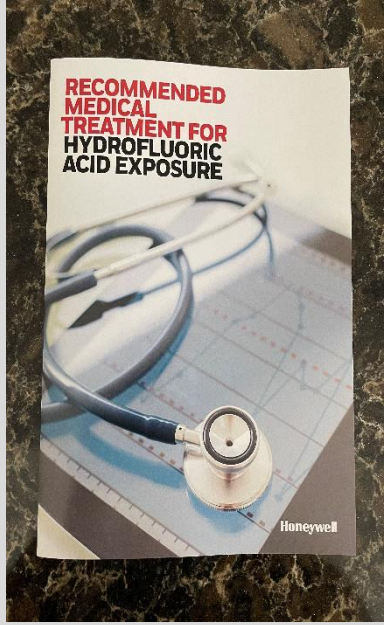



# HF GENERAL AWARENESS

**NIPSTA**
**Glenview, IL**
**May 2024**

**Tony Loggie**
**Honeywell HF Technical Services**

Honeywell

# HF PRODUCTION REACTION

$CaF_2$ + $H_2S0_4$ + Heat → **2 HF** + $CaSO_4$

**Fluorspar** | **Sulfuric Acid** | **Gypsum**

**100% Anhydrous (without water) HF Vapor**


**Water is added the AHF to make AQHF**

# END USES FOR HF ACID

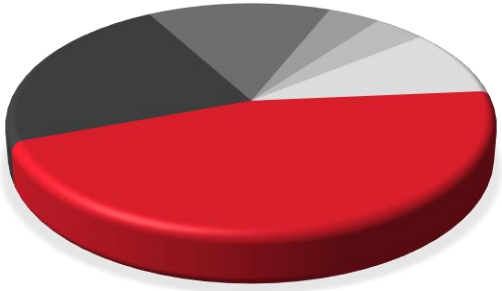
Chemical Derivatives

Alkylation

Nuclear

Aqueous

Fluoropolymers



Fluorocarbons

# ANHYDROUS HF PROPERTIES

# PROPERTIES OF AHF

## Anhydrous HF

- Clear, colorless liquid
- Dense white vapor
- Intolerable, pungent odor

*Smells like … ???*

- Boiling point: 19.5ºC (67ºF)
- Weight: 1.0 kg/l (8.34 lb/gal)
- Miscible in Water (S.G.- 0.97)
- Highly corrosive
- Non-flammable

# HF HAZARDS

# HF HAZARDS

## HF exposure causes severe burns

- **Inhalation hazard**
  - TLV: 2 ppm – (Ceiling) (ACGIH)
    0.5 ppm – (TWA) (ACGIH)
  - **PEL: 3 ppm** – (TWA) **(OSHA)**
  - IDLH: 30 ppm
  - HF Vapor is visible at 1 ppm

**Your nose can detect HF at approximately 1/3 ppm.**

# HF HAZARDS

**HF exposure causes severe burns**

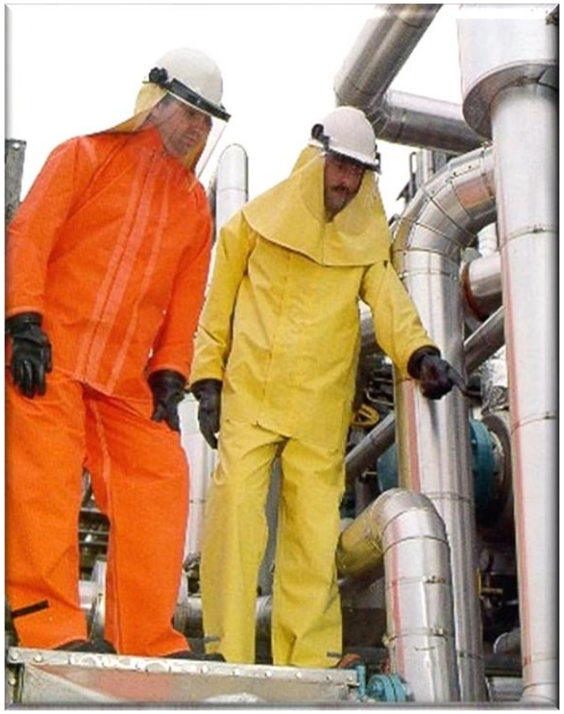
- **Inhalation hazard**
  - TLV: 2 ppm (Ceiling)

