HOW TO HIRE A MECHANICAL/ELECTRICAL ENGINEER

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Hiring the best engineer for your project can be difficult. Because many building owners often cannot describe in detail what their requirements are, the engineer has to quote a fee without having the services expected of him adequately defined. If the engineer is then selected on price alone, it s a recipe for disappointment. It s rather like asking for competitive quotes to buy a car without describing what kind of car you want. The more the task can be defined, the more likely owners are to get a product they are happy with.

The first step toward hiring an engineer is to define, to the extent possible, what you want the engineer to do. The following is a guide to some of the information required by the engineer. Most of this relates to heating and air conditioning. Plumbing and drainage are usually not such issues and are covered pretty well by building codes. Electrical is also covered pretty well by code except for energy efficiency and controls.

1. Description of the building (use, height, size in sq. ft., unit breakdown in the case of residential uses, any drawings that might be available, etc.).
2. Basic requirements of the mechanical systems (Is air conditioning required? Humidification in wintertime?).
3. Are individual room/tenancy controls required? Should there be upper limits to the temperature selected by the tenant? Do the tenants have any special needs or disabilities? Should the systems be tamper proof or vandal resistant?
4. Acceptable wintertime and summertime temperature ranges (legally, heating systems have to maintain 72 F, but there is no legal requirements for air conditioning). Often air conditioning systems are designed to give 80 F. If lower temperatures are desired, the owner should make this clear.
5. How important is energy efficiency? Is the engineer required to estimate the annual operating costs of various systems?
6. How important is equipment life span? What should the economic life span of major equipment be?
7. Does the owner have on-site maintenance staff or should the equipment be as maintenance free as possible?
8. Is building automation (a computer-based control system) required? Should the system be controlled/adjusted by building staff or off-site through an energy management company?
9. Is the engineer required to design a system to a particular set budget. If so, what is it?
10. Who is responsible for construction? Is there a general contractor? Are the sub-trades hired directly by the owner? What will be the engineers responsibilities during construction? How many site reviews and how many site meetings should be budgeted for? Will the engineer be involved in tendering the work or recommending contractors?
11. Who is responsible for commissioning and staff training? If the contractor is responsible, should the engineer oversee this?
12. Who is responsible for written maintenance instructions? Contractors are often not good at this sort of paperwork.

People rarely interview engineers. They should. Put together as much information as is available about the project and ask for proposals from four or five engineers you have short listed. Ask them to submit the

specifications and drawings of a similar project recently completed (they can block out the title block). See how complete they are. Are they CAD drawings? Are the specifications specific to the project or generic? Ask for a complete list of similar projects done in the last three years. Ask for three or four references.

Then interview the three engineers that look the best - not necessarily the cheapest. Following are some issues that you could discuss during the interview:

1. What kind of heating/air conditioning system would the engineer recommend?
2. What would the engineer suggest to save energy? Is the engineer familiar with energy saving technologies? Has the engineer done any energy management projects?
3. Does the engineer have the staff and the capacity to do the work within an acceptable time frame? How long will it take to do working drawings?
4. Ask the engineer to describe his services during construction.
5. Does the engineer have experience with DDC (direct digital controls)? Will the engineer prepare the sequence of operations and a points list for the controls contractor? (If you don t know what these things are, ask the engineer at the interview).
6. How will the engineer ensure that the equipment will have a long service life?

Engineers, like other professionals, sell their time. In simple terms, if you pay more money, you should get more time. Trying to save money on engineering fees, though, can be false economy. High fees, of course, are no guaranty of quality. But low fees usually lead to poor results. Some engineers may avoid detailed calculations by specifying equipment based on recycling old designs and on rules of thumb rather than on detailed calculations. The temptation is to make everything big; the result could be a system that works, but oversized equipment costs more initially and continues to waste energy and money for the life of the equipment. An engineer working for low fees may produce drawings and specifications that are less detailed and that leave the particulars up to the contractor. This could cause confusion and extras during construction. The extra cost of good engineering is usually insignificant compared with the consequences of poor construction documents. The old saying still applies: $1 in the office, $10 in the field .

Finally, during the project, the engineer should be required to hand over certain documentation. This is not only to ensure that the engineering is actually done, but for maintenance purposes. These submissions should include:

1. Heat loss and cooling load analysis on recognized software.
2. Hour-by-hour analysis over one year period and estimate of annual fuel consumption.
3. Comparison of standard and high efficiency boilers with life cycle costing (in the case of hydronic heating).
4. Pump selection criteria.
5. Calculation of ventilation and make up air grille and duct sizes.
6. If domestic hot water is included, submit calculations for tanks, heat exchanger.
7. Calculation of pipe sizing.
8. Working drawings on AutoCAD 14 or later, including: schematic, details, boiler room layout, section through boiler room, etc.
9. Prepare as-built drawings and submit in electronic format.
10. Prepare schematic mounted for installation in mechanical room.

Good luck.