TKC 上海腾喜建筑工程有限公司
Shanghai Tengxi Construction Engineering Co, Ltd.

FIREPRO

Industrial Fire Protection

Equipment fire detection and automatic extinguishing
Spark detection and water extinguishing for pneumatic conveying

Fire protection for industrial equipment and dust conveying processes

October 2026

TENGXI · FIREPRO



Modular Detection and Extinguishing

Configure detection, control, extinguishing and process interlocks for each protected hazard.

System component	Main function
LumEx and temperature detection	Detect sparks, flames or relevant temperature rise
CONEX control unit	Process signals and activate alarms, extinguishing and interlocks
Extinguishing devices	Select agents, valves and nozzles for the material and equipment
Auxiliary and monitoring devices	Manual release, audible/visual alarms and operating status



Configure equipment protection and duct spark extinguishing separately. Define interlocks for the process.

Rapid Detection and Status Monitoring

Select detection methods for the fire hazard and monitor detector operating status.

01

Rapid optical detection

Detect spark or flame radiation to initiate control. Verify total response time across detection, control and valves.

02

Detection options

Infrared, combined infrared/ultraviolet and temperature detection. Select the model for the equipment hazard and environment.

03

Self-test and contamination monitoring

Model-dependent self-test and optical window monitoring help identify obstruction and plan cleaning.

04

Interlocks and status indication

CONEX links audible/visual alarms with the relevant process. Monitoring functions and interfaces depend on configuration.

Confirm detection principles, self-test and contamination monitoring for the selected detector model.

Extinguishing Options and System Reset

Configure protection for equipment working areas, enclosed spaces and conveying ducts.

Protection or function	Application	Configuration focus
Local application	Coating equipment or machine tool working areas	Direct nozzle coverage at the hazard
Total flooding	Suitable enclosed spaces	Design for the agent, enclosure and retention conditions
Extinguishing barrier	Spray booth to filtration equipment connections	Control flame spread. Verify the applicable design basis.
Cylinder monitoring	Cylinder-based extinguishing systems	Use weighing devices to monitor agent quantity
Automatic spark system reset	After the hazard clears with no further sparks	Standby per control logic. Reset shutdown and isolation separately.

Select agents for the combustible material and equipment. Verify certification applicability for each protection method.

Spark Detection for Pneumatic Conveying

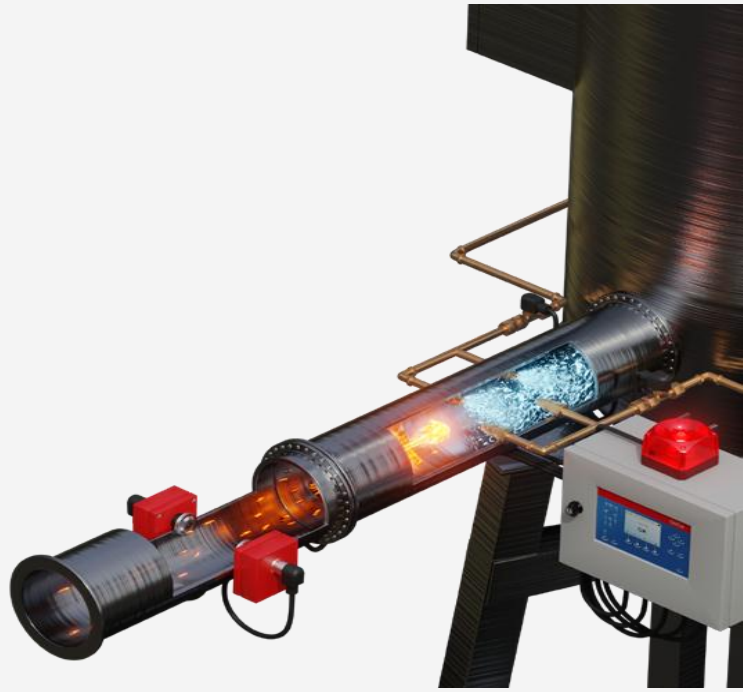
Detect sparks and glowing particles in the duct, then extinguish them in the downstream water spray zone.

