CHRISTIE

ENGINEERING STANDARD

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Table of Contents

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1. INTRODUCTION

1.1. Abstract

In order to reduce the environmental impact of the packaging materials in solid waste stream, Christie encourages source controlling and material content labeling to assist international recycling programs.

Christie packaging recycling strategies include the following aspects:

- Design packaging with the known recyclable materials;
- Encourage vendors to use recycled material instead of virgin material whenever feasible;
- Communicate material content information to customers and recycling facilities through proper labeling.

All new packaging design should follow this guideline. Christie engineering personnel should work together with suppliers to ensure any material substitution or design change does not impact the packaging performance.

1.2. Purpose

The purpose of this document is to set up Christie engineering requirements and supplier responsibility for packaging labeling and packaging material selection, which aims to:

- Recommend good practices to be included in new packaging design;
- Reduce and/or eliminate the use of non-recyclable materials that will prevent or hinder the packaging recycling after use.

1.3. Scope

This guideline applies to all primary, secondary, and tertiary packaging for products, devices, parts, subassemblies, materials, and supplies purchased by Christie for use in its manufacturing and distribution operations.

This guideline applies to all packaging used in protecting, handling, or marketing of Christie products, service spare parts, and accessory items, which also include those manufactured by OEMs (original equipment manufacturers).

This guideline applies to, but is not limited to, the following packaging materials and packaging components:

- Molded cushions (of any resin)
- Fabricated cushions (of any resin)
- Corrugated fiberboard
- Paperboard
- Rigid and flexible plastic containers (bags and wraps)
- Wooden Pallets, Crates and Skids

1.4. Regulatory References for Global Compliance

This guideline aims to comply with all of the standards above and applies to all the subject materials regardless of origin or destination. The guideline is to be updated in case that new applicable governmental regulations are introduced in future.

The following table includes various international and national standards, which represent the current regulatory requirements in the global market. These documents serve as the basis of this packaging guideline.

Index	Country/ Organization	Document Description	Date
1.	EU	Packaging and Packaging Waste Directive (94/62/EC)	1994-12-20
2.	EU	Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), REGULATION (EC) No 1907/2006	2006-12-18

3.	ISO	"Plastics – Generic identification and marking of plastics products" (ISO 11469)	2000-05-15
4.	ISO	"Plastics – Symbols and abbreviated terms – Part 1: Basic polymers and their special characteristics" (ISO 1043-1)	2001-12-15
5.	ISO	"Plastics – Symbols and abbreviated terms – Part 2: Fillers and reinforcing materials" (ISO 1043-2)	2000-07-15
6.	ISO	"Plastics – Symbols and abbreviated terms – Part 3: Plasticizers" (ISO 1043-3)	1996-04-15
7.	ISO	"Plastics – Symbols and abbreviated terms – Part 4: Flame retardants" (ISO 1043-4)	1998-02-15
8.	United States	"SPI Resin Identification Code Guide to Correct Use" (the Society of the Plastics Industry)	1995-01
9.	China	"Marking for the control of pollution caused by Electronic Information Products" (SJ/T 11364-2006)	2006-11-06
10.	China	"Packaging Recycle Mark Standard" (GB 18455-2001)	2001-09-18
11.	China	"Marking for Plastic Packing Products Recycling" (GB/T 16288-1996)	1996-04-10
12.	Japan	"Identification is Requested by Law on Plastics Containers and Packaging, and on Paper Containers and Packaging" (METI)	2002-03
13.	Korea	EPR (Extended Producer Responsibility) – Separate Discharge Mark System (ENVICO)	2003-01-01
14.	Germany	"The Ordinance on the Avoidance and Recovery of Packaging Waste" (national law)	1991-06-12
15.	Germany	"Marking of packing materials and packages for reclaiming recycling; plastics packaging materials and packages; graphical symbols" (DIN 6120-1)	1996-12
16.	Germany	"Marking of packaging and packaging materials for recycling purposes – Plastics packaging and packaging materials – Part 2: Supplementary marking (DIN 6120-2)	1996-12

Table 1. List of Regulatory References

2. RESPONSIBILITY OF PACKAGING SUPPLIER

The following requirements apply to all packaging materials purchased by Christie, and subsequently used by Christie for its products, parts and supplies shipments. They also apply to all packaging materials used to make shipments to Christie and to Christie's customers on Christie's behalf.

