

3E+ Insulation Thickness Program Executive Summary

Overview: The 3E+ Insulation Program is a free online software tool developed by the North American Insulation Manufacturing Association to simplify the tasks associated with evaluating thermal insulation opportunities. This software tool can be used to determine energy savings associated with insulation projects. The tool can also be used in a design mode to determine the optimum insulation thickness and type of insulation for a specific project. The tool can be used to conduct a complete Return-On-Investment analysis of an insulation project. The tool is equipped with an extensive database of insulation properties as well as installation parameters. The database can also be customized for specific plant and materials information. This powerful evaluation tool can be used to estimate surface temperatures of insulated materials when personnel protection is an issue. Piping, flat surfaces, and ducting can all be modeled with this tool. The tool models insulation projects and identifies the energy impact associated with the application. Along with this the tool identifies the economic impact of the project. Additionally the tool is used to estimate the environmental impacts associated with installing insulation.

Example of Use: A facility was operating with uninsulated and poorly insulated steam lines to the plant's four dryers. Because of the lack of insulation, there was a tremendous heat loss resulting in a steam pressure drop and a reduction in dryer operating temperature. This resulted in an increased drying time, which slowed the process down significantly. The company wanted to insulate the steam lines for energy conservation, improved process productivity, and personnel protection, as well as to eliminate dependence on purchased fuel.

The 3E Plus[®] computer program was used to determine the insulation thickness required to insulate the saturated steam lines. Computer projections estimated that insulation would significantly reduce the heat loss along the steam lines leading to the dryers. The reduction in heat loss alone would increase the steam temperature at the dryers by 15°F. The higher temperature in the dryers would result in a faster and more efficient process.

Installing the insulation allowed the company to cut steam usage by approximately 6,000 lb/hr (which is equivalent to saving about 18 tons of fuel per day); eliminate the purchase of outside fuel; reduce the amount of ash being generated and landfilled; and reduce the surface temperature of the pipes to a much safer level for personnel protection (approximately 85°F). By insulating the steam lines, the site was able to save more than 7 MMBtu/hr.

Data Collection Requirements: Prior to using the tool the basic analysis parameters must be identified. The fundamental parameters are the process material temperature, ambient temperature, and dimensions of the component (nominal pipe size and length for example). After identifying the cost of energy an economic analysis can be completed. The time required for data collection varies dependent upon the length and complexity of the piping system involved. For a 20 ft. section of pipe, data collection should be accomplished in a few minutes.

Qualifications: User must have a general understanding of various types of systems requiring insulation at a particular facility in order to operate this tool. Training is offered in a 20 minute self-paced e-learning format. Click [here](#) for more information on the self-paced training. Training is also offered as part of the 2-hour Webcast on the use of the Steam System Assessment Tool suite.

Usage of the tool: This tool requires only general operating characteristics to be identified. Continuous measurements are not required to operate this tool. It can be used for small sections of piping or entire piping systems.

Ease of Use/Software Compatibility: The tool is downloaded as a zip file which is saved on the user's computer. The zip file contains installation instructions which walk the user through the download process. Only basic knowledge of computers is required to operate the tool.

System Requirements:

- Microsoft Windows 98, Windows 2000, or Windows XP
- CD Rom drive with access to internet

If you have a previous version of 3E Plus®, make sure to uninstall it using the Control Panel Add/Remove Program feature.

Product roll-out roadmap: Version 4, released in 2005 replaces earlier versions of 3E+. Version 4 provides the user with a more robust reporting capability, metric conversions, improved retrofit calculations and the ability to add custom fuels. There are currently no plans to update the software.