

AUTOMATIC FIREFIGHTING  
SYSTEMS IN  
MACHINE TOOLS





*Technological progress involves greater value and calls for greater protection*

## Machine Tools

**The great number of machinery, their arrangement and measures require bespoke protection.**

**Firefighting equipment can be installed within protected machinery or in the surrounding area for local application over the risk.**

Machine tools are stationary industrial devices used to machine solid pieces, usually powered by electricity.

Numerical control (NC) machines control workflows automatically. If the flow is controlled by computer, then they are known as CNC (computer numerical control) machines.

These machines repeat sequences accurately to mould parts that can be very complex, using methods as varied as grinding, pressing, laser, plasma and EDM.

In this hazard we include machines as varied as lathes, drill presses, milling machines, polishers, grinders, brushes, saws and presses.

New-generation machines include the EDM machine which is used in the manufacturing process for electric discharge machining. It is powe-

red by an electric arc between the piece and the electrode.

These machines require lubrication and cooling circuits to run correctly and avoid overheating. It is especially important to refrigerate areas of friction between the workpiece and the tool by an oil- and water-based fluid called "coolant". The remains of this fluid should be collected and treated as hazardous waste.

All these machines are expensive, and downtime due to breakdowns result in substantial economic losses, so it is important to take all necessary safety measures to prevent accidents that may affect the operators who control them.

# Protection

Fire protection should be considered in two stages or phases:

- **Protection of workers in the enclosure, to prevent injury in case of fire.**
- **Protection of machinery to minimize damage resulting from fire.**

According to existing regulations, the risks are: fires in solid materials and combustible flammable liquids, as well as electrical fires due to the presence of electric motors.

**If protection is installed inside the machinery, it should act via an automatic fire extinguishing system to control any accident caused by sparks, leaks or spills.**

The automatic fire extinguishing system should protect the various parts such as mechanical and hydraulic lines and motors via properly placed nozzles to cover all risk areas.

## Fire hazard

The machines have mechanical components that get very hot. These include engines, lubricants and hydraulic lines that can cause a fire due to an accident, leak in the system or overheating.

**If oil reaches ignition temperature, sparks generated between the workpiece and the tool during machining can cause a fire.**

EDM machines are especially susceptible to starting fires because they work with electric arcs. Electric current can cause a fire if it is in contact with flammable liquids such as lubricating oil.

## ***FAST RESPONSE AGENT AND EQUIPMENT***

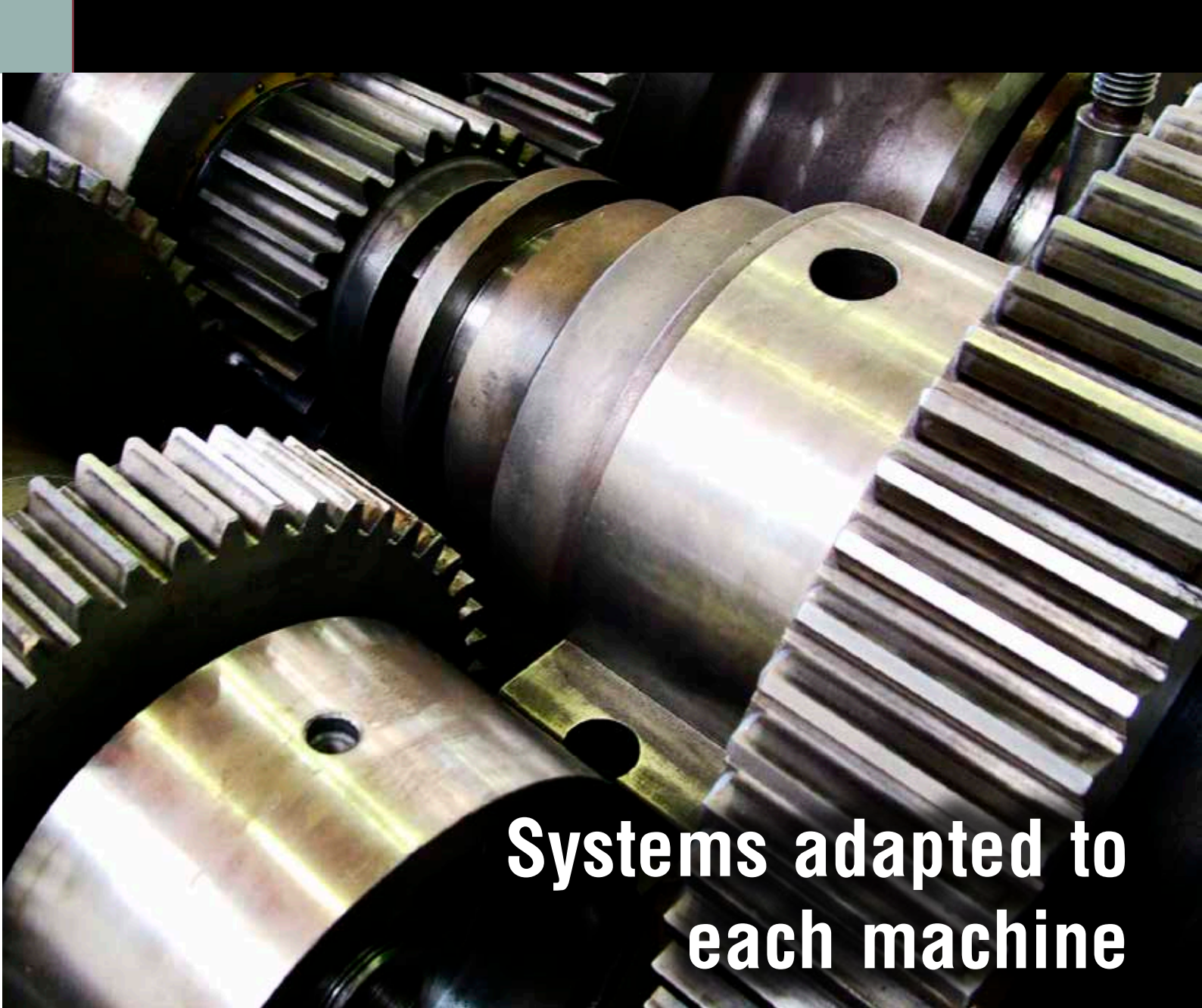
The quicker the response time to a fire, the less the equipment will be damaged and the risk of uncontrolled fires and explosions will be reduced.