    0.5 ppm – (TWA)
  - PEL: 3 ppm – (TWA)
  - IDLH: 30 ppm
- **Potentially toxic by all routes of exposure due to depletion of body calcium**
- **Potential delayed onset of symptoms**

# SAFE HANDLING & PPE

# PPE FOR HANDLING HF ACID

**Wear the prescribed level of personal protective equipment for whatever task you are performing**



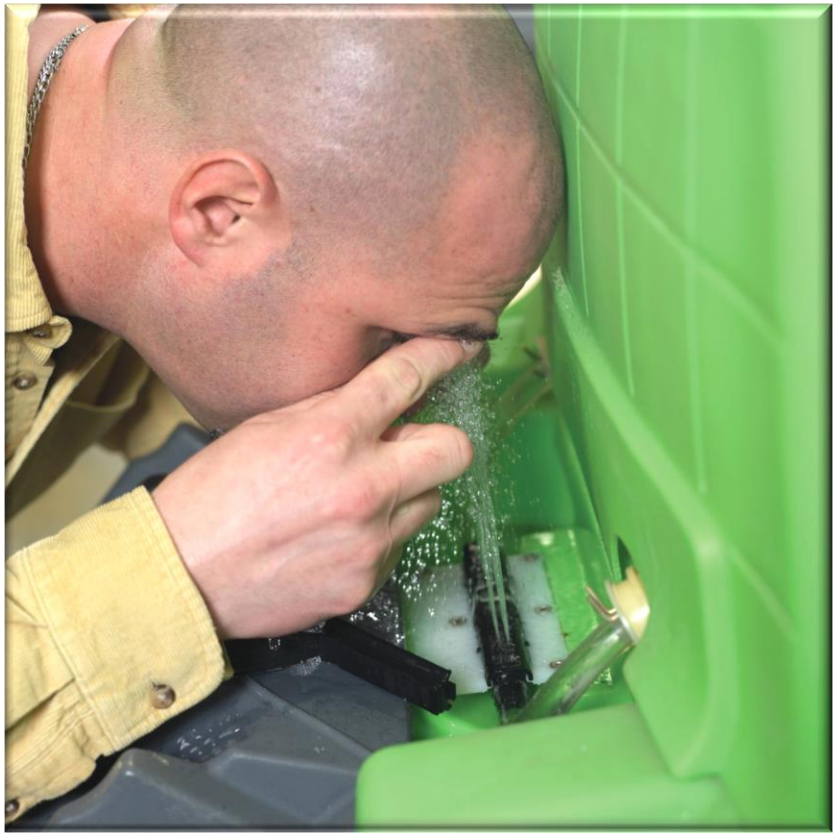

**Always wear the PPE required by your company**

# PPE FOR HANDLING HF ACID


**Responders will require the highest level of protection**

# DECONTAMINATION WATER

**Safety showers and eyewash stations should be near areas of potential exposure**

**Ensure Safety Showers are operational**

# NEUTRALIZE SPILLS AND EQUIPMENT

Caustic Soda or Potash

Soda Ash or Bicarb

Lime or Lime Slurry

**Any Alkaline (Base) Material Can Be Used to Neutralize HF**

# HF SPILL RESPONSE

## Deluge with coarse water spray

- <50% HF = No fumes
- Consider initial heat of dilution
- Greater dilution = greater heat absorptive capacity
- Contain/capture run-off for ultimate proper disposal

