FY2004 Market Monitoring Test Results

Sample purchase test related to the Household Goods Quality Labeling Law
"Tableware and Kitchen Utensils made of Tempered Glass"

(National Institute of Technology and Evaluation)

In FY2004, NITE conducted a sample purchase test of "Tableware and kitchen utensils made of tempered glass" to confirm their compliance with the quality labeling regulations for miscellaneous manufactured goods (hereinafter referred to as "labeling regulations") under the Household Goods Quality Labeling Law.

NITE purchased 15 sample products available in the market for the test; 4 tumblers and wineglasses labeled "strengthened mouth-part (rim)", 8 tumblers and dishes labeled "thermally strengthened glass," a tumbler labeled "chemically strengthened glass," and 2 dishes labeled "laminate strengthened."

These products are required to indicate product name ("Tableware/kitchen utensil made of tempered glass"), kind of tempering ("strengthened mouth-part," "heat-strengthened," "chemically-strengthened" or "laminate strengthened") and handling precautions in accordance with the type of tempering.

All the sample products were labeled properly for their names, types of tempering and handling precautions, however 3 samples provided insufficient labeling; the particulars subject to voluntary labeling were declared under the legislation name such as "labeling under the Household Goods Quality Labeling Law." The labeling regulations require the legislation names only when labeling the particulars to be declared. The legislation names should not be indicated for non-regulated particulars to avoid misleading consumers.

NITE presented the test results to noncompliant labelers and conducted hearings with them for their opinions and measures to be taken. The results of the hearings, together with the test results, were reported to the Ministry of Economy, Trade and Industry (METI). Based on the test results, METI has given administrative guidance to the relevant labelers.

Reference

(1) Type of tempering

Thermally strengthened glass: A type of glass that has been strengthened by heating and rapid quenching to create a compressive stress layer on the surface.

Chemically strengthened glass: A type of glass that has been strengthened by the replacement of ions which causes the surface of the glass to be in a state of compression.

Strengthened mouth-part (rim): Products such as glasses tend to break at the mouth-part (rim), thus these parts are to be strengthened thermally or chemically.

Laminate Strengthened: Deposits of more than 2 layers of glass with different coefficients of thermal expansion; heated at high temperature and then cooled to create a compressive layer on the surface which strengthens the glass.

(2) The reason for toughness of the tempered glass

A glass breaks when tensile stress from an impact is concentrated at fine cracks on the surface. Tempered glass is toughened by applying compressive stress to the glass surface beforehand through the process described in (1). This compressive stress opposes the stretching stress from an impact and prevents the glass from breaking.

(3) As described, tempered glass products are essentially break-proof; however they would break when the applied tensile stress is greater than the compressive stress or when a deep crack is formed beyond the compressive stress layer. Also, holding the strain (=compressive stress) on the surface means that they build up energy inside the glass. The stored energy would be released in case of product breakage. When a product made of "thermally strengthened" glass or "laminate strengthened" glass breaks, it can be shattered into sharp or fine fragments and scattered. From the safety standpoint, the labeling regulations require them to indicate precautions against breakage and also care instructions in case they break.

All the tested sample products fulfilled these requirements.

(4) To identify type of tempering, strain measuring equipment and a polarizing microscope were used to see whether the sample had a compressive stress layer, observe cross-section shape, and to conduct a crushing test.

From the test scene - Sample images of stress layer by strain measuring equipment

<Strengthened mouth-part (rim)> <Thermally strengthened glass>

Color and strain rate

yellow ← orange ← red	red-purple	blue → green → yellow
high ← low	nil	low → high