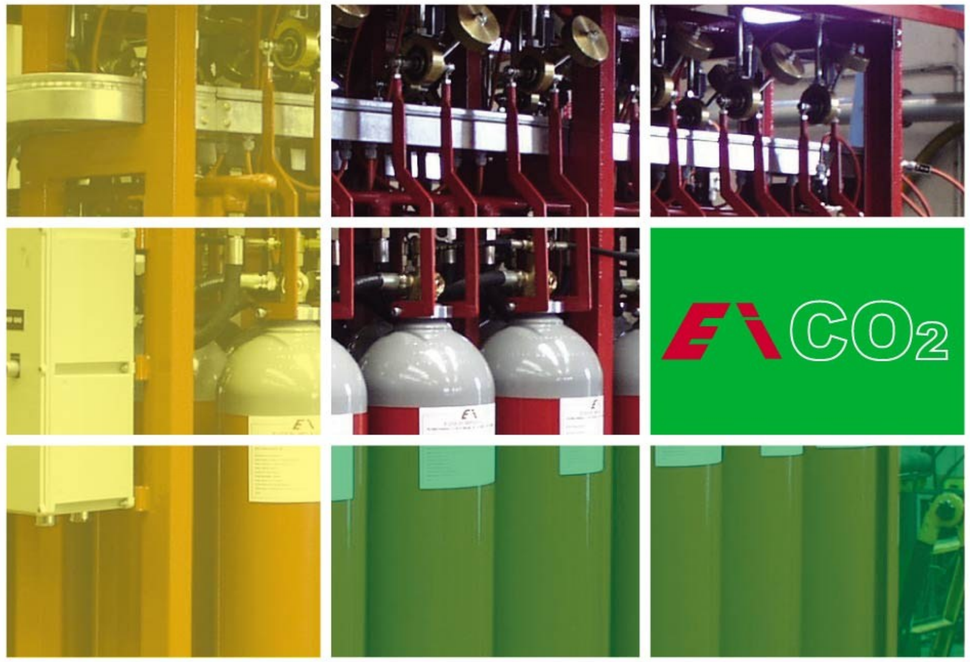

EI 高压二氧化碳灭火系统

EI High Pressure CO2 Fire Fighting System

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EUSEBI IMPIANTI
AUTOMATIC FIRE FIGHTING SYSTEMS

为什么选择二氧化碳？

火灾扑灭后无残留

二氧化碳是一种标准的商用产品，已经在各种商业领域中普遍应用，如二氧化碳软饮料、速冻食物、医疗用途、净化管道与储罐，同样也应用于消防灭火。在全世界大多数的城市与港口，都有二氧化碳应用的踪迹。而二氧化碳用于消防灭火也已经有超过80年的历史了。用于规范灭火系统的NFPA标准最初起草于1928年，并于1929年首次通过批准而开始广泛采用。迄今为止，NFPA标准大约已经更新过26次，这也表明将二氧化碳系统用于消防灭火的知识与经验已经得到了充分的积累，二氧化碳灭火系统是可靠的消防系统。

二氧化碳灭火系统的优势

在可预见的未来，二氧化碳是可以持续使用的灭火药剂，没有禁止使用的风险。
二氧化碳应用已经非常完备，已经成功使用了80年。
是标准的商用产品，用途广泛、在世界上觉大多数地方都能应用。
药剂价格低。如对发动机试验车间这类需要频繁喷放药剂的应用场所，可以大幅节约成本。
与洁净气体系统相比，安装成本更低。
药剂性质稳定，灭火时药剂不会发生分解，也不会对材料或者设备带来腐蚀或者损坏。
药剂喷放时，完全气化。灭火后无需清除药剂残留物。
灭火后较短时间内，防护区中的设备设施就可恢复运行。
适用于A类、B类及C类火灾。
可以适用于组合分配式系统（可从使用一套二氧化碳灭火系统保护多个防护区）。
二氧化碳的喷放的动力来源于药剂自身体积膨胀产生的力量，不需要使用增压气体、泵或者其他动力设施。
可以与其他类型的灭火药剂同时使用，不会影响灭火效率。

Residue-free suppression

Carbon dioxide is a standard commercial product that is commonly used for carbonated beverages, for fast freezing food, for medical purposes, for purging pipes and tanks as well as for extinguishing fires. It is readily available in most cities and seaports throughout the world. For more than 80 years carbon dioxide has been used for fire protection purposes. The NFPA standard for fire extinguishing systems was initiated in 1928was first adopted in 1929. It has been revised approximately 26 times since, and represents the accumulated knowledge and experience of those who have designed and used CO2 systems for fire extinguishing purposes.

