Plastic Construction Materials for 3-A Equipment

This paper describes the general requirements for plastic materials in 3-A Sanitary Standards. Readers should obtain a copy of the complete current standard for details or consult with a qualified laboratory authority on the testing protocol. To obtain this standard, go to the menus at the bottom of the 3-A SSI web site home page, click on 'Sanitary Standards and Accepted Practices Store' and follow to purchase information for 3-A Sanitary Standard *#20- , Multiple-Use Plastic Material Used as Product Contact Surfaces*.

What does this standard cover?

All 3-A Sanitary Standards require that any plastic materials that contact product or cleaning solutions shall conform to 3-A Sanitary Standard *#20- , Multiple-Use Plastic Material Used as Product Contact Surfaces*. This standard does not apply to single-use plastics such as consumer size food containers. Also excluded are rubber-like materials resulting from chemical or thermal vulcanization or curing. Such rubber-like materials are covered by a separate 3-A Sanitary Standard, *#18- , Multiple-Use Rubber and Rubber-Like Materials Used as Product Contact Surfaces*, which is described in a related article.

It should be emphasized that this is a plastic material standard. It does not show design and fabrication requirements for plastic components. Such criteria are provided in other 3-A Sanitary Standards and 3-A Accepted Practices.

Why a 3-A Sanitary Standard? Isn't FDA food grade testing sufficient?

A primary requirement for plastic materials is compliance with the FDA regulations of the Food, Drug and Cosmetic Act, as amended. The 3-A Sanitary Standard stipulates additional laboratory testing intended to determine "ability to be cleaned and to receive effective bactericidal treatment and to maintain their essential functional properties and surface finish in accelerated use-simulating tests." This summarizes the intent of the standard. It consists mainly of specifying laboratory tests, the preparation of plastic specimens for testing, and the criteria for listing and evaluating the test results.

What is needed to perform the testing?

These tests require the services of a capable and experienced laboratory. Few 'in-house' laboratories maintain the capability to perform these tests. For starters, you would need a number of reference standards, most from the American Society for Testing and Materials (ASTM). The appropriate laboratory equipment would also be needed, not to mention test solution chemicals and specialized knowledge of proper laboratory procedures. The testing should be performed by qualified commercial materials testing laboratories.

To locate such a laboratory, try the following sources:

ASTM International at www.astm.org.
American Council of Independent Laboratories at www.acil.org.
American Association for Laboratory Accreditation at www.a2la.org.

What does the testing entail?

An important prerequisite of the laboratory testing is the preparation of plastic test specimens. There should be a clear understanding as to who will supply them, or whether it will be the responsibility of the testing laboratory. As outlined in the provisions of the standard, preparation of 33 specimens is required. However, a few extra specimens should be prepared for comparison to the test specimens, in case they are needed. The specimens must be precisely prepared to have the required exposed surface area. For a plastic tubing specimen for instance, the exposed surface area includes outside, inside, **and** cut surfaces. Also, the standard requires the test specimen surfaces must be at least as smooth as a defined 150 grit surface on stainless steel.

Note: It is anticipated that in the next revision of this plastic standard a more precise degree of stainless steel smoothness equivalent will be specified, such as minimum 32 µin. (0.8 µm) Ra, which can be measured with a profilometer. In addition, other provisions of the standard specify very exact details of the actual test procedure and the reporting of test results.

The Appendix of the standard includes a four-part certification form concerning the testing and conformance to the criteria for acceptability. This certification page and the three pages of supporting laboratory results may be used to show conformance to the 3-A Sanitary Standard. Manufacturers of 3-A equipment should have such certification(s) on hand for each different kind of plastic which will be in contact with product and/or solutions. The certification(s) should be part of the Engineering Design and Technical Construction File (EDTCF) referenced in the Appendix of most 3-A Sanitary Standards. It will be reviewed by the Certified Conformance Evaluator when authorization is sought for use of the 3-A Symbol.

Other Appendix information provides important guidance about the re-testing of plastic materials, alloys and blends of polymers, and the certification of plastic materials with multiple trade names or product names.

As a general rule, standards of any kind should be reviewed often for relevance, content, and usefulness. Periodic revision is usually needed to accommodate regulatory demands and the ever-changing technology of materials, machinery, processes, and new food products. For over 50 years, 3-A Sanitary Standards were limited to the handling and processing of milk and milk products. However, beginning about four years ago, the scopes of new or revised 3-A SSI standards were expanded to include “other comestibles.” This means a great leap in the variety of products and conditions that plastics must meet when used in some 3-A equipment. This in turn requires a wider range of plastic materials. There is no doubt that more generic classes and other changes will be needed to accommodate the expanded scopes. Fortunately, there are well-established procedures for making amendments or revisions, together with dedicated volunteer Work Groups to carry them out.