

First-Ever R-19 Duct Wrap Solves Code Requirements in Washington State

OVERVIEW

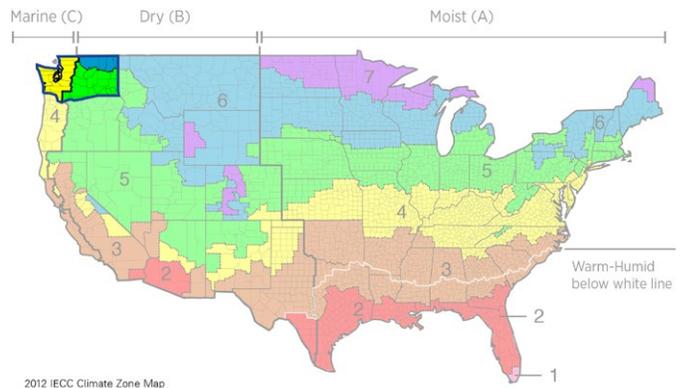
As our world moves toward improving energy efficiency and reducing excess waste, we are seeing more stringent energy code requirements for our buildings. This makes sense as buildings account for 40% of energy consumption in the U.S. and are responsible for over one-third of greenhouse gas emissions throughout the country. In the U.S., energy codes vary by state. In the leading states, like California and Washington, we see increasingly stringent energy code requirements for buildings as these states move to optimized energy efficiency and net-zero energy structures.

Frequently, these states will adopt the latest version of the International Energy Conservation Code (IECC) and then add even more robust code requirements to it. However, one growing problem with more restrictive energy codes is that they often outstrip the capabilities of current technology. For example, in 2018, the [Washington State Energy Code](#), Section C403.10 required any ducts that were part of the external envelope of the building to be insulated as though they were a wall.

[WAC 51-11C-40319, Section C403.10:](#)

*Ducts, shafts and plenums conveying outdoor air from the exterior of the building to the mechanical system shall meet **all air leakage and building envelope insulation requirements of Section C402**, plus building envelope vapor control requirements from the International Building Code, extending continuously from the building exterior to an automatic shutoff damper or heating or cooling equipment.¹*

This new code meant that the duct itself had to be insulated to the same R-value as the walls. Shawn Sailand, a Lead Foreman for [DKB Inc.](#), an insulation contractor servicing the north west U.S., explained why this new code is so important. "In the north west, when you don't add a robust insulation to ducts that bring in outside air, it's relatively common to get ice buildup inside the duct," he said. This can create a host of problems ranging from mold and mildew growth to damaged ducts or insulation.



In many situations, Washington's new code created a need for an R-19 duct insulation – an R-value requirement several times greater than that offered by any duct insulation on the market at the time. Beyond that, the code created some inconsistencies as differing wall constructions have differing insulation requirements, creating variations in what was required for the duct insulation as well.

As a result, in 2020, Section C403.10 was updated with a prescriptive requirement for R-16 insulation to be used on ducts that are part of the external envelope of the building. This new requirement would simplify the process for both installers and inspectors by creating a consistent requirement across all new buildings in Washington. It was intended to clarify duct insulation values for various cases to avoid confusion and increase affordability.

THE CHALLENGE

However, the market in Washington still faced a significant hurdle: there was no single-layer R-16 or R-19 duct wrap insulation. To achieve these R-values installers had two options, both of which created risks for the contractors:

1. Double layer duct wrap insulation: Installers could use one layer of unfaced duct wrap to achieve an R-10, and then add a second layer of faced, 3" R-8 duct wrap. However, using this method would make it difficult to create an effective vapor seal on the insulation. An ineffective vapor seal creates the potential for condensation on the insulation or even in the insulation and increases the risk for mold growth or damage to the structure in areas that get wet.
2. Use an adapted R-19 Metal Building Insulation (MBI) with a fabricator-applied FSK facing. Using building insulation for duct wrap created several problems for contractors. First, when the R-19 building insulation undergoes the 25% compression during installation around the duct, the R-value decreases, causing the insulated duct to become noncompliant with R-19

requirements. Second, since MBI is designed for use in wall cavities and not for use on ducts, it lacks the durability of a standard duct wrap. According to Calvin Green, Journeyman for DKB Inc, the facing on the adapted MBI tears easily making it difficult to achieve a tight wrap around the duct. Additionally, the insulation itself flakes, snags, and tears if it catches on a bolt. Understandably, the durability of MBI is designed to be placed in a wall cavity, and as a result, it does not make a useful alternative to duct wrap.

THE SOLUTION

Recognizing that neither of these solutions are a good option for HVAC insulation contractors, JM set to creating the first-ever R-16 and R-19 duct wraps: 5¾" Microlite® FSK (R-16) and 7" Microlite® FSK (R-19). Both duct wraps provide the R-values required by the Washington State Energy Code even when under 25% compression during installation.

Even though the code underwent a prescriptive change in 2020, creating a standardized R-16 requirement, JM offers materials that can meet both the earlier versions of the code that typically require R-19, as well as the latest version that calls for an R-16.



PRO-TIPS FOR HANDLING & INSTALLATION



Since R-16 and R-19 duct wrap are thicker and heavier than a typical duct wrap, there are some details installers should be aware of. Calvin Green from DKB, one of the first contractors to handle and install R-19 Microlite Duct Wrap, shared some tips to help ensure a quality long-lasting installation:

- **Cut it into workable sizes:** "Because of its thickness, R-19 Microlite is noticeably heavier than a standard duct wrap. As a result, it's important for installers to cut the material into a workable size, especially when you're working on very large ducts," Calvin said. "For this sports arena with very large, rectangular ducts that are 20' x 30' x 5', we found that cutting it into 20-foot pieces was ideal. It helped ensure that the pieces didn't get so heavy that the insulation pulled away from the duct."
- **Seam it on the bottom to prevent sagging:** "Even though the material is thicker than other duct wraps, you can pull it around the seams nicely without any tearing or adhesion issues. Installers should consider seaming it on the bottom to prevent sagging."
- **Use mechanical fasteners to hold it in place:** "Once it's installed, we used mechanical fasteners [weld pins] to help make sure the material stays in place. This is common practice for large ducts, and is especially important when you're dealing with a thicker and heavier material like R-19 Microlite duct wrap."

For more information about R-19 or R-16 Microlite FSK Duct Wrap, please visit the [External Duct Insulation](#) section of the [JM website](#).