Advantages of CO2 fire extinguishing systems

- Available agent for the foreseeable future. No ban on its use.
- Is well established. Has been successfully used for 80 years.
- Is a standard commercial product with many other uses and as a result is readily available in most towns and cities around the world.
- Low agent cost. Beneficial when frequent recharging is a factor, such as with engine test cell protection.
- Installed system cost is lower when compared to clean agents.
- Is stable and inert. Does not decompose when subjected to fire. Does not cause corrosion or damage materials and equipment.
- Vaporizes completely on discharge. No clean-up of agent required.
- Protected facilities can be back in operation with a minimum of delay.
- Suitable for Class A, B and C fires.
- Readily accommodates systems with selector valves (integrated systems that protect more than one hazard from a common carbon dioxide supply).
- Carbon dioxide discharges by the force of its own expansion. Does not require super pressurizing agents, pumps, or other pressurizing mechanisms.
- May be used simultaneously with other types of extinguishing agents with no effect on extinguishing efficiency.

二氧化碳与洁净气体对比

CO2vs Clean Agents

表格一

	二氧化碳 Carbon Dioxide	洁净气体 Clean Agent （注：此处洁净气体指的是卤代烃，如七氟丙烷）
药剂成本 Agent Cost	每磅（千克）价格低，可频繁进行喷放 Low cost per pound (kg) Beneficial for frequent recharging	每磅（千克）价格高，需要的药剂数量更少 High cost per pound (kg) Less agent is required
试验测试 Testing	因为药剂成本低，试验成本也低 Inexpensive due to low agent cost	因为药剂成本高、以及环境影响，试验成本高 Expensive due to high agent cost and environmental impact
市场普及 Availability	标准的商业化产品，全世界广泛使用 Standard commercial product Readily available throughout the world	仅在一些工业化国家的主要城市内使用，反复充装的配套设施有限 Only available in major urban areas of industrialized world. Limited recharge facilities available
淘汰风险 Proposed Usage Ban	没有禁令、也没有淘汰计划 No ban or planned phase-out	一些卤代烃在部分国家禁止使用，在部分国家，一些卤代烃有阶段性淘汰计划 Some halocarbon are banned in some countries Planned phase-out of some halocarbon in some countries
药剂分解 Agent Breakdown	二氧化碳不会分解，不会污染液体或者食物 CO2 is inert and does not decompose Will not contaminate liquids or food.	卤代烃在高热条件下会分解，分解后的产物有毒、有腐蚀性 Halocarbons break down when subjected to high heat Breakdown products can be toxic and corrosive.
生命安全 Personnel Safety	对人类和动物有致死威胁，药剂喷放前，人员必须撤离 Lethal for humans and animals Evacuation prior to discharge is required	有较低的毒性，低浓度下对人体不会造成较大危害，药剂喷放前，人员最好撤离 Low level of toxicity, low level concentrations can be tolerated Evacuation prior to discharge is recommended
安装成本 Installation Cost	相对更低，药剂喷放时间较长、管路直径较小 Relatively lower cost Longer discharge times and small diameter piping	相对更高，药剂喷放时间较短、管路直径较大 Relatively high cost Shorter discharge times and large diameter piping
钢瓶存放 Cylinder Storage	根据钢瓶数需要大量空间存放 Substantial space required and floor loading due to the number of cylinders required	节省空间，保护相同防护区使用的钢瓶数相对更少 Savings in space because comparatively fewer cylinders are required
产品供应 Supply	广泛使用的商品，价格由市场决定 Widely available commodity Price determined by the market	药剂供应有限、需要专门执照生产，价格由供应商决定 Limited sources for agent, proprietary licensing Price determined by the manufacturers

表格二

防护区类型 Hazard Area	防护区的主要风险 Risk Area Problems	推荐使用的灭火药剂 Recommended Agent	灭火药剂选择的理由 Reasons for SelectionAgent
计算机房、综合控制室、实验室等 Computer Rooms Control Rooms Laboratories etc.	人员安全 Personal Safety	洁净气体（Novec1230） Clean Agents (NOVECTM 1230)	防护区内有人员活动 Occupied areas
手套箱 Glove Boxes	压力增大 Pressure Buildup		安装有对压力敏感的设备、必须维持负压 Where pressure sensitive equipment is installed or where a negative pressure must be maintained
轮船、气垫船、机械设备空间 Ships &Hovercraft Machinery Spaces	重量与占用空间 Weight and Space		要求体积小、占据的空间小 Low bulk and weight
电信通讯设备 Telecommunications Equipment	冷却作用 Sub Cooling		有对温度敏感的设备，不能使用二氧化碳，药剂喷放时带来的温度急剧下降对设备危害大 Where rapid cooling resulting from the use of CO2 is not acceptable due to temperature-sensitive equipment
发动机试验车间 Engine Test Cells	灭火药剂喷放的频率 Rate of Recharge	二氧化碳（CO2） Carbon Dioxide (CO2)	灭火药剂成本低廉、足以支撑反复喷放 Cost of agent where frequent recharge is probable
印刷机 Printing Machines	机器开口大、局部保护 Large Openings, Local Application		开放或者是半封闭的空间中，二氧化碳是已被证明唯一适用于局部防护的灭火药剂 Open or partially-enclosed spaces-CO2 is the only gas proven suitable for local application.
标准用具及工具间 Standards & Instrument Rooms	腐蚀 Corrosion		灭火药剂不会分解，其喷放也不会带来腐蚀 Agent does not decompose and discharge does not cause corrosive action
档案室及地下室 Archives & Fur Vaults	深层火灾 Deep Seated Fire		二氧化碳是已被证明唯一适用于A类深层火灾的灭火药剂 CO2 is the only gas proven suitable for deep-seated Class A fires.

