Explanation of the Plastic Material Registration Directory

There are three registration systems for plastic materials. These are the flammability, ball pressure, and upper limits of the usage temperature. Each registration system manages the registered brands matter different registration numbers. In this registration directory, the registration information for each registration system is organized under the brand.

Contents description

1. Flammability

Flammability			
(1) Color	(2) Thickness (mm)	(3) Flammability class	(4) Registration number

(1) Color

The flammability may vary depending on the coloring agents that are mixed.

Tests are made for testing samples such as natural colors (non-coloring agent), black (organic pigment), white (inorganic pigment), red (dye), and other colors when necessary (such as modified of transparency and metal powder). When the brand is registered at the lowest flammability class among these results, it may be registered for "All Colors".

(2) Thickness

The thickness indicates the minimum thickness that is guaranteed for the flammability class.

The thickness of printcircuit laminated boards is normally the JIS (Japanese Industrial Standards) nominal value for the thickness.

(3) Flammability class

Tests are conducted according to the testing methods stipulated in the following reports by the Committee on Electrical Appliance Affairs of Japan Electric Association: "Horizontal Burning (HB) Test Method for Housing-use Plastic Materials Used in Electrical Appliances" and "Vertical Burning (VB) Test Method for Plastic Materials Used in Electrical Appliances".

The horizontal burning (HB) characteristic is indicated by 40 or 75 according to the burning speed. The vertical burning (VB) characteristic is indicated by V-0, V-1, or V-2 according to the afterflame and afterglow time.

(4) Registration number

H indicates that the degree of flammability is 40mm/min and less than 40 mm/min. for the HB test.

HS indicates that the degree of flammability is 75mm/min and less than 75 mm/min. for the HB test.
V indicates the VB characteristics.

2. Ball pressure test

Ball pressure test		
(1)Color	(2) Temperature (°C)	(3) Registration number

(1) Color
"All Colors" means that the representation applies to all colors, including natural colors.

(2) Temperature
Tests are conducted according to the testing methods stipulated in the following report by the Committee on Electrical Appliance Affairs of Japan Electric Association: "Registration System for Ball Pressure Temperature of Thermoplastic Used in Electrical Appliances".
The registered temperature is lower than the ball pressure temperature limit and it is indicated in 5°C units.
(Note: When be loaded a dead weight of 20+/- N is applied for one hour to the heated sample using a steel ball with diameter of 5 mm, the ball pressure temperature limit is the temperature where the diameter of the indented hole becomes 2 mm.)

(3) Registration number
B indicates the ball pressure registration.

3. Upper limits of the usage temperature

(1) Upper limits of usage temperature (°C)							
(2) Color	(3) Thick-ness (mm)	(9) Wire	(4) Characteristics				(10) (11) Regis-trati-on number
			(5) Elect-rical	(6) Mecha-nical with-out impact	(7) Mecha-nical with impact	(8) Flexi-bility	

(1) Upper limits of usage temperature (°C)

The upper limits of the usage temperature are registered temperatures for new materials and temperatures exceeding Section 1 for the upper limits of the usage temperature stipulated for separate insulation material types and classes contained in the attached table of "Upper Limits of Usage Temperatures for Insulating Materials Used in Electrical Appliances" of technical standards for electrical appliances stipulated in the ministerial ordinance (Ministry of International Trade and Industry Ordinance No. 85). Therefore, for the upper limits of the usage temperature in the sections that are blank in this directory, sections that come under the attached table will use the temperature appearing in the table, and new materials are assigned an upper limit of 50°C.

New materials are considered to be those materials that do not come under the items contained in the attached table (insulating material type, class, upper limit of usage temperature).

(2) Color

a. Brands where tests were conducted on testing samples using the types and additive quantities of coloring agents thought to give the lowest results for the upper limit of the usage temperature can be registered as "All Colors". The designation of "All Colors" includes natural colors, but not transparent colors.

b. Brands registered for transparent and natural colors are registered for that specific color only.

(3) Thickness

The thicknesses of insulating materials registered in this directory indicate the thickness guaranteed for the upper limit of the usage temperature. Therefore, if the registered materials are used in electrical appliances at thicknesses less than those in the directory, the registered temperature is no longer applicable.

(4) Characteristics and handling of the upper limit of usage temperature in insulating material applications

The temperature contained in the required characteristics is the estimated temperature for 40,000 hours when the

characteristics reach the end point. The temperature values are rounded using the rounding method based on the findings of the Committee on Electrical Appliance Affairs of Japan Electric Association:

Abstract of "Method of Rounding the TI Value" from the findings of the Committee on Electrical Appliance Affairs of Japan Electric Association:
The upper limit of the usage temperature is estimated in the following way based on the regression system and temperature index (TI) (IECPubl, 216-1[1974] Part-1). If the first figure after the decimal is less than 3, it is rounded down to 0. If it is 3 or more, it is rounded up to 5. If it is 5 or more and less than 8, it is rounded down to 5. If it is 8 or more, it is rounded up to 10.