For this, it is necessary to have a detection system that automatically triggers the release of the extinguishing system to produce the discharge immediately after the fire is detected.

**The system can also be released manually by the machinery operator in the event of detecting a fire.**



*As there is a high risk of fire propagation in engines and hydraulic lines, an automatic fire safety system should be installed to prevent accidental fires, acting quickly to extinguish fires.*



# Systems adapted to each machine

## GENERAL CONSIDERATIONS

Given the characteristics of the hazard, the agent SIEX recommends for this type of applications is CO<sub>2</sub>, which floods the interior of the machine and therefore does not pose a risk to people in the area. Chemical gases such as HFC-227 and inert gases are also suitable.

The autonomous extinguishing system inside the machine will consist of pressurized gas stored in steel cylinders. This helps save space and the installation is easy to operate, in addition to requiring very simple maintenance.

Detection may be automatic, via a pneumatic line with a detection tube which is depressurized with heat, triggering system, or by thermal-pneumatic fuse detectors. Both options are part of an autonomous system that does not need electricity to operate.

# Extinguishing



## LOCAL APPLICATION:

The SIEX-CO<sub>2</sub><sup>TM</sup> system consists of high pressure cylinders, either modular or in banks, depending on the amount of gas needed as calculated during the installation, which is carried out in a personalized manner in each case.

The cylinders are constructed with seamless steel tubes for a working pressure of 140 bar@50°C and 250 bar test pressure. The CO<sub>2</sub> at high pressure makes it possible to use long stretches of piping and separate the cylinders of the protected risk.

The SIEX-CO<sub>2</sub><sup>TM</sup> systems are suitable both for total flooding with calibrated radial nozzles and for local cup nozzle applications.

## SMALL SPACES:



The SIEX-HC<sup>TM</sup> 227 system has cylinders from 6 to 514 litres, with low or high working pressures. Meanwhile, the SIEX<sup>TM</sup> SMS for small enclosures has a capacity from 2 to 13.4 litres and a working pressure of 15 bar.

It delivers very stable performance, offering great confidence both during storage and at the moment of discharge. Users can be assured that HFC-227 that has not been used for a long time will not under-perform.

## TOTAL ROOM FLOODING:



INERT-SIEX<sup>TM</sup> has the widest range of environmental agents to suit every need. Its high pressure allows the use of long pipe runs and selector valves.

