

COOLFIRE

Cutting and Fire Suppression System

- Safe and Rapid External Fire Attack
- Compact and Light - Modular Design
- Latest Digital Controls and Interface
- Hard Wired and Digital Lance Control
- Rugged, Stainless Steel Construction
- Low Water Use and Minimal Maintenance



What is CoolFire?

CoolFire is the most rugged, simple to operate and advanced cutting and fire suppression system in the world. It has been developed to considerably improve firefighters' safety by allowing them to attack fires and effect rapid gas cooling from the outside of a compartment to create a safer environment prior to entry. The use of CoolFire minimises the levels of exposure to heat and smoke and reduces significantly the potential for backdraft or flashover.

The CoolFire system uses very little water compared to conventional firefighting methods by producing the optimum size of droplets to achieve the maximum heat transfer per litre of water.

This significantly reduces both collateral damage and the amount of water needed to be carried – and thus the size of vehicle.

Some fires can be suppressed using as little as 50 lt of water.



How Does CoolFire Work?

CoolFire uses two stage technology to access and control fires safely, efficiently and incredibly rapidly. The system comprises a 300 bar high pressure water pump, an advanced, digitally controlled plug and play Command Module, a high pressure water hose / umbilical and an ergonomically designed triple action lance.

The high pressure pump can be powered by a vehicle Power Take Off (PTO) by petrol or diesel engines.

Step 1: Penetrating Phase

With the lance firmly placed against the external surface, and with the unique safety interlock in the lance butt depressed, the lance operator pulls both the 'water' and 'abrasive' triggers. These commands are sent back to the Command Module electrically, via the hose / umbilical. The 'water' command activates the high pressure water supply, whilst the 'abrasive' command opens a valve in the command module allowing abrasive to be added to the flow.

The water / abrasive mix then travels to the lance and penetration commences.

The operation is such that the user will know immediately the surface has been penetrated and can then release the abrasive trigger.



Step 2: Misting Phase

The misting phase takes place after the penetration phase culminating in the water jet entering the compartment at ultra-high velocity.

Once through, the jet expands and breaks up to form a plume of water droplets averaging 100 microns diameter. The droplets travel as far as 30m with high levels of turbulence, ensuring optimum water droplet and fire gas mixing.

Through heat transfer the water droplets quickly cool the compartment, condensing out fire gasses. The misting phase is only 1-1.5 minutes, after which it is deemed safe to enter the compartment.

CoolFire Components

The CoolFire system comprises

- an ergonomically designed dual action lance
- a high pressure hose with integrated control wires
- a Digital Command Module.

Lance



The 'smart' lance is the delivery end of the system. It has been designed for optimum safety, comfort and ease of use. It comprises an ergonomically designed, ultra-tough body shell, which contains the primary (interchangeable) section of barrel, triggers and indicator light. The lance is in constant communication with the Command Module. A flashing LED light indicates that the lance is connected. The light turns solid when the lance is switched to 'Live'. There is also a position for a spare function button (e.g. Foam).

The lance barrel features a quick release mechanism to allow fast interchangeability with longer or shorter barrels.

The lance commands are sent electrically from the 'water' and 'abrasive' triggers which are connected to a safety interlock in the butt/shoulder piece.

All metal components are stainless steel and the electrical system is to IP67. The Lance connects to the Hose / Umbilical via quick release fittings for easy and fast disconnection and reconnection.

Command Module



The Digitally Controlled Command Module is the core of the system. Located on the vehicle or skid, it contains the electrical system controls, as well as a highly efficient, yet simple, fluid system, which supplies either plain water or adds abrasive to the water when commanded by the Lance.

The front of the Command Module hinges open and inside is a quick change, front loading, abrasive cylinder which provides up to 5 minutes piercing time.

These cylinders are prefilled.

Therefore switching to a fresh supply of abrasive takes under 20 seconds with no tools required.

