

Comparative Water Resistance of Coal, Wood Pellets, Torrefaction Pellets, and Mirá Biotech BioTerra™ Pellets

In assessing sustainable energy solutions, the water resistance of various fuel types is crucial for their practicality, usability, and overall performance. Examining how coal, wood pellets, torrefaction pellets, and Mirá Biotech BioTerra™ pellets perform under moisture exposure allows stakeholders to evaluate their suitability for storage and combustion, thereby facilitating informed decision-making in energy management.

Coal exhibits notable water resistance, rated at 85% after 15 minutes of exposure. This resilience suggests that coal can endure moisture without significant degradation.



However, it is not immune to moisture-related issues, such as spontaneous combustion during improper storage.

And, coal extraction and combustion contribute significantly to greenhouse gas emissions, raising wider environmental concerns despite its relatively strong water resistance.

Conversely, traditional wood pellets demonstrate a much lower water resistance, absorbing 0-20% moisture after just three minutes. This susceptibility to moisture highlights the necessity for stringent storage solutions, as rapid degradation can result in diminished energy content and efficiency. Additionally, wood pellets face logistical challenges due to their vulnerability to mold and biomass pests in humid environments, often

necessitating investment in climate-controlled storage.



As biomass energy demand grows, the balance between sourcing sustainable timber for pellet production and mitigating deforestation impacts becomes increasingly critical. For instance, deforestation has led to habitat loss, biodiversity decline, and increased carbon emissions, further complicating the environmental implications of wood pellet usage.

Torrefaction pellets, enhanced through a specific thermal treatment process, exhibit moderate water resistance of 30-75% within 4-10 minutes. Although they surpass traditional wood pellets in hydrophobicity due to this treatment, variability in moisture absorption raises concerns about their practicality under changing weather conditions. The high initial costs associated with torrefaction technology, primarily due to the complex processing equipment required, also complicate its commercial viability.

In stark contrast, Mirá BioTerra biofuel pellets demonstrate outstanding water resistance, achieving 100% resistance in just 15 minutes. This remarkable performance renders biofuel pellets exceptionally suitable for various environmental conditions.

Their resilience against moisture not only protects against degradation and mold growth, facilitating long-term storage without quality loss, but also ensures high energy yields during combustion.



Produced from agricultural byproducts, Mirá BioTerra pellets exemplify the principles of a circular economy by converting waste into valuable energy resources. This production approach mitigates waste and promotes carbon neutrality, as the carbon emitted during combustion is offset by that absorbed during biomass growth.

Mirá BioTerra biofuel pellets also offer superior energy density compared to traditional wood pellets, leading to lower transportation costs and reduced carbon emissions associated with shipping. Their low particulate emissions contribute to cleaner air quality, while compatibility with existing heating and power generation systems allows for seamless integration, making them an attractive alternative for energy users looking to lower their environmental impact.

Additionally, Mirá's proprietary enzymatic technology, PhytoCy™, plays a critical role in enhancing the biofuel pellets' properties, promoting efficiency in energy generation.



The implications of water resistance also extend to the practical applications of BioTerra pellets and their effects on energy generation systems.

Their resilience translates to less frequent maintenance and cleaning of combustion systems due to reduced ash and residue buildup compared to wood and coal. The ability to withstand moisture enables potential use in diverse geographic regions without performance degradation from climatic variances.

The hydrophobic properties of BioTerra pellets may also pave the way for innovative blending strategies with other fuels, optimizing combustion characteristics and overall energy system efficiency. As the global narrative increasingly emphasizes reducing greenhouse gas emissions and embracing renewable energy sources, biofuel pellets are positioned at the forefront, supported by their sustainability credentials, operational efficiency, and contribution to energy resilience.

Ultimately, selecting between these fuel types necessitates careful consideration of their water resistance attributes, as this significantly affects their storage, transport, and combustion efficacy. Factors such as energy density, combustion characteristics, and environmental impact must be integrated into the decision-making process.

By prioritizing moisture management and selecting the appropriate fuel type, strategies can be implemented that not only enhance energy efficiency but also foster sustainability, balancing economic and environmental goals in the transition to renewable energy. With their distinct advantages, biofuel pellets represent a forward-thinking option for those dedicated to promoting a greener future.