使用二氧化碳灭火系统的理想情况

二氧化碳灭火系统工作原理及优势

一套二氧化碳灭火系统包括一组或者多组二氧化碳药剂钢瓶，钢瓶与喷放管道相连，喷放管道末端安装有二氧化碳灭火系统专用喷嘴。灭火系统都是根据客户具体的应用需求而专门设计的。消防保护所需要的二氧化碳药剂的数量取决于防护区的体积大小以及消防危险的表面积大小，同时还需要考虑所保护的对象的材料材质特点、防护区内的温度、以及是否有需要考虑的特殊情况。可以使用同一套二氧化碳灭火系统保护多个防护区，这类系统被称作组合分配系统。选择阀的使用可以引导二氧化碳药剂进入火灾区域。我们推荐在组合分配系统中，再配备一套备用系统，以实现更佳的消防保护。

- **启动装置**
  Eusebi Impianti供应的二氧化碳灭火系统可以通过自动及手动两种方式启动。系统的自动启动方式与火灾探测系统以及火灾控制系统相连。火灾探测器分布在消防防护区内，当火灾发生时，火灾探测器将火灾信号发送至火灾控制盘，火灾控制盘下达指令释放二氧化碳。系统的自动启动方式是由电气控制的，同时也始终可以采用手动方式启动。

- **CE认证**
  采用的容器阀、选择阀、电磁阀、信号反馈装置，具有CE认证，优质可靠。

应用方式：

二氧化碳灭火系统有两种应用方式：
全淹没式系统
局部应用系统

- **全淹没式系统**
  是将足量的二氧化碳药剂释放到密闭的空间中，使防护区内完全惰化。防护区应当实现良好封闭，但二氧化碳喷放时，所有的门、通风口和其他开口都应当关闭。如果在设计阶段，就能够知道哪些开口在系统启动时是无法关闭的，也可以设计出可用的同，实现对防护区的保护。对于深层火灾（如带有隔绝材料、大量的布料类材料、或者储藏空间等），防护区必须实现良好密封，并且需要更长时间维持二氧化碳浓度。在这类火灾中，喷头的分部和朝向并不是特别大的问题，安装时出现小的偏差是完全允许的。

- **局部应用系统**
  是适用于某个空间内保护专门火灾对象（如发动机、浸槽等），但无需对全部空间进行淹没式喷放。喷头的布置，使二氧化碳直接释放到防护对象上，立即在防护对象周围创造出惰化环境。在此类应用中，对管路和喷头的要求非常严格，如果没有得到设计师的允许，安装时不能作出任何的微小更改。

CO2 fire fighting system working dynamics and advantages

Principles of Operation

A carbon dioxide system consists of a battery of one or more cylinders, manifolded together and connected to a system of distribution pipe work terminating in special carbon dioxide discharge nozzles. These systems are custom designed for the specific application. The quantity of carbon dioxide required for the protection of any particular hazard is dependent on the cubic capacity or the surface area of the hazard, together with the type of material involved, temperature of the hazard, and with allowance for special conditions. More than one hazard can be protected by the same bank of cylinders, and these systems are referred to as joint systems. Selector or directional valves are utilized todirect the carbon dioxide to the fire area. An interconnected reserve bank of cylinders is generally recommended for this type of protection.

- **Activation device**

EUSEBI carbon dioxide systems may be actuated manually or automatically. Automatic systemsincorporate fire detectors and controls. The fire detectors are located in the hazard area, and when a fire occurs, send a signal to the control panel which releases the carbon dioxide. Automatic systems are electrically operated andalways incorporate a manual override feature.