- Suppliers shall eliminate the use of **Lead, Cadmium, Mercury** and **Hexavalent Chromium** (the sum of their concentration levels not exceeding **100ppm** by weight) in any packaging or packaging component shipped to Christie.

- Suppliers shall review the substances used in the packaging materials to ensure compliant with the EU Regulation (EC) No. 1907/2006, Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), Annex XIV, Annex XVII, and act according to its obligation(s).
    - Examples of possible use of substances, which are listed in REACH Annex XVII, in packaging (please always refer to the latest ammended document to ensure compliant):
        - Asbestos fibres – in tape or thermal insulation, RTV.
        - Tris(aziridinyl) phosphinoxide – potentially used in textile gloves that we ship for service.
        - Azocolourant – potentially used as a colorant in textile gloves we ship for service.
        - Perfluorooctane sulfonates (PFOS) – could use as water/oil/grease/solvent repellants.
    - Current substances to be included in Annex XIV, that might be used in packaging(please always refer to the latest ammended document to ensure compliant):
        - Sodium Dichromate – in the bath of the chromium coating.
        - Dibutyl Phthalate – PVC plasticizer and thus could be used in any PVC's that are flexible as it provides the elasticity.
        - Diarsenic Pentaoxide – flame retardant used in electronics, smelting, paints, glass, semi-conductors.
        - Diarsenic Trioxide – flame retardant used in electronics, smelting, paints, glass, semi-conductors, enamel.
        - DEHP – plasticizer for polymer products, usually in high concentrations.

- HBCDD – flame retardant used in polystyrene and electronic equipment.
- SCCP (short-chain chlorinated paraffins) – possible flame retardant in textiles and rubber, in paint, sealants and adhesives.
- TBTO (tributyltin oxide) – used as biocides in polyurethane foam.
- BBP (Benzylbutyl phthalate) – plasticiser in polymer products like PVC. Used in sealants, adhesives, paints, inks.

- Suppliers must ensure that they utilize materials and methods which are conducive to recycling. Refer to Section 3 for details on material selection.

- Suppliers are required to add proper recycling labels to each packaging material category according to Christie's labeling requirements. See Section 4 for details.

- Suppliers who sell packaging materials to Christie, but do not manufacture or monitor all phases of the material production, shall verify that their suppliers of materials conform to the requirements identified above.

- Suppliers should contact Christie if they are in need of assistance in understanding these responsibilities or if they have difficulty to meet the requirements.

It is recommended that Christie's Vendor Quality group establish audit programs to assure packaging materials entering the manufacturing or distribution process are recyclable and properly identified with the correct labels. The programs may vary depending upon number of suppliers, number of parts received, etc.

3. PACKAGING MATERIAL SELECTION

3.1. Reduction of Non-recyclable Content

In order to reduce or eliminate the use of non-recyclable packaging materials and packaging material compositions that prevent from recycling. Here are some general recommendations to enhance recycling.

- Eliminate the use of free-rise foam-in-place where feasible.
- Eliminate the use of adhesives to commingle materials where feasible (e.g., foam cushions glued to a corrugated pad).
- Do not use bleached white corrugated board or oyster white board.
- Use water / soy based inks when printing packaging materials.
- Use only functional coatings or impregnating that does not adversely affect material recycling. Some coatings that aid resistance to water, grease, or scuffing may be used with no adverse effect on material recycling. Avoid wax based coatings.
- Avoid the use of film laminations and/or cross-linked resins such as urea formaldehyde or polyethylene coated paperboard or solid bleached sulfate (SBS).

Exceptions may apply for packaging designed for reuse.

3.2. Use of Recycled Cellulosic Materials

Christie encourages use of recycled cellulosic materials (i.e. paper products) for packaging. When choosing the suitable recycled paper materials, the following general rules should be followed:

- Use a recycled fiber source of premium grade (long fiber length);
- Use a recycled fiber source that is free of contaminants;
- Use recycled fiber in moderation since too much can result in poor performance.

High performance corrugated packaging is best achieved through the specification of performance properties, such as burst and compression strength.

