

## UL 325

You should never install, or have installed on your property, a vehicular gate operator that does not carry the "MARK" of an NRTL such as ETL or UL. You should also be aware that NRTL's do not "approve" or "certify" products that they test. Manufacturers that use this terminology are incorrect in its usage. When a product is tested by an NRTL, and that product is found to be in compliance with the safety standard, then that product is said to be "LISTED" and the manufacturer receives a "MARK" and an "Authorization to Label" from the NRTL.

The standard to which vehicular gate operators are manufactured and tested to is U.L 325 - Underwriters Laboratories Inc., Standard for Safety: Door, Drapery, Gate, Louver, and Window Operators and Systems. In addition to the 325 standard, vehicular gate operators must also be tested to U.L. 991 - Tests for Safety-Related Controls Employing Solid-State Devices.

The U.L. 325 Standard has undergone significant revisions over the past several years. The main purpose of the revisions were to create entrapment protection criteria for vehicular gate operators, and to increase over-all safety of the product. The revised standard was first published September 18, 1998, and went into effect March 1, 2000. The key issues of the September 18, 1998 revision are as follows:

Created different "classes" of vehicular gate operators.

Requires a primary and a secondary entrapment protection device (30A.1.1).

Defined the different types of entrapment protection devices than can be used for primary and secondary protection in a given class of operator.

Requires an audio alarm to sound upon two sequential activations of an entrapment protection device not interrupted by an open or close limit device (30A.1.1A).

Requires a renewed intended input in the line-of-sight of the operator once the entrapment sensing system detects a second sequential obstruction (30A.1.2b).

Requires slide gates not to move greater than 1 ft/sec (30A.1.19).

Requires the gate operator to have an integral means for manual operation (30A.1.20).

## Gate Operator Safety

Serious accidents (and some fatalities) have resulted from the improper design, installation, and usage of vehicular gate operators and vehicular gate operating systems. This web page is designed so that you know what to expect from your vehicular gate system, how to make it safe, and how to prevent accidents from happening. We also discuss several issues that need to be addressed when designing and installing a vehicular gate system. Vehicular gate systems can be made safe, but achieving this safety is the joint responsibility of the manufacturer, the system designer, the installer, and the end user. Below are some critical issues that you need to be aware of before designing or installing an automated vehicular gate operating system for your property.

### **Inherent Entrapment Sensing**

When selecting a gate operator, whether it is a slide or swing gate design, it is imperative that the product has been designed with an inherent entrapment sensing system that will sense an entrapment and reverse the gate in either the opening or closing gate cycle. This issue is CRITICAL. Several deaths have occurred when persons became entrapped in opening slide gates and the gate operator lacked an inherent systems to detect the entrapment. Many gate operators are designed with no entrapment detection, entrapment detection that is operable in the closing cycle only, or entrapment detection that reverses the gate in the closing cycle, but simply stops the gate in the opening cycle. These type gate operators lack an adequate

entrapment sensing system and will require expensive additional add-on features to bring the gate system up to safe operating standards. Pay special attention to the opening cycle operation on slide gate operators. Operators that sense an entrapment in the opening cycle, but then simply stop the gate (rather than reversing) do not provide the necessary safety to prevent serious accidents from happening.

Case History - California, 1996. Adult male, slide gate. An adult male reached through a slide gate to activate it. When the gate started in the opening cycle, the man's jacket became entangled in the gate and began to choke him and cut off his air supply. The gate operator sensed this entrapment and then simply shut-off (as it was designed to do). The man remained trapped with his air supply cut-off. When a deputy sheriff arrived, the man had no pulse or respiration. Using a knife, the deputy cut the man's jacket off to free him and started CPR. The gentleman did survive this close call. The point here is that had the operator been designed to reverse the gate upon sensing the entrapment, the accident may never have happened.

### **Manual (Emergency) Release Mechanism**

Once an automated vehicular gate operator is installed on a gate on your property, you must assume that at some point in time the operator will fail to open because of a power outage. Gate operators must have a provision to allow access from the outside of the property in, and egress from the inside of the property out, during these power failures. If you are a homeowner, there is nothing more frustrating than not being able to exit your property, or not being able to get into your property, because your automatic gate won't open. For property managers, this can become a nightmare with a long line of tenants in their vehicles blocking lanes because the gate won't open. Let's take this one step further. During fires or natural disasters (like an earthquake), power to a property is often cut-off. Now the critical issue becomes how do emergency vehicles enter the property, or how do people exit the property, if there is no power?

The answer to the above dilemma is to use (in general access applications) gate operators that employ a Fail-Safe release system. Simply stated, during power outages, these operators fail in a safe condition allowing the gate to be pushed open without the need of any mechanical device, keys, or cranks. Many Fire Department regulations require that fail-safe gate operators be installed to allow emergency vehicle access during power outages. In Los Angeles, California for example, the Fire Department requirement for power operated gates specifically states: In the event of a power failure, the gate/gates shall automatically open, or the gate must be capable of being pushed open without additional steps having to be performed. In Orange County (CA.), Fire Department Requirements state: The design and operation of all electrically operated gates shall be as follows: The gate control shall be operable by an approved emergency override key switch which is an integral part of the mechanism. In the event of a power failure, the gate shall automatically transfer to a fail-safe mode allowing the gate to be pushed open without the use of special knowledge or any equipment."