- **CE certificate**

Cylinder valve, direction valve, solenoid valve, pressure switch are CE certified, good quality and reliable

There are two methods of applying carbon dioxide to hazards:

- **Total Flooding**
- **Local Application**

- **Total flooding**

injects a sufficient volume of carbon dioxide into an enclosure so that an inert atmosphere is created. The enclosure should be reasonably well sealed and doors, vents and other openings should be arranged to close on the discharge of the system. Enclosures with openings that cannot be closed can be protected if known at the design stage. For deep-seated type hazards (insulation rags, storage vaults, etc.) the enclosure must be well sealed to retain the carbon dioxide for a long period of time. The location and orientation of discharge nozzles for these applications is not of major concern, minor deviations to project design can generally be accommodated.

- **Local application**

is the method used to protect a specific hazard (engine, dip tank, etc.) within an enclosure - without flooding the entire enclosure. Nozzles are arranged to discharge carbon dioxide directly onto the hazard, to build up an inert atmosphere immediately surrounding the hazard. For this application, the layout of piping and nozzles is critical, and deviations to project design must not be made unless approved by the designer.

二氧化碳技术参数

CO2Technical data

高压 CO2系统参数 High Pressure CO2 Fire Fighting System			
容器容积 Cylinder volume	70L	工作温度 Working temperature	0℃ ~ 50℃
储存压力(20℃) storage pressure	5.7MPa	最大充装密度 Maximum agent filling density	0.6kg/L
最大工作压力(50℃) max working pressure	12.4MPa		
电源电压 Power supply	DC24V	喷放时间 Discharge time	< 60S

高压二氧化碳灭火系统适用性

High Pressure CO2 Fire Fighting System Applications

二氧化碳如何灭火

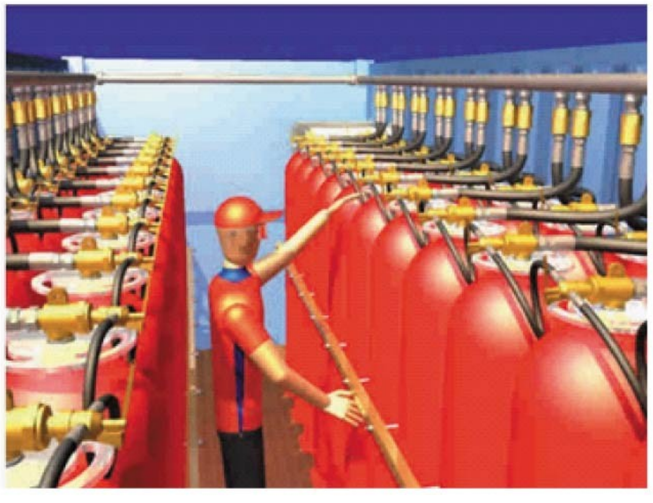
二氧化碳灭火的原理为稀释空气中氧气浓度到一定临界值，使其无法支持燃烧继续进行。通常，将空气中氧气的浓度从平常的21%下降到15%左右，就可以扑灭大部分火灾。对于一些特别的材料，需要将氧气的浓度降低到15%以下，甚至有的情况下，必须将氧气占空气的体积比降至6%左右，才能扑灭火灾。表面型火灾和爆燃型火灾（油、油漆等）能够快速扑灭，但是慢燃型或者深层火灾（成捆的棉花、衣物等）需要高浓度的二氧化碳长时间持续才能灭火。

除了二氧化碳的窒息作用外，二氧化碳快速膨胀同时带来温度的急剧下降，冷却作用也能对火灾进行很好的压制。

How can Dioxide Extinguishes Fire

Carbon Dioxide extinguishes fire by diluting the oxygen content of the space to a point where it will not support combustion. Reducing the oxygen content from the normal 21 per cent in air to 15 per cent will extinguish most fires. For some materials the oxygen content must be reduced below 15 per cent, and in some cases its concentration needs to go down to as low as six percent of the volume. Surface and flash type fires (oils, paints, etc.,).are quickly extinguished, while smoldering or deep-seated fires (baled cotton, clothing, etc.) are extinguished by the prolonged action of a high concentration.

In addition to its smothering action, the reduction in temperature due to its rapid expansion will provide some suppression caused by the cooling effect.



