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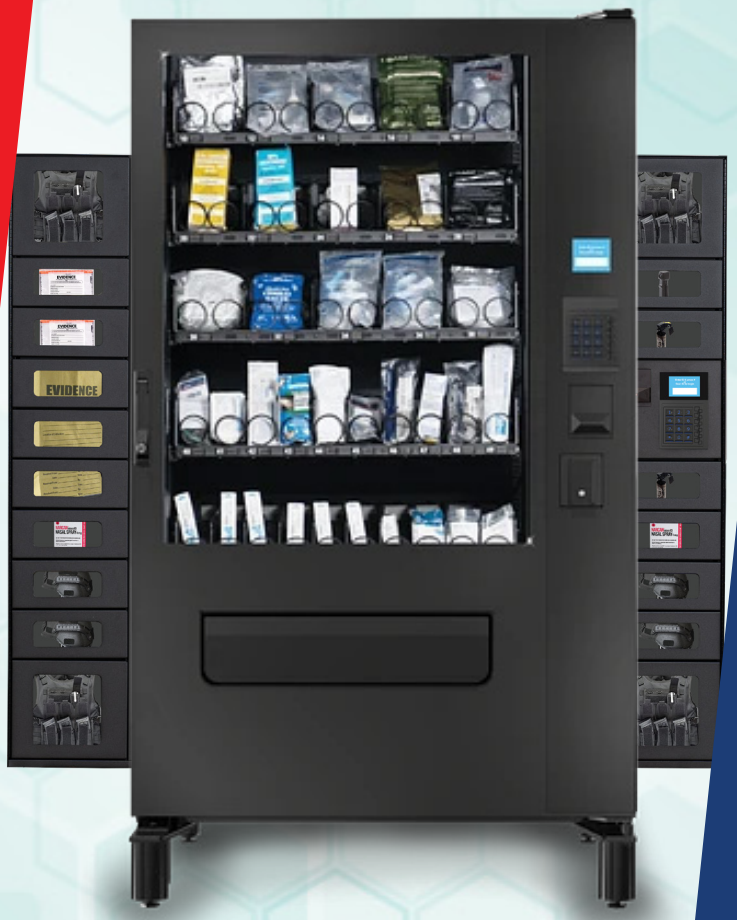
THE IMPORTANCE OF SAFETY AND COMPLIANCE TO REGULATIONS IN DISPENSING EQUIPMENT



IDS Intelligent Dispensing Solutions

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THE WHITEPAPER

OVERALL

STANDARDS FOR DISPENSING EQUIPMENT COMPLIANCE

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DISPENSING EQUIPMENT FROM UCAPIT AND THEIR COMPLIANCE TO REGULATORY STANDARDS

SUMMARY

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I. EXECUTIVE SUMMARY

Supply lockers and dispensing machines are critical components of an optimized inventory management solution. They are often large pieces of equipment that securely store assets and enable convenient, point-of-use access through a humanless transaction.

Like almost any type of office equipment and industrial machinery, improper use, a lack of training or maintenance and equipment that is not compliant with industry, state or Federal regulations can have serious consequences. Because of this, leading dispensing equipment manufacturers subject their equipment to rigorous testing and certification processes to avoid injury to people and damage to property.

These processes improve the dependability of the machines, reduce risk, prevent incidents before they happen, and ensure the safety of the end-users. Different types of certifications and regulatory standards approach risk mitigation from different perspectives. This paper discusses the necessity of some of these certifications and standards, the risk areas they address, and how this effort benefits all stakeholders of the controlled dispensing environment.

II. ABOUT THE AUTHOR

JAGADISH VAJRAMATTI

With over 14 years of product design and development experience, Jagadish brings a wide range of experience from the automatic merchandising, engineering design service, and sheet metal fabrication industries.

Jagadish Vajramatti joined The Wittern Group, UCapIt's parent company, in 2011 as Senior Design Engineer. In this role, Jagadish is responsible for the design and development of various locker systems and automatic merchandising products, continuous improvements, product testing and validation, various agency certifications for locker systems and vending machines.

Prior to joining The Wittern Group, Jagadish was Project Leader for Onward Technologies Limited, India. He and the team designed various laboratory equipment and furniture, designed laboratory furniture layouts for its client, Fisher Hamilton LLC, now owned by Hamilton Laboratory Solutions. Before Onward, Jagadish was a Design and Production Engineer for Suttatti Enterprises Limited, India. He was responsible for designing various sheet metal components, CNC Programming and production planning.

Jagadish has a Bachelor of Engineering in Mechanical from Visvesvaraya Technological University, India and he is a Certified Solid Works Professional.

