

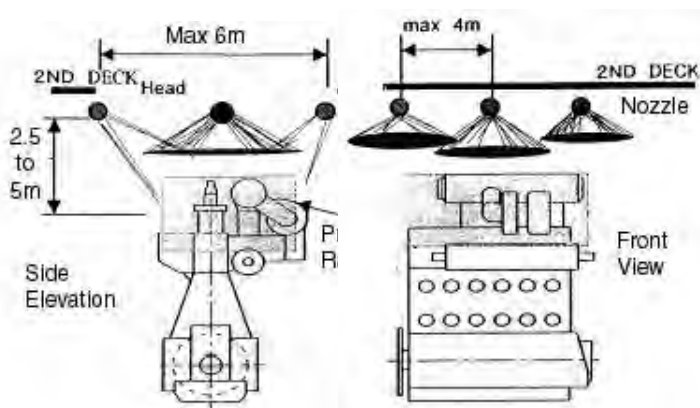


Water Mist / Fog Nozzle

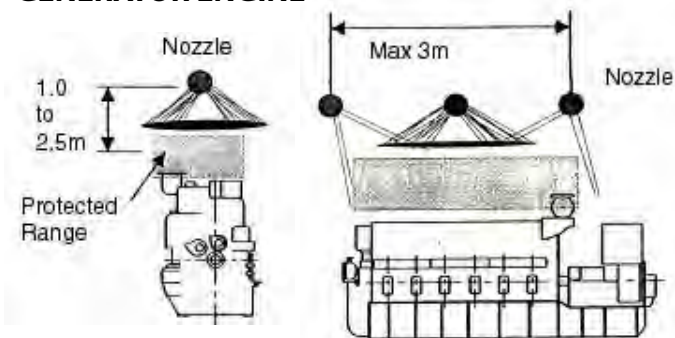
Wilson "RI" series Ruby Insert Fog Nozzles discharge critical mass of fine fog smaller than 20 microns used in WaterMist Fire Protection of engine room.



MAIN ENGINE



GENERATOR ENGINE



Watermist Definition

The term itself suggest a very fine water spray, whose drops remain suspended floating in the air and are easily moved around from the slightest air current.

In terms of size, such drops should have a diameter of about 20-30 micron, and produce an enormous exchange surface, allowing ultra fast evaporation.

Using drops with such dimensional range, however, proved not to be practical for several reasons.

In addition, an increasing number of recent investigations shows the tendency to use watermist systems at a very wide range of pressures (15 to 120 bar) and dropsizes larger than 100 micron for different applications.

It seems then reasonable to define a watermist system like a fire suppression system relying onto the water vapour effect for fire suppression, rather than a system that produces very fine droplets.



Technology

Because of stricter environmental laws and the decision to replace some of the widely used gases in extinguishing systems, the use of very fine water sprays in fire suppression systems, for class A and class B fires, has known always growing acceptance in the last years.

How Watermist Works

By evaporating very small water droplets in front of a fire, three main objectives can be reached:

The atmosphere composition is changed, insofar the steam produced by evaporation reduces the partial pressure of the pre-existing gases and therefore the partial pressure of oxygen. Oxygen being the one gas required to feed the combustion (fire), at the very moment when the oxygen partial pressure is reduced below a given limit, the fire cannot continue.

The limit for oxygen partial pressure varies with the type of fire, being around 13% for hydrocarbon vapours, and much lower for solid fuels like char and wood cribs.

The evaporation process requires a noticeable energy (539 Kcal/Kg), hence the process of evaporating droplets produces a strong local cooling effect, which is also against the combustion reaction.

Theoretically a combustion reaction cannot sustain a flame if the temperature drops below 1327° C.

The great number of droplets around the fire is a protection against radiating heat from the fire to increase the temperature in the surroundings of the fire.

While this effect may have a minor importance for the process of fire suppression, it can prove very useful in certain special cases for example since a reduced radiation will lower the evaporation rate from a surface of liquid fuel.

The diagram besides shows the result of a test performed with nozzles on an heptane fire in a closed room with a volume of 75 cubic meters, ambient temperature is reduced and the fire is suppressed in 30 seconds.

Watermist Limits

The same characteristics which make it advantageous to use a watermist fire suppression systems, easily indicate their limits. Watermist systems can be regarded as poorly effective in such caese where

The ambient temperature is not raised consistently by the fire, for example a small fire in a wide room.

Since water droplets evaporation is required, if the fire is small enough not to be able to raise the ambient temperature significantly, not enough water vapour will be created to be active on the fire.

The fire is located in the open or inside a ventilated room, where fresh oxygen is readily available and reducing its partial pressure in the atmosphere is difficult or impossible.



RI series

RUBY INSERT Fog Nozzles

Ruby-orifice 316 Stainless Steel Fog Nozzle produces Fog from 1 to 15 microns



NOZZLES	ORIFICE (INCH)	FLOW RATE @1000PSI (GPM)	ORIFICE (MM)	FLOW RATE @70BAR(LPM)
RI-10	0.0040	0.014	0.10	0.051
RI-15 *	0.0060	0.026	0.15	0.097
RI-20 **	0.0080	0.046	0.20	0.174
RI-30	0.0120	0.092	0.30	0.343
RI-40	0.0150	0.120	0.40	0.454
RI-50	0.0196	0.148	0.50	0.560

All nozzles pressure rating 3000 psi with thread of 1/8" NPT.
 *RI-15 will be standard size for most applications.
 **RI-20 will be standard for Turbine Cooling applications.

The nozzle consists of a 316 stainless steel body with ruby-orifice, 316SS impingement pin and extended polypropylene filter to avoid trapping particles in the base of the nozzle. High-pressure water (400-3200 psi) reaches the nozzle, shooting a fine liquid jet against an impingement pin of equal diameter resulting in the finest atomization possible, atomizing water into billions of 1 to 15 micron droplets like those occurring in natural fog.



WILSON SPRAY NOZZLE PTE LTD
www.wilsonspraynozzle.sg