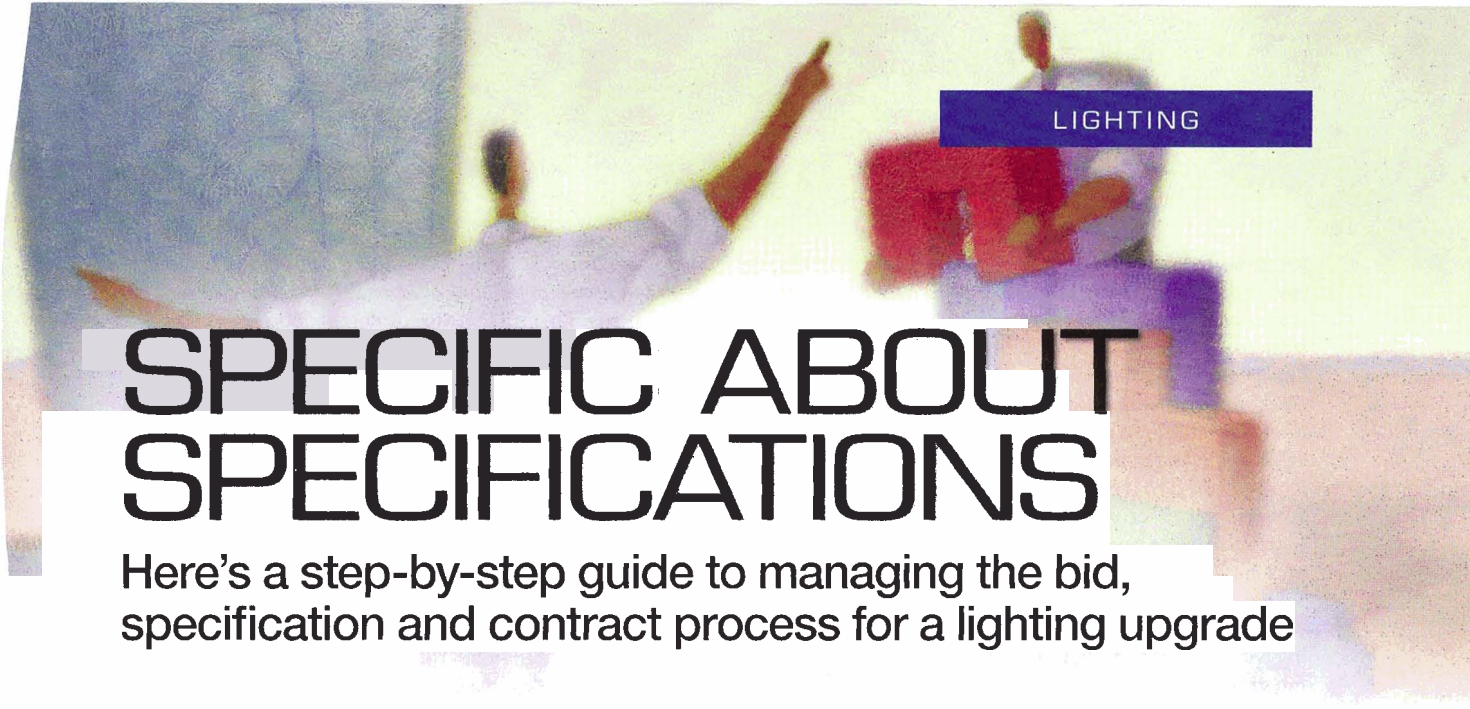

SPECIFIC ABOUT SPECIFICATIONS

Here's a step-by-step guide to managing the bid, specification and contract process for a lighting upgrade

BY STEFAN GRAF

If there is any silver lining to the continued rising cost of energy, it may be that the ROI for lighting upgrades is improving. Better returns make it easier now to get the CFO on board with budget requests. However, the flip side is that the rising cost of energy also means that budgets are much tighter, and projects — even those with a good ROI — may be scrutinized more than ever before, so facility executives need to be certain to do their due diligence. Will the lighting specified meet quality, performance and cost criteria? How can you be sure? What if the system does not satisfy expectations? Who will be responsible if it does not? How will it be fixed?

