

# New Technologies in Fire Prevention and Risk Management

## 火灾预防与风险管理新技术

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**FM Global**

**2016/11/11**

- Insure commercial property globally 提供全球商业财产保险
- Operate under mutual ownership 采用互助保险经营模式
- Believe most losses are preventable 相信大多数灾害可以预防
- Manage risks via engineering approach 依靠工程技术管理风险
- Study new challenges and technologies 不断研究新挑战和新技术



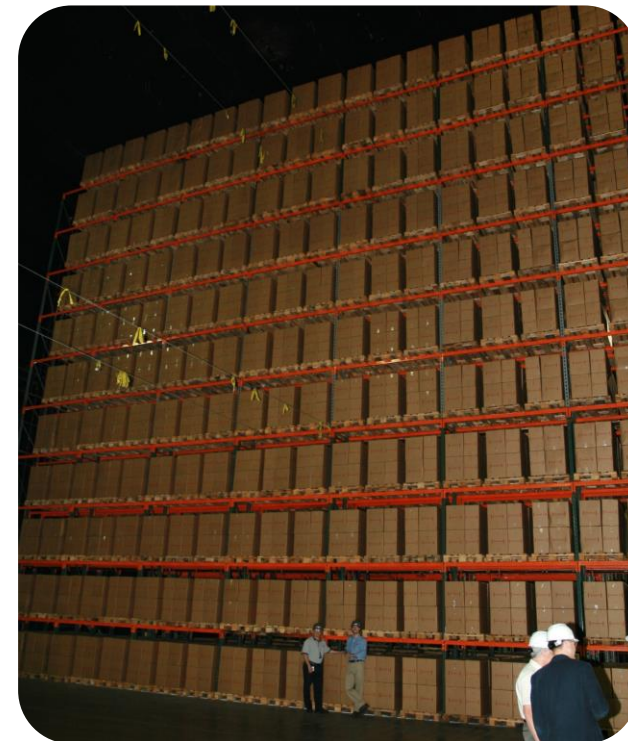
# In-Rack Sprinkler 货架内喷淋 – Background 介绍



Increasing Storage Height  
日益增加的存储高度



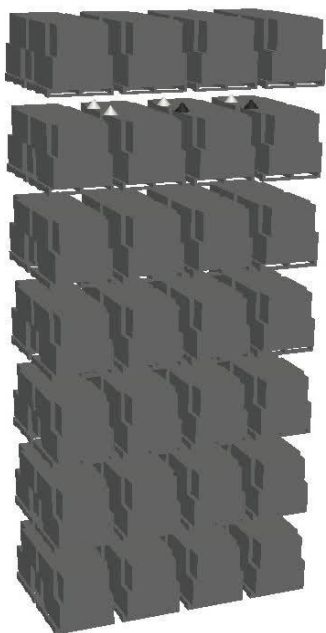
Ceiling-Only Sprinkler  
Inadequate  
仅用顶棚喷淋的不足



Lab Space at Limit  
试验空间有限

# In-Rack Sprinkler 货架内喷淋 – Research 研究

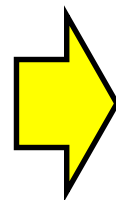
Modeling  
数值模拟



Time: 0.00



Reduced-Scale Testing  
小尺度试验



Large-Scale Validation

大尺度验证



# In-Rack Sprinkler 货架内喷淋 – Solutions 解决方案



- Unlimited height 高度不受限制
- Large vertical separation up to 40 ft  
垂直安装分离达12米
- Optimized water flow rates  
优化供水量
- Lower fire protection costs  
降低消防成本



**FM Global**  
**Property Loss Prevention Data Sheets**

**8-9**

June 2015  
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**STORAGE OF CLASS 1, 2, 3, 4 AND PLASTIC COMMODITIES**