III. INTRODUCTION

You may be surprised to learn that dispensing equipment and vending machines contribute to four times as many deaths per year as great white sharks. The data on electronic equipment safety incidents is released every year by the Consumer Product Safety Commission (CPSC). Its surveillance and follow-back system, known as National Electronic Injury Surveillance System (NEISS), has published year-over-year data for more than three decades.

In 2020, the number of injuries from vending and dispensing machines treated in emergency rooms was 1,260 [1]. That is more than three ER visits per day, but it does not have to be that way. Utilizing dispensing equipment that adheres to safety regulatory standards and quality certifications will significantly reduce these risks.

There are certification agencies that inspect and test dispensing equipment for electrical and fire safety.

Dispensing equipment that is certified to adhere to designated safety standards and regulations can significantly reduce workplace incidents while operating them.

Many safety standards prevalent in the USA apply to products manufactured locally.

Machines imported from other countries may be compliant with their respective local standards. It is important to ensure that their local standards are comparable to American regulation. Also, imported machines need to be appropriately certified to the same level of safety and reliability as the American manufactured equipment.

Unfortunately, the majority of imported machines are not certified to the same level of safety and reliability as American manufactured machines such as UCapIt dispensing equipment.

Let us consider the standards and certifications that define the safety and reliability of dispensing equipment in greater detail.

IV. SAFETY AND OPERABILITY OF DISPENSING EQUIPMENT

Dispensing machines are complex electro-mechanical equipment. They are connected to the same 120V 60 Hz AC power socket as your refrigerators and other home appliances, so the risk of electrocution from a dispensing machine is just the same as your kitchen appliance. There are some familiar risks from an improperly designed system, or if the equipment is not tested for Dielectric Voltage Withstand Test (HIPOT) and Grounding Continuity Test. These tests are for ensuring electrical isolation. The bigger risk, however, is due to the weight of the machine itself. An empty dispensing machine can weigh several hundred pounds. When fully loaded with supplies, the same machine can reach a thousand pounds. Manufacturers could design products to be compliant with UL's Product Stability Verification program.

Dispensing machines with cooling units have different types of coolants. R512a has a much smaller impact on global warming than R134a but has a poorer heat exchange efficiency.

R290 is great at heat exchange and has the least impact on global warming [2]. Safe dispensing equipment needs to be certified for efficiency and protection from hazards due to refrigerant gases. Several such parameters influence the safe usability of dispensing machines. Manufacturers need to comply with regulations that stipulate that the operating conditions stay within the boundary of safe operability. In terms of energy efficiency, it is imperative that manufacturers develop or use ENERGY STAR® certified refrigeration systems, motors, lighting systems, and all relevant associated paraphernalia.

Safety standards and regulations exist to protect users of electrical equipment.

V. STANDARDS FOR DISPENSING EQUIPMENT COMPLIANCE

There are several aspects of dispensing equipment that need to follow standards for safe operation. Adherence to safety, performance, and responsibility standards are demonstrated through certification by authorized and reputable certification agencies. Most major dispensing equipment manufacturers in the United States certify their products and their business for five major aspects.

They are the certifications for:

- Electrical safety
  - Protection against electromagnetic interference and electromagnetic compatibility
- Safe handling in the event of fire hazards
- Accessibility for the differently-abled
- Restriction on the use of hazardous materials or materials from conflict zones.

A . UL /ETL Certification

Underwriters Laboratory does UL Certifications. The OSHA (Occupational Safety and Health Administration) agency recognizes Intertek and Underwriters Laboratory among the certifying authority in its list of Nationally Recognized Testing Laboratories [3].

They test and certify products across several industries. The certification mark for Intertek is ETL.

The main focus of UL/ETL standards is safety in electrical products from electrocution and fire incidents.

Its relevance to dispensing machinery will depend on the scope of certification. Some of the UL/ETL standards that might be relevant to dispensing equipment include, but is not limited to:

- UL 50 – Enclosures for Electrical Equipment
- UL 50E – Enclosures for Electrical Equipment, Environmental Considerations
- UL 244B – Field Installed and/or Field Connected Appliance Controls
- UL 541 – Refrigerated Vending Machines
- UL 751 – Vending Machines
- UL 796 – Printed-Wiring Boards
- UL 962B – Outline for Merchandise Display and Rack Mounted Power Distribution Units
- UL 970 – Retail Fixtures and Merchandising Displays

Manufacturers comply with one or more UL standards depending on the application, ambient conditions, use cases, and operating conditions. In the US, looking for the mark of certification by UL or Intertek's ETL is one of the basic steps towards ensuring that the dispensing equipment is safe for the end-user. For the combined US and Canadian market, the mark of certification from these agencies are cULus and cETLus respectively.

