NANOFEA

NANOMAX
Getters Reimagined

CryoMAX
Advanced Cryogenic Getters

CryoMAX materials are designed to be a cost effective solution that is easily integrated, ~~that~~ exhibits rapid response and ensures long term reliability for all your cryogenic system needs.

CryoMAX		
Product	**Operating Temperature**	**Adsorption**
CryoMAX	-253°C to >250°C	180 cc/g

NanoFEA offers getter solutions for hydrogen, water vapor and other gases including oxygen, nitrogen, CO and CO_2, VOC's and Particulates. The NanoMAX product family now includes CryoMAX, our new discrete powder getter for capturing out gassed hydrogen in vacuum insulated cryogenic systems.

Typical Applications:

- Cryogenic Tanks
- Dewars
- Vacuum insulated pipes
- Cryostats
- Superconducting cables

NanoFEA's CryoMAX Getter consists of a proprietary blend of metal compounds engineered to provide the best balance of speed and capacity. The following outlines CryoMAX critical advantages:

1. Maintaining Vacuum	Act as chemical pumps, reacting with and capturing gas molecules to keep the vacuum pressure extremely low.
2. Hydrogen Sorbing	Captures hydrogen outgassed from the interior walls and insulation of the device.
3. Challenging environments	CryoMAX is highly effective at removing hydrogen at extremely low temperatures.
4. LOX Compatible	Per ISO 21010:2017 (E) Cryogenic Vessels, Section 5.4.3.2 Hot Wire Test.
4. Long Term Performance	CryoMAX provides a stable long-term pumping solution, lasting the entire lifetime of the device.
5. Pumping speed	CryoMAX provides for rapid pumping action to manage the higher outgassing rates typically found during the first few weeks of service.
6. Capacity and Cost	CryoMAX rivals traditional PdO installations without the wild price swings found with precious metal use.
7. Activation	None required

NanoFEA, LLC 4245 N Central Pkwy, #490, Dallas, TX 75205 email: Sales@nanofea.com Ph: +1(720)703-4622

NANOFEA

NANOMAX
Getters Reimagined

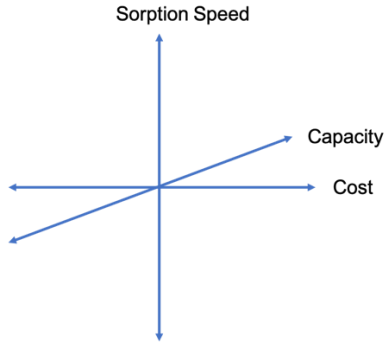
CryoMAX
Advanced Cryogenic Getters

CryoMAX is available in TyVek Pouches or bulk bottles

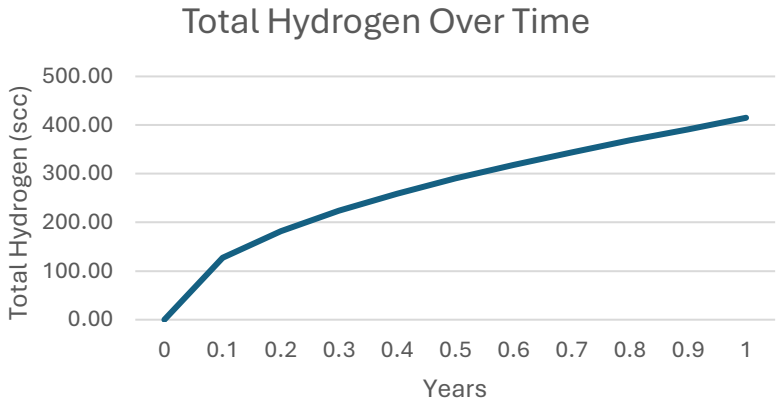
Getter Color: Black

CryoMAX Material Considerations

- Getter design and installation in new systems should always be verified by RGA analysis of the trace gases in the vacuum annulus after pump out and by boil off rate (BOR) testing.
- NanoFEA suggests the use of a separate, well activated desiccant that is not mixed with the hydrogen getter.
- We recommend the use of a 5A molecular sieve provided in 3-5 mm diameter pellets. It is preactivated, vacuum packed in vapor barrier bags and available through NanoFEA.
- Consider a minimum safety factor of 2.



Critical Factor Trade Off Space



The primary source of gas in a super insulated system is the MLI insulation itself. Outgassing rates in these systems vary significantly depending on the materials used and bakeouts during processing. Higher temperatures for longer times result in lower outgassing rates than lower temperature bake outs, particularly for water vapor. The NanoFEA CryoMAX material is well suited to the challenges of scavenging hydrogen in these challenging conditions. We bring decades of experience in gettering cryogenic systems to the table. Contact us today for more information on this exciting material.

NanoFEA, LLC 4245 N Central Pkwy, #490, Dallas, TX 75205 email: Sales@nanofea.com Ph: +1(720)703-4622