FM certificate

FM26US0079

FM listing item	System configuration
Class of Work	3265 – Spark Detection and Extinguishing Systems
Control units	CONEX 2 ZONE / 8 ZONE
Detectors and nozzles	LumEx 1, 2, 4 / TVM-K34
Specified manual	IMM-223 (06-2026) Rev 0

FM Approval applies within the current listing and specified manual for pneumatic materials handling systems.



Fast valves and anti-clog nozzles. Verify spacing, temperature and exposure for short ducts and outdoor use.

Dust Collectors and Collection Systems

Application: combustible dust flowing or accumulating in upstream ducts, filter bags or cartridges, clean-air plenums and hoppers.



Upstream ignition source interception

Install spark detection and water extinguishing before hazardous equipment. Interlock diversion and outfeed where required.

Internal collector fire protection

Provide internal water protection for bag or cartridge sections, clean-air plenums and obstructed hoppers.

Provide explosion protection for the assessed risk. Duct spark extinguishing does not replace internal collector fire protection or required explosion protection.

FM DS 7-76 (October 2024), §§2.4.2.1.1, 2.10.4.2, 3.3.1, 3.5.2

Wood Rotary Drying Processes

Application: main duct from the dryer drum to the cyclone, controlling downstream travel of sparks and smoldering particles.

01

Primary detection

FM requirements

A single spark initiates water spray. Reset per logic if no further sparks occur.

Configuration focus

Position detectors and nozzles per manual. Spark counting may trigger excessive-spark shutdown.

02

Secondary detection

FM requirements

Provide a second safety detector after the spray and before the cyclone.

Configuration focus

Detect particles that remain hot. Isolate or divert downstream discharge.

03

Safety actions

FM requirements

Stop feed and shut off heat. Activate cyclone deluge.

Configuration focus

Verify CONEX interfaces. Prepare a complete cause-and-effect matrix.

04

Fan and drum

FM requirements

Keep running in this process to clear material and prevent drum distortion.

Configuration focus

Apply process-specific interlocks. Avoid a blanket all-stop sequence.

FM DS 7-10 (May 2010), §2.3.7.2, pp. 16–17

Wood Flash Drying and Size Reduction

Application: fiber or wood-particle drying, particleboard furnish preparation and related size-reduction equipment.

Application area	FM requirements	System configuration
Flash dryers	Provide spark detection, extinguishing and isolation. Secondary detection triggers deluge.	Protect drying ducts and cyclones. Provide explosion venting as required.
High-temperature backup	Provide high-temperature limit detection at material and cyclone inlets.	Initiate the relevant safety actions also triggered by secondary spark detection.
Board-mill equipment	Provide suppression or venting with spark detection shutdown, based on risk.	Assess connected upstream and downstream equipment. Provide required explosion isolation.
Deposits and lenses	Inspect and remove fiber/resin deposits. Verify that detector optics remain clear.	Provide access for testing and service. Keep nozzles and optical windows effective.

FM DS 7-10 (May 2010), §§2.3.7.2(d), 2.3.8, 2.3.9. FM DS 7-76 (October 2024).

Pulp Flash Drying Processes

Application: ducts downstream of the drying tower, associated cooling sections and cyclones.

01

Detection and water spray

FM requirements

Detect downstream of the drying tower. Spray upstream of the cyclone inlet.

Configuration focus

A single spark initiates water spray. Confirm spacing and coverage per manual.

02

Secondary detection

FM requirements

Locate between the water spray zone and cyclone inlet.

Configuration focus

Isolate downstream paths. Stop feed and shut off heat.

03

Deluge and drainage

FM requirements

Activate automatic deluge in the drying tower and cyclone. Provide drainage.

