Plastics Identification Code

www.pacia.org.au

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The Plastics Identification Industry Code of Practice has been developed by PACIA through a grant from EcoRecycle Victoria and with sponsorship from Basell Australia.

PACIA

Plastics and Chemicals Industries Association Incorporated

Plastics Identification Code

The Plastics and Chemicals Industries Association, Inc. (PACIA) manages a voluntary coding system which identifies the resin, or polymer, composition of plastic containers, (and other items intended for recycling). The Plastics Identification Code (or PIC) is an industry code of practice intended for voluntary use by bottle and container producers (and manufacturers of other plastic items), to be embossed or otherwise imprinted onto the bottom surface of plastic containers (items).

This Code of Practice applies to all rigid plastics containers (and plastic products intended for recycling).

The original Code of Practice was introduced to Australia in 1990. Following a review by PACIA funded by EcoRecycle Victoria, the Code was revised in September 2002.
This review is part of PACIA's commitment to the National Packaging Covenant that commenced in August 1999. It also demonstrates the ongoing commitment of the Australian Plastics Industry to Product Stewardship and Sustainability.

The Code is intended to provide stability for the post-consumer waste management of plastic containers. It provides practical guidance for plastics manufacturers, product fillers, brand-owners and consumers. The code continues to deliver a national identification system to assist consumers, governments and industry to work cooperatively to improve plastic recycling outcomes.

Contents

What it is

The Plastics Identification Code is a voluntary system of marking plastic containers to identify the plastic resin from which they are made.

The code allows for simple identification of a container after it has been used so that it can be recycled within that polymer stream.

What it is not

The code is not intended to be a guarantee of recycling or to provide companies with a platform for environmental claims.

Why we use it

The coding system is intended to assist recyclers to sort plastic containers by resin type. Plastics recycling in Australia continues to grow, driven by developing markets, improved technology and broad concern for environmental and product stewardship. A national code for identifying post-consumer plastic waste is vitally important to the continuing development and viability of the recycling industry in Australia.

Recycling offers an effective means of reducing the amount of waste which requires disposal. Recycling has many other advantages, including resource conservation and in some cases, the opportunity to reduce imports and boost exports.

Throughout Australia, local municipal councils have created kerbside collection programmes and collection depots for their communities with approximately 85% of Australian households having access to kerbside recycling.[1] In 2003, there are 50 reprocessing sites that convert post-consumer plastics. People working in recycling centres often rely on the plastic codes to accurately sort materials into polymer groups.

It is also important that consumers sort recyclable containers from their household waste and put these into their recycling services.

The sorted plastics are then sold into the recycling industry to be re-processed into materials that can be used to make new products. Some products are also exported for reprocessing.

This voluntary coding system provides a convenient method of identification for those in the business of collecting and separating post-consumer plastic waste.

The benefits of the code

The recycling of plastics in Australia continues to increase. The largest markets are in PET for soft drink bottles and HDPE for milk containers, but markets are developing for other resin types.

As plastic continues to become the packaging material of choice, many new items are being produced from a wider range of polymers. The code helps the effective recycling of these new products.

The coding system identifies the six most common plastics which are used to make packaging and container materials. The code also encourages sorting in the home and makes industrial sorting more effective. More effective sorting produces recycled materials with a higher value than that of mixed plastic scrap.

Multi-material containers (eg made from co-extruded resin mixtures) would be recycled as "mixed" plastics. There are, however, a growing number of recycling and other waste management initiatives in Australia that use mixed plastics.

To ensure these plastic containers and packaging suit recycling systems and result in marketable end-products, a coordinated effort is needed to create new market places with sustainable demand.

PS

OTHER

How your company can implement the code

The plastics identification code is designed to be easy to read at a glance and to be distinguishable from other marks placed on items by manufacturers for use in processing and identification.

The system uses a triangular-shaped symbol composed of three arrows, with a number in the centre indicating the material from which the container is made, as follows:

1 =	**PET**	= Polyethylene Terephthalate
2 =	**HDPE**	= High Density Polyethylene
3 =	**V**	= Vinyl
4 =	**LDPE**	= Low Density Polyethylene
5 =	**PP**	= Polypropylene
6 =	**PS**	= Polystyrene
7 =	**Other**	= All other resins and mixed materials

The acronym used to represent the resin type can be added to the bottom of the symbol. These additional letter codes are optional and can improve identification in some instances where the number on its own may be difficult to identify.

The plastic code should be moulded into or embossed on the bottom of each container, or as near as is technically feasible. This may mean the heel of the container in some instances.

The symbol should not be a prominent mark on the container so that shoppers seek out the symbol and make purchasing decisions based on the material type.

Secondary Items

Containers with components made of a second material may, if the materials are compatible in recycling systems, carry the symbol of the primary material. Otherwise the "7-Other" code is appropriate.

