TRITIUM PERMEATION LEAK DETECTOR

氚渗漏监测器

Model ~ TRI-PER

FEATURES: 特点

- HIGH SENSITIVITY TRITIUM ION CHAMBER
- 高灵敏氚电离室
- SEALS TO ANY SIZE TANK
- 可与任何尺寸容器密封在一起
- USER SETTABLE UNITS - uCi/l or Bq/m^3 etc.
- 用户设定单位- uCi/l or Bq/m^{3}等
- WIDE RANGE - DIGITAL ACCURACY
- 宽量程-数字精准
- PROGRAMMABLE DIGITAL READOUT
- 可设置数字读数显示
- SENSITIVE FOR OCCUPATIONAL EXPOSURE
- 对职业辐射暴露灵敏
- BATTERY OPERATION OR AC OPERATION
- 电池或AC电源供电
- BUILT-IN RS-232 / USB COMPUTER INTERFACE
- 内置电脑接口RS-232 / USB
- EASY TO RE-POSITION FOR MEASUREMENT OF DIFFERENT AREAS OF THE TANK
- 容易重新定位用于不同部位测量
- PORTABLE FROM ONE TANK WALL LOCATION TO ANOTHER AND FROM TANK TO TANK
- 便携，可从被测容器一侧移到另一侧，从一个容器移到另一个容器
- **OPTIONAL** - BUILT-IN HIGH LEVEL ALARM
- 选项-内置上限报警

TRI-PER ELECTRONICS

DESCRIPTION: 描述

Technical Associates **TRI-PER** is a Tritium Permeation Leak Detector; an ion chamber designed to seal to any type of cylindrical tank wall regardless of tank diameters via pliant air tight rubber seals.

TA公司生产的TRI-PER是一款测氚渗漏监测器，电离室设计可以使用防漏橡胶密封件封装进任何尺寸圆柱形容器

What is a Triton? 什么是氚核？

The nucleus of a Tritium atom, consisting of a proton and two neutrons.

氚原子的核，由一个质子和两个中子组成

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SITUATION: 问题

A high pressure tank of Tritium gas (T$_2$) continuously loses the Tritons as they migrate through the metal tank wall and emerge on the tanks outer surface as if the tank is sweating Tritium. The tank wall is vulnerable to this migration as though it was a thin membrane.

因为氚原子像出汗一样从容器金属壁中不断渗出，高压氚气容器 (T$_2$)持续丢失其原子，容器壁像薄膜一样

Escaping Tritium nuclei are of interest and concern for a variety of reasons:

基于以下原因逃逸出的氚原子应得到重视：

- They constitute a health / safety environmental problem when released.

- 释放的氚会构成健康/环境安全问题

- They might someday be useful as a measure of the activity and quantity, volume or pressure of the remaining Tritium gas in the tank.

- 可能对于容器里的剩余的氚气的压力、体积、数量及活度测量有用处

- They are an indicator of the tank's structural integrity.

- 可以说明容器结构的整体性

TYPICAL MEASURMENT TECHNIQUES: 典型测量方法

- Take wipes from the tank's outer surface and count them in the SF-TF-6 Proportional Counter or the SSS-22P Liquid Scintillation counter

- 擦拭容器表面并用SF-TF-6正比计数器或SSS-22P液闪计数器计数。

- Spray the outer surface of the tank with LSC fluid lightly and photograph the fluorescence in low light.

- 向容器表面喷洒薄薄的液体闪烁体，在暗光线下显示荧光

- Use an FF-27 Tritium Surface Monitor. However, while very effective for measurement on smooth flat surfaces this method is not particularly useful for measuring curved, bumpy surfaces of cylindrical storage tanks.

- 使用FF-27氚表面监测器，此方式用于光滑平坦表面非常有效，但是不适用于测量曲面/不平整的圆柱形存储容器

TRI-PER MEASURMENT TECHNIQUE: TRI-PER测量方法

1. **Select portion of tank wall to be measured.**

   选择容器壁某一部分测量

2. **Wipe surface area with filter paper and measure Tritium of filter paper with the SF-TF-6 Proportional Counter or the SSS-22P Scintillation Counter for baseline data.**

   用滤纸擦拭这一区域表面，用**SF-TF-6**正比计数器或**SSS-22P**闪烁计数器测量滤纸上氚并得出基线数据

3. **Clean area to remove preexisting Tritons (Tritium) and any volatile chemicals, dirt, and dust.**