Looking for the mark of certification by UL/ETL is one of the basic steps towards ensuring that the dispensing equipment is safe to use by the end-user.

B. FCC Certification

The Federal Communications Commission (FCC) has mandated the Declaration of Conformity and Certification Procedures to its regulations on electromagnetic interference. Manufacturers use the FCC mark or logo to claim compliance with the FCC's regulations and is a voluntary declaration [4].

Manufacturers outside the United States can get their products certified for FCC's regulations if they choose to do so. However, FCC stipulates that the entity's location responsible for conformance should be within the United States. Some foreign manufacturers choose to stick to the regulations of their local agencies or omit EMI-EMC certifications.

C. CE

CE (Conformité Européenne) pertains to health, safety, and environmental protection regulations for products in the EU and their standards are respected globally. The CE mark on a product means that it is fit to perform the intended function without endangering lives or property.

The following directives and standards form a part of the CE marking procedure

i. Low Voltage Directive (LVD)

The Low Voltage Directive (LVD) is a harmonized set of safety standards that comprehensively covers electrical, mechanical, chemical, energy, and related hazards.

A mandatory part of CE conformance, the LVD applies to electrical equipment designed within the following voltage range (input or output) – 50 and 1000 volts for alternating current (AC) or between 75 and 1500 volts for direct current (DC).

ii.RoHS

RoHS is the abbreviated form of "Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment." This directive was passed by the European Union and took effect in 2006. However, the United States has allowed the respective states to decide its applicability for products manufactured and sold there [5]. Different states have adopted regulations inspired by or in line with the European RoHS Directive.

The directive restricts the usage of 10 hazardous materials in the manufacturing of electrical and electronic products.

Though there are exceptions in part or full to these directives for selected products, dispensing equipment lie fully within the scope of RoHS. As discussed earlier, compliance with the RoHS directive is not mandated by law at the federal level and in most states at the state level. However, some leading dispensing equipment manufacturers choose to demonstrate compliance with the terms of the RoHS directive.

iii. Electromagnetic Compatibility (EMC) Directive

The operation of electronic devices like vending machines, if improperly designed, may lead to electromagnetic interference. Machines should be designed to avoid any faulty electromagnetic interactions that jeopardize safety. This is why EMC (Electromagnetic Compatibility) testing and certification is mandated for specific industries like industrial machinery, automotive, medical, aerospace, and railway equipment. In the US, FCC determines and regulates the specific EMC standards that need to be complied with.

D. Health and Safety

Responsible dispensing equipment manufacturers also build in features that go over and above mandated regulatory compliance or specifications. Such features might include mechanisms that constrain the usage of the machine within the safe operating range. When the dispensing machine breaches this range, the safety system shuts down either the compromised / unsafe part or the entire machine.

Manufacturers could define this range as upper and lower limits of temperature or event triggers like intentional damage to parts of the machine. This prevents the abuse of the machine and saves the abuser from physical harm. Such features are not mandated by law or competent regulatory authorities and is left completely to the initiative of the manufacturer.

VI. THE BENEFITS OF COMPLIANCE AND CERTIFICATIONS

Standards and regulations are often defined to ensure the end user's safety. Standard and regulation-compliant dispensing equipment will be of higher cost than non-standard equipment. Manufacturers who invest in the necessary safety certifications strive to protect users from unexpected mishaps, translating to the higher cost of dispensing equipment, but machines that are certified for safety can avert painful or sometimes even fatal accidents. Other benefits, such as Mean-Time-Between-Failures (MTBF) and lower cost of ownership due to improved reliability, are simply added advantages. However, the benefits of investing in certified dispensing equipment are not limited to this.

A. Provides reassurance between you and the users accessing the machine

Employees and patrons of small businesses are naturally attracted to using automated dispensing equipment. Their only hurdle to successful machine usage is the lack of trust in a heavy gadget powered by electricity. Certification helps the end-users overcome this distrust by confirming that the machine has been safety tested. This stamp of authority helps improve the adoption of this dispensing equipment. When used to its capacity, dispensing equipment delivers benefits like saving the bandwidth of IT support personnel or maximizing the customer's experience while picking up food from a locker at a restaurant.

B. Duty-of-Care compliance

The law governs this fiduciary responsibility of business leaders towards their employees and customers in the United States. They own the responsibility for the health and safety of the work environment.