This directory contains the temperatures for the upper limit of the usage temperature for the separate required characteristics. As a result, the upper limit of the usage temperature of insulating materials that can be used for different applications is found by selecting the lowest temperature from the temperatures in the applicable required characteristics.

Relationship between required characteristics and application

The ○ mark indicates characteristics required for the application.

Application \ Required characteristics				Electrical	Mechanical (without impact)	Mechanical (with impact)	Flexibility
Electrical insulation	Can be used in location forming an enclosure			○	○	○	
	External mechanical force	Applied location	With impact	○	○	○	
			Without impact	○	○		
		Location where external mechanical force is not applied		○			
	Location requiring flexibility			○	○		○
Thermal insulation	Can be used in location forming an enclosure				○	○	
	External mechanical force	Applied location	With impact		○	○	
			Without impact		○		
	Location requiring flexibility				○		○
All locations (except for wires and wiring tubes)				○	○	○	○

(5) The electrical characteristic is applicable to electrical insulation used in locations where an external mechanical force is not applied (see Appendix Table 1.1.2). It does not apply to insulating materials used for thermal insulation (see Appendix Table 1.1.3).

(6) The mechanical (without impact) characteristic applies to insulating materials used in parts where an external mechanical force is applied but no impact is received. Parts not subjected to an impact are parts of the insulation that are fully fixed in place by other parts such as slot liner and are not directly subjected to impact.

(7) The mechanical (with impact) characteristic applies to insulating materials used in parts where an external mechanical force applies an impact. The parts that are subjected to an impact are parts directly subjected to external pressure such as rotators and parts performing alternating motions and linear motions.

(8) The flexibility characteristic applies to insulating materials used for protective tubes and other parts where flexibility is required.

(9) The wires characteristic applies to wiring insulation used for wiring inside appliances. (It does not apply to the insulation used for the power supply wires.)

(10) Registration number

The registration number is represented as shown below.

(z) 123 ABC 4567 -890

(a) (b) (c) (d)

The letter z indicates that this number is a preliminary registration. Final registrations do not include this symbol.
The number at (a) is a unique code number (three-digit number) for registered companies in the registration of the upper limit of the usage temperature.
The number at (b) is a classification code (two to three letters) determined by the filler, plastic type, usage purpose, and other factors.
The number at (c) is a registration number (four-digit number).
The number at (d) is a registration number (three-digit number) for materials of the same species. This three-digit number is used only for similar species and is not used for basic materials.
Accordingly, the numbers in the (b) and (c) sections correspond to one of the basic materials, and the (d) section indicates that the similar species has been registered separately from the basic material.

(11) Final registration and Provisional registration

The registration formats are divided into final and provisional registrations. Registration is based on the results of upper limit tests conducted by the designated testing laboratory. If confirmation of the test results are received, registration can be made for values exceeding those in the appended table "Upper limit of usage temperature(℃) No.(2)".
Provisional registration is used as a temporary remedy during the period until the upper limit tests are complete for insulating materials whose usage results are already available. Based on the data of the client, a certain amount of physical and chemical measurement are conducted by the designated testing laboratory. Then, generally, values that are less than those in the appended table "Upper limit of usage temperature(℃) No.(2)" are registered as a preliminary measure.

(12) Basic materials and similar species
Basic materials refers to materials registered for the first time by the manufacturer for the material types, ingredients, and composition of the series.
Similar species are materials made by the same manufacturer as the basic materials where the material types, ingredients, composition, and thermal degradation tendencies are within the same fixed range as the basic materials, and the upper limit values of the usage temperature are within +/-10°C of the values for the basic materials.

(13) Differences between plastic classifications
The registration directory divides some similar species into plastics and mixtures. However, this does not necessarily mean that there are differences in the composition or properties between the two materials. The wire insulation for wiring inside appliances is evaluated as wiring, and since the criteria used for wire testing and materials testing are different, this is classified as a mixture.
Even if the material has the same composition, different testing methods result in assignment of different values for plastics and mixtures.

(14) Compensation of the upper limit of the usage temperature according to the classification of the electrical appliance

In the technical standards for electrical appliances stipulated in the ministerial ordinance (Ministry of International Trade and Industry Ordinance No. 85), the temperature values in section B can be added to the upper limit of the usage temperature according to the classes of electrical appliances in section A.
A. Classes of electrical appliances
Class 1: Appliances that are expected to be connected to the power supply throughout the year and to have a long usage time
Class 2: Appliances that are expected to be used seasonally and appliances not in Class 1 or 3

Class 3: Appliances that are expected to be connected to the power supply only when used, and disconnected from the power supply after usage

B. Compensation values for upper limits of usage temperature
Class 1: 0°C
Class 2: 8°C
Class 3: 16°C

3. Usage precautions for registered material
To satisfy the registered values, the registered materials are manufactured under controlled conditions for the type and composition of additives, coloring agents, and ingredients. Therefore, sufficient care should be taken since if the composition of the ingredients is changed at the stage where the registered materials are configured, the characteristic values for the registered material cannot be guaranteed. Materials whose composition has been changed are no longer be considered as registered materials.