   擦拭表面清除已经残存的氚和其它可发挥化学物和尘土

4. **Secure Tri-Per mounting bracket with included strapping to the cleaned area.**

   将**TRI-PER**安装托架固定在容器擦拭过的地方

5. **Insert Ion Chamber**

   插入电离室

6. **Plug cable into electronic read-out.**

   用缆线和电子学连接

7. **Check electronic settings.**

   检查电子学设定

8. **Push start count button and note time and date.**

   按下开始按钮，注意时间和日期

   - **A longer count time is necessary for measuring small amounts of Tritium**
   - 较长计数时间用于测量较小量的氚
   - **A shorter count time is necessary for measuring large amounts of Tritium**
   - 较短计数时间用于测量较多量的氚

9. **Record counts and elapsed time.**

   记录计数和经过时间

10. **Calculate leak rate with simple formula included in the Tri-Per manual.**

    用**Tri-Per**手册中简单公式计算泄漏率

SPECIFICATIONS:　　　　　　　　规格

Ranges:	Compact, easy to read digital LCD readout. 1×10^{-3} to 10 uCi/l (37 KBq/m^3 to 3.7×10^8 Bq/m^3)
量程：	易读LCD数字读数
Circuit:	Electrometer circuit amplifies chamber current from 0.7 liter Tritium internal chamber.
电路：	静电计电路将0.7升内室电流放大
Controls:	Power, Battery Check, Set (calibration aid) Zero Adjust, Meter Programming (Two buttons).
控制：	电源，电池检测，设定零点，读数器可编程（两个按钮）
Calibration:	Can calibrate internally with Tritium gas, or on a calibration course, or (at a single point) with optional Beta or Gamma source.
标定：	可以内部氚气标定或使用场地标定程序，或（单点）用β/γ源
Computer Port:	RS-232 / USB serial port is built in (fully addressable).
电脑接口：	内置RS-232 / USB（全寻址）
Portability:	Tri-Per is provided with carrying handle.

CBRN
Real - Time
Air & Water
Specialists

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便携性：	Tri-Per带提手
Electronics Case:	Deep drawn aluminum case, with handle with a gasketed lid, and an easily cleanable anodized finish.
电子学外箱：	深拉铝外箱带把手和密封盖，容易清洁抛光面
Battery:	9V rechargeable and sealed.
电池：	9V可充电电池，密封
Battery Life:	20 hours continuous use between charges.
电池寿命：	一次充电20小时
Battery Charger:	Built-in.
电池充电器：	内置

WEIGHT & DIMENSIONS:　重量&尺寸

Dimensions:	**Instrument Case (Including handle):** 9.25"W x 13.5"L x 10" Tall.
	Front Panel: 9" Long x13" Wide.
尺寸：	仪器外箱（含把手）9.25"宽 x 13.5"长 x 10" 高.
	前板：9" 长 x13" 宽
Weight:	12 lbs.
重量：	12磅
Shipping Weight:	18 lbs
邮寄重量：	

OPTIONS:

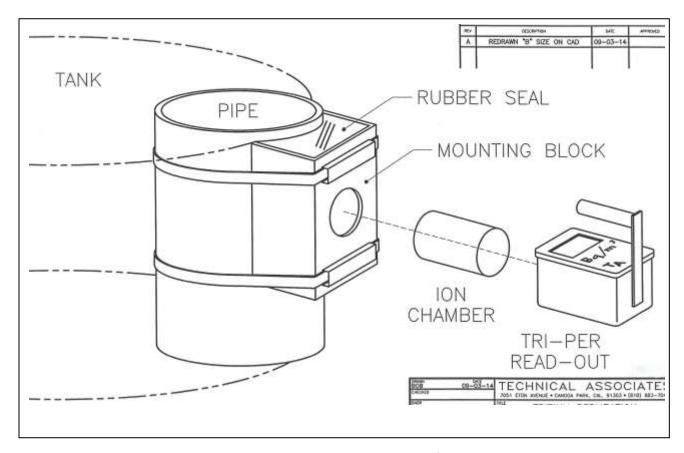|	
	Higher Range　　　　Different Readout Units
选项：	高量程　　　　　　　不同读数单位
Alarms:	High Level Alarm: Red Lamp and Audio Alarm.
报警：	高值报警：红灯和报警音

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TRI-PER Attachment & Detection Process