Cryogenic Fluids

Cryogen is considered any liquid that has a boiling temperature below -150 Degs F

Nitrogen in Liquid form	-320 degs F	Expansion ratio 710 to 1
Oxygen in Liquid form	-297 degs F	Expansion ratio 862 to 1
Carbon dioxide in Liquid form	-109 degs F	Expansion ratio 535 to 1
Helium in Liquid form	-452 degs F	Expansion ratio 757 to 1
Hydrogen in Liquid form	-434 degs F	Expansion ratio 850 to 1
Argon in Liquid form	-303 degs F	Expansion ratio 847 to 1
Methane in Liquid form	-256 degs F	Expansion ratio 650 to 1

Carbon Dioxide can be in gas or solid form below a pressure of 60 PSI

Matt Fraley 1/15/2021

Cryogenic Fluids

All of these travel through Vermont, I live on 22a and see everyone of these trucks go by.

Biggest thing to remember is you firefighting gear will not protect you from these fluids at all.

Your FF gloves and bunker gear have residual moisture in them as well as the moisture in your skin will instantly freeze causing sever frost bite and cryogenic burns and the loose of skin and limbs.

To handle these fluids safely require cryogenic gloves.

Matt Fraley 1/15/2021

LEPC 8 2021

Cryogenic Fluids

Carbon Dioxide

Carbon Dioxide is not really by the term a cryogenic liquid.
Carbon Dioxide is a special case when not pressurized, it can be in a solid (Dry Ice) or gas form.
Dry ice is still -109 degs F will cause severe burns and frost bite.
You never want to put solid carbon dioxide in a closed container with out pressure relief as it will turn to a gas as it warms up and with an expansion ratio of 535 to 1 you have a potential bomb.

Matt Fraley 1/15/2021

Cryogenic Fluids

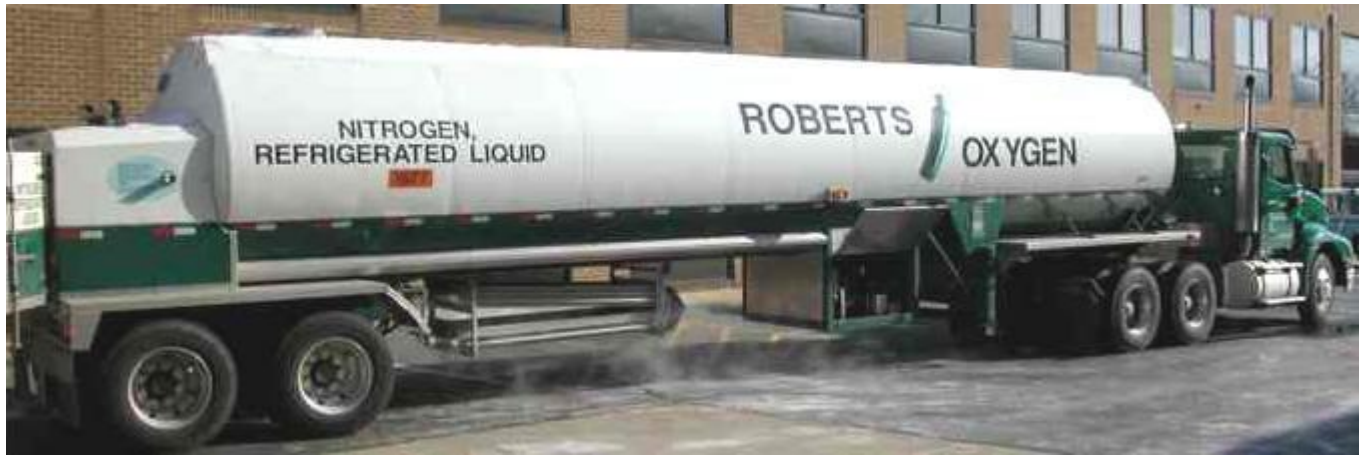
https://www.youtube.com/watch?v=0DPr79wDKxs

Matt Fraley 1/15/2021

LEPC 8 2021

Cryogenic Fluids

Delivery Trucks



Cryogenic Fluids

Solid Carbon dioxide or Dry ice is use for transport a lot of different items that need to maintain a certain temperature to maintain survivability. i.e. food, medication, and material.

Area of concern at this time would be with Covid-19 vaccine
They must maintain below -70 deg F to be viable for 6 months of storage.

Matt Fraley 1/15/2021

Cryogenic Fluids

Matt Fraley 1/15/2021

LEPC 8 2021