

Learning the Ropes for Getting UL Listings

Certain protocols exist to secure a Listing from Underwriters Laboratories. PE&T's Joe Totten goes behind the scenes and provides readers with a "heads-up" on the process.

Easing the way for third-party approvals



Flammable liquid storage tanks with lift fittings undergo a design strength of lift fitting test. Photo courtesy of UL.

Getting independent third-party certifications of petroleum equipment products is essential to product developers, manufacturers, installers and owners. Insurers and regulators rely heavily on such certifications to ensure that the products conform to standards and specifications and do not impose undue fire, explosion or environmental risks. Provisions for independent third-party testing and certification have been included in many federal, state and local regulations, as well as in national model codes and standards.

Underwriters Laboratories Inc. (UL) is North America's oldest, largest and most widely used third-party testing service for commercial and industrial products, including petroleum equipment and related products. UL, however, is not the only organization that provides third-party testing of such products. Other testing organizations will be the subject of an article in a future PE&T's issue.

This article will discuss the processes for getting and maintaining UL approval to use the UL Mark on products. It will provide recommendations that should help avoid undue delays and expenses along the way.

Why UL?

The presence of the UL Mark on so many consumer and industrial products may persuade many to think that UL is a government or regulatory agency, or that manufacturers are mandated to seek UL certification of their products. To the contrary, UL is a private, not-for-profit corporation. The regulations, codes and standards that provide for third-party testing and certification generally do not cite UL as the source for these services.

Rather, UL's status today comes from its far-reaching capabilities (in terms of its global presence and all-inclusive product testing expertise) and a reputation built on 104 years in the product safety business. UL's independence from manufacturers and others with vested interests in product testing results is vital to its perpetuity.

UL has five main laboratories in the US, 17 subsidiary laboratories (eight in Asia, one in Mexico, seven in Europe and one in the US) and an affiliate laboratory in Canada. Each year, UL does more than 80,000 product investigations, on more than 17,000 different types of products. About 14 billion UL Marks are placed on product units annually. UL does not maintain separate data on how much of this activity is related to petroleum equipment. However, UL officials do say that petroleum equipment investigations number somewhere above 1,000 a year and that UL Marks are placed on tens of thousands of petroleum equipment product units a year.

General suggestions

Just a few minutes talking with UL officials was all it took for me to realize that the two best pieces of general advice I could give prospective (or current) UL clients are to

(1) get thoroughly familiar with UL publications explaining its organization, operations and processes; and

(2) before, during and after submitting a product for UL investigation, communicate frequently with UL representatives to get needed clarifications and guidance. Advise them of your plans (and any change thereto) and stay up-to-date with the status of UL's work on the product. These actions will help ensure that requests, applications and other materials submitted to UL are satisfactory and that problems are identified and resolved as early in the process as possible.

Ask UL representatives a question about UL and they very likely will direct you to one of UL's publications for the answer. Information on UL's Publications Catalog is provided at the end of this article, along with a listing of the addresses and contact numbers for UL's laboratories and related facilities.

Tailor-made services

Before submitting a product to UL for testing and certification, the client needs a basic understanding of UL's services. Most petroleum equipment products are investigated under UL's Listing Service. Some products, however, will be handled under the Classification Service, the Component Recognition Service or Field Evaluation Services. The decision on which service to use will be made by UL based on preliminary information provided by the client. Different UL Marks or markings are authorized for products investigated under these different services, as illustrated in the following examples.

Generally, the Listing Service is for products that are produced at a factory for shipment to other locations for use. Representative samples of the product are tested and evaluated (usually, but not always, at a UL laboratory) against UL safety standards and all foreseeable hazards. Products passing these tests and evaluations are called Listed products and are eligible to bear the UL Listing Mark. Petroleum storage tanks, pipes, dispensers and related products usually are handled under the Listing Service.

Relatively few petroleum equipment products are investigated under UL's Classification Service. This service is for evaluating products for certain properties (e.g., flammability of plastics); performance

under specified conditions (e.g., hazardous locations); compliance with regulatory codes; or compliance with other organizations' standards (e.g., compliance of a portable gasoline can with ASTM standards). A UL Classification marking, which is a necessary qualifying statement designated by UL, may be applied to Classified products. The UL Classification Mark may also be applied.

Under its Component Recognition Service, UL evaluates products that generally are not complete products in themselves, but are components that will later be used in a complete UL Listed or UL Classified product or system. Recognized Components or their packaging are eligible to bear the UL Recognized Component Mark. Using Recognized Components allows UL to speed up the evaluation of the complete product for its intended use. A good example is the material used in manufacturing fiberglass USTs. Using previously tested fiberglass materials bearing the UL Recognized Component Mark eliminates 270 days that would otherwise be required for exposing and testing the tank material. An important word of caution here: compatibility between the component and the complete product is critical.