# SMART Sprinkler智能喷淋 – Background介绍



Increasing Storage Height  
不断增加的存储高度



Ceiling-Only Protection  
仅用顶棚保护

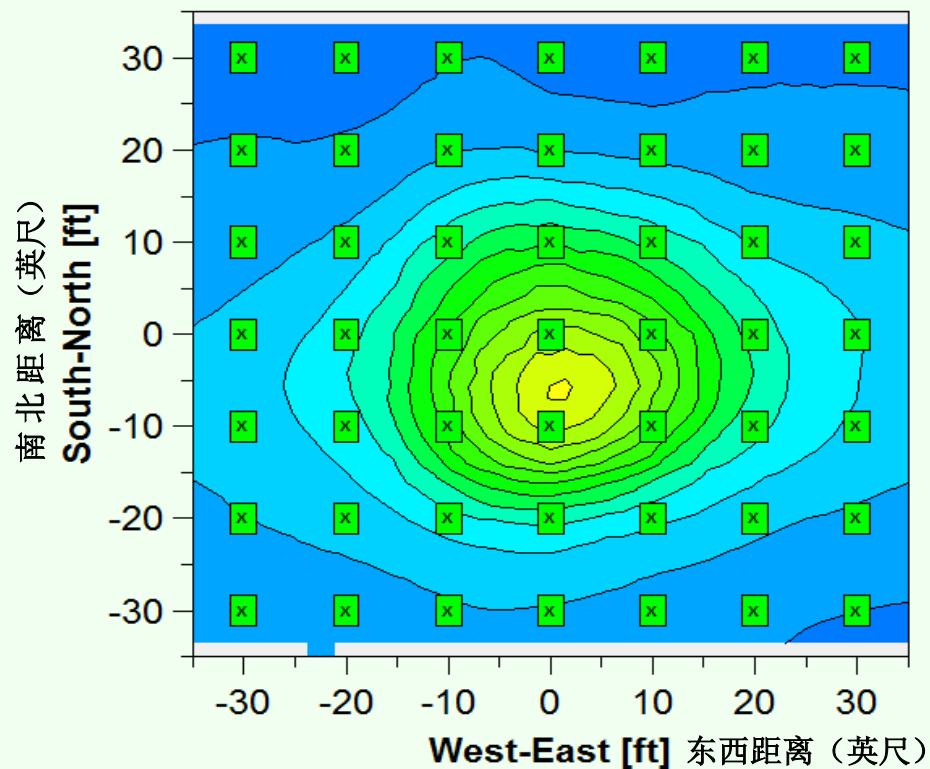
# SMART Sprinkler智能喷淋 – Research研究



Multi-Sensor & Wireless Communication  
多重传感和无线通讯



Fast Detection & Dynamic Activation  
快速探测和动态启动



# SMART Sprinkler智能喷淋 – Benefits优越性

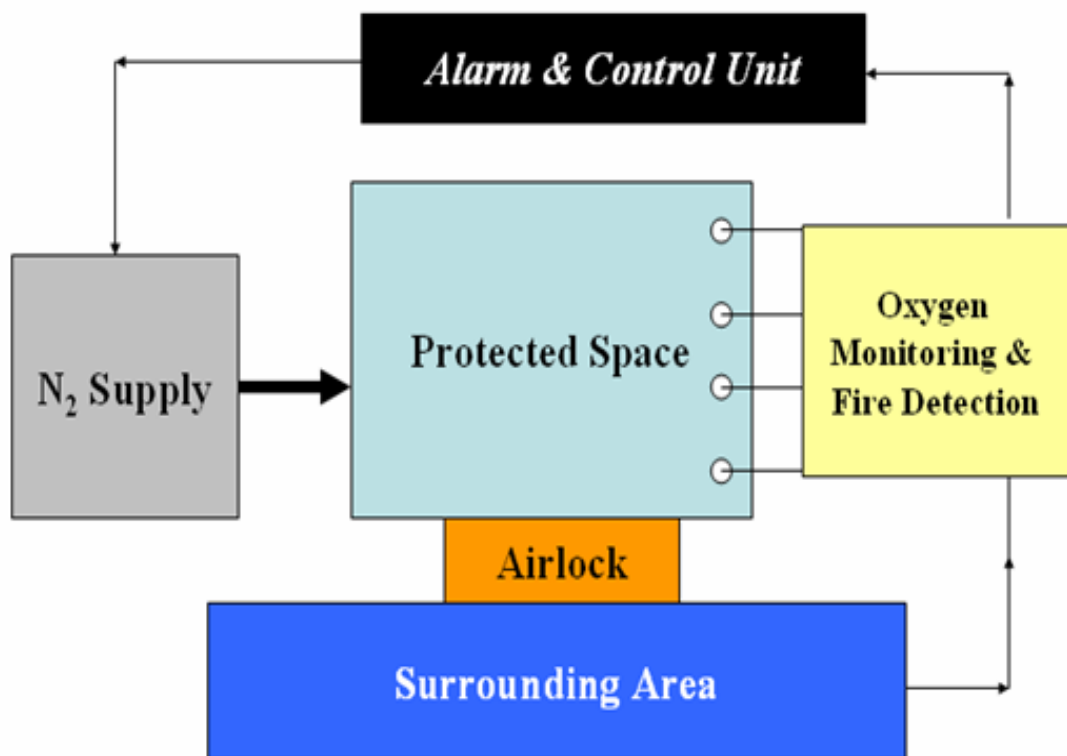


- **Highly challenging fires**  
高挑战性火灾
- **Faster response time**  
加快响应速度
- **Lower water demand**  
降低水量需求
- **Less property damage**  
减少财产损失