# HF FIRST AID & MEDICAL TREATMENT

# HF ACID EXPOSURE: UNIQUE ISSUES

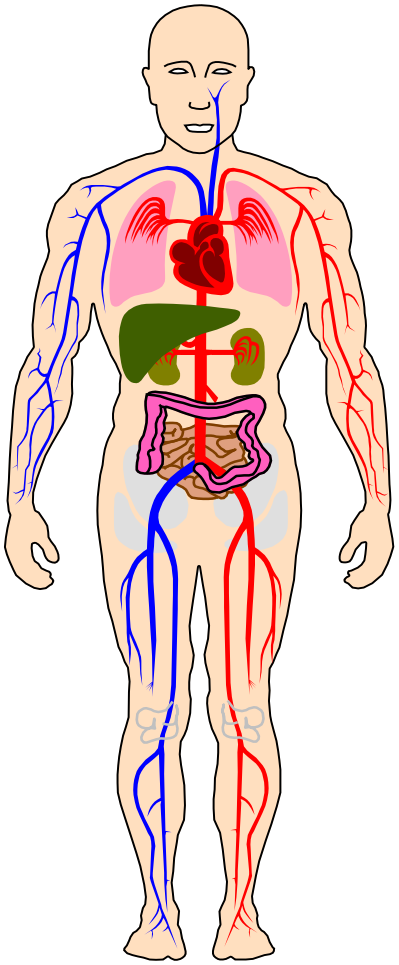
## HF burns are not like other acid burns

- Fluoride ions can penetrate the skin, causing deep tissue destruction and possible acute fluoride toxicity

## Unlike other acid burns, washing with water will not stop the corrosive action

- HF exposures require immediate and specialized first aid and medical treatment

# SYSTEMIC FLUORIDE TOXICITY



- Fluoride exposure lowers serum calcium and magnesium, and **may** result in **cardiac arrest**
- A relatively small amount of absorbed fluoride **may** be **fatal**
- Concentrated HF skin burns over **1%** body surface area are of concern
- **Any inhalation or ingestion is of concern**

# HF ACID BURNS

## First Aid

- **Flush immediately with lots of *water***
- **Remove contaminated PPE & clothing while performing decontamination**
- **Treat exposed areas with one of the approved HF Specific First Aid Procedures**
- **Do not delay treatment**

# HF SKIN BURNS

## *Measuring Success*

- **Cessation of pain is important**
- **With Calcium Gluconate gel or Benzalkonium Chloride soaks, expect relief of pain in 15 to 30 minutes.**
- **Blanching & redness should disappear**
- **If pain recurs, continue using gel or soaks**
- **If no pain relief with gel or soaks, use Calcium Gluconate 2.5 - 5% injections**

# WWW.HONEYWELL-HFACID.COM



## Hydrogen Fluoride

**Honeywell ensures a secure and seamless supply chain from extraction to market. Depend on Honeywell to deliver a quality Hydrogen Fluoride (HF) product. As the world's largest producer and consumer of HF and the leader in safe and reliable HF transportation, we're committed to delivering a consistent product to support your operations.**

As the world leader in Hydrogen Fluoride (HF) production and delivery, our customers know we understand the rigorous requirements for producing and handling HF with the quality and safety they demand. We take our safety responsibility very seriously. No other supplier can match the experience and support we provide throughout every phase of production and delivery. We provide this service for all grades of HF.