The hinged front door is fitted with an ultra- durable 'CAN' Digital Controller. This has a series of simple, easy to read displays. The Digital Controller is used to control and monitor all aspects of CoolFire's operation including water, abrasive and fuel levels, plus engine operation (on skid systems), PTO engage / disengage and system test. It is in constant communication with the lance (plus engines or vehicle) to ensure system integrity.

The Digital Controller is normally mounted on the front of the Command Module, but can be mounted elsewhere if required. Alternatively CoolFire can be controlled via CANbus from the main (high flow) pump panel (where fitted) using the CoolFire software pack.

The Command Module is IP67 and manufactured to military standards of toughness using stainless steel or other non- corroding components throughout.



Abrasive Refill Cylinder



CoolFire uses a unique 'cartridge' system to hold and supply the 'Garnet' abrasive. The cartridge is a lightweight composite cylinder which is prefilled with abrasive by the user in a clean, stress free, environment. CoolFire is supplied with a minimum of 2 cylinders. One in the Command Module and another one (or more) to be carried with the system.

When the Control Panel indicates that abrasive is low, the door of the Command Module is opened, the empty cylinder disconnected using a large, hand tight, screw and slid straight out.



The new, full bottle is guided on self-centering pins, locked in place and the door closed. CoolFire is now back up, running and ready to go with another full supply (of up to 5 minutes) abrasive – all in only 20 seconds .

Hose and Reel



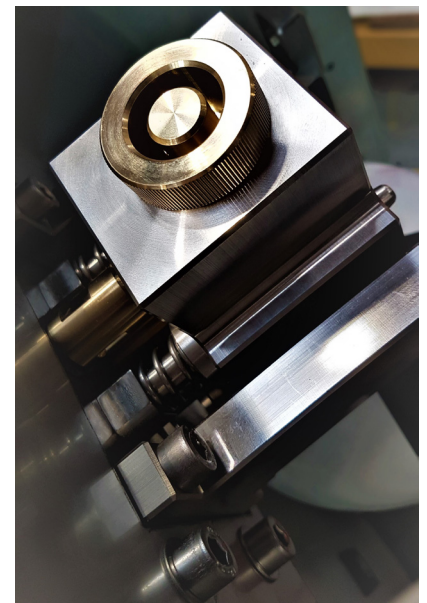
The CoolFire's communications between the Command Module and 'smart' lance are ultra-safe and reliable as they are sent by 'hard wire' rather than radio. To do this CoolFire uses a unique and proprietary 25mm diameter umbilical - a fully formed combination of high pressure water hose and command wires encased by a bonded, heavy duty, outer layer of 25mm diameter. The Hose/Umbilical can be used while still on the reel and has stainless steel quick release connections at either end to allow additional sections to be added for greater length.

The Hose / Umbilical is supplied in 40m or 80m lengths. These can be extended by adding further lengths for long distance deployments.

The Reel can be supplied with manual, electric or pneumatic rewind and can be also be made of stainless steel if required. The Reel is fitted with a slip ring and swivel for connection to the Command Module.

World Leading Design and Manufacture

CoolFire is the result of advanced design developed by Angus Fires' engineers working with firefighters globally to give users a product that meets their needs and exceeds their expectations.



CoolFire systems are manufactured by highly experienced engineers using top quality materials, primarily stainless steel. The high pressure system components are 100% inspected and tested before use.

CoolFire systems are 3D CAD designed, assembled and rigorously tested - all in house at Angus Fire's production facility in Bentham, North Yorkshire, in the United Kingdom.