3.2.1. Guideline for Recycled Fiber Content

Corrugated fiberboard packaging should be manufactured using a minimum of 50% recycled fiber content using the maximum available post consumer material where adequate supplies exist.

3.2.2. Calculation for Recycled Fiber Content

Because corrugated mediums travel in the vertical as well as horizontal direction, take-up factors must be used when calculating a material's combined basis weight to compensate for the additional material. Industry approximations for the take-up factors are shown below:

Flute	Take-up Factor
A	1.55
B	1.35
C	1.43

Typical Example:	
Board Type:	Double wall
Flute:	B/C
Test:	350 psi
Liner Combination:	/26/44/26/42
Combined Basis Weight:	200 lbs/msf

Sample calculation: the combination of 100% recycled mediums and interior liners, together with near-virgin outside liners, produce a high-performance, corrugated product with a proportionately large amount of recycled fiber. An example of a high-performance board with a similarly high contribution from reclaimed material is illustrated in Table 2.

Component	Basis Weight (lbs/msf)	(times) Recycled Content (%)	(equals) Recycled Content (lbs/msf)	(times) Take-up Factor	(times) Quantity	(equals) Total Recycled Content (lbs/msf)
Liner board	42	25%	10.5	--	2	21.0
Liner board	44	100%	44.0	--	1	44.0
Medium	26	100%	26.0	1.43	1	37.2
Medium	26	100%	26.0	1.35	1	35.1
Total	200					137

$$\text{Recycled Content (\%)} = \frac{137 \text{ lbs/msf}}{200 \text{ lbs/msf}} = 68.5\%$$

Table 2. Recycled Content Calculation

3.3. Use of Recycled Polymeric Materials

Christie encourages that plastic packaging to be manufactured using the maximum possible post consumer plastic recycled resin. This requirement is contingent upon several factors, including the existence of processes that produce equivalent performing materials.

The percentage of post consumer content technically achievable depends on the chemistry of the material utilized, the performance requirements of its end use application, and the availability of usable post consumer recycled feed stocks. Due to these variables, this requirement will be measured on an individual application basis. For example, polyurethane foams are currently produced using a process that does not permit recycled resin to supplement prime material while some high density polyethylene (HDPE) materials can achieve up to 100% recycled content.

Packaging suppliers should assess the use of post consumer recycled resin for Christie applications, and utilize the maximum percentage content practicable. Christie engineering personnel are to verify the possible substitutes and select the materials which are capable of achieving high percentages of recycled content where feasible.

4. CHRISTIE PACKAGING LABELING REQUIREMENT

In order to supply products into the major markets in the world, Christie product packaging must comply with various national regulations (details in Section 5).

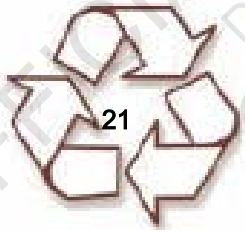
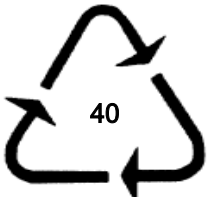
4.1. Labeling Symbols

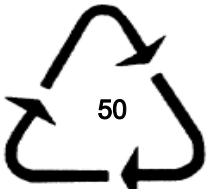
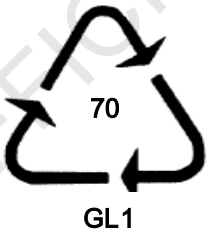
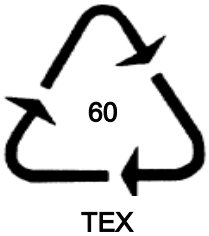
One or more of the four labels should be used on Christie packaging for each different material category.

- **ISO abbreviation for material names** (only for plastics) [details in Section 5.1];
- **EU (i.e. Germany) packaging symbol** (for various materials) [details in Section 5.2];
- **China packaging symbol** (for various materials) [details in Section 5.3];
- **Korea synthetic resin symbol** (only for cushion foams) [details in Section 5.4];

The following table lists the proper codes and abbreviations used for each category of Christie packaging materials.

