and current to them through intrinsic barriers that prevent energy from crossing over from the safe area.

Hardy Weight Processors and Weight & Rate Controllers use proprietary technologies that have great value for Hazardous Area applications and confined spaces. Our C2® Electronic Calibration allows calibration of the weighing system without ever entering the environment. Conversely, Integrated Technician® is used for system diagnostics and troubleshooting from the safety of the safe area thereby reducing risk to operators. Other features such as WAVERSAVER® is used to eliminate the effects of vibration on the weight signal so only Stable Weight is communicated to the Control System.

Hardy's single-slot Rockwell® PLC/PAC modules read and condition data from strain gage load cells and communicate it over the I/O chassis backplane to the processor. They provide basic weight data or are loaded with sophisticated algorithms to perform application-specific industrial weighing processes from simple batch weighing to loss-in-weight control, filling or dispensing. Modules are available for Allen-Bradley® ControlLogix®, CompactLogix®, Micro800® or POINT I/O chassis.



For Tanks, Vessels, Mixers or Reactors, a Typical Weighing System Configuration for a Hazardous Area: Use Intrinsically Safe Barriers to prevent energy and current from instruments in the safe area from crossing over to low energy equipment in the hazardous area.



Tools to Increase Safety & Productivity

The Hardy Process Toolbox is a unique set of productivity tools that support industrial weighing functions. Each tool saves time, increases accuracy, improves efficiency or reduces risk in process weighing applications. Another key benefit is calibration and diagnostics of weighing functions from Hardy instruments located in the **safe area**.

- ✓ **Accurate**
- ✓ **Stable**
- ✓ **Fast**
- ✓ **Flexible**
- ✓ **Easy**



C2® - Calibrate Without Weights

The Hardy C2® Process Toolbox function provides quick and easy electronic calibration of a weighing system from the safe area. This reduces the risks of bringing test weights into the hazardous area.



INTEGRATED TECHNICIAN® - Diagnostic Tools for Operators

Hardy's INTEGRATED TECHNICIAN (IT) helps you troubleshoot your weighing system and diagnose problems from the front of the instrument or via the PLC. This allows diagnosis from the safe area.



Embedded Web Server - Connect from Anywhere

Access your instrument from any computer browser including in either the Hazardous Area or the Safe Area. Use the embedded web server to set up all parameters from anywhere on your Ethernet network



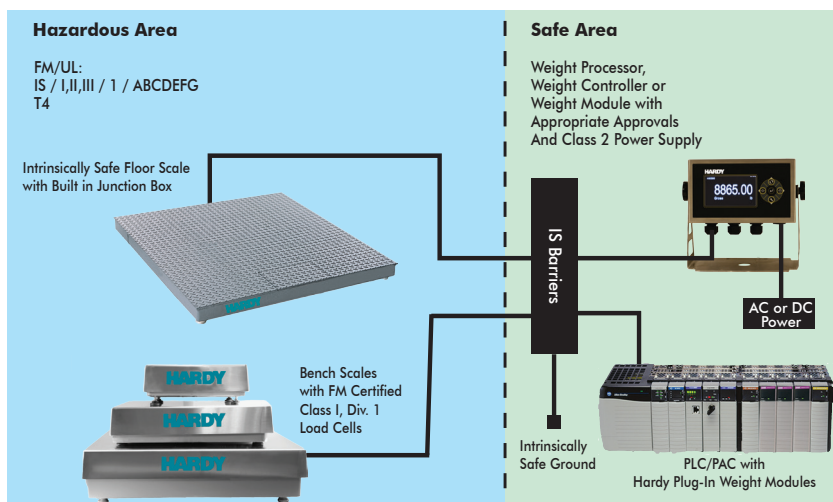
Secure Memory Module - Safe Configuration Backups

Hardy's Secure Memory Module (SMM) uses a standard SD card or USB stick to automatically back up critical weighing system data, allowing you to transfer it to another like controller in a few minutes. You can also use the card or USB to easily back up your controller data onto a PC.



WAVERSAVER® & WAVERSAVER+ - Stabilize Noisy Weight Readings & Increase Scale Resolution

Hardy's WAVERSAVER core technology eliminates the effects that surrounding vibration has on the scale weight signal, providing only true data for fast, accurate weight reading. WAVERSAVER+ Filters both external and internal noise under a static weight condition to go beyond the 1 in 10,000 limitation, providing repeatable weighing results the first time and every time.



Floor & Bench Scale Weighing System Configuration For a Hazardous Area: Use Intrinsically Safe Floor or Bench Scales with built in summing cards and IS Barriers to prevent energy from instruments in the safe area from crossing over to low energy IS scales in the hazardous area.

Proven Solutions

For 100 years Hardy Process Solutions, headquartered in San Diego, California, has been providing innovative process control solutions. With these solutions, we have saved our customers thousands of production hours and millions of dollars. Our goal is to provide superior weighing equipment as an industrial scale company that stays on the pulse of innovations in the field. At Hardy, we pride ourselves on the ability to continuously provide superior product quality and excellent customer support, which enables our customers to achieve their process goals.

Hardy delivers high performance weighing solutions with the **LOWEST TOTAL COST** to own. We include Industry Leading Technology in all of our scales and instruments to make it **EASY** for you to install, integrate, and maintain. Powerful solutions that are easy to use is why our customers realize increased production efficiency.

Instant Information

We offer instant access to videos, white papers, articles, case studies brochures, application notes, and more.

Simply go to:
www.hardysolutions.com/media-center/view



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