

Heat Flow Simulation - using software modeling to help choose the right insulation

For many, if not most insulation applications, the correct type of insulation used is often a relatively straightforward decision to make, especially for experienced personnel who deal with insulating engine and exhaust systems on a daily basis. While there are always variables to be taken into account, such as the type of engine involved (i.e. gas or diesel), the exhaust temperature, where the insulation will be located (i.e. indoors or outdoors), etc., the correct type of insulation to be used is typically easily identified.

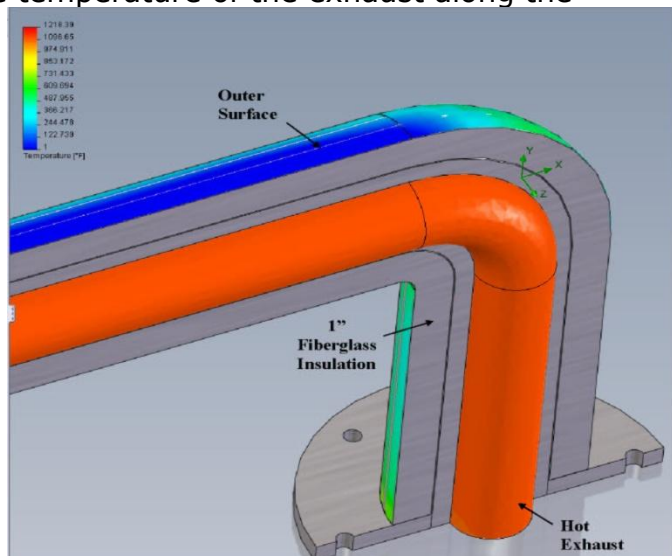
"Being a busy insulation provider, we come across many different scenarios. Our engine library for instance, contains the patterns for a wide variety of engine makes and models. So when a customer presents us with an insulation need, we can more often than not choose the correct insulation with some basic information, without the need for a sophisticated analysis", said Jon Miles, Firwin's senior design engineer.

With exhaust temperatures running increasingly hotter, exhaust systems becoming increasingly complex, and with emissions reduction requirements becoming increasingly stringent, Firwin has begun to see a growing number of applications where the ability to perform heat flow analyses is needed, either because of the complexity of the system, or because the customer demands it.

"When a company is designing a new exhaust system, they often would like to see the effects of different variables on the temperature of the exhaust along the various parts of the exhaust system.

This is especially true for OEMs, who require design validation data when trying to determine what insulation may be required at different points along the exhaust system", said Joash Katsivo, a design engineer at Firwin.

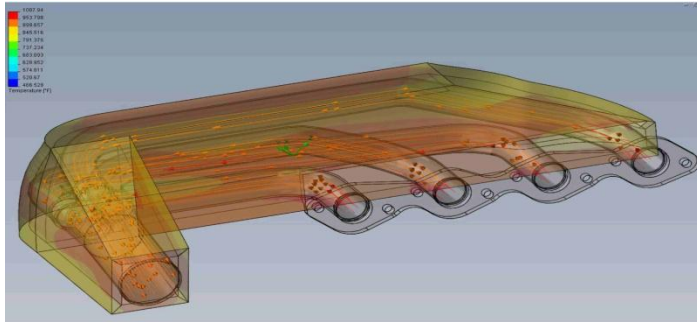
"This is where our ability to perform Computational Fluid Dynamics (CFD) using Flow Simulation software can be extremely useful, especially to companies requiring this type of analysis, but who do not have the ability to do it themselves in house," added Joash.



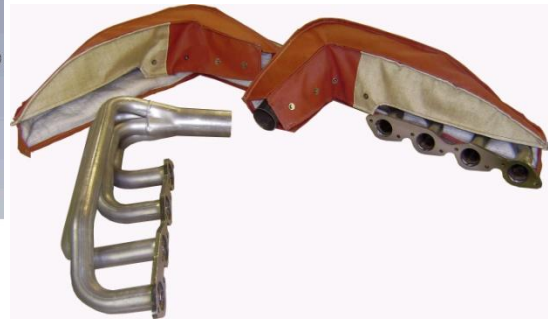
Heat Flow Simulation - Analyzing Real World Situations

Modeling real world situations has until recently been somewhat limited due to the large number of variables that have to be considered when computing heat flows. Whereas a company would in the past be restricted to performing relatively simple

analyses on straight pipe systems, CFD now allows for an unlimited number of variables to be plugged in, which results in a much more accurate picture of what the characteristics of a given exhaust system would be in real-life situations.



Heat Flow Simulation



"Whereas in the past we were restricted to 'steady state analysis', we can now account for gradations in temperature anywhere across a given exhaust system", said Jon Miles. "Furthermore, there are so many variables that can affect the exhaust temperature, and thus the effectiveness of a given insulation. For example, the configuration of the exhaust piping (bends, elbows, etc.), the model of the engine, catalyst, silencer, etc., ambient temperature, humidity, air flow, sunlight, emissivity, and other environmental factors. All these variables can now be plugged into the Flow Simulation software for an accurate picture of real world settings; plus the software allows us to view the heat flow temperatures as it moves its way through the exhaust", added Jon.

Heat Flow Simulation - Savings to Customers' Bottom Line

The ability to perform real-world heat flow analysis can also save a company money. For OEMs, it allows a company to put forth different exhaust configurations, and view the resultant temperature flows, and choose the appropriate insulation before even building a prototype.

For non OEMs, Firwin recently came across a case where a heat flow analysis proved quite beneficial. "A company wanted to insulated a large silencer in their in-house testing area, as they were concerned about the heat it would generate in the relatively close environs", said Jon. "Instead of having to insulate the entire silencer, a Heat Flow Analysis showed that insulating the top of the silencer only would suffice for them to achieve the heat containment they were looking for."

"The latest Flow Simulation software allows for much more sophisticated analysis than in the past. This , along with our training on the software and experience with insulation products, gives Firwin the ability to assist companies who have somewhat complex heat flow situations, and who would like data validation for their insulation decisions. Just give us a call, and we would be happy to sit down and work with you" added Jon.

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