Category	Symbols Applied	Description	Abbreviation	Number
PLASTICS	(EU/China label)  AND (ISO label)	Polyethylene Terepthalate	PET	01
		High Density Polyethylene	HDPE	02
		Polyvinyl Chloride	PVC	03
		Low Density Polyethylene	LDPE	04
		Polypropylene	PP	05
		Polystyrene (includes Arcel™)	PS	06
		Others (includes Polyurethane)	Others	07

	>PET< AND only for cushion foams:  (Korea label: the Korean characters at the bottom remain the same for all plastic materials.)			
Paper	(EU/China label)  NCFB (ISO label: N/A) (Korea label: N/A)	Corrugated Fibreboard	CFB	20
		Non-corrugated Solid Fibreboard	NCFB	21
		Paper	WPP	22
		Paperboard	PB	-
		Corrugated Cardboard	CB	-
Metal	(EU/China label)  FE	Steel	FE	40
		Aluminium	ALU	41

	(ISO label: N/A) (Korea label: N/A)			
Wood	(EU/China label)  (ISO label: N/A) (Korea label: N/A)	Wood	NW	50
		Cork	FOR	51
Glass	(EU/China label)  (ISO label: N/A) (Korea label: N/A)	Colourless Glass	GL1	70
		Brown Glass	GL2	71
		Green Glass	GL3	72
Fabrics	(EU/China label)  (ISO label: N/A)	Cotton	TEX	60
		Jute	TEX	61

	(Korea label: N/A)			
Composites	(EU/China label)  (ISO label: N/A) (Korea label: N/A)	Plastic / Aluminium (incl. ESD bags)	-	11
		Plastic / Tin	-	12
		Plastic / Mixed Metals	-	13
		Plastic / Glass	-	14
		Glass / Aluminium	-	21
		Glass / Tin	-	22
		Glass / Mixed Metals	-	23
		Paper or Fibreboard / Plastic	-	31
		Paper or Fibreboard / Aluminium	-	32
		Paper or Fibreboard / Tin	-	33
		Paper or Fibreboard / Mixed Metals	-	34
		Paper or Fibreboard / Plastic / Metals	-	41

(Note: although codes have been assigned fro various materials in the EU, aside from plastics, they are not commonly used. Therefore, if there is a conflict between the EU code and China code, apply the China code.)

Table 3. Christie Packaging Materials Abbreviation and Numbering

4.2. Labeling Size

A proper size can be selected by suppliers based on the actual size of the packaging part. The optional sizes are 20mmx20mm, 40mmx40mm, 60mmx60mm, and 80mmx80mm. If the packaging surface is extremely small or large, suppliers should make a written inquiry to Christie Engineering for an individual solution. Possible solutions could be: to attach a legible label on the outside box specifying material content for each packaging piece inside; or to add notes in the user manuals.

4.3. Labeling Color

The symbol should be bright green (GSB B51001-94 G03). If the packaging colour makes the green symbol appear unclear, other colours may also be used. Black is common for plastics. If other markings on one packaging piece are in one colour (i.e. Christie Blue), use that colour.

When a special background colour does not allow Green, Black or Christie Blue to be visible, a written inquiry must be submitted to Engineering for separate approval.

4.4. Labeling Location

Label should be placed on the front or top surface of the packaging part, where it can be easily visible by end users. The location of the labels should not likely be torn apart from the rest of the packaging part.

4.5. Labeling Quantity

Each separate packaging piece generally requires one set of symbols. For example, if a package contains four individual pieces of foam, all four require separate marking.

4.6. Labeling Methods

The common methods include: printing, molding-in, spraying and affixing of adhesive labels. Correct marking methods should be selected based on different packaging materials. Whatever method is chosen, the marking must be legible and remain on the packaging within its recyclable life.

4.6.1. For Molded Parts

When marking a molded plastic piece with the resin identifier, it is recommended that the identifier be embossed on the part ejection pins. Because the pins are not an integral part of the mold, the molder selects the appropriately marked pin whenever new parts are molded. This method of imprinting is preferred as it allows flexibility in resin recycled content identification. It also adds little expense to tool development or the piece price of molded cushion parts. Each time a cushion is molded, the resin identifier and recycled content will be permanently displayed on the molded part.

