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  + [Filtration Standards & Specifications](http://www.powdertechnologyinc.com/filtration-standards-specifications/)
  + [Test Dust History](http://www.powdertechnologyinc.com/test-dust-history/)
* [Particle Size Analysis](http://www.powdertechnologyinc.com/particle-size-analysis/)
* [Quote](http://www.powdertechnologyinc.com/request-quote/)
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[](http://www.powdertechnologyinc.com/test-dust-contaminants/test-dust-history/)

**Test Dust History**

Arizona sand has been used for testing filtration, automotive, and heavy equipment components for decades. A variety of names have been applied to Arizona sand including Arizona Road Dust, Arizona Silica, AC Fine and AC Coarse Test Dusts, SAE Fine and Coarse Test Dusts, J726 Test Dusts, and most recently ISO Ultrafine, ISO Fine, ISO Medium and ISO Coarse Test Dusts.

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Many military and industrial specifications require use of Arizona Test Dust and refer to one or more of the above names. This report will attempt to describe particle size differences and provide a brief history of Arizona Test Dust use dating back to 1940.

**Test Dust History**

**HISTORICAL PERSPECTIVE: EARLY HISTORY**

Use of Arizona sand as a test contaminant dates back prior to 1940. The proposed Air Cleaner Test Code, SAE Journal, Volume 47, July 1940 pages 294 to 299 provides an early examination of particle shape, particle size, and accepted analysis methods used at that time. SAE Handbook, 1943 Edition, Page 716, Air Cleaner Test Code-Preparation of Air Cleaner Test Dust reads as follows: Due to the absence of definite information and the almost unanimous lack of agreement on the part of those concerned, it has not been possible to set up a standard test dust although there is probably no single element affecting to so great a degree the efficiency of an air cleaner as the fineness of the dust used for testing. Satisfactory results in the development of air cleaners having a high degree of field efficiency have been obtained by preparing dust as follows:

**Raw Material:** The material shall be dust that settles out of the air behind or around tractors or implements operating in the Salt River Valley, Arizona. It is recommended that this dust be caught on a canvas cloth.

**Method of Manufacture:**

1. Dry raw dust in oven
2. Sift dust through 200 mesh screen (0.0029 in. width of openings)
3. Discard dust retained on 200 mesh screen
4. Sift dust obtained in section 2 through a 270 mesh screen (0.0021 in. width opening) until no more will go through

Screen Analysis (By Weight)80 per cent through 270 mesh screen. 20 per cent through 200 mesh screen, but shall be retained on 270 mesh screen.

**Examination of these specifications reveals:**

**First:** The requirement of air floating results in dust is in every way comparable with that entering the air cleaner of a tractor when operating in a field, since the position of the air inlet is such that the greater part of the dust entering the tractor inlet is actually air floated.

**Second:** The specifications of sieve size were arrived at by analyzing samples of dust caught in the oil cups of a number of cleaners operating in the extremely dusty conditions in the Southwest.

**Third:** Examination of air floated dust from the Salt River Valley of Arizona reveals that it contains a high percentage of extremely fine particles, highly abrasive in nature, the size of which is difficult to arrive at by any screening specifications. To develop the fallacy of depending solely upon a screen analysis, an examination has been made of such dust as would pass through a 270 mesh wire screen. One of these samples was taken from dust originating in Salt River Valley, Ariz., the other originating in the Imperial Valley at Calexico, Calif. An examination of this dust revealed the following properties:

|  |  |  |
| --- | --- | --- |
| **Particle Size (microns)** | **Arizona Dust (percent)** | **California Dust (percent)** |
| 53-44 | 17.3 | 5.1 |
| 43-24 | 54.2 | 42.3 |
| 23-6 | 15.4 | 35.9 |
| 5-0 | 13.1 | 10.7 |

Formulation of Arizona Test Dust by collecting wind blown topsoil, which required screening and blending, became impractical as larger quantities of test dust were needed. It is also conceivable that significant variation in particle size of wind blown dusts would occur as a result of changing weather conditions.