Consult with the product brand-owner

Since this is a voluntary code, PACIA strongly recommends that the companies whose products are to be packaged into these containers be consulted regarding the use of the code. As brand owners, these companies may have specific requirements, including legal obligations, as to how their products are marked.

Containers where the code should not be applied

Consideration must be given to whether or not plastic containers which store certain chemical products should enter the normal recycling stream. In many cases, other markings will be included as required by mandatory codes e.g. embossed "POISON" or labels to meet the requirements of the Australian Dangerous Goods (ADG) Code. Although it is possible that with correct cleaning and monitoring procedures, resin from such containers could be re-used for specific purposes, it is recommended that containers intended for the carriage of dangerous goods do not carry the Plastic Identification Code. Such containers should be labelled with instructions for decontamination and disposal.

The Occupational Health and Safety considerations of other people who manage and handle your products should always be the higher consideration. A risk management approach should be adopted where hazards might arise.

Flexible Packaging

The code can also be used for flexible packaging to identify the resin type. In this case, a code could be printed on a sticky label, which would be clearly displayed on the package. The code could also be printed on the package itself.

In either case, the code must be able to be read at the end of its working life for it to be beneficial.

Design and Size of Embossed Markings

For the code to work effectively, the size of the identification mark is a key factor.

Depending on the capacity of the container, the symbol size should be as follows;

HDPE

PIC Symbol – 12.5mm

12.5mm symbol for containers of nominal capacity 500ml to 1 litre.

V

PIC Symbol – 19mm

19mm symbol for containers of nominal capacity above 1 litre to 5 litres.

LDPE

PIC Symbol – 25mm

25mm symbol for containers of nominal capacity above 5 litres.

Detailed dimensional drawings for each of these sizes are appended: **Figures 1,2, & 3 respectively.**

The code numbers and letters to be contained in these symbols will be in the following point sizes:

Size of Symbol	Number Point Size	Letter Point Size
12.5mm	13 pts.	9 pts.
19mm	20 pts.	3 pts.
25mm	26 pts	17 pts.

Size and clarity are crucial to visibility. Items with symbols that cannot be quickly and clearly seen may end up as "mixed plastic" scrap. Companies are encouraged to maintain these recommended sizes to assist viable sorting.

Small Containers

Containers less than 500ml capacity are still valuable for recycling but require clear identification to be accurately sorted. Companies should provide the largest and clearest logo and type size which the container design allows. Anything less than 6mm is generally regarded as unreadable and companies are encouraged to use a size between 6mm and 12.5mm which can be clearly distinguished at the end of life and meets all other recommendations of this code.

Mould Modifications

New and existing moulds used in injection moulding, blow moulding or thermoforming should be marked by one of three methods: stamping, engraving or sandblasting. The selection of the method depends on the material, the flatness of the mould surface and the capabilities of the mould shop.

Mould Stamping

Some new and existing moulds, with mould surfaces which are not hardened, may be marked with a hardened stamp.

Care should be taken to firmly hold the stamp to insure a good impression overall with sufficient depth for satisfactory readability of the moulded symbol. This depth may be from .08 mm to .03 mm, depending on the contrast with the surrounding surface.

Hardened stamps may be purchased from a quality engraving shop familiar with stamp fabrication techniques.

Alternatively, an experienced mould-maker may be consulted for assistance in making of locating stamps. This method will not be satisfactory for moulds where the symbol must be applied to a curved surface.

Mould Engraving

Moulds that have hardened surfaces, or where the surface to be marked is not flat, will not be able to use the stamping method. These will need to have the symbol applied by engraving.

Engraving can be done by most mould-makers or by an engraving shop familiar with mould fabrication techniques for injection moulding, blow moulding and thermoforming.

Master drawings for the creation of engraving masters are included in this brochure. These are at six times scale for the 12.5mm symbol, four times scale for the 19mm symbol and three times scale for the 25mm symbol. Complete full scale

Reproduction masters are also included.

Whilst no masters are included for symbols less than 12.5mm, companies are encouraged to apply proportional scaling in these instances. The final size will need to suit the packaging design.

Sandblasting

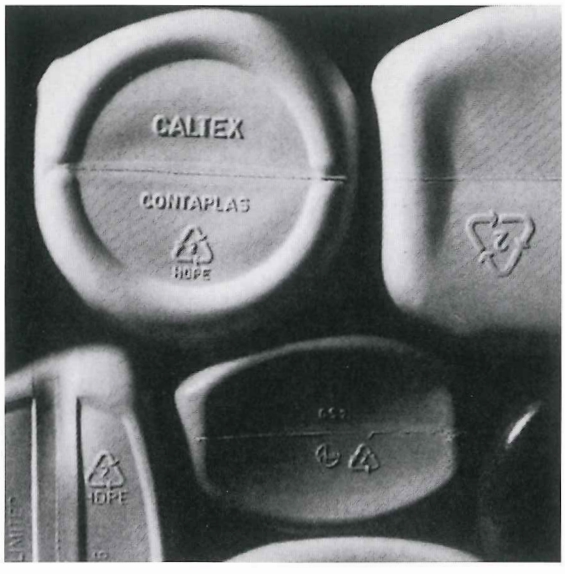
Sandblasting the symbol onto the mould can be done by most mould shops. On some moulds, particularly thermoforming moulds, the mould surface is already sandblasted and the use of a sandblasted symbol would not be readily visible.