4.6.2. For Fabricated Parts

It is recommended that fabricated parts including those made of polyurethane or polyethylene should apply the resin identifier using either hot wire imprinting or a stamp which prints the appropriate mark using permanent ink. Caution must be used when selecting the ink and location to ensure it does not smear or transfer to the machine covers. Each individual component must be marked. The marking may be applied with a small permanent label if that is the only way to achieve compliance.

5. DETAILED LABELING INFORMATION FOR VARIOUS COUNTRIES

5.1. ISO Label Standards for Plastics

The resin identification system is intended to help identify plastics products for handling, waste recovery or disposal. A number of coding systems have been developed worldwide by: ISO (the International Organization for Standardization), SPI (the Society of the Plastics Industry in US), DIN (Deutsches Institut für Normung), GB (China Standards), etc. Except where local legislations require the use of one particular system, manufacturers can select any coding system that is most appropriate for their applications.

The ISO resin marking and coding system for packaging recycling is specified in a series of documents (ISO 11469 and ISO 1043-1~-4). The surface of each packaging component should be marked with the appropriate abbreviation(s) between the punctuation marks “>” and “<”. For example:

- For acrylonitrile-butadiene-styrene polymer use: **>ABS<**;
- For an alloy of polycarbonate and acrylonitrile-butadiene-styrene in which the polycarbonate is the main polymer with the acrylonitrile-butadiene-styrene being dispersed therein, use: **>PC+ABS<**;
- For a product made of three components, the visible one being a thin coating of poly(vinyl chloride) over a polyurethane containing an insert of acrylonitrile-butadiene-styrene that is the major component by mass, use: **>PVC,PUR,ABS<**.

Note: Resins must be 99% pure in order to apply the resin identifier. This is to avoid contamination during recycling.

The current common practice of the major electronic equipment manufacturers is to integrate the SPI resin code and the ISO 1043 standard on abbreviated terms.

Isosceles Triangle Comprised of Chasing Arrows

SPI Resin Code

ISO 1043 Material Abbreviated terms

Figure 1. Typical Layout of Resin Identifier

Plastic packaging is usually made with one of the following resins:

- PETE (polyethylene terephthalate);
- PE-HD (high density polyethylene);
- PVC (polyvinyl chloride) or vinyl;
- PE-HD (low density polyethylene);
- PP (polypropylene);
- PS (polystyrene);
- Other (if the material is made with a resin other than the six above, or made of at least 2 resins).

5.2. European Union (Germany as example)

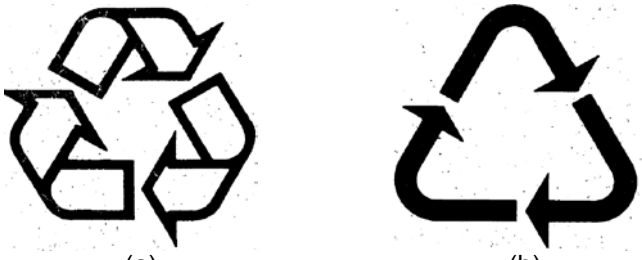
European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste covers all packaging placed on the market in the Community and all packaging waste, whether it is used or released at industrial, commercial, office, shop, service, household or any other level, regardless of the material used. According the directive , "Packaging" consists only of:

a) Sales packaging or primary packaging;
b) Grouped packaging or secondary packaging;
c) Transport packaging or tertiary packaging, which does not include road, rail, ship and air containers.

The directive 94/62/EC states that the Member States shall take measures to prevent the formation of packaging waste, which may include national programs and may encourage the reuse of packaging. As an EU member state, Germany has developed its standards to comply with the EU packaging directive.

5.2.1. Symbol

Materials are to be identified by a Numeric Code (*mandatory*) and/or Abbreviation (*voluntary*). The identification marks shall appear in the centre of or below the graphical marking (see Figure 2) indicating the reusable or recoverable nature of the packaging. The numeric codes are explained in Annex 1 for each material category.



(a) (b)

Figure 2. General recycling symbol (a: standard; b: simplified)

5.2.2. Symbol Size

There is no particular size specification. However, the marking has to be easily recognized. For technical reasons and on small packages, the mark can be printed in the simplified form of single lines.

