
From: Dave Anstine <Dave.Anstine@imerys.com>
Sent: Thursday, April 16, 2015 5:40 PM
To: zzMSHA-Standards - Comments to Fed Reg Group
Subject: Re: "RIN 1219-AB85" Request for Information to Improve the Health & Safety of Coal Miners and to Prevent Accidents in Underground Coal Mines Docket Number "MSHA-2014-0029"
Attachments: Imerys Response to RIN 1219 AB85.pdf

To Whom It May Concern

Imerys Carbonates is pleased to submit these comments as solicited by MSHA via the Federal Register regarding the desire to improve the health and safety of miners and to prevent accidents in underground coal mines.

Thank you for considering these comments. Please feel free to contact me should you have any questions.

Best Regards,
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April 16, 2015

MSHA, Office of Standards, Regulations, and Variances
1100 Wilson Boulevard, Room 2350
Arlington, Virginia 22209-3939

Re: "RIN 1219-AB85" Request for Information to Improve the Health and Safety of Coal Miners and to Prevent Accidents in Underground Coal Mines Docket No. "MSHA-2014-0029

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Imerys Carbonates is pleased to submit these comments as solicited by MSHA via the Federal Register regarding the desire to improve the health and safety of miners and to prevent accidents in underground coal mines

Imerys Carbonates has participated with NIOSH in testing of Rock Dust to improve the existing standard. These comments are based in part on the results of those tests. The following includes the specific questions from Section "C Rock Dust", with the response below.

"C.17" *What specific tests should be performed to monitor the quality of rock dust to assure that the rock dust will effectively suppress an explosion in the mine environment?*

Mine operators should require Certificates of Analysis with each lot from rock dust suppliers which documents the lot was tested for the following:

- a. The percentage of product passing through a 200 mesh screen, and
- b. For Moisture Tolerant Rock Dust: The percentage of surface treatment applied to the product

In addition, the mine operator should receive an annual certification from the rock dust supplier that the product produced for this application:

- a. Tested for Explosibility in 20L Chamber (Similar to NIOSH) and No Explosion
- b. Contains less than 1% Combustible Matter
- c. Contains less than 4% Silica Content
- d. Passes the caking & dispersability test* requirements when wetted and dried
- e. Tested for Specific Surface Area and found to be Greater than 2600sq.cm/g

* A specified Test that defines "Puff of Air" by pressure & time

"C.18" *What materials produce the most effective rock dust?*



Limestone, marble and dolomite produce the most effective rock dust. They contain little to no combustible material and are abundant in supply throughout the United States. These carbonate rocks act as heat sink in the prevention of coal dust explosions and in addition absorb energy as calcination occurs. Light colored rock dusts are preferable because of increased visibility and the fact that operators can more easily identify areas where float coal is accumulating and re-dusting is required.

"C.19" What are the advantages, disadvantages, impact on miner health and safety, and costs of limiting rock dust to light-colored inert materials, such as limestone and dolomite?

The main advantage is that the lighter and whiter rock dust is more visible in the mine and allows the operator or MSHA inspector to determine areas where float coal has accumulated and requires re-dusting.

A disadvantage is that limestone, marble, and dolomite rocks contain some amount of silica, and a fraction of that silica may be respirable. Most deposits have the silica commingled in the crystal with the calcium or magnesium carbonate, and the silica is difficult to liberate. The testing for respirable silica relies on acid digestion of the surrounding matrix, an operation which does not occur in mines. So while silica is present, the actual amount liberated and free is small.

Costs of materials are due in part to local availability; consideration in a final standard should be given to the availability of light colored stone.

"C.20" Please provide information on the types of impurities that could degrade rock dust performance. What tests or methods can be used to detect the presence of impurities?

Common impurities for Rock Dusts are clay, sand, quartz and organic matter. At low concentrations, none of these impurities will degrade the Rock Dust performance. At higher concentrations, the organic matter would be the only one that could be of concern to Rock Dust performance due to the possibility of combustion. A proposed 1% total organic content requirement using a simple ashing procedure would assure that this is not an issue.

"C.21" What particle size distribution for rock dust would most effectively inert coal dust? What should be the maximum particle size? What should be the minimum particle size? Please explain and provide the rationale for your answer.

NIOSH has done 2 studies utilizing the 20 liter Explosibility Chamber that give definition to the particle size of Rock Dust required to best inert coal dust.

The first study found that particles of Rock Dust greater than 60 Mesh(250um) do not assist in the abatement of explosions with coal dust.



The second study looked at the specific surface area of Rock Dust that was required to effectively inert coal dust. NIOSH determined that a minimum specific surface area of 2600sq.cm per gram was required to effectively inert coal dust.

Based on these studies, it would seem that the maximum acceptable particle size would be one that has 100% passing 60 Mesh(250um) and a minimum specific surface area of 2600sq.cm/g. The minimum particle size would still have to meet the requirements of 100% passing 60 Mesh(250um) and a minimum specific surface area of 2600sq.cm/g but would vary depending upon the nature of the Rock Dust ore and the processing of that ore.

"C.22" Determination of fine particle size of rock dust by sieving may be complicated by static agglomeration. What test methods should be used to measure the size distribution of rock dust to ensure consistent quality? What are the advantages, disadvantages, and costs of these test methods?

