

Gift-Wrapped Insulation Specification

Automated insulation system creates an energy-efficient thermal envelope

By Brad Rowe

Imagine if your air barrier and vapor retarder specifications for metal buildings were similar to the gifts you wrapped this past holiday? Imagine an enormous vapor retarder sheet starting from the floor, pulled up to ceiling, then pulled throughout a 200-foot-long building bay and down to the floor on the other side. One continuous durable sheet that requires only perimeter bay sealing and zero penetrations through the sheet membrane versus many current specifications incorporating only 60-inch- to 72-inch-wide vapor retarder strips and requiring time-consuming and ineffective taping or stapling. Stoughton, Wis.-based Thermal Design's new AutoCeil automated insulation system was specified to wrap each building bay for a new pelt-processing facility in southern Wisconsin with the key design objectives of reducing air infiltration and creating a more energy-efficient thermal envelope.

Waterloo, Ind.-based Nucor Building Systems provided the 30,000-square-foot metal building (142 feet by 200 feet), including the specified ceiling support struts for the high R-value insulation system. Struts were placed every 10 feet and connected to attachment plates on mainframe rafter webs. Roof insulation system was specified to meet the 2015 International Energy Conservation Code (IECC) and incorporated two layers of Denver-based Johns Manville's unfaced metal building insulation, totaling a pre-installed R-38. Envelope design was to reach high installed R-value with minimal insulation compression using the cavity space between the purlins. Thermal Design developed this method using support straps fastened to the bottom-side of the purlins to create the space for the Simple Saver System. However, the new AutoCeil system provided all the same benefits, but eliminates the time-consuming, bottom-side support straps and fastening because of the specified strut design.

Custom-sized AutoCeil sheets were used, each approximately 30 feet wide by 245 feet long, to cover the entire ceiling bay and both sidewalls in one continuous piece. Sheets were folded, wrapped and labeled for the appropriate bay and were accompa-



nied with all the equipment and tools required for the installation. Each AutoCeil sheet was placed inside the designated bay at one sidewall while the AutoCeil winches were secured to the foundation on the opposite end of the building. Installers unfolded the sheet on the ground and installed the pulling assembly to the sheet. Winch cables were manually pulled up to the ceiling plane, over all ceiling struts and down to the staged sheet at the opposite sidewall.

Approximately 200 feet away, one operator from the ground used push button controls to wind up the cables and lift the sheet straight up the wall to where it transitioned to the ceiling. The operator continued to pull the sheet throughout ceiling plane until it reached the other side, then transitioned down to the floor. Within 20 minutes, over 5,700 square feet was pulled in the entire ceiling bay and instantly covered both sidewalls.

The strong sheet was tensioned and locked in place to corner strut on each sidewall. By eliminating the bottom-side strap and fastening, it only required three installers less than two hours to tension, lock and seal the system in place. Production rates with the project were over five times as fast to install with the automated system compared to Thermal Design's other liner systems.

Once sealed, it was certified for OSHA compliance for fall protection. At one point during the building process, the erector had to stop installing the sheet in the next bay so the insulation and decking crew on the roof could try and catch up. AutoCeil specification also made it easy for mechan-



ical, electrical and plumbing contractors because the visible support struts provided easy attachment and fastening points, which maintained the zero penetration vapor and air barrier design.

The wall insulation system was also specified to meet the 2015 IECC; however, the wall assembly did not include rigid board/continuous insulation (ci) as prescribed in the energy code. The alternative AutoCeil wall specification utilized a thick, unfaced and uncompressed single-layer, pre-installed R-30 fiberglass insulation within the wall girts, and was installed out of the wind and weather. The AutoCeil wall sheet was sealed along the columns, at the floor and mechanically fastened. It provided a clean interior appearance.

Over half the United States has adopted new energy codes for metal buildings, which require effective air barrier design and transitions from compressed to full-thickness insulation methods, supported in the roof and walls. Our industry's quality steel erectors are in high demand, considering the new envelope stringencies, installation methods, tight project windows and the increasing demand for metal buildings. The gift-wrapped AutoCeil specification for the processing facility provided speed, safety and scheduling benefits for the erector, a thermal envelope design that exceeded energy code requirements with zero penetrations and a bright, clean facility. 

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