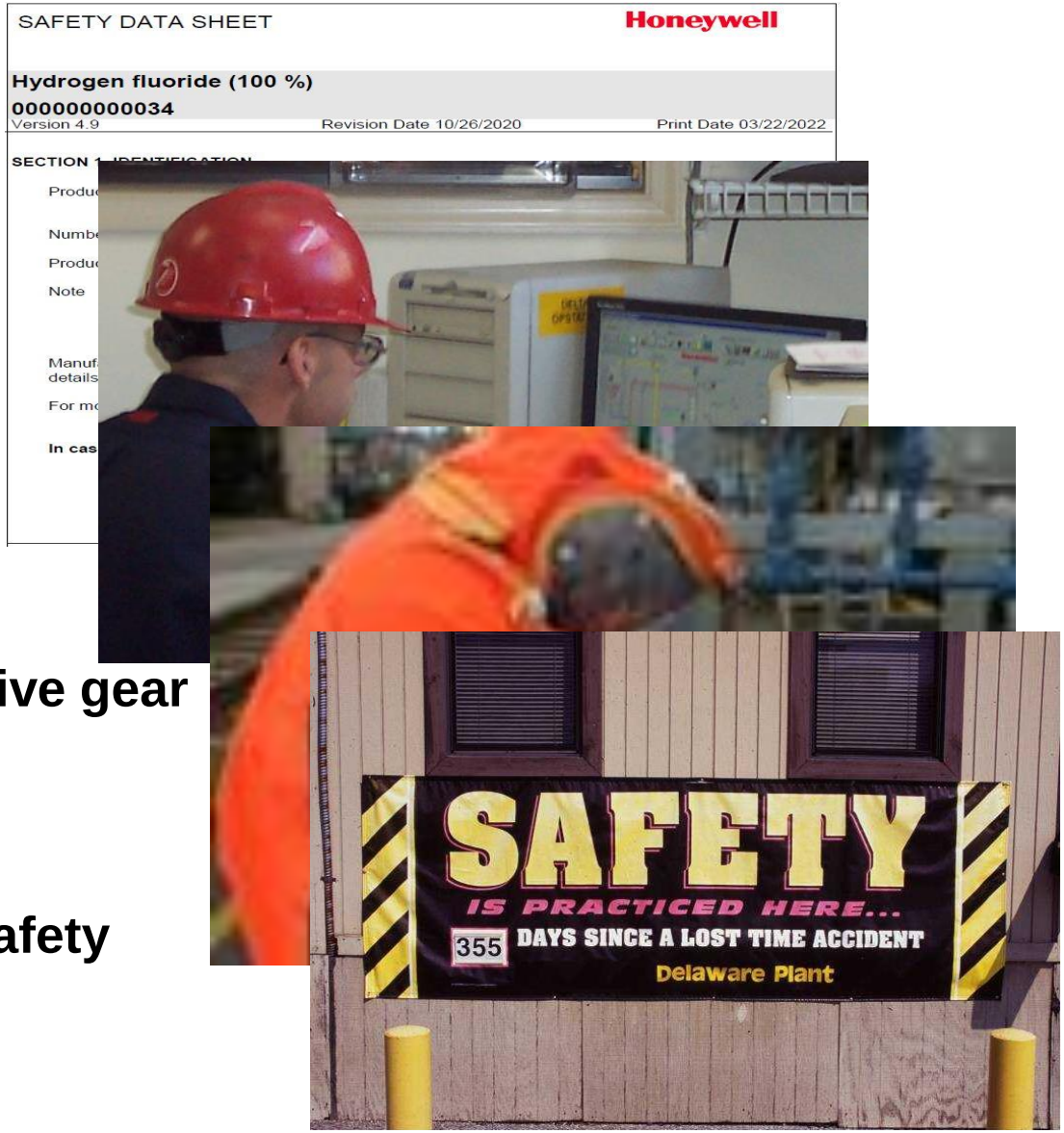
As a trusted Hydrogen Fluoride (HF) source for over 50 years, we continue to invest in technology that advances the safety and reliability of our HF acid. Our challenge is to provide the safest working environment – protecting employees, the environment, and equipment – while simultaneously enabling you to improve throughput and productivity.

### What is Hydrogen Fluoride?

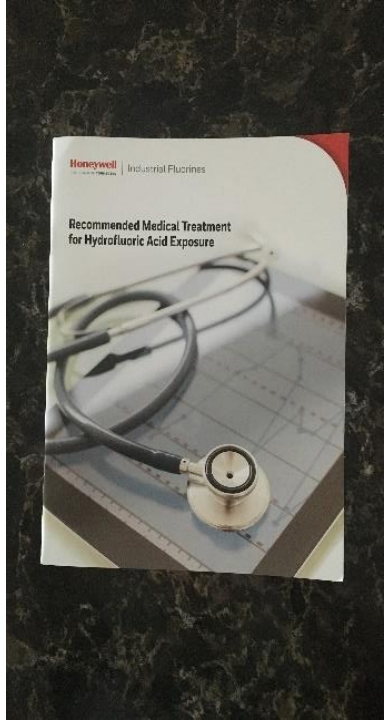
Hydrogen Fluoride also referred to as HF acid or Anhydrous HF is a clear, colorless corrosive liquid that is extremely hazardous. HF is a versatile chemical with diverse industrial applications, but its handling requires meticulous attention to safety due to its corrosive nature and potential health hazards. When HF acid is dissolved in water, it may be called hydrofluoric acid. HF is a weak acid. It's called a weak acid because it doesn't fully detach or separate into its ions in water, but it's still a very dangerous acid due to the potential of acute fluoride toxicity

# WORK SAFELY

- Know the hazards
- Follow operating procedures
- Wear your protective gear
- Maintain a good safety attitude






# HF TRANSPORTATION

**NIPSTA**
**Glenview, IL**

**Tony Loggie**

Honeywell

# BULK TRANSPORT

## Hydrogen Fluoride, Anhydrous

49CFR 172.101Hazardous Materials Table

## Bulk Packaging

49CFR 173.244

- (a)(1) **Rail Cars**: Class DOT 105, 109, 112, 114, or 120 fusion-welded tank car tanks.
- (a)(1)(iii) Hydrogen Fluoride must be transported in tank cars having a test pressure of 20.68 Bar (300 psig) or greater and conform to Classes 105, 112, 114, or 120.