Dispensing equipment certified for safety and compliance to the ADA Standards for Accessible Design helps assure the users that the machines are safe and accessible for all end-users. UL certification protects end-users from hazards from operating electrical equipment, such as a dispensing machine. FCC assures that machines and lockers operate without electromagnetic interference.

C. Avoid the cost of accidents due to unsafe equipment and parts

Dispensing equipment that does not have certification for safety standards may or may not be safe to use. Unsafe equipment might lead to accidents at the workplace and is an unnecessary and avoidable hazard.

The fundamental driver for investing in controlled dispensing equipment is to reduce the dependence on human effort for providing access to materials, but suppose users are not willing to use the machine. In that case, they will be encouraged to go back to the IT support team or the facility management team to access what they need. This reverses all of the benefits gained through the automation of the process. Another potential cost of accidents due to unsafe equipment is litigation for negligence. While this is extreme, it is not unheard of. Safety tested and certified equipment helps avoid these costs.

D. Employers' liability insurance

The modern workplace is very safe, compared to a few decades ago. This improvement has brought down the average cost of employers' liability insurance. However, non-standard and uncertified equipment incidents can increase the cost of insurance that covers the employer's liability. Certified products can contribute to keeping this cost as low as possible.

VII. DISPENSING EQUIPMENT FROM UCAPIT AND THEIR COMPLIANCE TO REGULATORY STANDARDS

IDS Supply Dispensers meet the requirements for UL/ETL certification and also complies with CE standards. They have been subjected to rigorous testing and development cycles to ensure safety for the end-users. Some of the safety aspects that IDS Supply Dispensers have been tested for are:

- Safety from unintentional contact with non-insulated live electrical parts
- Protection from a number of risks including fire, electric shock, or other injuries caused by corrosion of iron or steel enclosures and cladding.
- The equipment is provided with a flexible, non-detached power supply cord and necessary grounding and earthing arrangements. It is also fitted with a ground-fault circuit interrupter.
- Protection from tipping over. The supply dispensers are provided with leveling screws or casters for the legs.

By getting FCC certification, the dispensing equipment from UCapIt is proven safe from electromagnetic interference. Hence, they are safe to use in hospitals, long-term care centers, and other facilities where critical care is provided through vulnerable, life-saving electronic equipment. For industrial applications, these machines are tested for power interruptions, magnetic fields, conducted & radiated electronic noise, and electrostatic discharges associated with static electricity.

UCapIt dispensing equipment also has features that will electronically disable the machine in the event of temperature fluctuations beyond the preset limits. It can be configured in such a way that when the deviation exceeds the 15 minute limit, either part of the machine, or the entire machine, shuts down.

These features prevent the contamination of temperature-sensitive merchandise in the machine and protects the user from a potentially faulty operation.

Finally, UCapIt uses ethically purchased materials and components to manufacture its equipment responsibly. IDS, as a part of The Wittern Group, assures that its products do not contain REACH Substances of Very High Concern nor "Conflict Materials," as declared in the Dodd-Frank Act [6].

VIII. SUMMARY

Despite their size and electric power source, dispensing machines are relatively safe pieces of equipment. However, there are potential safety hazards from uncontrollable parameters during machine operation.

These hazards could deter the end-user from using the machine to gather essential supplies and equipment. When the machines are certified for safety, it improves the adoption of automated dispensing solutions. Certified equipment also helps businesses that invest in them prevent dangerous and expensive workplace incidents. The regulatory bodies expect businesses to demonstrate their duty of care by taking care of the welfare of their employees. Ensuring that the employees use tested and certified dispensing equipment can help this cause. Certified dispensing supply lockers can reduce the chances of unscheduled failures and incident-related downtime.

Such failures have a cost due to response to the incident and an opportunity cost of lost production that is often an even bigger reason to worry.

These factors collectively make it easier for businesses to invest in certified dispensing equipment that improves the bottom line and makes the safety of employees a priority.

Our professionals at IDS can answer your questions on the necessary certifications and testing processes that make our machines a valuable and safe asset management solution.

Reach out to us at **(877) 771-4446** to know more about how certified dispensing equipment can help you mitigate safety risks and improve the process reliability. You can also visit our website at **www.idsvending.com.**

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For over 15 years, UCapIt has served hundreds of EMS agencies, fire stations and other medical organizations across the United States as the trusted single-source partner for the latest in dispensing hardware, software, parts, training, and technical support.

Through iQ Technology, our proprietary inventory management software, UCapIt will take your inventory tracking and management program to the next level with features and capabilities designed to streamline your operations, maximize visibility, and ensure compliance.

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