


A stylized graphic of water sprays. Three nozzle-like shapes at the bottom emit multiple lines radiating upwards, creating a fan-like spray pattern. The background is a light blue gradient with a large white circular arc on the right side.

WATER SPRAY OPTIMIZATION AND MAINTENANCE GUIDE

The bottom half of the page features a close-up photograph of a large pile of dark, irregularly shaped coal chunks. The lighting creates highlights and shadows, emphasizing the texture and jagged edges of the coal.

Spraying Systems Co.
Experts in Spray Technology



WATER SPRAYS ARE TYPICALLY USED IN UNDERGROUND AND ABOVE GROUND MINING OPERATIONS TO PREVENT AND EXTINGUISH SPARKS, DISPERSE METHANE GAS, KNOCK DOWN COAL DUST, COOL MACHINERY AND MORE.

WATER SPRAYS THAT ARE NOT PERFORMING PROPERLY CAN ENDANGER MINER SAFETY. ENSURING THAT WATER SPRAYS ARE PERFORMING PROPERLY IS EXTREMELY IMPORTANT.

THIS GUIDE PROVIDES GENERAL RECOMMENDATIONS ON HOW TO INSPECT AND MAINTAIN WATER SPRAYS. IT ALSO INCLUDES SELECTION GUIDELINES TO HELP ENSURE THE BEST WATER SPRAYS ARE BEING USED IN VARIOUS OPERATIONS. HOWEVER, THE OPERATING CONDITIONS IN EVERY MINE ARE DIFFERENT SO BE SURE TO CONTACT AN EXPERT FOR ASSISTANCE WHEN SPECIFYING A NEW SYSTEM.






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GOOD SPRAY PATTERN

BAD SPRAY PATTERN

INSPECTING WATER SPRAYS

Verify that all sprays are present. Spray nozzles are small and can be accidentally damaged or broken during normal operations. Replace missing sprays immediately – even one missing spray affects system pressure and compromises the performance of the other water sprays.

Verify that all sprays are performing properly. Changes in a nozzle's flow rate can be caused by many things but wear is a common reason. Flow rate changes can cause performance problems, safety concerns and wasted water.

- Examine spray patterns and watch for heavy edges and changes in spray angle or spray distribution
- Determining if the sprays are worn and spraying over capacity cannot be detected with a visual inspection. Install simple gauges to monitor system flow and pressure

INSPECT EACH SPRAY

Replace nozzles if the following conditions are observed:

- Clogging
- Corrosion
- Caking/bearding
- Damage





MAINTAINING & REPLACING WATER SPRAYS

Nozzle orifices are precision engineered. Be careful to avoid damage when cleaning. Use cleaning tools that are significantly softer than the material of the sprays like a toothbrush or toothpick. Never clean the orifice with metal objects.

Soak sprays in mild solvent to loosen debris for easier removal.

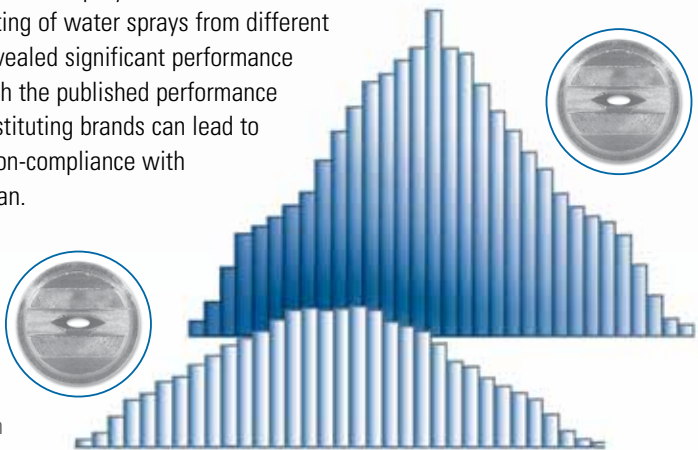
Set-up a regular maintenance schedule and adhere to it. The specifics of your operation will dictate how frequently water spray inspections should occur. Consider the liquid being sprayed and the quality of the water being used.

