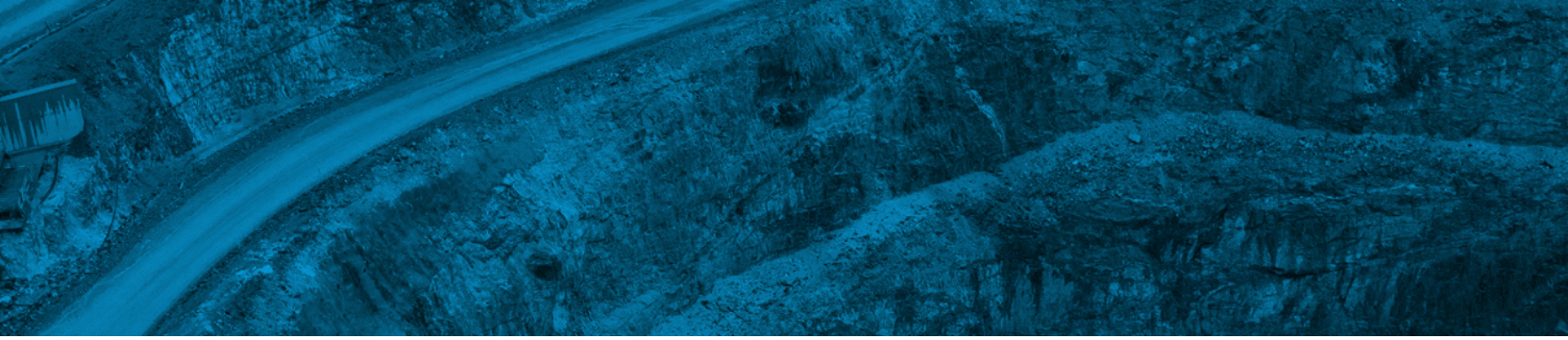
MSHA
Dust Results.

A overview of MSHA guidelines and results of DUSTGRIP® JFP-95

Quaker Houghton™
Forward Together™



MSHA Dust Results

Overview

The need for dust suppressants in the mining industry continues to increase due to health, safety, and regulatory reasons. Whether on a surface or underground mine, dust and other particulates are a constant safety concern for those working in the mining industry. These hazards can cause a wide range issues including respiratory illnesses, exposure to noxious gases, and operational risks.

MSHA Requirements

On August 1, 2016, Phase III of MSHA's respirable dust rule went into effect.

- The concentration limits for respirable coal mine dust were lowered from 2.0 milligrams of dust per cubic meter of air (mg/m^3) to 1.5 mg/m^3 at underground and surface coal mines
- The concentration limits for respirable coal mine dust were lowered from 1.0 mg/m^3 to 0.5 mg/m^3 for intake air at underground mines and for part 90 miners (coal miners who have evidence of the development of pneumoconiosis)
- Within the dust levels recorded, quartz must be .10 mg/m^3 or less of the total make up

Lowering the concentration of respirable coal mine dust in the air that miners breathe is the most effective means of preventing diseases caused by excessive exposure to such dust.

- MSHA requires quarterly samples be administered by qualified mine personnel at specific equipment and worker locations
- Personal Dust Monitors (PDMs) are used to collect coal dust readings while volumetric cassette pumps are utilized for quartz measurements
- The samples are measured portal to portal and can result in reduced dust standards if over the maximum 1.5 mg/m^3 of coal dust and .10 mg/m^3 quartz content"
- If high levels of respirable coal mine dust or quartz are found, a reduced total respirable coal dust standard and specific operational changes can be enforced to protect workers from the elevated levels
- Please see below results from samples taken following MSHA guidelines at an underground coal mine. Samples were taken both before and after the addition of DUSTGRIP® JFP-95, Quaker Houghton's solid cartridge dust suppressant

MSHA Dust Results: DUSTGRIP® JFP-95

	RESPIRABLE DUST	
APPLICATIONS	PRIOR TO DUSTGRIP® JFP-95	AFTER DUSTGRIP® JFP-95
Continuous Miner Operation	0.326	0.221
Shuttle Car	0.317	0.169
Shuttle Car	0.350	0.221
Scoop	0.372	0.152
Roof Bolter	0.228	0.168

	QUARTZ	
APPLICATIONS	PRIOR TO DUSTGRIP® JFP-95	AFTER DUSTGRIP® JFP-95
Continuous Miner Operation	33.8%	5%
Shuttle Car	6.9%	4.3%
Shuttle Car	22.9%	4.1%
Scoop	4.4%	4.1%
Roof Bolter	14.2%	7.1%