# Oxygen Reduction System 低氧系统 – Background 介绍

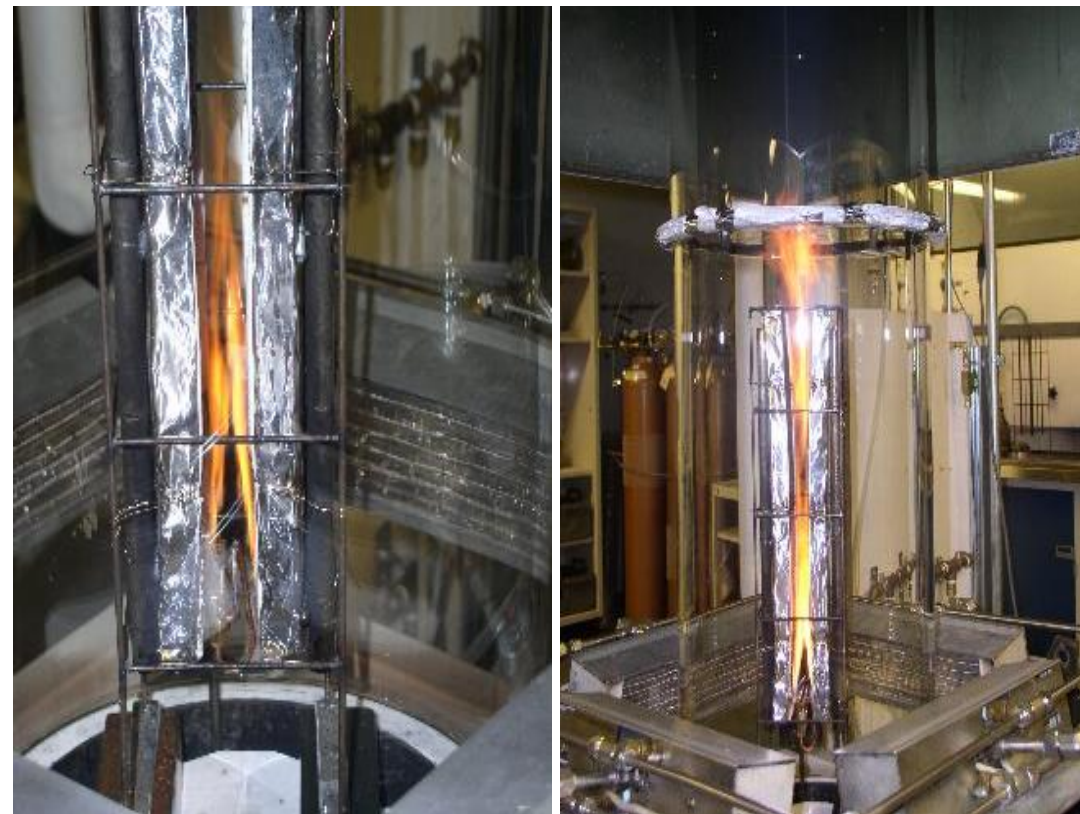
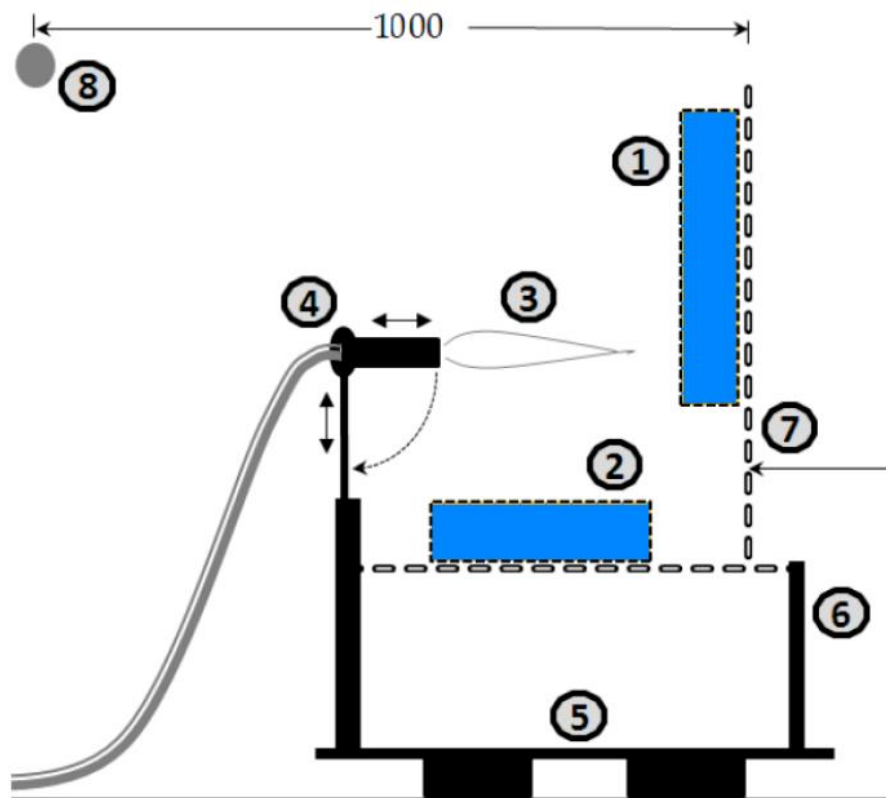


**Protection of well-sealed space**  
保护密闭空间



**Apply to high-value or water sensitive occupancies**  
适于价值高或对水敏感的场所

# Oxygen Reduction System 低氧系统 – Research 研究



**Current testing method inadequate**  
目前测试方法不适用

**PMMA fire propagation in 15% O<sub>2</sub> (> LOC)**  
有机玻璃火在15%氧气下传播

- **Don't use as primary protection means**  
不能用作主要消防措施
- **Current testing method inadequate**  
目前测试方法不适用
- **Oxygen too high in current installed systems**  
在运行系统氧浓度过高
- **System availability to be determined**  
系统可靠性有待确定