二氧化碳作为灭火药剂的特点

二氧化碳（CO2）是一种无色无味的气体、洁净干燥、不导电、无腐蚀性、无破坏性、不会恶化的惰性气体，比空气重约50%。

二氧化碳是标准的商业产品，并且广泛应用于充气饮料、冷冻速食、医疗应用、清洁管道和储罐，同时也应用于灭火。在全世界绝大多数的城市和海港都有二氧化碳的稳定供应。

当吸入二氧化碳时，人类鼻孔处将会产生刺痛感，就如同在喝二氧化碳充气饮料时的感觉一样。二氧化碳会加速人体呼吸（增加呼吸的频率），在溺水或者电击的受害者昏迷时，采用小剂量受控的二氧化碳进行知觉恢复是比较有效的。

二氧化碳药剂在高压钢瓶中是以液体方式储存的，通常储存的压力是70°F时850psig（21°C时58bar）。如果是低压二氧化碳系统，储存的压力为-18°C时20bar。二氧化碳最重要的一个特点就是其体积膨胀的比率很大，大约是450比1。二氧化碳可以凭借其自身膨胀的力量从钢瓶中向外喷放，无需使用任何泵组或者其他增压手段。二氧化碳会深入到每一个火灾可能潜伏的隐蔽处或者角落处。

在二氧化碳喷放时，会形成冷雾。从喷头处篷房的二氧化碳温度大约为零下110°F。由于二氧化碳的低温效应，空气中的水汽会形成云雾状，有类似“雪”的物质伴随着二氧化碳喷放。在几分钟之后，云雾会消散的。

Properties of CO2 as a Fire Extinguishing Agent

Carbon Dioxide (CO2) is a colorless, clean, dry, electrically non-conducting, non-corrosive, non-damaging and non-deteriorating inert gas, that is approximately 50 percent heavier than air.

Carbon dioxide is a standard commercial product. It is commonly used for carbonating beverages, for fast freezing food, for medical purposes, and for purging pipes and tanks, as well as for extinguishing fires. Carbon dioxide is available in most cities and seaports throughout the world.

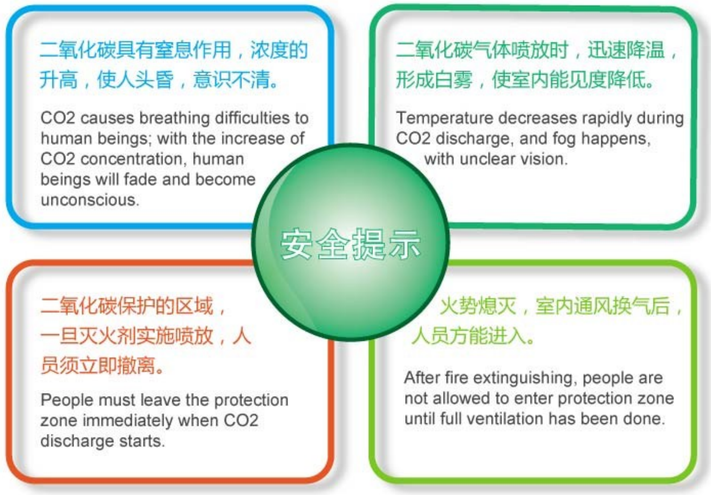
When inhaled.CO2 produces a tingle in the nostrils, the same as is experienced when drinking carbonated beverages. Carbon Dioxide stimulates breathing (increases the rate of breathing), and is useful in small controlled doses in the resuscitation of drowning and electric shock victims.

Can Dioxide is stored in liquid form in high pressure steel containers, usually at 850 psig at 70 (58 bar at 21℃). It may also be stored at 20 bar at -18 °, for special large requirements. One of carbon dioxide's most valuable properties is its amazing high ratio of expansion, approximately 450 to 1.Carbon dioxide is discharged from the cylinder by the force of its own expansion - without the need for pumps or other pressurizing mechanisms. Carbon dioxide will penetrate every nook and comer of a space where re might lurk.

On discharge, carbon dioxide creates a cold fog. The temperature of can dioxide discharging from a nozzle is approximately 110 ℉ below zero. This cloud effect or fogging, is due to the moisture in the air being frozen by the extremely low temperature of the Carbon Dioxide and fine "snow" accompanying the discharge. The fogging will generally dissipate after a few minutes.