Case History - California, 1994. The Northridge Earthquake. The 6.6 earthquake that struck Southern California on January 17, 1994 disrupted power, gas, and water services to thousands of residents and commercial customers for days following the quake. To make matters worse, many residents of apartment buildings and gated communities found that they could not evacuate their vehicles from secured parking areas. Without power, gate operators on the access gates were all locked shut. In the hours after the quake, release keys, handles, cranks, and other items intended to release the gate in just such an emergency could not be found. And because the quake was in the early morning hours, maintenance and management personnel were not immediately available. One gate operator service company described residents in a panic because they could not get their vehicles out of the parking area. Other gates were simply run down to get them open. However, gates that had operators designed with a Fail-Safe release system where simply pushed open and residents were able to exit the property. One property manager stated that his gate operator was the only thing that performed as designed during the emergency and that the fail-safe release feature was invaluable.

### **Battery Back-Up Systems**

Some operators now have the option of being equipped with a battery back-up drive system that will open the gate upon sensing a power outage. This back-up drive system is self contained in the gate operator, but is also completely independent from the primary (AC) drive system. These back-up drive systems are not designed to maintain normal gate operation during a power failure, rather they are designed to automatically open the gate so that the traffic lane (driveway) is not blocked - a convenience factor really. Battery back-up systems are especially useful in gated communities and apartment applications. When a power failure occurs, the gates automatically open thus allowing residents to enter and exit the property without the need of waiting for maintenance or management personnel to release the gate.

It should be noted that gate operators equipped with battery back-up systems generally do not relieve you of the fail-safe release requirement that some Fire Departments may have. When it comes to blocking emergency vehicle access lanes (gates), Fire Marshall's will assume the worse case - there is a power failure and the batteries in the back-up system are dead. The question that is put to you is: My truck is on the outside, now how do I get in?

### **Laboratory Listing**

Be sure that the gate operator manufacturer has had the product tested and that it is listed by a Nationally Recognized Test Laboratory (NRTL). These products will have the UL, ETL, or one of the other approved laboratory seals on their housing. The two most recognized listings are U.L. (Underwriters Laboratories) and ETL (Electrical Testing Laboratories). Many city building codes require that the products installed be recognized by an approved testing laboratory. This insures that the product has been tested in accordance with established test procedures and that the product conforms to certain safety standards. Failure to comply with the local building code can be cause for the operator to be red tagged requiring it to be removed and replaced with a product that has been listed.

### **Operating Control Location**

Proper location of the gate access device (keypad, push button, card reader, telephone entry system, etc.) is one of the easiest ways to prevent accidents from happening. Improperly placed controls can cause tragic accidents. It is CRITICAL that all gate control devices be located in such a way that a person using the device cannot touch the gate or gate operator while using the device. It is especially important that the control be located so that persons using it cannot reach through a gate to activate the unit. A general rule of thumb is to not install any gate operating control device closer than 10 feet to the gate. Any gate control that is closer than 10 feet to the gate should be disconnected and removed from service immediately.

Case History - California, Adolescent female, slide gate. A young girl was going to a friends house to baby-sit. She reached through the gate to activate a switch on the inside of the gate. When the gate started, she was pulled into the gate pocket. The child died of asphyxiation. If the gate activation switch was not located where it was accessible from the outside, the child would not have had the opportunity to reach through the gate to activate it.

### **Pedestrian Gates**

One of the hazards of automated vehicular gates is that everyone seems to want to use the vehicular gate and traffic lane as a pedestrian walk way. This creates two hazards. First, pedestrians are in the traffic lane which in and of itself is a hazard. Secondly, vehicular gate operators are not designed for use in pedestrian traffic applications and should never be used as a means to control pedestrian traffic. We recommend that whenever a vehicular gate system is designed or installed, provisions should be made for a pedestrian walk gate to keep pedestrian traffic out of the traffic lanes and away from the gate system.

Case History - Adult male, slide gate. An adult male was on the inside of his gated community and had walked to the vehicular gate system where he was to be picked up by a friend. When

his friend arrived, he climbed the gate to exit the property and fell off of the gate during his attempt. The gentleman has suffered severe and permanent damage because of his fall - according to his lawyer. There was no provision in the gate system to allow pedestrian entry and exit.

### **Vehicular Safety**

In addition to the issues addressed above, designers and installers of vehicular gate systems must also make provisions for vehicular traffic safety. The accepted method to provide a safe operating environment for vehicular traffic is the use of a loop detection system and the installation of strategically placed ground loops. In addition to the loop system, speed bumps should also be considered to slow traffic through the gate system. There is no need for vehicles to be speeding through the system or for trying to beat the gate. Many gates that have hit a vehicle are actually the result of a speeding car trying to beat the gate system and striking the gate. Speed bumps are a method to decrease and/or eliminate this problem.

### **Summary**

Be sure the gate operator is designed with an inherent entrapment sensing system that is operable in both the open and close cycles of gate travel, and that the system will reverse the gate travel in either direction.

Be sure the operator is equipped with a manual release system that will allow the gate to be pushed open during power outages. Fail-safe release systems are the preferred method.

Be sure that the gate system will allow emergency vehicle access during both modes of operation - power available and power not available. In the case of a power failure, the gate must be able to be opened from the outside without any special tools to allow these vehicles entry.

Battery back-up systems in gate operators can be useful - but a release method must still be provided with the gate operator when the battery system fails.

Never install any gate activation device in such a manner that the gate or gate operator can be touched while using the device. Access control devices should be a minimum of 10 feet away from the gate.

Install a pedestrian access gate to keep pedestrians out of the traffic lane.

Be sure that the ground loops in the loop detection system are properly placed and installed.

Consider installing speed bumps in the traffic lanes to prevent vehicles from speeding through the lanes and hitting gates.