Water Mist Fire Protection Systems as a Solution in Food Processing Process involving HACCP Protocols

Pablo Correa
CEO

IWMA International Water Mist Association

RMC CORPORATE

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Agenda

- Introduction
- Fire Risk Assessment
- Conventional Fire Systems
- Optimized Fire Control
- Case Study
- Questions

Scope

We **will** discuss:

- Fire protection in contaminant-free environments
- Fire Risk Assessment for Food Operations.
- Comparison between different approaches (CFS vs OFCS).

We **will not** discuss:

- Effectiveness of water mist systems in fire control
- Best practices for microbiological control in food processing (HACCP)
- Food safety in general.

Some definitions

HACCP	Hazard Analysis Critical Control Point
MIC	Microbiologically influenced corrosion (MIC)
SRB	Sulfate Reducing Bacteria
APB	Acid Producing Bacteria
GMP	Good Manufacturing Practices
FRA	Fire Risk Assessment
BCP	Business Continuity Plan
FPO	Food Processing Operations

Chile?

About us
RMC Corporate

INTEGRATED RISK CONTROL PROJECTS

We are a **group of companies** focused on comprehensive **solutions for the protection of people and industrial operations**, from the analytical engineering phase to the implementation of high-tech projects.

Our market is broad; industries such as Mining, Energy, Fuel, Food, Pulp and Paper have trusted RMC for the execution of their projects. We achieve this in collaboration with our **partner companies**, which are world leaders in the development of systems for monitoring, detection, and fire suppression.

Why?

Fire suppression in Food Processing Operations

Main Challenge: Effective and **clean** fire control systems using water.

What is the industry looking for?

- Control fires in time
- Reduce operational downtime
- Ensure minimal contamination
- Speedy recovery upon incidents

FRA
Fire Risk Assessment

RMC Model to start new projects. Comprehensive analysis should at least include (NFPA 551):

- Source of ignition/fire hazards
- Preventive control measures
- Risk separation
- Fire detection/monitoring systems
- Fire extinction systems
- Emergency response plan (safe evacuation)
- **Recovery Plan (BCP)**

FRA
Fire Risk Assessment

Fire hazard sources in FPO:

- Power transformers, electrical cabinets, trays.
- Operation/storage of packaging materials.
- Hot sealing machines.
- Flammable dust.
- Flammable construction materials.
- Food Itself: Specially fatty foods processing (e.g. meat, poultry and others)

“One of the principal hazards in FPO is the food itself.”

Birgitte Messerschmidt, NFPA Director of Research (2022 NFPA Journal)

Conventional Fire Systems [CFS]

Sprinklers and/or Manual Systems

Carbon steel piping

Carbon steel / concrete water tank

Industrial water

Contaminants involving CFS:

- Iron oxides, hydroxides, solid deposits (corrosion)
- Suspended solids
- Chemical contaminants: chlorides, sulfates, carbonates.
- Bacteria and microorganisms, SRB, APB
- Other anaerobic media contaminants

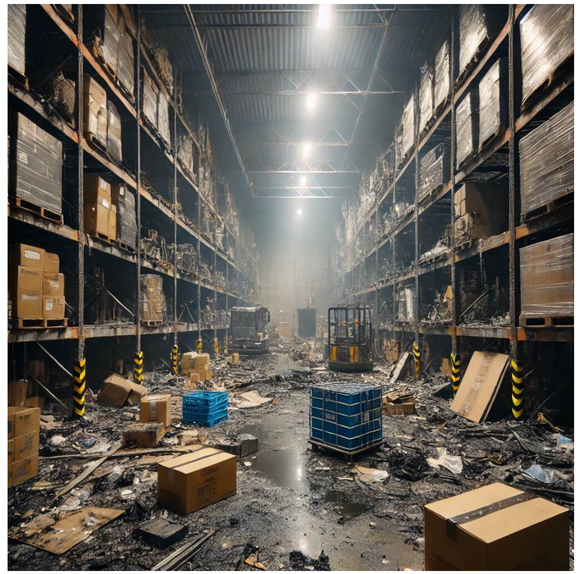
High damage: in case of confirmed fire or false activation.

Conventional Fire Systems [CFS]

Sprinklers and/or Manual Systems

Post-Incident involving CFS

- Disposal of all food, packaging and production affected by fire, smoke, and fire protection water.
- Extensive deep cleaning/decontamination, and possible equipments and parts replacement.
- Tons of water in a limited surface (OH-1 / OH-2).
- Sampling and authorization to resume operations.



2 - 10 weeks of downtime (depending of fire event size).

+

Total cost of disposed production

Optimized Fire Control Systems [OFCS]

Water-Mist : Automatic or Open Systems

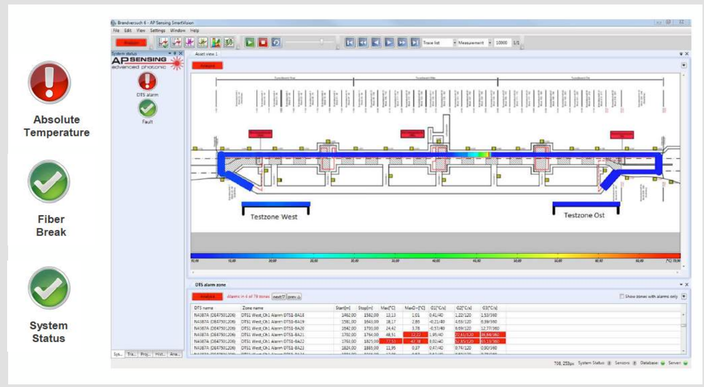
Stainless steel piping

Stainless steel / PP water tank

Drinkable water - pre-treated water

Contaminants involving OFCS

- Some resistant bacteria in anaerobic media
- **Controllable:** by pre-treatment of water storage.