Configuration focus

Address nozzle blockage and deposits. Coordinate drainage and structural loads.

04

Fan and backup

FM requirements

Keep conveying fans running to clear pulp. High-temperature limits trigger similar safety actions.

Configuration focus

Retain required explosion venting. Define interlocks for the drying process.

FM DS 7-4 (April 2026 interim revision), §§2.4.2, 2.4.3.2, p. 28

Industrial Exhaust and Combustible Deposits

Application: fire spread control in industrial exhaust ducts, treatment equipment and connecting sections.

Review item	FM requirements	Configuration focus
Materials and deposits	Provide fire protection for combustible ducts or deposits where applicable criteria are met.	Check duct/lining materials and deposits. Select suitable FM Approved equipment.
Internal duct protection	Apply protection when specified duct size and deposit/material conditions are met.	Verify internal protection under DS 7-78. Design separately from spark extinguishing.
Drainage and collection	Provide adequate low-point drains. Control ponding and contaminated discharge.	Check drainage and support loads against actual water discharge rates.
Interlocks and changes	Monitor airflow and verify process interlocks. Reassess after branch or fan changes.	Recheck velocity and deposits. Confirm detector and nozzle suitability.

FM DS 7-78 (October 2024 interim revision), §§1.0, 2.2, 2.3, 2.4. Excludes process piping.

Spray Booths and Coating Equipment

Application: early fire protection for liquid or powder coating areas and associated filtration equipment.

Hazard locations

Spray areas, electrostatic grounding, coating deposits and filtration equipment

Product configuration

Provide detection and extinguishing at the hazard.

Interlock spraying and material supply.



Select equipment protection for the specific design. Confirm extinguishing agent and certification applicability.

Machine Tools and Production Machinery

Application: machine tool working areas and mixing, drying, milling and crushing equipment.



Machine tool protection

Assess working-area detection and extinguishing for machining heat, oil mist and electrical faults.



Process machinery protection

Select agents for the material, temperature and equipment design. Coordinate shutdown and hazardous material isolation.

Where combustible dust is present, verify equipment fire protection and explosion protection under the relevant FM Data Sheets.

Selection and Installation Conditions

Process data, site conditions and protection objectives determine the system configuration.

Item to confirm	Engineering configuration focus
Materials and hazards	Material properties, particle size, moisture and required dust test data. Confirm agent compatibility and required explosion protection.
Conveying and installation	Duct diameter, normal/maximum velocity, temperature and pressure. Identify fans, branches, available straight runs and service access.
Detection and water spray	Check minimum spacing, nozzle coverage and response time per manual. Verify water pressure/flow and environmental conditions.
Power and interlocks	Verify power, hazardous-area certification and control interfaces. Define secondary detection actions and related equipment safety responses.

Configure to the current FM listing and IMM-223 manual. Apply DS 7-76 for relevant combustible dust hazards.

Functional Verification and Maintenance

Application: maintaining effective operation of spark detection and water extinguishing systems.

01

Monthly inspection

FM requirements and implementation

DS 7-76 specifies a minimum monthly inspection frequency for spark detection and extinguishing systems. Severe service may require more frequent checks.

02

Complete functional testing

FM requirements and implementation

Follow manufacturer guidance and retain records. Verify detection, valve water discharge, alarms and interlocks against the design.

03

Cleaning and servicing

FM requirements and implementation

Keep optical windows, nozzles and service access effective. Check contamination, blockage, water supply and fault indications.

04

Process changes

FM requirements and implementation

After changes to materials, branches, fans, capacity or control programs, reassess protection conditions and related interlocks.

FM DS 7-76 (October 2024), §2.6.2, Table 2.6.2.1-1 and §2.6.6. DS 7-78, §2.4.

Shanghai Tengxi Construction Engineering Co., Ltd.

Fire protection for industrial equipment and dust conveying

Product selection and technical coordination
Project configuration and system integration

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