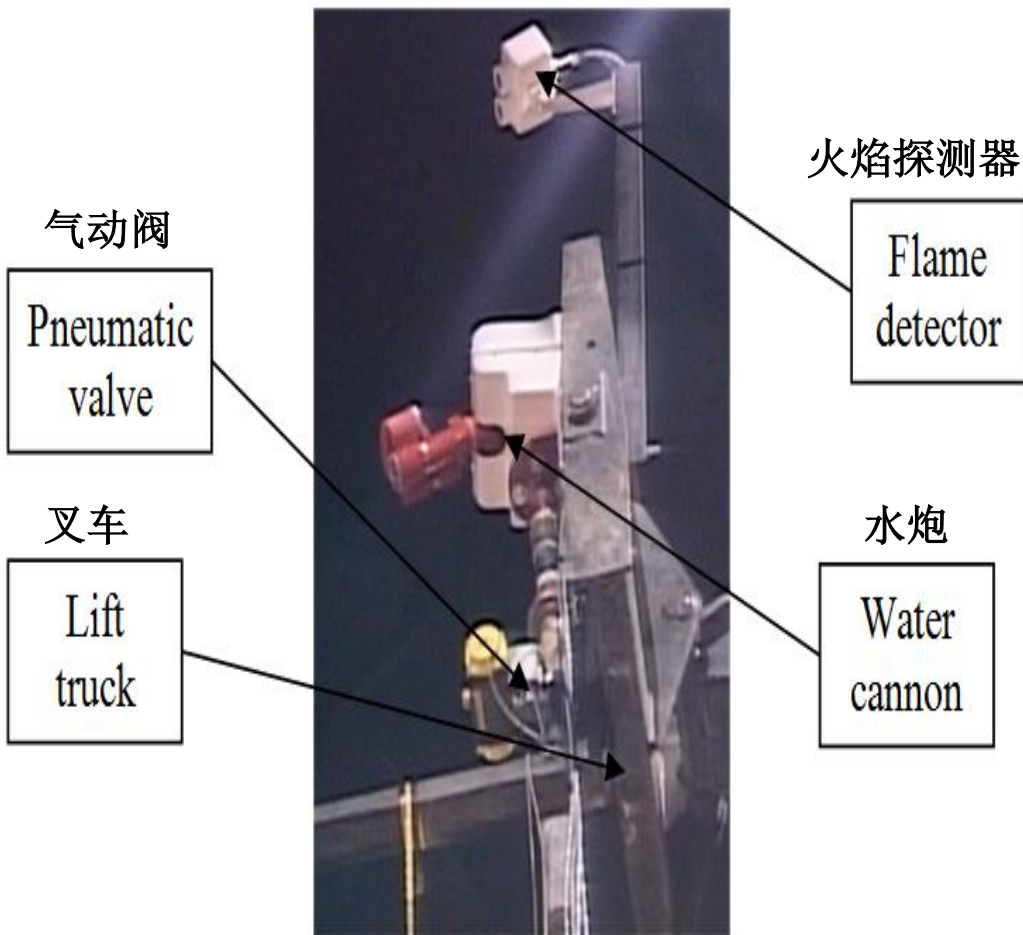
# Automatic Water Cannon 智能水炮 – Background 介绍



**Protection of large-open space with image-based detection and targeted water delivery**

利用图像探测和定向射水保护大空间

# Automatic Water Cannon 智能水炮 – Research 研究



Water spray applied (0:51).

Target ignited (2:01).

# Automatic Water Cannon智能水炮 – Summary结论



## Pro 优势

Fast response; 快速响应

Smaller fire size; 火势小

Water/foam agent; 水或泡沫均可

Large coverage area; 覆盖面积大

Low cost per unit protected area; 单位面积成本低

## Con 不足

Detection blockage; 探测遮挡

Spray blockage; 射水遮挡

Pressure adjustment; 压力调节

Water delivery accuracy; 射水准确性

Reliability; 系统可靠性



- **New challenges in fire protection constantly emerge**  
火灾预防不断呈现新的挑战
- **Research helps develop new protection solutions**  
科研能够帮助正确了解灾害和风险
- **New technologies require careful evaluation**  
新技术需要认真评估
  - **Effectiveness** 有效性
  - **Reliability** 可靠性