5.2.3. Symbol Colour

There is no colour specification. But the dark lines should be identified clearly.

5.2.4. Symbol Location

Packaging shall bear the appropriate marking either on the packaging itself or on the label attached. The marking shall be clearly visible and easily legible.

5.2.5. Symbol Quantity

One symbol is required for each packaging or packaging material.

5.2.6. Marking Methods

The symbol may be applied to the packaging and packaging materials with all techniques commonly used in the packaging sector. The marking shall be durable and lasting for recycling purpose.

5.3. China

As an integrated part of the "China RoHS" legislations, electronic information products producers or importers shall follow national standard GB18455-2001 to label the packaging material codes on the packages of the products. The key elements of the standard are summarized as below.

"Packaging materials" refer to containers, materials and accessories used for the convenience of storage, transportation and promotion of sales in order to protect products during their circulation.

5.3.1. Symbol

There are four basic symbols to represent different material characteristics.

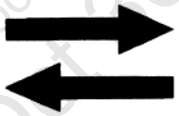
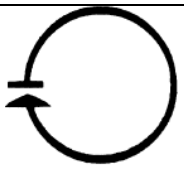
Index	Description	Graphic Symbol	Note
1.	Reusable material		Used only for defined closed loop systems. Not for standard pallets, and so on.
2.	**Recyclable material**		**Most common one. Used to identify ALL packaging materials so that suitability for recycling can be determined locally when they enter the waste stream.**
3.	Renewable material		Not recommended to use on Christie packaging, because the legal definition of "Renewable" is finalized.
4.	Green point mark		Used only for 3rd party waste collection and recovery programs

Table 4. China Basic Packaging Symbols

For packaging materials, the China coding system is similar to the German DIN 6120 and the US SPI resin coding standards. See details of China coding system in Annex 2.

5.3.2. Symbol Size

20mmx20mm, 40mmx40mm, 60mmx60mm, and 80mmx80mm are the four standard options for the recycling symbol size. If the surface area of the package is small than $5x10^3 mm^2$, a note can be added in the product brochure instead of symbol marking.

5.3.3. Symbol Colour

Symbols should be printed monochromatically. According to the national standard, black is used for common plastic packaging, while bright green (GSB B51001-94 G03) is used for other general purposes. Other colour can be selected instead if green is not visible compared to the background colour or if other current labels are all printed in another standard colour.

5.3.4. Symbol Location

Recycling symbols must not cover the packed content and the marking should be placed at locations easy to spot by customers.

5.3.5. Symbol Quantity

Each packaging piece generally requires one symbol.

5.3.6. Marking Methods

The common methods include: printing, affixing of adhesive labels, and spray application. The marking must be legible and remain on the packaging within its recyclable life.

5.4. Korea

The scope of Korean Separate Discharge Marking system, which is a part of the "Extended Producer Responsibility", includes the electric and electronic equipment buffer materials that are made of formed synthetic resin.

Note: Korean markings also exist for Metal (steel, aluminum), Paper (paper, paper back), Glass and other specialty items. But they are not applicable to electronic equipment packaging.

Do Mark: molded and fabricated foam cushions, padded envelopes and other cushioned plastic wraps or bags including microfoam and bubble wrap.

Do NOT Mark: corrugated boxes or inserts, tape, banding, stretch wrap, poly bags, ESD bags, vacuum formed materials, molded pulp, and paper cushions (i.e. Pad Pak and similar).

5.4.1. Symbol

The Korean packaging symbol design and its detailed dimensions are shown in the diagram below. The four characters below the mark mean "separate discharge". The "substance indication letters" ("PS") in the centre refer to the actual substance used. The six "indication letters" for plastics are: PET, HDPE, LDPE, PP, PS, and PVC.

