



FOODSERVICE PACKAGING  
INSTITUTE

# **GUIDANCE DOCUMENT FOR QUALIFYING OVENABLE PACKAGING**

**Developed by the  
Foodservice Packaging Institute's  
Foodservice Packaging Standards Council**

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# GUIDANCE DOCUMENT FOR QUALIFYING OVENABLE PACKAGING

## ***Purpose:***

The purpose of this document is to provide guidance to manufacturers seeking to qualify single-use packaging products for ovenable applications.

## ***Scope:***

This guidance document is intended to be applicable to all single-use packaging products, for use in consumer, commercial and institutional ovens. These include conventional or range, convection, conveyor and other ovens used in households and the foodservice industry.

## ***Background:***

In 1988, the Foodservice & Packaging Institute (FPI) developed, in conjunction with the Cornell University's Department of Nutrition, "Test Procedure Guidelines to Qualify Dual Ovenable Containers."

This guideline set forth test criteria for the evaluation of single-use containers intended for use in microwave, conventional, convection and combination ovens, as were found in a normal consumer household, including:

- a) oven calibration,
- b) guides for evaluating temperature resistance,
- c) guides for evaluating dimensional stability,
- d) guides for evaluating impact resistance,
- e) guides for determining odor limits,
- f) microwave oven criteria, and
- g) glossary of terms.

In 2009, the Foodservice Packaging Institute's Foodservice Packaging Standards Council, comprised of industry representatives from both member and non-member companies, considered a revision of these guidelines.

Since the original guidelines were developed over 20 years ago, improvements in cooking technology have produced a wide variety of ovens for cooking, heating and re-heating food. Because of the development of these new cooking technologies, the council determined that it is no longer possible to have a "one size fits all" standard testing protocol to determine the suitability of single-use packaging for ovens. Therefore, the council has developed this guidance document as a replacement.

**General Guidance:**

When seeking to determine the suitability of using a single-use package in an ovenable application, the Foodservice Packaging Institute encourages manufacturers to:

- consider all the variables involved:
  - cooking technology, i.e. conventional; convection; combination; conveyor; pizza; rack ovens; etc.
  - packaging material, i.e. aluminum, paper, coated paper, plastic or other
  - quantity of packages
  - foods contained in the package(s)
  - uses of the package(s), both by household consumers and foodservice operators
- use existing standards developed by organizations such as:
  - American National Standards Institute (ANSI) ([www.ansi.org](http://www.ansi.org))
  - ASTM International ([www.astm.org](http://www.astm.org))
  - International Organization for Standardization (ISO) ([www.iso.org](http://www.iso.org))
  - Technical Association of the Pulp and Paper Industry (TAPPI) ([www.tappi.org](http://www.tappi.org))

*[Applicable existing standards from these organizations are listed below.]*

- be sure that testing results are reproducible.

As with all packaging, FPI strongly recommends that manufacturers use only packaging materials that are in compliance with the Food and Drug Administration's Code of Federal Regulations (CFR) Title 21 ([www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfCFR/CFRSearch.cfm](http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfCFR/CFRSearch.cfm)). For more information on compliance issues, please refer to FPI's Compliance Manual, found at [www.fpi.org](http://www.fpi.org).

**Guidance for Oven Preparation and Calibration:**

When preparing and calibrating ovens, testing should be completed as closely to the geometric center of the oven as possible with temperature monitoring essentially in the same location in an effort to provide the best reproduction for the test conditions. In addition, consider the following standards:

- ANSI/AHAM ER-1-2007 Household Electric Ranges (<http://webstore.ansi.org/RecordDetail.aspx?sku=ANSI%2fAHAM+ER-1-2007>)
- ANSI Z21.1-2005 Household Cooking Gas Appliances (<http://webstore.ansi.org/RecordDetail.aspx?sku=ANSI+Z21.1-2005>)
- ASTM F1496 - 99(2005)e1 Standard Test Method for Performance of Convection Ovens ([www.astm.org/Standards/F1496.htm](http://www.astm.org/Standards/F1496.htm))

