

三氟化氮 Nitrogen Trifluoride

NF₃气体在 高能化学激光、电子工业(IC)以及太阳能光电产业等方面具有非常广泛的应用。目前,黎明院拥有一条年产2000吨的NF₃生产线,其生产工艺、设备均处于国内领先地位。

Nitrogen Trifluoride is widely used in high energy chemical laser, electronic industry (IC) and solar photovoltaic industry. At present,黎明 Institute has an NF₃ production line with an annual output of 2000 tons, and its production process and equipment are in the leading position in China.

主要用途: 见产品介绍翻译

NF₃的三个主要用途,一是用作高能化学激光气的氟源,二是作为电子工业(IC)中的蚀刻剂、清洗剂,三是应用于太阳能光电产业。

NF₃其它用途:生产全氟铵盐,用作填充气体以增加灯泡的寿命和亮度,在采矿和火箭技术中用作氧化剂等。

物化性质:

NF₃在室温和大气压力下是无色、稳定和有毒的气体。相对分子质量为71.002,沸点为-129.06℃。

NF₃在室温下较稳定,但在800~1200℃下发生猛烈分解;NF₃是一种有潜力的氧化剂,特别是在约200℃时,其反应性与氧相当;NF₃在与其它元素反应时主要用作氟化剂;NF₃在常温下不与水、稀酸和稀碱溶液反应,但在100℃下与碱性溶液接触时会缓慢水解生成亚硝酸盐及氟化物,在电火花作用下,NF₃可与水猛烈反应;NF₃与H₂或氢化物可快速反应并放出大量的热,该反应是NF₃用于高能化学激光器的基础;NF₃可与有机物作用,但通常需升高温度以引发反应,因而常常发生爆炸;在低于70℃时NF₃气体对普通金属不腐蚀,因此可用钢、不锈钢、镍、铜和铝等材料制作相关设备。

安全数据:

NF₃是一种有毒、不可燃的压缩气体;

无气味,但其中所含的杂质使它闻起来有发霉的气味;

暴露极限: OSHA: PEL=10ppm. ACGIH: TWA/TLV=10ppm. NIOSH: 1000ppm. 当进入浓度超过暴露极限的泄方区时需配备自给式呼吸器(SCBA);

氧化剂，会引起或促进金属和非金属物质的燃烧，特别是温度超过200℃时；燃烧产物有毒；

使用 NF₃的任何系统都不应有油、油脂和其它有机物；

存储于钢瓶中，压力小于1500psig，盛装 NF₃的气瓶不允许在高于52℃的环境下使用、贮存和运输。

包装规格：

包装：高压无缝碳钢钢瓶

包装规格：47L 国标或 DOT 瓶、470L Y 瓶等。

Physical and chemical properties: NF₃ is a colorless, stable and toxic gas at room temperature and atmospheric pressure. The relative molecular weight is 71.002, and the boiling point is - 129.06 °C.

NF₃ is stable at room temperature, but decomposes violently at 800~1200 °C; NF₃ is a potential oxidant, especially at about 200 °C, its reactivity is equivalent to that of oxygen; NF₃ is mainly used as a fluorination agent when it reacts with other elements; NF₃ does not react with water, dilute acid and dilute alkali solution at room temperature, but slowly hydrolyzes to form nitrite and fluorine when it contacts with alkaline solution at 100 °C. Chemical, NF₃ can react violently with water under the action of electric spark; NF₃ can react rapidly with H₂ or hydrides and release a lot of heat, which is the basis of NF₃ used in high energy chemical lasers; NF₃ can interact with organics, but it usually needs to raise the temperature to initiate the reaction, so it often explodes; when the temperature is lower than 70 °C, NF₃ gas does not corrode ordinary metals, so steel and stainless steel can be used. Nickel, copper, aluminum and other materials manufacturing related equipment.

Safety data:

NF₃ is a kind of poisonous and nonflammable compressed gas;

No smell, but the impurities in it make it smell moldy;

Exposure limit: OSHA: pel = 10ppm. ACGIH: TWA / TLV = 10ppm. NIOSH: 1000ppm. Se
lf contained breathing apparatus (SCBA) is required when entering the discharge
area with concentration exceeding the exposure limit;

Oxidants can cause or promote the combustion of metal and non-metal substances,
especially when the temperature is over 200 °C; the combustion products are to
xic;

Any system using NF3 shall be free of oil, grease and other organic matters;

The cylinder stored in the cylinder with the pressure less than 1500psig and NF
3 is not allowed to be used, stored and transported in the environment higher t
han 52 °C.

Package specification:

Package: high pressure seamless carbon steel cylinder

Package specification: 47l national standard or dot bottle, 470l y bottle, etc.

三氟化氮质量指标:

GB/T 21287-2007电子工业用气体 三氟化氮

项目 Item (体积分数 volume percent)	企标 Institute Standard Q/LMY106-2009
$\text{NF}_3, \times 10^{-2}$	≥ 99.99
$\text{N}_2, \times 10^{-6}$	≤ 5
$\text{O}_2 + \text{Ar}, \times 10^{-6}$	≤ 3
$\text{CF}_4, \times 10^{-6}$	≤ 40
$\text{CO}, \times 10^{-6}$	≤ 1

$\text{CO}_2, \times 10^{-6}$	≤ 5
$\text{N}_2\text{O}, \times 10^{-6}$	≤ 5
$\text{SF}_6, \times 10^{-6}$	≤ 5
酸度 Acidity(as HF), $\times 10^{-6}$	≤ 1
水 (H_2O) , $\times 10^{-6}$	≤ 1

黎明院生产现状:

目前,黎明院现有一套年产2000吨的三氟化氮生产线,以生产4N以上规格的产品为主,并可提供 GB/T 21287-2007指标中其它规格产品。

2008年,黎明院 NF_3 产品通过了中国台湾某著名企业严格的清洗蚀刻试验,完全能够满足其生产需要,已进行了批量采购,目前反馈的使用报告表明黎明院 NF_3 产品质量良好,并确定黎明化工研究院为 NF_3 气体合格供应商。

2009年黎明院 NF_3 生产工艺、质量控制、分析方法及产品质量通过了日本某著名气体厂商的仔细考察与严格检验,气体检测结果表明,黎明院的 NF_3 产品质量已达到国际先进水平,随即与黎明院签署长期合作协议,开始批量采购。

At present, Liming Institute has a set of nitrogen trifluoride production line with an annual output of 2000 tons, which mainly produces products of more than 4N specifications, and can provide products of other specifications in GB / T 21287-2007.

In 2008, liming Institute's NF_3 products passed the strict cleaning and etching test of a famous enterprise in Taiwan, China, which can fully meet its production needs. The products have been purchased in batches. The current feedback report shows that Liming Institute's NF_3 products are of good quality, and liming Chemical Research Institute is determined as a qualified NF_3 gas supplier.

In 2009, Liming Institute's NF3 production process, quality control, analysis methods and product quality passed the careful inspection and strict inspection of a famous Japanese gas manufacturer. The gas detection results show that Liming Institute's NF3 product quality has reached the international advanced level, and then signed a long-term cooperation agreement with Liming Institute and began to purchase in batches.