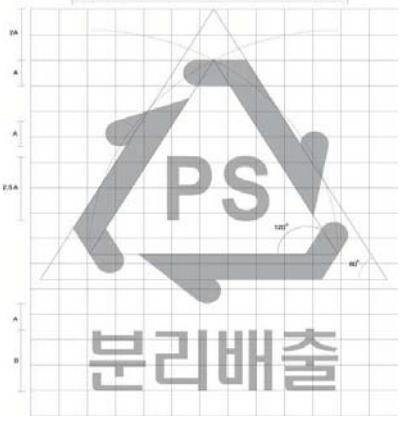


Figure 3. Korean Resin Recycling Label (use "polystyrene" as example)

5.4.2. Symbol Size

The minimum mark size is 8mmx8mm. See Figure 3 for detailed design.
- The extended lines of the mark design constitute an isosceles triangle. The interior angle of the extended lines is 60 degrees. The interior angle of the backside of the arrow is 120 degrees.
- If the thickness of the design line is A, the thickness of the substance indication letters in the middle of design is 2.5A when the letter part is composed of 2 or fewer characters, and 2A when the letters are composed of 3 or more characters.
- The space between the arrow design and the substances indication letter is A.
- If the height of “separate discharge” is B, the width of design is 4B.

5.4.3. Symbol Colour

Black and White are the standard. But other colours are also allowed.

5.4.4. Symbol Location

The label must be attached to the product to allow consumers to easily recognize for separate discharging and recycling.

5.4.5. Symbol Quantity

Each separate piece of the cushion foam requires one label.

5.4.6. Marking Methods

The mark should be indicated by direct printing or embossing/molded-in (see Figure 4) on one side (front or top) of the packaging. Labels/stickers are allowed only when the other marking methods are not available.

(a) (b)

Figure 4. Samples of Korean Packaging Marking (a. print; b: mold-in)

5.5. Japan (only required for consumer products)

In "Plastics containers and packaging, and paper containers and packaging: Questions and Answers" issued on March 2002 by Japan Ministry of Economy, Trade and Industry:

Q: For containers and packaging common to household use and business use, is it allowable that those for business use also have identification marks?

*A: It is recommended to separate the containers and packaging in each use, and to **avoid** giving identification mark on those of business use, as far as possible.*

Therefore, for the containers and packaging of products consumed for the business, obligations of recycling and identification are not applied. Current Christie products are **NOT** within the scope and thus no Japanese markings need to be added at present.

Note: If a new product is to be designed for Japanese consumer market, the recycling labels **MUST** be applied. The Japanese recycling labels (for plastics and papers) are licensed and they have to be obtained from appropriate companies.

The detailed marking information is stated in Annex 3 for reference should the labels be required in future.

ANNEX 1 - GERMANY PACKAGING MATERIALS CODING

The Ordinance on the Avoidance and Recovery of Packaging Waste, in short the Packaging Ordinance, came into force in Germany on 12 June 1991. It places a legal obligation on trade and industry to take back and recycle transport, secondary and sales packaging. The following table is derived from the Annex IV of the Packaging Ordinance.

Description		Abbreviation	Number
Plastic	PET	PET	01
	HDPE	PE-HD	02
	PVC	PVC	03
	LDPE	PE-LD	04
	PP	PP	05
	PS	PS	06
	Others	O	07
Corrugated Fibreboard		PAP	20
Non-corrugated Solid Fibreboard		PAP	21
Paper		PAP	22
Steel		FE	40
Aluminium		ALU	41
Wood		FOR	50
Cork		FOR	51
Cotton		TEX	60
Jute		TEX	61
Colourless Glass		GL	70
Green Glass		GL	71
Brown Glass		GL	72
Paper or Fibreboard / Mixed Metals		-	80
Paper or Fibreboard / Plastic		-	81
Paper or Fibreboard / Aluminium		-	82
Paper or Fibreboard / Tin		-	83
Paper or Fibreboard / Plastic / Aluminium		-	84
Paper or Fibreboard / Plastic / Aluminium / Tin		-	85
Plastic / Aluminium		-	90
Plastic / Tin		-	91
Plastic / Mixed Metals		-	92
Glass / Plastic		-	95
Glass / Aluminium		-	96
Glass / Tin		-	97
Glass / Mixed Metals		-	98

Table 5. German Materials Abbreviation and Numbering

ANNEX 2 – CHINA GB18455 PACKAGING MATERIALS CODING

The abbreviation and naming requirements are derived from GB 18455-2001 standards and are summarized in the table below.