## QUALITY OF GASEOUS EXTINGUISHING AGENTS

*All our teams are supported by VdS. Installation design is calculated by SIEX using our software, also certified by VdS, for proper calibration of nozzles and sizing of pipe diameters for each of the systems.*

## CONTINUOUS WEIGHING

*SIEX has a very reliable VdS-approved weighing device. This allows efficient, accurate and safe load control—visually and electronically—for cylinders in each system.*

## DESIGN STANDARDS FOR INSTALLATIONS

*For the design of extinguishing systems, our equipment is based on national and international technical rules of which the most important are:*

- NFPA-2001: INERT and CHEMICAL AGENT SYSTEM
- NFPA-12: CO<sub>2</sub> system
- ISO STANDARD
- CEA

# Detection



WITH DETECTION TUBE

## Wide variety of standalone equipment and a variety of installations

### SIEX PNEUMATIC DETECTION:

SIEX has a pneumatic detection system featuring pressurized flexible detection tube. The advantage of these systems is that they need no external power supply as they are completely self-contained and automatic. The typical applications of the detection tube are those in which the hazard is located in small, enclosed volumes such as in the case of machinery interiors.

The detection and discharge flexible tube is attached to the extinguishing agent tank, internally pressurized (12-18 bar) with the pressure of the extinguishing agent itself. It bursts when it reaches a certain temperature (between 80 °C and 110 °C). **The composition of the tube makes it suitable for use in dirty, damp or greasy environments, etc.**

The detector tube is designed to detect fires in the protected hazard and to pneumatically activate the extinguishing system selected.

## INSTALLATION MODES

### DIRECT SYSTEM

The direct system for small spaces discharges agent along the pipe itself when it bursts due to the temperature of the fire at the exact place the fire was generated. It therefore detects and extinguishes the fire in its early stages with highly satisfactory results. The standard supply consists of: bottle or cylinder, valve (with a pressure switch port), fixing hardware, end of line with a pressure gauge and detector tube. This system does not require any discharge nozzles.

### INDIRECT SYSTEM

The indirect system discharges the agent through a pipework and nozzle system, with the pressurized tube acting solely as a means of fire detection, and the cylinder valve is activated when the tube is depressurized as it bursts due to the heat of the fire. The standard supply includes: bottle or cylinder, valve (with a pressure switch and pressure gauge port), fixing hardware, end of line with a pressure gauge or manual release, detection tube and discharge nozzles.



## MECHANICAL-PNEUMATIC DETECTION:

SIEX has thermal-mechanical-pneumatic fire detectors.

SIEX™ TK-SIMPLEX The advantage of these systems is that they need no external power supply as they are completely self-contained and automatic.

The SIEX-NTD™ thermal-pneumatic detector is designed to detect fires in the protected hazard and to pneumatically activate the extinguishing system selected. There are two possible ways for this actuator to be triggered: manually, by pulling a safety ring and thermally, through a fuse which breaks at a certain temperature.

The activation of the extinguishing system is always done pneumatically through a nitrogen-filled cartridge.

After system actuation, the user simply needs to replace the thermal fuse and reload the cartridge for the system to be fully operational again.

## Our commitment

### CHOICE OF SYSTEMS

SIEX has the widest range of products and systems to suit different needs, both as regards pressures and extinguishing agents.

### COMPETITIVE PRICE

Optimizing all of our processes make us more and more competitive worldwide.

### SPECIALIZED ENGINEERING

Our highly qualified staff ensure the best service for customers both as regards technical advice on the choice of system, and solving any problems that might arise after installation. Backed up by our extensive experience and a track record of successful projects.

### INNOVATION

At the forefront of innovation in every product we develop, ensuring the technical features offered.

### QUALITY GUARANTEE

All products meet the highest quality requirements and internationally recognised official approvals.



## OTHER SPECIAL HAZARDS PROTECTING BY SIEX:

SERVICE STATIONS	TELECOMMUNICATION CENTRES	HISTORIC BUILDINGS
ARCHIVES AND LIBRARIES	HOTELS	ROBOTIC PARKINGS
DPCs	HOSPITALS	WIND TURBINES
PAINT SPRAY BOOTHS	EDUCATIONAL ESTABLISHMENTS	STEEL INDUSTRY
ELECTRICAL PANELS	TRAIN AND UNDERGROUND STATIONS	BANKS
INDUSTRIAL KITCHEN	TRAINS	OFFICES
TURBINES AND GENERATORS	TRANSFORMERS	LARGE VEHICLES
ROAD TUNNELS	OFFSHORE PLATFORMS	CONVEYOR BELTS
NATURAL GAS PLANTS	SOLAR THERMAL PLANTS	GAS PUMPS
CLEAN ROOMS	MACHINE TOOLS	OIL & GAS
CABLE TUNNELS	PRINTING INDUSTRY	TIMBER INDUSTRY



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