Insulating Metal Buildings

Getting what you specified? Most don’t!

By Brad Rowe

What if 95 percent of the metal buildings you have worked on in the past dozen years performed 20 to 40 percent below actual insulation code intent? What if those building owners came back looking for an explanation and remedy?

This is a sobering realization for designers and contractors who have relied upon the industry method of insulating metal buildings by compressing a single layer of fiberglass batts over purlins and girts. It’s been nearly two years since ASHRAE issued the press release with revised U-factors for these assemblies, which directly effects various versions of Standard 90.1 dating all the way back to 90.1-1999. If your projects included insulating with a single layer of fiberglass and relied upon the ASHRAE published U-factors, industry published values and/or code compliance programs, it is extremely likely that the installed performance of thermal envelope is substantially lower than what was intended. Fast forward to today when the building owner asks about the insulation in your proposed design. Even if you think you are meeting the requirements written in the energy code or you have used a COMCheck to demonstrate compliance, in reality the design may be far short of actual code intended performance.

Learning more about different insulation methods for metal buildings has never been more important for yourself and your clients. Rigid board, foam, spray foam, IHPs certainly have their advantages and have grown in popularity, but metal building fiberglass insulation still continues to be the popular and the most cost effective material for use in the industry. An effective fiberglass insulation design should first, require filling the purlin and girt space and to require proper vapor retarder and air barrier placement, which encapsulates all metal pur- lins and girts. Using this fabric liner system design requires fabric liners exposed on the exterior purlin and girt surface areas from about 40 to 50 percent to less than 1 percent of the roof and wall area making the cost per installed R-value for fabric liner systems extremely expensive compared to other products and methods when installed correctly.

VALUE ENGINEERING

Too often the term “value engineering” means reducing insulation levels to keep first cost low, which most times does not provide value and is certainly not engineering. Insulation has no moving parts, and if installed correctly should be worry and maintenance free. Alternatively, exploring reallocation of the investment and budget dollars towards properly insulating the building envelope, which may reduce HVAC equipment, costs, labor and continuous main- tenance costs on the equipment over the life of the building. The gas piping and electrical services alone can be significant collateral savings.

Partner with a knowledgeable insulation supplier that can help demonstrate these off setting first costs (equipment, lighting, finishing) and consider their envelope analysis which helps demonstrate the return on investment. For example, our company takes it one step further and works with designers and contractors to qualify their projects for energy efficiency incentives, such as rebates, grants and the attractive $183 per-square-foot commercial build- ing tax deduction outlined in our Synergy Design analysis. Improving the building envelope design and optimizing the installed insulation performance will return more value to the building owner than any other building material going into the project.

WATCH FOR THESE RED FLAGS

When learning and evaluating the different insula- tion options there are primarily two red flags to look for. The first is an absence of documented performance values and the second is lack of installation instructions for the product or method to achieve stated performance. Sellers of products that do not substantiate their performance claims “as typically installed” are essentially not making performance claims that can be relied upon when their product is actually installed in the conditioned space and to require proper vapor retarder and air barrier placement, which encapsulates all metal pur- lins and girts. Using this fabric liner system design requires fabric liners exposed on the exterior purlin and girt surface areas from about 40 to 50 percent to less than 1 percent of the roof and wall area making the cost per installed R-value for fabric liner systems extremely expensive compared to other products and methods when installed correctly.

The new addition to this building features a liner system which incorporates a finished look which is a seal of insurance to achieve a higher R-value for energy efficiency. “With the new energy codes and the new standards, we have evolved a more complex system, which means thicker insulation in the walls and the roof. It has been a game-changer in insulation systems and what we are going to be doing to insulate their buildings,” says Grouws.

The system uses a series of one-inch galvanized steel sheet metal with a soft white or black poly- styrene foam that serves as the low permeance vapor retarder for the system. The fabric sections are stapled to the metal sheet metal with a staple gun or as a free-fall that comes with the material. The stabi- lization and a clean interior finished appearance, which allows roof cavities to be completely filled with un-compressed insulation and maximizes the thermal performance.

Ryan Grouws of CHS Building Systems Inc. in Renton, Wash., says that the system has been a hit in the market, “Not only are the core code energies are increasing- ingly strict. In Washington state, they have made a move to very high R-values for energy code compli-