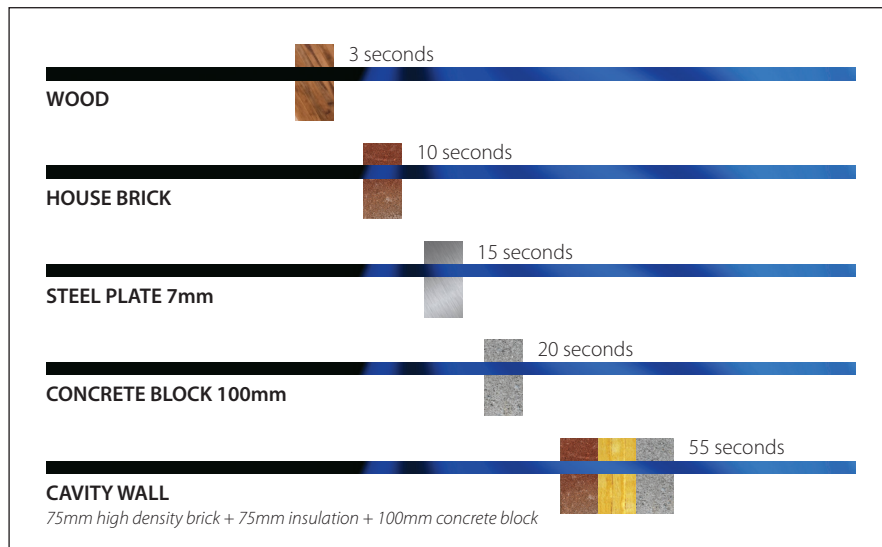


COOLFIRE

Performance

CoolFire pierces a small diameter hole, typically less than 5mm, in construction materials using a combination of high pressure water and cutting abrasive delivered at 300 bar pressure.

Typical Cutting Times



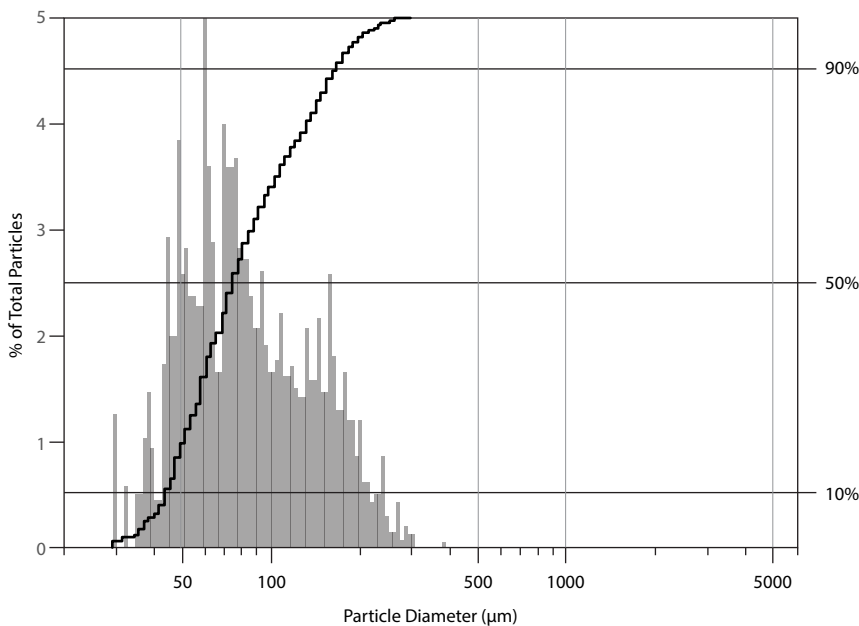
Fires can generate temperatures in excess of 600°C. The use of high pressure water mist produces a rapid reduction in temperature to less than 100°C after a short period of time enabling safer access to the fire zone by firefighting personnel.



Droplet Sizes

The chart below shows the droplet size distribution at 300 bar, 56lpm using a 2.3mm nozzle, with an average droplet size of 60 microns.