Determine the optimal interval for replacement and put procedures in place to ensure it occurs.

Water sprays may look the same but may not perform the same.

Be sure to replace the water sprays with the same brand. Side-by-side flow testing of water sprays from different manufacturers has revealed significant performance difference even though the published performance data is identical. Substituting brands can lead to significant fines for non-compliance with your written safety plan.

Water spray nozzles that look the same may not provide the same performance. Flow rates and/or spray distribution may be quite different.





WHEN TO MAKE CHANGES

If clogging is a problem:

- Use water clarification devices
- Use strainers
- Use sprays with adequate free passage

If corrosion is a problem:

- Specify water sprays in corrosion-resistant materials
- Control water hardness level
- Use chemical additives

Be sure any changes do not violate your written safety plan.

VALIDATE PERFORMANCE BEFORE MAKING CHANGES

If you are considering a change in your water sprays such as changing the type or brand, be sure to verify the new water sprays produce the promised performance. One mine recently decided to replace the water sprays recommended by the original equipment manufacturer with a different brand.

- Published performance data confirmed that nozzle performance should be identical
- Two sizes of each brand were tested. In the first size tested, there was no difference between the two brands
- When the second size was tested, there was a difference in flow rate. The water sprays recommended by the OEM matched published data. The water sprays from the other manufacturer sprayed 24% under the rated capacity. As pressure increased, the flow rate disparity increased as well

A visual inspection of the sprays showed significant differences. The original water sprays from the OEM-recommended brand were uniform and consistent. The water sprays from the other manufacturer produced a pulsating, inconsistent pattern



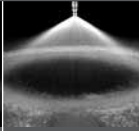




ARE YOU USING THE BEST WATER SPRAYS FOR THE OPERATION?

There are many types of water sprays. It is important to understand the differences in drop size and spray patterns. The following chart provides typical uses for different water sprays. However, the specifics of your operation will determine which will work best.

Contact an expert for assistance.

Smallest Drop Size  **Largest Drop Size**

					
APPLICATION	AIR ATOMIZING	HYDRAULIC FINE SPRAY	HOLLOW CONE	FLAT SPRAY	FULL CONE
Longwall mining machines, coal shearers continuous miners			•		
Jaw crushers	•	•	•		
Methane gas dispersion	•	•			
Loading terminals		•	•		
Primary dump hoppers	•	•			
Transfer points	•	•	•		•
Transport areas	•		•		
Stockpiles		•		•	
Stackers, reclaimers		•			•



WIDELY USED WATER SPRAYS

Spraying Systems Co., the global leader in spray technology, has been serving original equipment manufacturers and mines for more than seven decades. In addition to supplying the mining industry with a wide range of water sprays and dust control equipment, the company has published several technical bulletins on drop size and dust prevention and suppression. Spraying Systems Co. has consulted on the *Dust Control Handbook for Industrial Minerals Mining and Processing* released in January 2012 by the National Institute for Occupational Safety and Health (NIOSH).



For information on the products or reference material listed below, visit spray.com/miningsolutions or call 1-800-95-SPRAY.

PRODUCTS

In-Line and Right-Angle BD Series
WhirlJet® Hollow Cone Hydraulic Nozzles
SpiralJet® Hollow Cone Hydraulic Nozzles
FloMax® Air Atomizing Nozzles
J Series Air Atomizing Nozzles
VeeJet® Flat Spray Hydraulic Nozzles
FullJet® Full Cone Hydraulic Nozzles
LN and UniJet® Hydraulic Fine Spray Nozzles

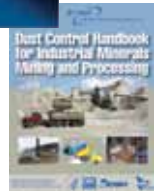
LITERATURE

A Guide to Spray Technology for Dust Control, **Bulletin 652**

Optimizing Your Spray System, **Technical Manual 410**

Understanding Drop Size, **Bulletin 459C**

The Dust Control Handbook from NIOSH is available online: **spray.com/miningsolutions**



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Bulletin No. 697 Printed in the U.S.A. ©Spraying Systems Co. 2012