Under its Field Evaluation Services, UL makes three types of on-site assessments:

- (1) safety evaluations (construction examination, installation review and any necessary testing) of products that have already been installed and that can be completely evaluated in the field;
- (2) inspections of installed products that, for some reason, do not bear a UL Listing Mark or Classification marking even though they were eligible to do so when they were produced; and
- (3) investigations of installed products that cannot be completely evaluated in the field. All field assessments and their results are coordinated with regulatory authorities. Products passing field evaluations may bear the UL Field Evaluated Product Mark; those passing inspection may bear either the UL Listing Mark or Classification marking. For investigated products, UL does not apply a Mark, but issues a report on the investigation scope and results, including any noncompliance with UL requirements.



UL investigation of fire resistant ASTs includes full scale fire test. Photos courtesy of UL

Follow-up services

After UL's initial product evaluation leading to UL Listing, Classification or Recognized Component certification, the product units meeting the requirements may bear the appropriate UL Mark. UL field representatives make repeated unannounced visits to production facilities to determine that products bearing these Marks continue to be manufactured in compliance with UL's safety requirements. These representatives check production controls, observe testing, conduct inspections and periodically select samples for further testing at a UL laboratory.

International services

UL helps manufacturers understand and meet international safety requirements and obtain product

Protected USTs undergo pipe connection moment test.



export approvals. Through cooperative arrangements with many international organizations, UL can evaluate products against other countries' standards and facilitate acceptance by multiple organizations with one product submittal.

By virtue of its accreditation by the Standards Council of Canada, UL evaluates products intended for the Canadian marketplace based on Canadian standards and codes. UL authorizes clients to label those products with a C-UL Listing Mark, a C-UL Classification Marking or a C-UL Recognized Component Mark, depending on the UL testing services performed on the product.

This service is not to be confused with product testing and certifications by Underwriters Laboratories of Canada (ULC). Although ULC recently became an affiliate of UL, they are still separate operations. Manufacturers seeking certifications of products for use in Canada need to be familiar with both UL and ULC services and should consult with UL's International Services officials for assistance.

Process pecking order

As set forth in UL's brochure, Submitting Products, the formal process for getting a product tested and certified by UL starts with a letter request from the client, after which UL determines which testing services will be used, the number of samples required and the estimated cost of the services. UL advises the client of these determinations and provides application forms and a Follow-Up Service Agreement. Next, the client sends a preliminary deposit, the completed application forms and the signed Follow-Up Service Agreement.

Then, UL examines and tests the product. If the product does not comply with UL requirements, UL sends the client a letter stating the specific reasons. The applicant can request additional information, appeal the matter to appropriate UL officials, or correct the product design and resubmit it. When the product is found to be in compliance, UL issues a final report on the product's construction and test performance, which includes a notice of UL Listing, Classification or Recognition. After a UL field representative checks the first production lot of products that will bear the UL Mark, the products may be shipped from the factory.

Submitting the right stuff

It is all too true that, no matter what the undertaking, it takes longer and costs more to correct mistakes or resolve problems than to invest the time and effort to foresee the problems and get the job done correctly the first time. And, as mentioned earlier, the sooner problems or mistakes are found, the sooner they can be resolved, which also saves time and money.

In my experience, there is one underlying cause of many (if not most) mistakes and problems that occur in a process such as the UL product submittal, testing and certification process: unclear, incomplete or inaccurate communication. For the process to work smoothly, the client and UL need to clearly understand what they need from each other. Clear, complete and accurate communication must take place throughout the process to avoid problems or minimize their effects. How do you do this?

First, even before sending UL the initial request letter, **the client should call the appropriate UL representatives to discuss the product design**, UL requirements and any identifiable changes that might be needed. Such preliminary discussions can also clear up questions about the UL process and what to expect later.

In some cases, products can be submitted during their development, and UL engineers can do a preliminary evaluation to help identify areas needing change or rework, even before tooling is cut or parts and materials are purchased. A preliminary evaluation can be completed in a day or two at one of UL's locations, or even at the manufacturer's location.

Second, invest the necessary time and staff resources to ensure that the formal request letter, application forms and other documents prepared for UL contain complete, current and accurate information as stipulated on pages 2 and 3 of UL's brochure, Submitting Products.

The information called for here is lengthy, detailed and technical—all natural enemies of data quality. The information should be assembled by those who are most familiar with the subject matter. It should be checked and rechecked for accuracy and completeness, preferably by technical staff other than the original preparer. Insist that questions (about what UL needs or what is being provided) are resolved as they arise, via discussions with UL representatives as needed. Resist firmly any temptation to "send it out now and fix it later," just to get the process started.

