

DuPont Statement – Feb. 6, 2008
Non-Animal Testing Alternatives for Nanomaterials

DuPont endorses the use of scientifically valid non-animal testing methods for assessing the safety of nanomaterials to human health and the environment. Accordingly, the Nano Risk Framework developed by DuPont and Environmental Defense calls for using scientifically validated alternative methods that reduce, refine or replace the use of animal models in research. DuPont believes that the Nano Risk Framework is designed to minimize animal testing through an iterative safety evaluation approach.

This approach starts with a thorough understanding of the nanomaterial characteristics and behavior and a literature review of the corresponding bulk and nanomaterial, followed by the design of technically relevant tests to address specific safety questions for the particular nanomaterial and its designated uses. Nanomaterial test substances must be optimally characterized before conducting any type of safety testing. Non-animal testing alternatives to address these safety questions should be used where they have been shown to be predictive for nanomaterials.

DuPont believes that validated non-animal alternatives such as *in vitro* assays and computer modeling will become increasingly available and should be used to reduce or replace animal tests for nano products whenever possible. DuPont is actively pursuing several approaches to validate *in vitro* tests for both fine and nanoscale materials to make them part of our testing program (e.g., substitution of *in vitro* tests for *in vivo* skin and eye irritation tests). We will share what we learn with other organizations that may benefit. We encourage other companies to also investigate non-animal test methods, and to share any new developments.

Below are some non-animal or reduced-animal test methods that should be considered as alternatives to some common animal tests. These tests have been approved by ECVAM, ICCVAM or OECD for bulk materials and should be considered as an early screen or replacement in nanomaterial testing programs once they are validated as being predictive for nanomaterials. In addition, the growing list of available non-animal tests should be considered in keeping with the vision outlined by the National Academy of Science's report, *Toxicity Testing in the 21st Century: A Vision and a Strategy*. These alternatives can be used alone or as part of a testing program combining *in vitro* and *in vivo* methods, as appropriate. Over time, we believe that scientific advances will provide additional tools that will reduce animal testing, while continuing to ensure product safety for humans and the environment.

Endpoint	Method	Validated and Recommended for Regulatory Use:
Skin Irritation	EPISKIN with MTT Reduction and IL-1a release	ECVAM: as a replacement ICCVAM: as a screen in a tiered-testing strategy
	EpiDerm with MTT Reduction and IL-1a release	ECVAM: as a replacement (a negative result may require further testing) ICCVAM: as a screen in a tiered-testing strategy
Skin Sensitization	LLNA in mice	OECD 429
Skin Penetration	<i>In Vitro</i> Skin absorption	OECD 428
Skin Corrosivity	Corrositex	OECD 435
	<i>In Vitro</i> Skin Corrosion: Human Skin Model Test	OECD 431
Genotoxicity	Ames-Bacterial Reverse Mutation Test	OECD 471
	<i>In Vitro</i> Mammalian Chromosome Aberration Test	OECD 473
	<i>In Vitro</i> Mammalian Cell Gene Mutation Test	OECD 476
Ocular	Bovine Corneal Opacity (BCOP) Isolated Chicken Eye (ICE)	ECVAM: supports the use in appropriate circumstances and with certain limitations as screening tests to identify substances as ocular corrosives and severe irritants in a tiered-testing strategy, and as part of a weight-of-evidence approach. ICCVAM: these test methods are not considered to be replacements for the <i>in vivo</i> rabbit eye test; however, they can be used in appropriate circumstances and with certain limitations as screening tests to identify substances as ocular corrosives and severe irritants in a tiered-testing strategy, and as part of a weight-of-evidence approach.