The Alpine Jet Sieve method (ASTM D-5158) is most preferred to measure particle size at this range. This is not an expensive apparatus, as the vacuum part alone can be as simple as a ShopVac from any hardware store. Wet screening (ASTM D117) is also an acceptable method, although it is less reliable and subject to some operator technique. Neither technique is expensive nor time consuming.

"C.23" How can the potential of rock dust to cake be minimized? Are subjective and practical tests available to determine the caking potential of rock dust? If so, please explain and provide documentation.

Rock dust caking can be prevented by the addition of a hydrophobic material. The treatment changes the surface energy of the ground limestone/marble. Two simple Rock Dust caking tests are known of by this author.

1) Add 1/2 cup of rock dust on top of a folded paper towel and add 1/4 cup of water to the perimeter of the Rock Dust pile. Visually determine if the mixture wicks up water and let it sit overnight to dry. After 24 hours, see if the Rock Dust is as dispersable as a non-wetted Rock dust by providing a light puff of air across the sample.

2) Add 50g of Rock Dust to a 250ml beaker and gently without stirring add 100 ml of distilled water which is at room temperature to the beaker. Allow the beaker and contents to stand at room temperature for 24 hours. Decant the water from the beaker and immediately blow on the Rock Dust sample and observe whether the Rock Dust readily disperses into the air.

The above 2 tests are simple pass/fail measures and are not intended to completely satisfy 30CFR 75.2

"C.24" Please provide information on how fine particles (less than 10 [μ m]) may increase the likelihood of caking in rock dust.



We have no evidence nor do we believe that fine particles contribute to or encourage caking.

"C.25" Can rock dust be treated with additives that would reduce caking? Would the additive enhance or diminish the ability of the rock dust particles to quench a coal dust explosion and, therefore, impact the effectiveness of the rock dust to inert coal dust? Please provide information on the chemical composition of any suggested additives, the quantities needed, costs, and potential impact on miner health and safety. If available, what areas of an underground coal mine would need to be treated with non-caking rock dust? Please explain and provide the rationale for your answer.

Additives can be added to reduce the caking potential of the Rock Dust. There are additives available that will not diminish the effectiveness of the Rock Dust to inert coal dust. A common additive family used with limestone, marble and dolomite Rock Dusts are fatty acids. The amount of fatty acid treatment required for these current Rock Dusts would be in the range of (0.1 to 0.3) weight percent. Fatty Acids are non-toxic and are found in everyday foodstuffs and cosmetics.

Costs of manufacture will increase due to; the costs of the chemicals, new equipment to apply it, the costs of running such equipment, and the costs of new storage silos.

The main areas of underground coal mines that would see the greatest benefit to non-caking Rock Dusts would be areas that encounter wet and high humidity conditions.

"C.26" Applied rock dust must be dispersible to inert an explosion. What in-mine tests can be used to determine the caking resistance (i.e., dispersibility) of applied rock dust?

The two caking tests described in answer to question 23 could be used "as is" or modified to provide an in-mine dispersibility test

1) Add 1/2 cup of rock dust on top of a folded paper towel and add 1/4 cup of water to the perimeter of the Rock Dust pile. Visually determine if the mixture wicks up water and let it sit overnight to dry. After 24 hours, see if the test Rock Dust is as dispersible as a non-wetted Rock dust by providing a light puff of air across the sample.

2) Add 50g of Rock Dust to a 250ml beaker and gently without stirring add 100 ml of distilled water which is at room temperature to the beaker. Allow the beaker and contents to stand at room temperature for 24 hours. Decant the water from the beaker and immediately blow on the Rock Dust sample and observe whether the Rock Dust readily disperses into the air.

The above 2 tests are simple pass/fail measures and are not intended to completely satisfy 30CFR 75.2

"C.27" How does combustible material degrade the performance of rock dust? How should MSHA modify the existing specification in the definition of rock dust? Please explain and provide documentation.



At higher concentrations, the organic matter would be the only component that could be of concern to Rock Dust performance due to the possibility of combustion. A proposed 1% total organic content requirement using a simple ashing procedure would assure that this is not an issue.

"C.28" How should MSHA modify the existing requirement for free and combined silica in the definition of rock dust? Please explain and provide documentation.

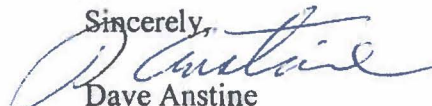
Modifications to the percentages of free and combined silica found in 30CFR 75.2 would not be recommended at this time but it may be of interest to MSHA to determine the current silica levels found in Rock Dusts throughout the US.

"C.29" How can the respirable particle size fraction of rock dust, i.e., less than 10 [mu]m, be limited, while maintaining the effectiveness of the dust to suppress the propagation of a coal dust explosion? Please explain.

In short, it cannot. Any practical effort to decrease the respirable fraction (<10 micron), will reduce the effectiveness of the Rock Dust to suppress an explosion. It is possible to reduce the <10 micron fines in the 200 mesh product. However, this will limit the inerting capability of the product as it is reliant on surface area. The fraction of < 10 micron particles has a disproportionately large percentage of the surface area of the entire product, so removing them would be costly and counterproductive.

Thank you for considering these comments. Please feel free to contact me at 770-645-3413 or dave.anstine@imerys.com should you have any questions.

Sincerely,


Dave Anstine
Senior Technical Leader