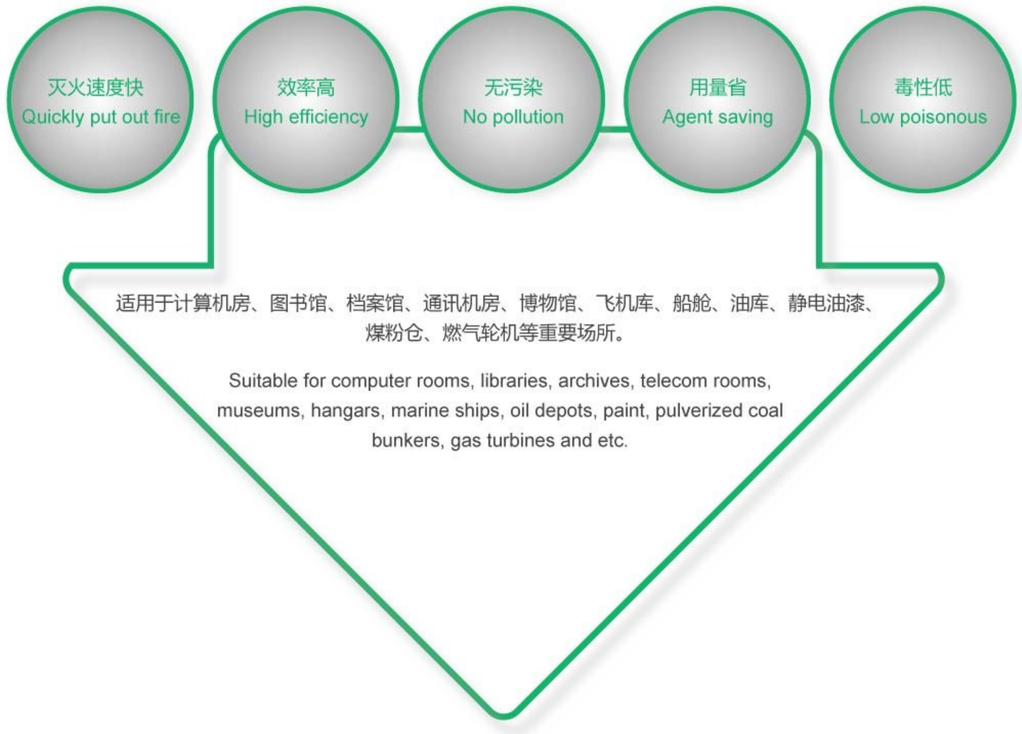
安全提示

Safety notice



特点及适用场所

Characteristics and applications



高压二氧化碳灭火系统的灵活性

★ **药剂用量可调**
高压二氧化碳系统所用钢瓶数量灵活、方便用量调节。低压二氧化碳灭火系统储罐通常尺寸增长都是以吨为单位的。高压二氧化碳灭火系统具备更强的灵活性，在存放二氧化碳储存装置时能够更有效率，可以节约储存所需的空间和成本。

★ **无需制冷设备**
不需要对二氧化碳进行制冷保温。全淹没系统使用的钢瓶可以储存在-18℃到54℃的环境温度中，不需要特别的措施。局部应用系统的钢瓶需要储存在0℃到49℃的环境温度中。

★ **灌装方式多样**
灌装钢瓶时，可以根据环境温度的需要非常便捷地调整充装方式，在高温条件下减少充装量，在低温条件下加充氮气。

★ **钢瓶储放灵活**
空间要求更灵活。如果没有一整块较大的空间用于储存钢瓶，可以将钢瓶分散储存在若干个较小的钢瓶间中。

★ **没有承重要求**
承重要求更灵活。如果楼板承重成为钢瓶存放的障碍，可以将钢瓶分散储存在若干个较小的钢瓶间中，用于分散楼层的承重压力。

★ **无需连接电源**
高压二氧化碳灭火系统药剂储存对电源没有要求。

flexibility of high pressure CO2 fire fighting system

★ **easy to adjust the agent quantities to be used**
High pressure cylinders are available in different capacities. Low pressure containers are typically available in one ton increments. This greater flexibility among high pressure systems allows the stem designer to allocate storage with greater efficiency, thus saving storage space and money.

★ **no need to use refrigeration units for temperature control**
Refrigeration of carbon dioxide is not required. Cylinders can be stored without any special treatment at temperatures Between -18℃ and 54℃ for total flooding systems, and 0℃ to 49℃ for local application.

★ **different gas filling methods in different temperatures**
Cylinders can be easily adjusted for higher or lower temperatures by under filling for higher temperatures or adding nitrogen for lower temperatures.

★ **flexible space requirements**
Flexible space requirements - if a single large space is not available multiple cylinder banks can be divided and stored in a number of smaller locations.

★ **Flexible for weight requirements**
Flexible for weight requirements - if floor loading is a problem multiple cylinder banks can be divided and stored in a number of locations to distribute the floor loading.

★ **electrical power not required**
Electric power is not required for high pressure carbon dioxide storage.