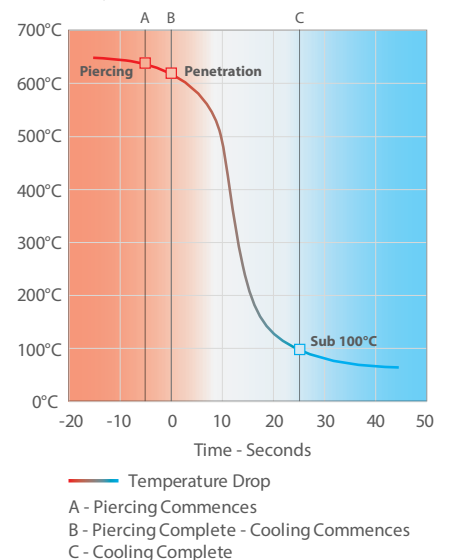
Diameter Number Frequencies



Temperature Drop

The graph below shows a test during which a slow burning wood fire reaches a temperature of over 600°C. When CoolFire is applied, within less than 30 seconds the temperature falls to 100°C.

CoolFire 56lpm Compartment Cooling

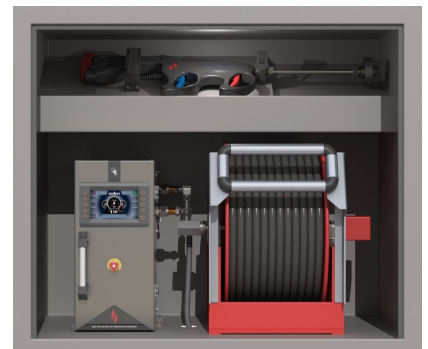




Technical Data

Product Specification	
Command Module (Excluding Abrasive Cartridge Cylinder)	
Dimensions (LxWxH)	520 x 320 x 560 mm
Weight	40 kg
Abrasive Cartridge Cylinder	Light weight carbon composite, PET liner
Capacity	4.7 litre
Abrasive Running Time	5 mins
Weight (Empty / Full)	4.75 / 15.9kg full
Hose and Reel (Manual, Pneumatic, Electric Options)	
Hose / Umbilical Length	80m standard
Diameter	25.1 mm
Weight	111 kg
Reel (LxWxH)	610 x 640 x 622 mm
Communications	5 Core Umbilical
<i>Standard reel is a manual rewind. Pneumatic and electric are available.</i>	
6 pole slip rings for trigger control on the Lance	
Control Trigger on Lance	Electrically operated 1 x water, 1 x abrasive 1 x safety interlock built into butt
Lance	
Length	1031mm
Weight	7.8 kg

System Options



	56lpm Skid	28lpm Skid	56lpm PTO
Water Flow Rate	56 lpm	28 lpm	56 lpm
Water Pressure	300 bar	300 bar	300 bar
Power Take Off	N/A	N/A	35 kw @ 1450 Nm
Dimensions (LxWxH)	1500 x 1195 x 1297 mm	1100 x 1000 x 1470 mm	N/A
Weight (Dry / Wet)	630 kg / 1000 kg	420 kg / 670 kg	N/A
Water Tank Capacity	300 lt	200 lt	N/A

