

11 earwax from drum - Mercury

B-375-G1

65% asbestos
35% ignitables

Loss-on-ignition 42.7%

1159-N

69% asbestos
3% limestone
28% ignitables

Loss-on-ignition 36.7%

Assume wear products are $\frac{2}{3}$ B-375-G1, $\frac{1}{3}$ 1159-N

Equivalent "non-decomposed" composition:

asbestos: $\frac{2}{3} \times 0.65 + \frac{1}{3} \times 0.69 = 0.433 + 0.23 = 0.663$

Ignitables: $\frac{2}{3} \times 0.35 + \frac{1}{3} \times 0.28 = 0.233 + 0.093 = 0.326$

Limestone: $\frac{1}{3} \times 0.03 = 0.01$

PLAINTIFF'S
EXHIBIT
FD-251

Loss-on-ignition of wear debris from drum with
B-375-G1 secondary and 1159-N primary: 30%

Equivalent loss-on-ignition of both shoes (initially)
 $= \frac{2}{3} \times 0.427 + \frac{1}{3} \times 0.367 = 0.285 + 0.122 = 40.7\%$

For 1g initial lining,

Let $x = g$ remaining after total ignition = 0.593

$y = g$ solid dust generated

$y - x = g$ loss on ignition of dust.

$$\frac{y - 0.593}{y} = 0.3$$

$$0.3y = y - 0.593$$

$$y = \frac{0.593}{0.7} = 0.846$$

8000 8029

81.9

composition of asbestos lining appearing as dust
Basis: 1 g lining

Assume 0.66 g asbestos (0.574 g dehydrated asbestos + 0.086 g water of hydration)
0.33 g organic

Let y = g organic decomposed during wear

$0.33 - y$ = g organic remaining in dust after wear

Assume dust includes dehydrated asbestos + limestone
(0.584) plus some undecomposed organic ($0.33 - y$).

Fraction of dust which is lost on ignition

$$\text{is } \frac{0.33 - y}{0.584 + 0.33 - y} = 0.3 = \frac{0.33 - y}{0.914 - y}$$

$$0.33 - y = 0.3 \times 0.914 - 0.3y = 0.274 - 0.3y$$

$$0.7y = 0.056$$

$$y = 0.08$$

Fraction of original lining appearing as dust = $0.584 + 0.25 = 0.834$

Fraction of original organic appearing in dust = $\frac{0.25}{0.33} = 0.76$

For a more typical lining, which contains perhaps 52% asbestos, 18% other inorganics, and 30% organics, if we assume that all of the water of hydration in asbestos is lost ($0.12 \times 0.52 = 0.0624$) and $\frac{1}{4}$ of the organic is lost ($\frac{1}{4} \times 0.3 = 0.075$), then total debris remaining is $1 - (0.075 + 0.0624) = 0.857$ g

g initial lining

or $\frac{0.857}{0.52} = 1.65$ times the amount of asbestos worn away.

5008 0030

If, instead, half of organic is lost ($\frac{1}{2} \times 0.3 = 0.15g$),
then total debris remaining is $1 - (0.15 + 0.068) = 0.782$
g per g initial lining, or $\frac{0.782}{0.52} = 1.5$ times the
amount of asbestos worn away.

8000 0031

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