化学实验室–发动机机罩–油断路器–可燃液体储罐

Chemical Laboratories - Engine Enclosures - Oil Circuit Breakers - Flammable Liquid Storage

应用场合	二氧化碳的优势								
	深层火灾	局部应用	极限温度	停机时间/污染	全淹没式	矿井	有开口、不能完全封闭	清洁/惰化	药剂续放
引擎测试车间	●								●
水力发电机	●								
记录储藏室	●								
集尘器	●								
皮草储存库	●		●						
食品加工机	●								
梳棉机、轧棉机	●								
垃圾滑槽	●								
报纸印刷机		●							
转轮凹版印刷机		●							
燃气涡轮机		●							
金属轧机		●							
浸槽、排水板		●							
开放式喷漆室		●							
大型商用炸锅		●							
柴油发电机		●							
煤炭输送、磨碎、储存	●	●						●	
喷漆及层压		●	●				●		
混合罐		●			●				
油淬		●	●			●			
金属加工		●				●	●		
制革喷漆与烘干			●				●		
危险金属储存	●								
氢冷发电机								●	
高架地板下的空间	●						●		
特制厨房				●					
工业烤箱、烘干			●		●		●		
喷漆装置							●		

Applications	CO_2 Advantages								
	Deep Seated Fire	Local Application	Temperature Extremes	Down Time/ Contamination	Total Flooding	Pits	Unclosable Openings	Purging/ Inerting	Extended Discharge
EngineTest Cells	●								●
Hydroelectric Generators	●								
Records Storage	●								
Dust Collectors	●								
Fur Storage Vaults	●		●						
Food Milling	●								
Carding Machines & Cotton Gins	●								
Linen & Garbage Chutes	●								
Newspaper Presses		●							
Rotogravure Printing Presses		●							
Gas Turbines		●							
Metal Rolling Mills		●							
Dip Tanks & Drain Boards		●							
Open Spray Booths		●							
Large Commercial Fryers		●							
Diesel Generator Sets		●							
Coal Handling, Grinding,Storage	●	●						●	
Flo Coat Painting & Laminating		●	●				●		
Mixing Tanks		●			●				
Oil Quenching		●	●			●			
Metal Processing		●				●	●		
Tanning Sprays & Dryers			●				●		
Hazardous Material Storage	●								
Hydrogen Cooled Generators								●	
Under Raised Floors	●						●		
Institutional Kitchens				●					
Industrial Ovens & Dryers			●		●		●		
Painting Facilities							●		

EI使用200升钢瓶的二氧化碳灭火系统专业性

按照ISO11228规定的要求，在搬运超过25kg以上的重物时，必须使用机械设备。因此，在搬运从67升钢瓶到200升钢瓶时，没有任何区别，都必须使用机械设备。

但是，工人总是会人工搬运表面上看起来不重的钢瓶，因为各种各样的原因，可能是对重量的错误估计、懒惰、缺乏信息和培训，而这将会对他们的健康和安全带来严重的后果。

因此，如果使用大容量的钢瓶，就可以清楚地传导给搬运者，人工搬运是不可能的，必须使用设备来减少人工搬运的风险。

以上的观点得到了Eusebi Impianti在钢瓶存储和安装中丰富经验的有力支持。

技术标准通常都要求供货商将所有的钢瓶需要组装到集成模块的组架上、柜体中或者集装箱中，这样就只有在重新为钢瓶充装药剂时才会有搬运钢瓶的问题了。

因此，在集装箱中，通常都安装有横梁，而钢瓶就与横梁相固定。通过使用特殊的卡车将设备托起放置于集装箱中，同样在系统维护时，也需要使用这样特殊的车辆。在系统维护时，由于专用设备的使用，钢瓶的尺寸和重量就不会成为工作的障碍，同时大尺寸钢瓶的使用也节约了大量的空间和成本。

Eusebi Impianti在供应货物时，同时也可以供应该托举设备。

完成一只钢瓶的生产需要压力容器、容器阀、虹吸管和药剂灌装。

钢瓶的容积有多种多样的选择。二氧化碳药剂在环境温度下都以液态保存在钢瓶中，满足21℃时8.6bar额定压力的要求。

所有的钢瓶都是无缝瓶，是按照要求进行加工生产和试验的。大容积的容器都是钢制的。
除了特殊温度条件下，所有的钢瓶都充装一定重量的液态二氧化碳。并不是只充装部分钢瓶。

钢瓶内的压力会由于温度的变化而不断改变。通常局部应用系统中使用的钢瓶其环境温度应当保持在0℃到49℃之间，全淹没系统使用的钢瓶保持在-18℃到54℃之间。

200L CO2 fire fighting system

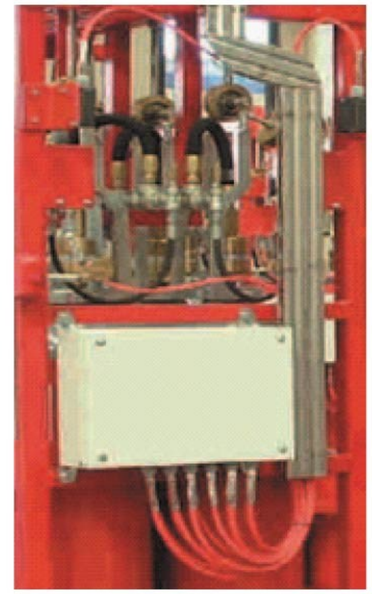
In accordance with the technical standards 150 11228, the use of mechanical equipment for handling activities becomes mandatory when material's weight overcomes25 kg. Consequently, there is no difference in the way of handling cylinders ranging between 67 and 200 liters.