Description	Abbreviation	Number
Plastic	PET	01
	HDPE	02
	PVC	03
	LDPE	04
	PP	05
	PS	06
	Others	07
Corrugated Fibreboard	CFB	-
Non-corrugated Solid Fibreboard	NCFB	-
Paper	WPP	-
Paperboard	PB	-
Corrugated Paperboard	CB	
Steel	FE	-
Aluminium	ALU	-
Wood	NW	-
Colourless Glass	GL1	-
Brown Glass	GL2	-
Green Glass	GL3	-
Paper or Fibreboard / Plastic	-	31
Paper or Fibreboard / Aluminium	-	32
Paper or Fibreboard / Tin	-	33
Paper or Fibreboard / Mixed Metals	-	34
Paper or Fibreboard / Plastic / Metals	-	41
Plastic / Aluminium	-	11
Plastic / Tin	-	12
Plastic / Mixed Metals	-	13
Plasticn / Glass	-	14
Glass / Aluminium	-	21
Glass / Tin	-	22
Glass / Mixed Metals	-	23

Table 6. China Materials Abbreviation and Numbering

ANNEX 3 – JAPAN PACKAGING REGULATION DETAILS

Identification is requested by Japan law on plastic containers and packaging, and on paper containers and packaging (excluding those made of corrugated cardboard materials) for only Consumer products.

1. Symbols

Two symbols with Japanese characters are used for Paper and Plastic packaging.

(1) (2)

Figure 5. Japanese Recycling Symbols for Plastic Packaging: (1) made of single material; (2) made of composite material. (Abbreviations are in accordance with ISO 1043-1)

Figure 6. Japanese Recycling Symbols for Paper Packaging

2. Size

The size of the identifying mark shall be more than 6mmx6mm for printing, and more than 8mmx8mm high for stamping and embossing. There is no maximum size limit.

3. Marking of Symbols

The preference is for the markings to appear on each article so that they can be easily identified. However, there are many exceptions including situations where markings of any type are not normally done. In this case, a combination marking on the shipping container to identify all materials contained within the package assembly must be applied whether the materials are marked individually or not. The purpose of the combination marking is communicate to consumers in Japan

prior to purchase and to identify materials that are not or cannot be marked individually. All subject items should be marked regardless of origin or destination since redeployment of inventory to Japan is possible. The regulation that requires this is applicable only to Japan but the markings may appear on goods sold outside of Japan.

The label artwork needs to be licensed first before get applied to packaging. The trademark of plastic symbol is owned by the *Plastics Containers and Packaging Recycling Promotion Council*. The trademark of paper symbol is owned by the *Paper Containers and Packaging Recycling Promotion Council*.

ANNEX 4 – LIST OF RELEVANT TERMS

Cellulosic	A substance made of natural plant parts including wood and paper.
Commingle	To intermix dissimilar material.
Discharge Marking (Korea)	A marking placed on the packing materials to support recycling efforts.
Foam-in-place	Two liquid components combined under heat to produce polyurethane foam. The final shape may be formed by either of two ways: a) using a mold; or b) dispensing directly into carton to “free-rise” around a particular shape.
Molded Cushion	Foam that has been cast into a particular form and allowed to expand and form its cellular, bubble-like structure. Note: all molded foams are expanded but not all expanded foams are molded. Some are extruded.
Fabricated Cushion	Foam that is usually expanded and extruded in plank form, which is cut and/or bonded into its final useful form.
Flexible plastic container	A plastic container that can be flexed and twisted, without the aid of tools, without damaging the container.
Rigid plastic container	A plastic container which has essentially the same shape empty as full.
Polymeric	A substance that is made of plastic.
Post consumer waste	Materials which have been diverted, sorted for recycling after they have performed their designed purpose.
Primary package	The first layer of packaging in contact with the saleable item.
Secondary package	The second layer of packaging for grouping multiple saleable items, which contains primary packages.
Recyclable	Waste which is capable of being processed back to raw materials for subsequent use. Material is recyclable only if there is widely available economically viable collection, processing, and marketing system for it.
Reusable	Packaging that is capable of being used more than one time, without being significantly changed. (i.e. used in its same physical form, requiring only minor repair or cleaning). It is different from recyclable.
Recycled material	Material which has been reclaimed from a waste product and processed in order to regain raw material.