- ASTM F1639 - 05 Standard Test Method for Performance of Combination Ovens ([www.astm.org/Standards/F1639.htm](http://www.astm.org/Standards/F1639.htm))
- ASTM F1695 - 03(2008) Standard Test Method for Performance of Underfired Broilers ([www.astm.org/Standards/F1695.htm](http://www.astm.org/Standards/F1695.htm))
- ASTM F1817 - 97(2003) Standard Test Method for Performance of Conveyor Ovens ([www.astm.org/Standards/F1817.htm](http://www.astm.org/Standards/F1817.htm))
- ASTM F1965 - 99(2005) Standard Test Method for Performance of Deck Ovens ([www.astm.org/Standards/F1965.htm](http://www.astm.org/Standards/F1965.htm))
- ASTM F2022 - 01(2007) Standard Test Method for Performance of Booster Heaters ([www.astm.org/Standards/F2022.htm](http://www.astm.org/Standards/F2022.htm))
- ASTM F2093 - 06 Standard Test Method for Performance of Rack Ovens ([www.astm.org/Standards/F2093.htm](http://www.astm.org/Standards/F2093.htm))
- ASTM F2140 - 01(2007) Standard Test Method for Performance of Hot Food Holding Cabinets ([www.astm.org/Standards/F2140.htm](http://www.astm.org/Standards/F2140.htm))
- ASTM F2141 - 07 Standard Test Method for Performance of Self-Serve Hot Deli Cases ([www.astm.org/Standards/F2141.htm](http://www.astm.org/Standards/F2141.htm))
- ASTM F2142 - 01(2007) Standard Test Method for Performance of Drawer Warmers ([www.astm.org/Standards/F2142.htm](http://www.astm.org/Standards/F2142.htm))
- ASTM F2237 - 03(2008) Standard Test Method for Performance of Upright Overfired Broilers ([www.astm.org/Standards/F2237.htm](http://www.astm.org/Standards/F2237.htm))
- ASTM F2238 - 03 Standard Test Method for Performance of Rapid Cook Ovens ([www.astm.org/Standards/F2238.htm](http://www.astm.org/Standards/F2238.htm))
- ASTM F2239 - 03e1 Standard Test Method for Performance of Conveyor Broilers ([www.astm.org/Standards/F2239.htm](http://www.astm.org/Standards/F2239.htm))
- ASTM F2380 - 04 Standard Test Method for Performance of Conveyor Toasters ([www.astm.org/Standards/F2380.htm](http://www.astm.org/Standards/F2380.htm))
- ASTM F2472 - 05 Standard Test Method for Performance of Staff-Serve Hot Deli Cases ([www.astm.org/Standards/F2472.htm](http://www.astm.org/Standards/F2472.htm))

***Guidance for Evaluating Temperature Resistance:***

Various materials have unique upper temperature limits to which they can safely be subjected without unacceptable distortion or deterioration. Consequently, it is important to establish an upper temperature limit for the container under test.

When evaluating temperature resistance, it is recommended that the test be done under a “no load” condition. In addition, consider the following standards:

- ASTM D618 - 08 Standard Practice for Conditioning Plastics for Testing ([www.astm.org/Standards/D618.htm](http://www.astm.org/Standards/D618.htm))
- ASTM D4332 - 01(2006) Standard Practice for Conditioning Containers, Packages, or Packaging Components for Testing ([www.astm.org/Standards/D4332.htm](http://www.astm.org/Standards/D4332.htm))

***Guidance for Evaluating Dimensional Stability:***

After the recommended upper temperature limit has been established, test the product for dimensional stability. When evaluating dimensional stability, consider the following standards:

- ASTM D648 - 07 Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position (<http://www.astm.org/Standards/D648.htm>)
- ASTM D1042 - 06 Standard Test Method for Linear Dimensional Changes of Plastics Under Accelerated Service Conditions ([www.astm.org/Standards/D1042.htm](http://www.astm.org/Standards/D1042.htm))
- ISO 2796:1986 Cellular plastics, rigid - Test for dimensional stability (<http://webstore.ansi.org/RecordDetail.aspx?sku=ISO%202796:1986>)

***Guidance for Evaluating Impact Resistance:***

After all temperature testing has been completed, those test samples having passed the temperature criteria and an equal number of untested samples should be impact tested under a food load condition. A simulated food load may be used, however it may give erroneous results. Therefore, it is suggested that the intended product for end use be used as the food load material.

When evaluating impact resistance, consider the following standards:

- ASTM D5276 - 98(2009) Standard Test Method for Drop Test of Loaded Containers by Free Fall ([www.astm.org/Standards/D5276.htm](http://www.astm.org/Standards/D5276.htm))
- ASTM D2463 - 95(2005) Standard Test Method for Drop Impact Resistance of Blow-Molded Thermoplastic Containers ([www.astm.org/Standards/D2463.htm](http://www.astm.org/Standards/D2463.htm))

***Guidance for Conducting Thermogravimetric Analysis:***

When conducting thermogravimetric analysis, consider the following standard:

- ASTM E1131 - 08 Standard Test Method for Compositional Analysis by Thermogravimetry ([www.astm.org/Standards/E1131.htm](http://www.astm.org/Standards/E1131.htm))

***Guidance for Determining Odor Limits:***

When determining odor limits, consider testing according to ASTM Manual 26, “Sensory Testing Methods: 2nd Edition,” published in 1996. For more information, go to:

- [www.astm.org/DIGITAL\\_LIBRARY/MNL/SOURCE\\_PAGES/MNL26.htm](http://www.astm.org/DIGITAL_LIBRARY/MNL/SOURCE_PAGES/MNL26.htm)

Another resource is the TAPPI standard, T 483 cm-02 Odor of Packaging Materials ([www.tappi.org/s\\_tappi/doc\\_bookstore.asp?CID=7371&DID=517411](http://www.tappi.org/s_tappi/doc_bookstore.asp?CID=7371&DID=517411)).

***Guidance for Evaluating Single-use Containers Intended for Use in Microwave Ovens:***

For more information on evaluating single-use containers intended for use in microwave ovens, please refer to FPI’s “Standard Test Method to Qualify Disposables for Use in Microwave Ovens,” which may be found at [www.fpi.org](http://www.fpi.org).

***If you have updates to this guidance document, or would like to include other reference materials and standards, please submit them for consideration to [fpi@fpi.org](mailto:fpi@fpi.org).***