When sending a lighting system for bid, facility executives soon learn that different suppliers have different recommendations using different products or methods to achieve the same goals. Sometimes, the suppliers know little about the process that created the initial specification. They are looking at the components listed hoping to make a sale. The availability of several different solutions may be beneficial. It could also be a big problem.

There are ways to produce and manage specifications to help minimize problems like these. Creating good specifications and a successful lighting installation involves a minimum of five phases of active involvement that facility executives should be aware of:

- Design: information gathering and developing the lighting solutions.
- Creating good specification documents.
- Bid pricing: product review and approval.
- Implementation: managing the design specifications during construction.
- Commissioning: final review, punch list, aiming of adjustable lights, programming and verification of control systems.

All five parts are needed to achieve successful results.

Choosing a Design Philosophy

To begin with, it is important to understand that there are two ways to begin the specification process. Both may yield very different results. The first is the "engineered" lighting approach and the second is the "designed" lighting approach.

In simple terms, engineered lighting specifications are created when the lighting solutions are based primarily on first selecting products to replace old ones or when new products are needed for a new installation. Then, footcandle calculations are provided and specifications are written based on this very basic information.

A lighting engineer, contractor or product sales person may provide the specification based on the facility executive's desired solution. The criteria may be simple, such as reduce energy costs or make a space brighter. Engineered lighting specifications do not involve a comprehensive design process; therefore they may not address key, important issues and are more prone to value engineering. They are the standard, quick-fix to lighting problems.

Designed lighting specifications are created with a design process to address a lighting problem. A design process begins with the designer or specifier, facility executive and even users getting together to ask and answer questions. Then, lighting goals and objectives are established. The goals and objectives define the lighting solutions and establish the basis for the lighting specifications.

To order "Lighting Guidelines for Specification Integrity," produced by the International Association of Lighting Designers in conjunction with the Lighting Industry Resource Council (LIRC) of manufacturers, go to **WWW.IALD.ORG** then to the LIRC tab.

The designer or specifier should address the numerous issues described in the new Lighting Design Guide found in the Illuminating Engineering Society of North America Handbook, Chapter 10, Quality of the Visual Environment. Addressing the points made in this chapter leads facility executives through all of the important considerations required

for good lighting solutions. Unfortunately, many lighting specifiers are not aware of this resource or do not understand the importance of following it. It raises the minimum standard of care required by designers in providing lighting specifications to projects where the quality of the visual environment is important to good visibility. In the past, the minimum standard of care was simply meeting a footcandle criteria; the new standards have changed that. Lighting quality is essential to the success of the lighting system well beyond energy effectiveness.

In addition, a good design process will reveal that there may be many more issues important to lighting solutions than just lighting fixtures and lamps. These can include wall color, finish reflectance values, integration of electric lighting with natural light, lighting control systems, architectural integration, initial cost and long term operation cost comparisons and user preferences.

Specification Documents

Once lighting system criteria are established, it's time to select and specify the lighting components. Many considerations are involved in the equipment selection process, including:

- Equipment performance and efficiency: Some products produce more light than others. Some create more glare than others. A comparison of several similar products is important.
- Lamp standards, lamp compatibility: Reducing the number of lamp types or adapting to lamp standards may be important for maintenance simplicity.
  Ballast type: Review and selection of the right ballast for your application.
- Luminaire (fixture) aesthetics: Review of the many choices in fixture design and aesthetics can be important. Survey of actual samples can reveal even more important information than just seeing catalog photos.
- Controls: Dimming, switching, timers, relays, photo cells, motion sensors are the key to reducing lighting loads beyond energy codes.
- Initial cost: First cost considerations may be an important driver.
- Operations, life-cycle cost: Some equipment will offer faster paybacks over time in energy and maintenance savings.
- Installation cost: Some equipment, though seemingly similar, may have vastly different installation procedures. This can be an important factor in large systems with high labor costs.
- Product availability: Verification that the product can make delivery dates may be important.
- Service by a local representative: Working with someone that is responsive, trustworthy and professional is obviously valuable.
  Regional manufacturer: With today's shipping costs, finding companies that are in your region may be a worthy goal or important consideration if LEED points are important.