The need for tight quality controls over the information as described above was emphasized to me by an official from a prominent company that manufactures manholes, vents and other petroleum equipment listed by UL. This official, in describing some of the lessons learned in past dealings with UL, notes that "Information presented to UL staff will be closely scrutinized. Make sure all documents, drawings and data support each other. There should be no contradictory information, such as text saying the size is 4 inches and a drawing showing the size as 4.25 inches."

Third, closely scrutinize UL-prepared application forms and other documents to ensure that the information they contain about your product is complete, current, accurate and consistent with your intent. Clear up any questions or problems promptly with UL.

Fourth, follow the UL instructions (in the brochure Submitting Products and as given orally by a UL representative for your particular product) **for sending product samples to UL for testing**. UL officials tell me that problems and delays can occur when sample containers are not addressed to the assigned UL project engineer and when the application forms or other documents are enclosed in the same containers as the product samples.

Fifth, ensure that the assigned UL project number and the assigned UL project engineer's name are affixed to every piece of correspondence, document or other material sent to UL in connection with your product. Call the assigned engineer to confirm receipt of submitted items.

Getting the right result

UL officials tell me that many products are found to be not in compliance the first time around.

However, don't be discouraged. UL officials are quick to add that most of the products are brought into compliance through design correction and retesting. This, of course, takes additional time.

This kind of data indicates to me that there are significant opportunities for reducing the overall time required for gaining UL certification. How? By knowing the applicable standards and test protocols and designing the product accordingly and by staying in close touch with the testing to learn about any problems as soon as possible.



Simulated vehicle impact test being conducted on a protected AST. Photos courtesy of UL.

An official from a leading petroleum piping manufacturing company, with several years' experience working with UL, says that his company goes to great lengths to ensure that their products will pass through UL's testing without undue delay. Before submitting a product to UL, the company knows what UL requires of the product and runs it through testing protocols that are at least as demanding as those that UL will use. Needed modifications can be made before submittal to UL. Also, a company representative will likely be on hand at the UL facility to witness the testing, so that any problems can be dealt with as soon as they are spotted.

UL officials say that it is not uncommon for manufacturing company officials to visit UL to observe the testing of their products.

Using the correct Mark correctly

UL is highly protective of the printing of UL labels and the use of UL Marks on products, advertisements, catalogs and other promotional material.

The application of the UL Mark to products can begin only after the UL investigation finds the product to be acceptable and a UL field representative checks the first production lot. The UL Marks must be applied to the products before they are shipped from the factory. UL officials can tell of instances in which products left the factory without first having the UL Marks applied. Correction of this oversight is costly and time consuming.

For each product that will bear the UL Mark, UL provides a formal "Follow-Up Service Procedure," which authorizes the use of the Mark (under specific controls) and describes the product as it was constructed when originally tested. This document guides periodic unannounced plant inspections by UL field representatives to assess the manufacturer's quality control over the continued production of the product. Compliance with the Follow-Up Service Procedure enables the client to continue to use the UL Mark on the product until the next on-site UL inspection. Significant discrepancies, however, will result in withholding the application of the UL Mark until they are resolved.



Each flammable liquid storage tank must pass a 3-5 psi leakage test before leaving the factory.

Before leaving the factory, each FRP tank is subjected to an internal vacuum test in accordance with UL's Standard for Glass-Fiber-Reinforced Plastic USTs. Photos courtesy of UL



One of the manufacturing company officials mentioned above has some words of wisdom concerning the Follow-Up Service Procedure: "Review all of the information in this document for accuracy. If there are any mistakes, notify UL immediately. This is the book that the UL inspectors will use to review your product and if the product does not match the document, problems may result." Guidelines for printing UL labels and using the UL Mark in advertising, packaging and promotional communications are provided in the two UL brochures, Printing UL Marks and Show the UL Mark. While these brochures are referred to as guidelines, the contractual agreements signed during the product submittal process require that they be followed in every respect. So, these are must items if you want to maintain your authorization to use the UL Mark on your product.

One critical point about ordering labels came up in my discussion with UL officials. It concerns the timing of the initial order. To ensure that labels are ready as soon as the product is approved and ready for shipment, they should be ordered soon after products are submitted for investigation. Orders should be placed with the Label Center in the Follow-Up Services department of the UL office handling the investigation.

The order will be processed upon completion of the investigation that determines the product to be acceptable. Waiting until the process is completed before ordering labels can put a real strain on meeting the initial production schedule.

Call again soon

Well, there you have it. The UL process in a nutshell. As with most things, the process is not nearly as difficult as it might seem at first. Familiarity with the different terms, UL Marks, services and other elements of the process greatly eases the difficulties. Also, I am told by Jon Brannan, UL Associate Managing Engineer, that readers are encouraged to call him (847-272-8800, ext. 42429) about anything more they need to know about UL and how to get its services.

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