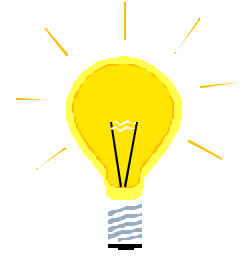


E.F. SIEGFRIED Co., Inc.



"HOT AIR" NEWSLETTER

We have several new things to announce this quarter including our new damper/louver line and the launching of our website. We also have an application section on electric heating. Read on!

Please distribute to all mechanical designers and engineers



For those of you who haven't already heard, E.F. Siegfried Co. is pleased to welcome **Pottorff**, a division of **PCI Industries**, into our family of HVAC lines. Pottorff manufactures a variety of products including **control dampers, fire/ smoke dampers, louvers, backdraft dampers, access doors, ceiling radiation dampers, and louvered penthouses**. Pottorff has been manufacturing (primarily for the West Coast) since 1928 and is a **sister company of Dynasonics, Inc.**, whose sound attenuation line we also represent. With plants in Texas, California, and West Virginia, Pottorff is equipped to handle the entire country's HVAC needs.



We are happy to announce that the E.F. Siegfried Co. **website** is up and running:

www.efsiegfried.com

The website has a listing of **all the products** we represent with **links to the manufacturers' websites**. Any announcements from E.F. Siegfried will be posted on the site; however, **engineers will still be receiving** this newsletter and announcements through e-mail (provided you are in our database). In addition, the current and all **past issues** of the "Hot Air" Newsletter are now posted on our web page. You can still e-mail me at rkugler@efsiegfried.com or through the website. Enjoy!



Now that the 90°F days of summer are over and the nighttime temperatures start to drop into the forties, it's time to start thinking about heating. When it comes time to design a commercial heating system, the first decision that has to be made is what will be the source of heat. The three most common methods are oil, natural gas, and electricity. This issue's application topic will deal with the **benefits of electrical heating in commercial applications**.

The first thing on every engineer's mind, when it comes to electrical heating is the **cost**. While the cost of electricity may still be higher than gas or oil, there are a few things to consider.

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First, the cost of electricity has been much **less volatile** than that of natural fuels. Oil and gas prices are much more susceptible to the supply and demand factor than electricity. While electrical supply can be affected during peak summer month usage (as in California recently), rarely is this an issue during the colder months. Also, the price of oil is affected by non-domestic issues (such as what OPEC decides to charge for a barrel of crude oil this month) that do not affect electricity prices. Another interesting factor is what's known as a "**ratchet clause**". This clause, which many electric utilities (**including local ones**) use, states that minimum demand charges **cannot be less than 40 or 50 percent** of the maximum demand charge during a 12-month period. Basically this says that if you use the most electricity during the summer months (which most businesses do that have air-conditioning) and you use less than 40 percent in the winter (which may be the case if you have gas or oil heat) you'll **still be paying 40 percent of your highest bill for that year!** If you're already paying for it, why not use it?

The advantages of electrical heating continue in the areas of **cleanliness and safety**. Unlike natural gas and oil, there are no products of combustion at the point of usage (smoke, soot, carbon dioxide) that are toxic or need a flue to exit. Electricity also does not utilize or require storage of materials that are flammable or explosive.

The build up of soot also leads to the issue of **maintenance**. Fuel-fired systems require much more regular maintenance (burner cleaning and adjustment, boiler cleaning) than electrical systems. Repairs can also be an issue when using a central gas or oil-fired system. If maintenance or repairs on central gas/oil systems need to be performed, the **entire system has to be shut down**. Because electrical heating systems are more compartmentalized and area specific than central air systems, repairs can be performed on individual units **without affecting the rest of the building**.

Electrical systems also have inherently **high efficiencies**. Electricity is converted directly to heat right at the point of utilization and the age of electrical equipment does not affect this efficiency the way it does for fossil fuel systems. The efficiency ratings associated with fossil fuel systems are also somewhat misleading. These efficiency ratings are for combustion in the boiler or furnace and are based on laboratory tests under non-cycling full load conditions after warm-up and with new equipment. They are **not the overall efficiency of the system** and do not take into account the inefficiencies of seasonal usage.

Even if you already have a central gas or oil-fired system, **auxiliary electrical heat** is beneficial for several additional reasons. First, it is a quick way of adding heating capacity **without making the existing system obsolete**. It is also inexpensive to add in limited quantities because existing transformers and distribution facilities **can often handle extra loads**. The electricity used for air-conditioning in the summer can be used for heating in the winter. Electric heat also has the flexibility to match load requirements more closely than gas/oil systems, which are available in a more limited number of sizes.

Designing around electrical heating systems requires some planning before undertaking. Simply substituting fossil-fuel heating systems with an electric system doesn't allow the designer to take full advantage of the unique features electric heating has to offer. Additionally, the heating system should not be examined by itself but rather as **part of the total energy and mechanical system**. Electrical operating costs of a building may depend heavily upon how the other electrical loads are handled. **Priority load controllers** are an option to insure that non-

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essential loads do not adversely affect the electrical demands of the building and, hence, operating costs.

While electric heating **frees a great amount of space** normally used for large mechanical rooms, space must still be set aside for electrical distribution equipment and transformers. The size and weight of this type of equipment, while small in comparison to boilers and furnaces, is still crucial when designing an electrical heating system.

Heat loss calculations can be made using **standard ASHRAE methods**. In addition, no special requirements are needed as far as wall/roof insulation or ventilation are concerned; **customary design practices** will suffice. It is also **not necessary to oversize the equipment**, as is common practice today with central systems. Oversizing has been used as a way of reducing the time necessary to regain room temperature after night/weekend setback and as a reserve for future expansion. In the case of electric heating, the equipment should be **sized as close as possible to the calculated heat loss**; electric heat is almost instantaneous and, because electric heaters are smaller in scale and more localized, **future expansion is simple**. The result is a true **custom comfort system**.

Electric heating system design is a fairly straightforward task but does require some preparation. Electrical and other codes should be thoroughly reviewed before system design starts. It would also behoove the designer to familiarize him/herself with the plans and programs of the local utility. However, as the reasons stated above indicate, **electrical heating can be an economical, efficient and comfortable way of addressing commercial heating needs**.

Reference: "A Guide to Design of Electric Heater Systems" – Markel Products Company

If you have any questions, call me at 215-887-7244 or e-mail me at: rkugler@efsiegfried.com

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