These are the criteria that will determine which systems and manufacturers are acceptable to specific needs. This essential information should be clearly spelled out in your written specifications.

It's important to learn which additional manufacturers have products available that meet your design criteria so you can list them as "approved equal" in your specification documents. This will help to foster competitive pricing. The specifier should be confident in the products being listed knowing that it is the best solution for the job. Never write "or equal" in the specification document; always write "approved equal." Then, the document should list the specific manufacturers.

It is best to create a formal specification document — a lighting schedule or pages of equipment sheets that are detailed and are clear as to what is required. Simply supplying a catalog sheet may not adequately convey all of the information needed. The specification document should have an equipment description, including a list of the features and benefits, a list of manufacturers and catalog numbers of the products selected, and a list of the specific lamp types, including the manufacturer, product code and catalog code of the desired lamp. Also consider listing the color Kelvin, CRI, lumen output and lamp life. Too often lamps are not specific enough and then the supplier may just choose the cheapest, low quality option. Lamps are the most common product substituted or changed without approval. The wrong lamp can ruin the lighting intent.

DON'T SPEC "OR EQUAL." INSTEAD, SPEC "APPROVED EQUAL" AND LIST THE SUPPLIERS

Other parts of the detailed specification include a list of accessories and a list of notes or comments for the installing contractor that are important to this product — "aim the track lighting to accent the art" or "install the down lights 30 inches from the wall," for instance. If possible, include photos or illustrations of what the fixture or equipment looks like.

In addition to detailed equipment specifications, provide in writing "Contractor/Supplier General Provisions." This document will cover important topics and expectations for the suppliers. Topics should include if or how an alternate product may be proposed, expectations about product ordering and delivery schedules, whether the contractor is responsible for proper interpretation of the drawings and specifications, and a list of expectations from the specifier about contractor responsibilities.

Tackling Bid Pricing

Submittals should be provided with unit pricing for each fixture specified. Unit pricing is very important for managing costs and the budget. Be sure to specify unit pricing in the Contractor General Provisions document. Let the suppliers know that submittals will not be reviewed without unit pricing. Sometimes unit pricing reveals that a cost is much higher than expected. This may be because of a misunderstanding of what is specified or the product is being priced by a distributor who has to purchase it from another distributor, creating

excessive markups. It's also possible that pricing will be much lower than expected because the contractor or supplier forgot to price specified hardware or accessories. Unit pricing works to protect everyone.

Carefully review the submittals to be sure that all of the product features, accessories, lamp ordering codes and catalog numbers are correct. This is the contract with the supplier.

Hands-on Role

Staying involved throughout construction is important to help the contractor with questions that may arise. Lighting locations are very important and should be verified during an early walk-through. The installing contractor plays an important role in the success of the lighting plan. They should be made to feel part of the design team, so be available and encourage them to ask questions. It's a good idea to meet with the contractor early, before equipment is ordered, to review the design intent, specifications, locations, etc.

Such a meeting has several benefits. It establishes an early positive relationship and facilitates an exchange of information about the design intent. The meeting allows for a review of lighting location requirements, such as where lights need to be located on the plan to achieve the best results, and can help determine where to purchase unusual or custom equipment and what to do if a question comes up in the field.

Commissioning

The final element of the design specifications is commissioning. This will include:

- Review of the equipment and installation to be sure it meets the design criteria.
- Aiming and adjustments of lights that need to be focused to accent areas.
- Testing and programming of lighting control systems.
- User training of the lighting and control system.
- Maintenance training.

Many of these tasks can be performed by outside firms. However it is important that this be listed and required in the initial specification documents. The success of the lighting design over time will depend upon how it is programmed and how well facility staff is educated for long-term operation. Lighting is maintenance-intensive so without good maintenance training, improper lamps may be installed or control systems bypassed or disabled by users.

A quality lighting design can be responsible not only for tremendous energy savings over time but also can have an impact on productivity, occupant satisfaction and absenteeism. A life-cycle cost analysis will show that the return on investment of better lighting is very short when it is done properly. BOM

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