COOLFIRE	Benefit
Safety:	
Safety Interlock	The safety interlock against the shoulder enables the user to operate the lance only in the correct position. Should the user slip or drop the lance, the power will cut off and protect the user from a pressure jet.
Automatic Pressure Control	The Digital Controller can be programmed to control pump speed to ensure that the pressure at the HP Pump or Reel never exceed the safe working pressure.
Lance and Hose not pressurised when not in use	The CoolFire System (Lance, Hose and Command module) are only pressurised when the water trigger is pulled. The entire system depressurises when the water trigger is released. In case of a failure, safety interlocks automatically cut the system off.
Hardwired with Digital Communications and a 'smart' Lance	Hardwired digital communication increases safety and reliability and offers a far better user interface. It allows the system to be used at long range or underground and enables the lance to be 'smart' and to be able to report its condition to the user. No batteries required.
Lance 'Live' LED	A high visibility LED is used to (a) Confirm the integrity of communications to / from the Command Module, and (b) indicate to the user when the Lance is 'Live'.
Ease of Use & User Friendliness:	
Light weight, Modular design	At less than 40kg when full, the CoolFire Command Module is a fraction of the weight of comparable steel vessels. Each element can easily be removed and replaced in minutes without special tools or training. This reduces both the system and the vehicle down time for servicing and maintenance.
Lightweight, compact and ergonomic 'Smart' Lance	Suitable for left or right handed users. Easier and more secure handling – one hand per trigger. The well-balanced clear separation between the water and abrasive triggers of the lance results in ease, comfort and safety of use. Clearly visible 'Live' LED.
Flexible design	Lightweight Command Module can be mounted anywhere in relation to the Reel and Lance. The Digital Control panel can be located anywhere on the appliance or vessel, or the system be controlled by the main pump control panel using CoolFire software.
Fast and easy front recharge of abrasive	Replacing an empty cylinder takes less than 20 seconds just by opening the door of the Command Module. No need to leave space above the unit for top refill. The complete system can be mounted, used and refilled using only one locker shelf in a fire truck. A pre-filled cylinder of abrasive that will provide 5 minutes piercing.
Barrel Change / Barrel Choice	Flexibility of use, fast (under 60s) no tools required. Long, Standard, Short or user specified Barrel options
CANbus Communications	CoolFire communicates entirely using CANbus logic. That means CoolFire modules can exchange information and instructions with each other and with the appliance or engine pack using a common language.
Resilience & Efficiency:	
Stainless steel construction	Better resistance to corrosion and results in longer lifetime. It can be used with seawater, foam concentrate or inhibitors.
NATO-standard connectors	Toughest connectors on the market. They are IP67 waterproof, highly resistant to damage, water and vibration. They are designed for quick connection / disconnection without tools.
Clutch on the HP Pump	Total control by the Lance operator. The pump is only engaged when it gets a command directly from the lance and does not idle when not required. This means it will last much longer.
Advanced Fluid Circuitry	The ultra-efficient fluid circuit in the Command Module is designed to maximise the power at the lance, minimise the number of components, and cut out potential wear points.
Top quality Garnet abrasive	The naturally occurring mineral garnet is non-toxic and insoluble with a neutral pH. It offers the best performance and does not clog or settle in the vessel.

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System Options

CoolFire is available in two different flow rate options: 28lpm and 56lpm. The modularity of the system means it can be skid mounted, retrofitted to almost any size of existing vehicle or designed into new vehicle.

PTO (Power Take Off) Options

PTO	
56lpm	28lpm
35kW	20kW

The PTO systems can be fitted on a wide variety of vehicles ranging in size from a compact pick-up to a full size fire tender.

- Makes use of an existing power source (i.e. the vehicle engine)
- Compact fit which frees up more onboard space for other uses
- Small footprint allows greater flexibility in locating modules
- Lighter weight and lower noise levels
- Lower maintenance

Skid Options

SKID		
56lpm		28lpm
2 petrol engines	1 diesel engine	1 petrol engine

The Skid mounted systems are entirely self-contained. The power is supplied by either single or twin petrol engines. Alternatively a single diesel engine can be used particularly for offshore, marine and mining. The skid requires no external connections other than water where they are to be used for periods of more than 5 minutes. Skids can be loaded into and carried in a vehicle or can be in a fixed or semi fixed location.

- Self-contained, stand-alone system
- No installation costs
- No vehicle modifications required
- Designed to be switched in and out of a wide range of vehicles
- Air transportable
- Ideal for semi-fixed or fixed applications (e.g. training centres, marine, infrastructure)



For live demonstrations of the CoolFire system and full training packages, please contact Angus Fire.



Angus Fire

A global leader in firefighting technology, Angus Fire supplies fire safety products and services to customers operating in a wide range of industries such as oil companies, international airports, harbours, ports, to military bases, power stations, and of course to fire and rescue services. Angus is a global name with an impressive history of over 220 years in the firefighting industry. It is this rich heritage and associated expertise, which makes Angus Fire the preferred partner with firefighters worldwide.

