

include mining and non-mining markets, and the non-mining market has a product safety standard with more stringent approval requirements than MSHA for a specific product, MSHA could, at the request of the applicant, issue an approval based on the more stringent requirements. The approval documentation will state that the product fulfills both the applicable approval requirements in the non-mining standard and MSHA's approval requirements. In this case, the approved product sold in mining markets will provide a greater degree of protection than that specified by MSHA under existing requirements. Should the non-mining market have product safety standards which are, in some aspects, less stringent than those of MSHA, the applicant will be required to fulfill the non-mining standards' requirements and, in addition, all other requirements deemed necessary to ensure that the product provides at least the same degree of protection demanded by the MSHA approval requirements. In this situation, the approved product will exceed the safety requirements of the non-mining standard and meet those of MSHA. The same analysis will apply if the targeted areas were foreign and domestic markets.

In these situations, MSHA's approval documentation will show that the product had fulfilled the requirements of any non-MSHA product safety standard and those of MSHA. In the first instance, the product marketed in the non-mining application will embody a higher level of safety, while in the second instance it will embody equivalent safety. In no case will the product provide less protection than mandated by MSHA approval requirements.

The following example illustrates how MSHA will evaluate non-MSHA product safety standards to determine if they provide at least the same degree of protection as MSHA's product approval requirements. MSHA's approval regulation under 30 CFR part 18 requires explosion testing of explosion-proof enclosures using a methane-in-air mixture. The IEC explosion-proof enclosure standard (IEC 60079-1) requires the use of more sensitive test gases. That standard specifies the use of methane to determine "reference pressures" and uses a hydrogen/methane fuel mixture to test for flame propagation. The tests used in both MSHA requirements and the IEC standard produce higher pressures/temperatures than occur during normal operation.

One obvious difference in the two test protocols is MSHA's criterion to observe

for the "discharge of flame" (hot glowing gases) during any of the tests. The IEC standard does not have this requirement. The reason for this difference is that MSHA tests enclosures "as manufactured" without any intentional gaps and, unlike the IEC, does not require flamepath gaps to be enlarged to the maximum specified by design. Therefore, during MSHA testing, flamepaths are not forced open to any appreciable amount, unless there are defects or weaknesses in the enclosure. This is important because MSHA's requirements do not contain provisions for regular prototype pressure testing to supplement the explosion tests, as do the IEC requirements. Such pressure testing is specifically designed to identify faulty products over a broader range of pressures than can be achieved by the MSHA explosion testing protocol.

Considering the above discussion, MSHA's explosion testing protocol, with combustible mixtures of methane as the test gas and using the discharge of flame as an additional criterion to flame propagation for test failure, sets a high evaluation standard for explosion-proof enclosures used on mining equipment in the U.S. However, testing is accomplished without introducing intentional flamepath flange gaps. In contrast, the IEC standard requires that tests be conducted with flamepath gaps intentionally enlarged to within 80% to 100% of the maximum specified design. Thus, the IEC test standard allows for luminous flame to pass, but with insufficient energy to ignite the surrounding atmosphere and uses a more easily ignitable test gas than methane. This concession is significant when flamepath gaps are purposely enlarged for testing. Such a practice could produce non-incendive luminous gas discharges during testing, which would be considered unacceptable under MSHA test protocols. MSHA has no evidence that such a non-incendive luminous gas discharge is unsafe. The MSHA requirement and the IEC standard could be considered equivalent because the MSHA requirement to observe no discharge of flame is offset by the IEC's use of a more easily ignitable test gas and intentional gap enlargement.

With all other factors equal, MSHA could consider the explosion test specified by IEC to be equivalent to the explosion test procedure followed by MSHA in fulfillment of 30 CFR 18.62. In this manner a single test could verify conformity to the test requirements of both product standards with no reduction of safety in either case.

This example highlights the methods that will be employed by MSHA when determining if a non-MSHA product safety standard provides at least the same degree of protection as MSHA's product approval requirements. In like fashion, other differences between MSHA requirements and the IEC standards will be analyzed to determine if they are equivalent or if modifications to the IEC standards will be required.

This same process will be applied to all non-MSHA product safety standards that will be evaluated for equivalency. For example, MSHA requires that a component in an intrinsically safe circuit be tested to determine that it will not overheat under fault conditions and ignite a layer of coal dust. UL requires the product to be marked with a maximum temperature rating (also called a "T-Code") or tested using a different ignitable dust or gas. MSHA will determine if the temperature rating is below the minimum ignition temperature of a coal dust layer or if the specified dust layer (*e.g.*, grain dust) used in the test has a lower ignition temperature than a coal dust layer currently used in MSHA tests. If equivalency could not be determined, MSHA will require an additional test using a layer of a specified type and size of coal dust to ensure at least the same degree of protection is provided.

MSHA anticipates that cost savings from use of equivalent non-MSHA product safety standards could reduce the manufacturer's unit cost by permitting more standardized construction (*i.e.*, single product line) and, thus, improve the manufacturer's competitive position. This, together with the need to provide products meeting the highest level of safety demanded by the market areas of interest, could encourage a more rapid introduction of mining products embodying new technology with enhanced safety features. In general, this final rule should provide increased opportunity for direct competition leading to improved safety and performance quality in mining products.

Under this final rule, manufacturers who apply for MSHA approval of their products can have MSHA base the approval on either MSHA approval requirements or the equivalent non-MSHA product safety standards. MSHA will retain the responsibility of approving or denying an application based on all information submitted in the application.

As is the case with existing MSHA approval regulations, this final rule will not discriminate between U.S. and foreign manufacturers. Any manufacturer, either domestic or