



## FIRE PERFORMANCE AND ENERGY EFFICIENCY IN MODERN BUILDINGS

Modern building and construction practices reflect the latest building and material science research and information. New and existing buildings are also key in our effort to fight climate change – everything from improved energy efficiency to electrification to reduction and reuse of materials. Plastic building materials have provided innovative solutions to many construction challenges and will continue to do so in the years to come.

### AN EFFICIENT BUILDING ENVELOPE MATTERS

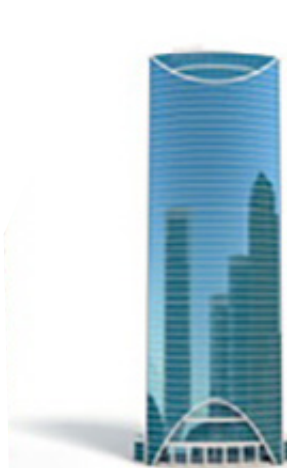
- A properly insulated and air-sealed home can save homeowners up to 50 percent on heating and cooling costs, according to the U.S. Department of Energy (DOE) and U.S. Environmental Protection Agency.
- The DOE found that in commercial construction, new buildings can achieve a 50 percent energy savings when a variety of energy-efficient design elements, including use of a continuous foam plastic insulation, are incorporated into the project.
- Continuous insulation can mitigate thermal bridging by reducing 20-70% of the heat flow through building wall versus cavity insulation of an equivalent R-value, according to ASHRAE Research Project Report RP-1365.



### WHY IS A FOAM PLASTIC INSULATION PRODUCT AN ENERGY-EFFICIENT CHOICE?



- It can help “air-seal” the building envelope. Sealing a building with a foam plastic insulation product helps reduce drafts and control indoor temperature, contributing to lower energy use.



- It can help designers manage moisture. Properly managing vapor transmission and bulk water intrusion of the building envelope is essential to the long-term durability of buildings.



- It is a valuable tool used by designers to mitigate thermal bridging, a significant cause of energy loss.



- It is durable. When properly installed, foam plastic insulation materials can perform throughout the life of the building.



- It has a high R-value per inch. R-value measures the ability of insulation to resist the flow of heat.



- It is easy to install. Foam plastic insulation solutions are available for all six sides of the building – roof, walls, and foundation.

### THE BUILDING CODE CONTRIBUTES TO FIRE SAFETY

Building codes, fire safety standards and education have contributed to a consistent decreasing trend in the civilian fire death rates in the United States. Since 1977, the number of civilian fire deaths per million population has declined by 70 percent, from 34.4 in 1977 to 10.2 in 2015 (2017 study). Code-compliant use of foam plastic insulations supports the building code’s purpose and intent of safeguarding against fire, fire risk, and the impact of fire on building occupants.

- Code-compliant rated roof assemblies, on large buildings such as offices, schools and hotels, can reduce the spread of fire and provide crucial time for people to evacuate in the event of a fire.
- Code-compliant wall assemblies can help prevent or slow fires.
- Compliance with code requirements helps ensure fire performance and design considerations, such as ignition, fire spread, and fire resistance, are managed in accordance with the code and support the principles of fire safety.



Foam plastic insulation and wall assemblies must meet a comprehensive set of performance and design requirements associated with water management, thermal resistance, and air leakage, and fire performance. Third-party certifications are available for many products and applications.

### STRINGENT BUILDING CODE REQUIREMENTS

As with any building material, compliance with stringent science-based building codes and fire safety standards is essential to help ensure the benefits provided by plastic building materials are realized over the long term.

- Model building codes include multiple layers of requirements regarding fire safety, and fire performance including but not limited to:
  - Fire performance tests for materials and assemblies
  - Use and protection of combustible materials
  - Application, height, and region-specific requirements
- Model building code requirements include multiple fire performance tests for plastic materials based on their different uses including but not limited to:
  - Surface burning characteristics
  - Roof assembly fire classification
  - Hourly fire-resistance rating
  - Large scale exterior wall fire propagation

### REFERENCES

1. NFPA Report – Trends and Patterns of U.S. Fire Losses
2. Local Residential Energy Efficiency | US EPA
3. Advanced Energy Design Guides | Department of Energy
4. BC Hydro | Power Smart
5. RP-1365 – Thermal Performance of Building Envelope Details for Mid- and High-Rise Buildings | ASHRAE Store