

Turning complex challenges into powerful possibilities.

Nuchar® activated carbons

Low pressure adsorbed natural gas storage in bulk gas (virtual pipeline) distribution and flare gas recovery applications



Nuchar activated carbons are the leading global automotive solution for fuel vapor emissions control systems in gasoline fueled vehicles. These activated carbon products are ideally suited for sustainable working capacity performance to store and release mixed hydrocarbon vapors like gasoline and natural gas.

For the gasoline vehicle market, our Nuchar activated carbon products:

- Have proven life-of-vehicle performance
- Have been used in more than 1 billion canisters since 1975
- Help recover more than 10,000 metric tons of fuel each day, preventing emissions from escaping into the environment and saving resources

Adsorbed natural gas (ANG)

ANG is the high density storage of natural gas at low pressures (below 1,000 psi) using highly porous adsorbents. By filling low pressure LPG vessels with Nuchar granular activated carbon, the natural gas storage capacity can be increased by up to three times that of a compressed gas at a pressure of 230 psig (16 bar). Under controlled depressurization, the natural gas is released and exits the storage vessel under pressure based on the natural gas demand.

Bulk gas distribution and storage

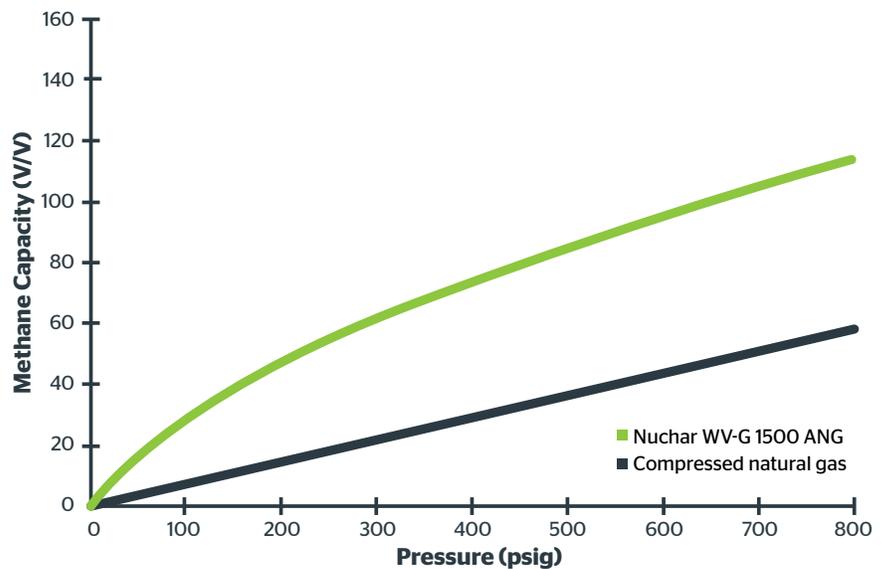
The significant increase in North American natural gas production and the corresponding decrease in price are leading to a growing market demand for access to natural gas. Geographic areas not currently served by natural gas pipelines are considering alternative means to gain access to the fuel via portable delivery systems, often referred to as a virtual pipeline. In this process, compressed natural gas (CNG) can be delivered via truck to serve institutional or industrial sites.

The natural gas is sourced from a nearby local distribution utility, then transported in specially designed CNG storage trailers which are offloaded at the customer's facility. For large demand customers, the natural gas can be sourced directly from the CNG trailer. For smaller demand customers, the natural gas is often depressurized and stored on-site in low pressure LPG tanks.



ANG for enhanced low pressure natural gas storage

The methane storage comparison curve below demonstrates the significant increase in natural gas storage that can be achieved by filling low pressure LPG tanks with Nuchar granular activated carbon versus simply filling the same tank with pressurized natural gas. As a result, significant capital cost savings can be achieved by using much smaller LPG tanks for the same volume of stored natural gas. ANG can economically enable low pressure recovery and reuse of flare gas as well as low energy demand virtual pipeline applications typically too small for traditional CNG service models. Approximately five percent of annual gas production is flared or vented worldwide. The World Bank initiative to end routine gas flaring at oil production sites by 2030 is helping to drive industry momentum, with endorsement by nine countries, 10 oil companies and six development institutions.



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