WATER MIST CURTAIN AS A THERMAL RADIATION SHIELD

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Development of highly-technological military surveillance equipment is a reason why aerosol screening plays an extremely important role in modern warfare. The increasing frequency of use of high-sensitivity forward-looking infrared devices at battlefields causes the necessity to use smokes which are opaque to infrared (IR) radiation.

The main purpose of the present research is the analysis of the use of water mist curtain as a potential means for IR obscuring.

It was found out that by dispersing water aerosol into the air or onto the surface of an object, it can interfere with the transmission of infrared radiation, making the object less detectable.

Water droplets have the ability to absorb, scatter, and emit infrared radiation, which can disrupt the thermal signature of an object. When water droplets are present in the infrared path, they can absorb and scatter the infrared radiation emitted by the object, reducing its detectability. The scattering effect of the water aerosol can also cause the infrared radiation to be redirected or diffused, making it more difficult to accurately identify the source.

While water mist curtains can provide some level of obscuring in the infrared spectrum, it is crucial to consider the limitations and potential drawbacks of this method. First, the reduction of visibility may be limited depending on the type of infrared detector and its sensitivity to different spectral ranges. Secondly, water aerosol can reduce the service life of weapons or critical equipment (i.e. electronic devices), reducing their effectiveness and durability. Thirdly, if the object's surface is very hot, the water can evaporate quickly, reducing its effectiveness as a shield from infrared devices. And also, the effectiveness of water mist curtains as an infrared obscuring method can be influenced by various factors, including the size and concentration of the droplets, atmospheric conditions (such as humidity, wind and temperature), as well as the distance between the observer and the object. In addition, water spray may not help reduce the visibility of the object in other spectral ranges, such as visible light or ultraviolet radiation.

Overall, water mist curtains can be utilized as a means for infrared obscuring, but the specific circumstances and requirements of the situation should be carefully considered to ensure the desired level of effectiveness.