Low consequential damage in case of confirmed fire or false activation.

Optimized Fire Control Systems [OFCS]

Water-Mist : Automatic or Open Systems

Post-Incident involving OFCS

- Disposal of all food, packaging and production affected by fire, smoke.
- Minor cleaning/decontamination, and no required equipments/parts replacement.
- 5% of water compared CFS.
- Sampling and authorization to start the operations.

1 day of downtime (depending of fire event size).

+

NO disposed production by water contamination

Key-Aspects

Defining the project under **OFCS**

As per NFPA 551:

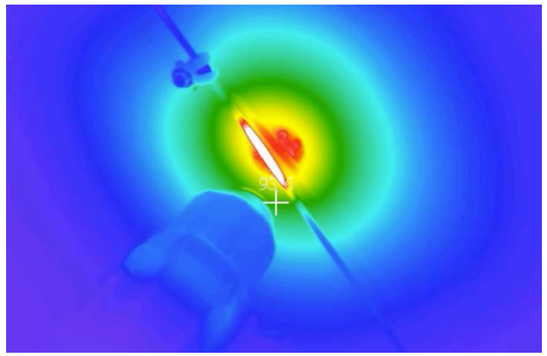
- **Hazards to be protected:** Local/Enclosed/Open Areas, addressing more hazards that CFS.
- **Fire detection/monitoring systems:** preventive early temperature monitoring (DTS) to define threshold values to process control or fire control activation.
- **Fire extinction systems:** water-mist based system.
- **Emergency response plan:** safe corridors for personnel evacuation.
- **Recovery Plan:** damage and downtime control by efficient and clean system.

Our Experience

Food Processing Plants in Chile **OFCS**

Distributed Temperature Sensing (DTS)

- 6.000 m of DTS fiber-optic
- 50 cm precision
- Real-Time monitoring, capable to identify any change of temperature with 0.5°C precision.



High-Pressure Water Mist (HPWM)

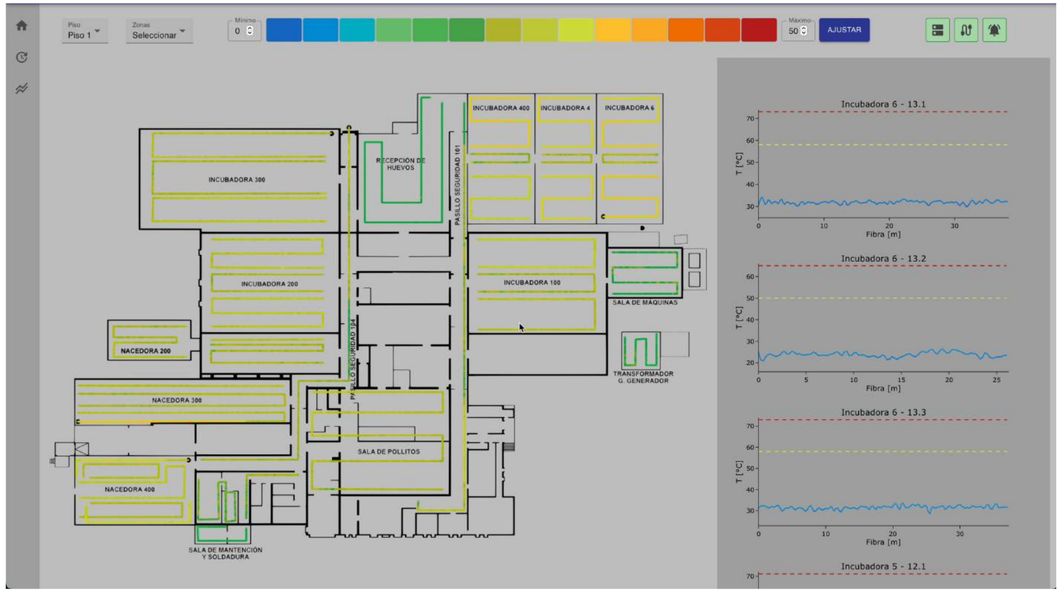
- Local application
- Enclosed areas.
- Open space areas.

Our Experience

Food Processing Plants in Chile **OFCS**

Protected Assets

- Electrical rooms
- Electrical trays and cable tunnels
- Transformers
- Packaging area
- Electrical cabinets
- Storage of packaging material
- Safety evacuation corridors
- Ammonia compressors
- High sensitive areas in chicks-hatching operations.



First world's plant in its kind with OFCS, EPC developed by RMC (Q4-2024/Q1-2025)

RMC CORPORATE

sustainable!
eco-friendly!
reliable & flexible!

IWMA
International Water Mist Association

Questions

2024