The employee often, tries the manual handling of apparently slight cylinders, because of wrong estimate of their weight, laziness, lack of information and training, with serious consequences for health and safety.

In contrast, the use of cylinders with larger volume clearly communicate the impossibility of a manual handling by requiring the timely use of equipment such as trucks, thus reducing the risk from manual handling loads.

This reflection is supported by Eusebi Impianti's pluriennal experience in storage and installation.

Technical standard requires very often cylinders to be assembled in skid, cabinet or container by the supplier, so the handling problem only occurs when customers have to refill the cylinders.



For this reason the container is arranged with a beam on which cylinders are fixed. These are raised mechanically by a special truck leaning on the cart used to carry it to the company which will do the maintenance. 50 on the aspect of maintenance, the cylinder's size is notso important such as saving space and cost.

Eusebi Impianti can quote the handling equipment as part of the supply.

A basic cylinder assembly consists of a pressure vessel, a valve and siphon tube assembly and a charge of carbon dioxide.

A variety of cylinder sizes are available. They are all designed to hold pressurized carbon dioxide in liquid form at atmospheric temperatures, corresponding to a nominal pressure of 8.6 bar at 21℃.

All cylinders are seamless. They are manufactured and tested in accordance with the requirements. Large cylinders having capacities are made of steel.

Except for special temperature conditions, all cylinders are filled to their specified weight with liquid carbon dioxide. Cylinders are not partially filled.

The pressure inside the cylinder will vary as the temperature changes. In general, the ambient storage temperature for standard cylinders used in local application systems should be between 0 ℃ and 49 ℃. For standard cylinders used in total flooding systems, the ambient storage temperature should be between -18 ℃ and 54 ℃.

检验报告
Certificate


检 验 报 告

No.Gn201200708

受检单位 天津意安消防设备有限公司

产品名称 高压二氧化碳灭火系统

检验类别 型式检验

国家固定灭火系统和耐火构件质量监督检验中心


样品描述

样品图片：

Reference List in 2008 to 2012

2008-2012 部分工程业绩表

TOO POINT A	低压CO2系统	哈萨克斯坦	2008
ROSETTI MARINO SPA	CO2系统	克罗地亚	2008
DANIELI & C. OFFICINE	供应CO2和氩气灭火系统	乌克兰	2008
Elplus company	CO2系统	格鲁吉亚	2009
EUSEBI IMPIANTI	CO2称重装置	意大利	2010
东方电气集团 东风电机有限公司 阿塞拜疆芭芭拉，明哥桥；越南 达克明水电站项目	CO2系统	阿塞拜疆 越南	2011
沈阳华晨宝马喷涂车间	CO2灭火系统	沈阳-中国	2011
上海特孚贸易有限公司 山东东营汽车测试中心	CO2灭火系统	东营-中国	2011
上海优华劳斯喷涂车间	CO2灭火系统	上海-中国	2011
北京汽车株洲分公司发动机厂	CO2灭火系统	天津-中国	2011
EUSEBI IMPIANTI 美国通用电气 GE 中国邯郸钢铁项目	CO2灭火系统	邯郸-中国	2012
马拉维卡普拉奇电站	CO2灭火系统	马拉维	2012
越南广福水电站项目	CO2灭火系统	越南	2012

米兰–意大利
Turbigo发电厂

Eusebi Impianti为Turbigo发电厂从850MW改造成联合循环电站项目中，提供了各种消防系统进行消防保护。发电厂位于米兰大区的Turbigo和Robecchetto市，占地56公顷。

变压器和油盒采用高压细水雾系统进行保护，二氧化碳灭火系统保护变压器站，燃气涡轮机采用高压细水雾预作用系统进行保护，在综合控制室和控制设备间采用IG惰性气体灭火系统进行保护。所有的消防灭火系统都由Eusebi Impianti制造的火灾探测报警系统控制。

Milan - Italy
TURBIGO POWER STATION

Eusebi Impianti has safeguarded the initial environmental requalification phase of the Turbigo power plant, while it was changed from 850 MW into a combined cycle. The power plant covers an area of 56 hectares and is situated in the territories of the Municipalities of Turbigo and Robecchetto, in the province of Milan.

Water mist systems have been installed to protect the transformers and oil boxes, CO2 systems to protect the MT stations, pre-action systems to protect the turbine bearings, inert gas systems in the control rooms and panel rooms. All the systems are managed by Eusebi Impianti's fire detection systems.