**Honeywell uses DOT 112 pressure rated railcar of 340 psig or greater**

# BULK TRANSPORT

## Bulk Packaging

49CFR 173.244

- (b) **Cargo Tanks**: Specification MC 330 and MC 331 cargo tank motor vehicles and, except for Division 4.2 materials, MC 312 and DOT 412 cargo tank motor vehicles.

- (c) **Portable Tanks**: DOT 51 portable tanks and UN portable tanks that meet the requirements of this sub chapter, when a T-code is specified in column (7) of the table.

**IBCs not allowed for PG I liquids (Aq. HF >/= 60%)**

# PLACARDS: ANHYDROUS HF


**PROPER SHIPPING NAME**
Hydrogen fluoride anhydrous
**PRIMARY CLASSIFICATION**
Class 8 CORROSIVE
**UNID**
1052

**US SUBSIDIARY CLASSIFICATION**
Class 6 POISON
INHALATION HAZARD
ZONE B

# DOT112S500I


Full Head Shields

1.250 ” Carbon Steel Shell & Heads

Industry Standard Color Scheme

# AHF TANK TRAILER DESIGN

## DOT 412


**All Honeywell AHF Trailers are DOT-412**

**All Honeywell AHF trailers are of Stainless-Steel construction**

# AQUEOUS TRAILERS

# AQUEOUS TRAILERS

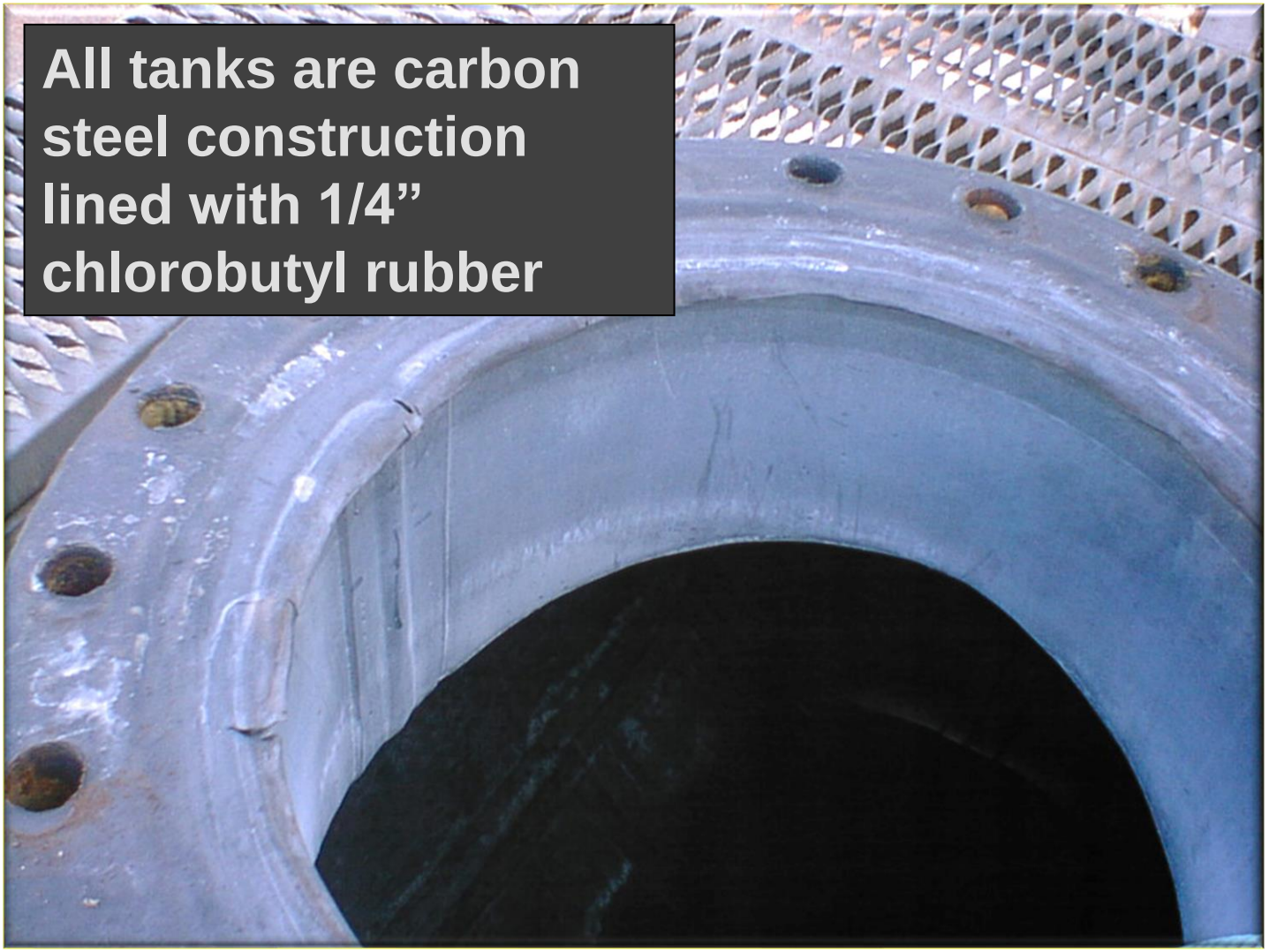
**All AQ HF strengths are placarded Class 8 Corrosive with a UN number of 1790**


