

Abrasion Testing with Rubber Wheels

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The ASTM G 65 dry-sand rubber wheel test is a popular low-stress abrasion test in the USA. It uses coarse silica as the abradant and it is thought that this abradant best simulates the type of abrasion that occurs in mining and agriculture. The abradant is introduced between the test specimen and the rotating wheel with a chlorobutyl rubber tire.

The rubber wheel wears in each use and requires periodic replacement. In 2008 the only USA source of ASTM G 56 rubber wheels discontinued manufacture. A search was launched to find a new rubber wheel supplier, but concurrently we conducted tests to determine if more readily available rubbers could be substituted for the chlorobutyl rubber. This paper describes ASTM G65 tests conducted with four different rubbers. All four rubbers produced lower mass losses on reference steel than specified in the test standard. A limited number of tests were conducted on the candidate rubbers to determine if the test results correlated with a particular rubber property. The best correlation was obtained with the coefficient of friction of the abradant against test rubbers. This study suggests that it may be possible to use abrading wheels made from rubbers other than chlorobutyl rubber if the test metric is changed from “wear volume” to “wear ratio”.