



Health, Safety & Environmental Affairs – Toxicological -“Tox” Testing

Since the early 1960's, as a part of its corporate responsibility and product stewardship commitments, Master Chemical has sent its finished metal removal products to an independent laboratory for health and safety testing. The results of this testing can be found in Section 11 of the product Material Safety Data Sheet (MSDS). While Master Chemical has an internal requirement for this type of testing, all the law requires is a “good faith” evaluation of the risks associated with “hazardous” chemicals included in the formula at more than one percent.

The chemical industry is rife with examples of two very hazardous chemicals coming together to produce an innocuous and useful chemical; such as chlorine and sodium producing table salt (NaCl), or hydrogen and oxygen producing water (H₂O). Conversely, when “safe” chemicals are combined, they can produce a hazardous chemical; such as water and sulfur producing sulfuric acid (H₂SO₄). Given examples such as these and its longstanding commitment to “end-user safety,” it is logical Master Chemical runs testing on all its finished products.

Independent toxicology “tox” testing is done both on the fluid concentrate and on fresh working solution at the highest concentration of a product's expected use. MCC typically runs the following tests on all its products:

1. Acute Inhalation Toxicity – In this test a rat is subjected to an aerosol of the working solution at the desired concentration and then the results measured. The results are reported as either toxic or nontoxic, with a reported numerical value, such as LC50>220mg/l, indicating the lethal concentration of the tested product for 50% of the subject rats was greater than 220 mg/l of air. The test article is not considered to be toxic if LC50>220mg/l.

2. Acute Oral Toxicity – In this test a rat is fed the working solution or the concentrate and the results measured. The results are reported either as toxic or nontoxic, as well as reporting a numerical value, such as, non-toxic LD50>5000mg/kg. The test article is not considered to be toxic if less than half the animals die at a dose of 5000mg/kg. (16 CFR 1500.3(c) (2) (i).

3. Acute Dermal Toxicity – A rabbit's skin is repeatedly “painted” with the fluid to be tested and then the results are read. These results are reported as either toxic or nontoxic, plus a numerical value is reported, such as nontoxic LD50 >2000mg/kg body weight.

4. Primary Dermal Irritation – After carefully shaving patches of the rabbit's fur, samples of fluid(s) to be tested are applied and allowed to stand over time.



The results are then read and a numeric value assigned. Both the numeric value and whether or not it is an irritant is reported, such as, nonirritant PDI index = 0.38. The irritant/nonirritant transition for the PDI is ≥ 5.0 .

5. Primary Eye Irritation – In this test, drops of the concentrate and the working solution are applied to the rabbit's eyes and the reaction observed and rated as either an irritant, nonirritant or indeterminate.

6. Repeated Insult Patch Test – In this test, highly paid volunteers, largely college students, have 4”x4” gauze pads soaked with the solution placed on their skin, and covered for extended periods of time. After several exposures, the test site is allowed to rest for a week and then challenged again and the results read.

While there is not a generally accepted test or legal standard for the "toxicology" of metalworking fluids, Master Chemical feels this battery of tests provides excellent results. These tests are similar to those used by the cosmetics industry. We evaluate fluids using similar standards.

NOTES:

1. While Master Chemical does everything in its power to produce the safest possible products, metalworking chemicals, like all other chemicals, should be treated with respect and used as intended.
2. PDI Index is the Primary Dermal Index and values less than 5 are considered nonirritants, values above 5 are considered irritants.

3. LC50 is the lowest concentration in the air that can be expected to kill 50% of the test animals. The value given is expressed as X amount by weight of the product per weight of the test animals, as in mg/kg.
4. LD50 is the lowest level of product that through exposure by other than inhalation can be expected to kill 50% of the test animals. The value given is expressed as X amount by weight of the product per weight of the test animal, as in mg/kg.

For additional information on toxicology testing procedures, contact: your Master Chemical District Manager or Authorized Distributor, our **Tech Line 800 537-3365** (North America only), or our web site

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