49% in **T-4XX** trailers


70% in **T-7XX** trailers

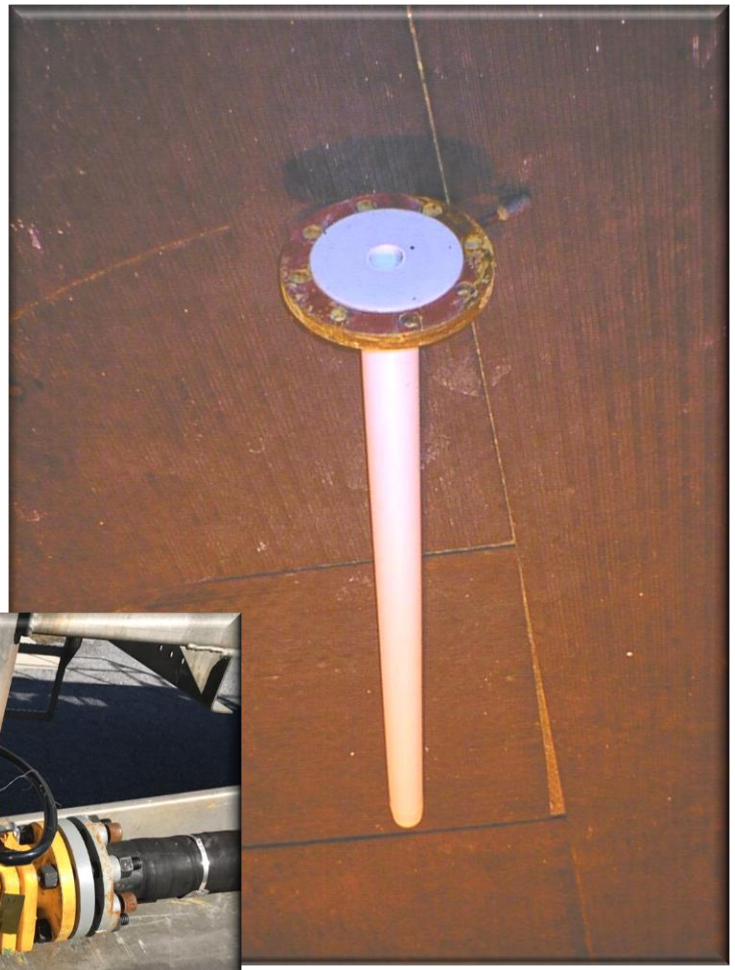
Note: The Bill of Lading is the final check for product contained in the vessel

# AQUEOUS TRAILERS - LINER



# AQUEOUS TRAILERS – PTFE LINED

All components not lined with rubber are protected by Teflon



# QUESTIONS?

# THANK YOU!



Honeywell