When modifying existing sandblasted moulds, the symbol should be engraved. For new moulds, the symbol should be stamped or engraved prior to sandblasting the mould surface. The symbol should then be marked for protection during the sandblasting operation.

Imprinting

Under special circumstances where mould modification is not technically feasible, the symbol may be imprinted on the bottom of the container or the top of the lid through the use of appropriate container marking or decorating equipment suitable for logos or special symbols.

Care should be taken to use permanent inks, applied to surfaces appropriately conditioned to retain the mark through the entire container handling system to the recycler. This method should not be used to mark the underside of lids where contents of the container may come in contact with the imprint. Reference to the Environmental Code of Practice for Packaging will provide additional guidance.



Qualifications

PACIA is promoting this voluntary guideline for a plastic container material identification code as a service to the public and industry. The plastics and packaging industries, recyclers, government agencies and the public will be informed of the revised code through news releases, copies of this brochure or other appropriate means. The system is available to any company or person to use as appropriate.

However, the system is voluntary. PACIA is not responsible for implementation of the system. Proper use of the system is the sole responsibility of each company that chooses to use it.

Change in Material

If the resin used to produce a particular style of container is changed, it is the responsibility of the manufacturer to change the code to match the new resin. As noted above, use of the symbols on plastic containers is totally voluntary, and producers are free to change resins for particular containers, as they see fit. The code is intended to relate solely to the resin type from which the container is made, and does not relate to the contents of the container, its shape or appearance.

Recyclability of Containers

Neither the recommendations of PACIA to identify containers by resin type, nor the presence of a resin symbol on a container, conveys any guarantee that any one container is suitable for recycling into any particular product.

The suitability of a recycled resin for a particular application will depend upon the demands of the application and the nature of any contamination resulting from prior container use.

Companies are encouraged to actively work with recyclers to ensure a sustainable outcome for a given product. Reference to the Environmental Code of Practice for Packaging will provide additional guidance.

Legal Liability

There are Federal and State laws and regulations covering a range of issues which companies must consider regarding container labelling. These include, but may not be limited to:

• consumer protection • labelling • dangerous goods
• return for recycling • hazardous substances.

Container manufacturers should be familiar with the requirements of all relevant laws prior to introducing the code on a container into the market place. Legal liability should be considered, including the issues of false and misleading advertising due to the inclusion of a plastic coding symbol on a container and any environmental claims.

If you are still unsure, advice should be sought from a legal adviser with expertise in this area.

Product Stewardship and Risk Management

Products may inadvertently cause problems for people and the environment during or after their intended life. Product stewardship seeks to identify the risks from any impacts and eliminate them as far as is practicable. Companies are encouraged to apply a risk management approach and during product design to consult those parties which may be affected by potential problems. Risks might include occupational health and safety or environmental factors and occur throughout the supply chain and waste management activities.

Do's and Don'ts

1. Do remember the code is to assist in separating out used containers into their resin types.
   - The code must be able to be read clearly at the end of its working life.
   - Location and size are critical
2. Do consult with the packaging filler and/or brand owner to ensure it is OK to use.
3. Do ensure the code is on the bottom of the container or as close as is practicable – preferably on the heel as the next best option.
4. Do maintain the minimum sizes recommended. Codes which cannot be read may end up as mixed plastics in any case.
5. Do separate the plastic code from other identifications on the container to avoid confusion for recyclers.
6. Do ensure that you understand the range of legal, regulatory and voluntary requirements and labelling obligations of the markets where containers will be used.
7. Do consult with customers and recyclers and if necessary, get legal advice.

1. **Do not** use the code as a marketing tool
2. **Do not** apply the code to containers that should not enter recycling systems.
3. **Do not** make recycling or other environmental claims next to the plastic code.
4. **Do not** use the same code when using an alternative resin type for the same application – eg a short-term production run with a different material.
5. **Do not** drop below the minimum recommended sizes – these cannot be seen and may result in the product not being effectively recycled.

Frequently Asked Questions

1. *What are my legal obligations?*

- Trade Practices: Federal law prohibits a corporation from engaging in conduct which is misleading or deceptive, or is likely to mislead or deceive. This may include placement of the symbol anywhere except on the base of the container. The Australian Competition and Consumer Commission provides guidance on this matter.[2]
- Dangerous Goods: State and Federal law on dangerous goods and hazardous substances should be considered.
- These laws and others designed to control the container or its contents should be consulted prior to using the mark. If you are still unsure, advice should be sought from legal counsel with expertise in this area.

2. *What if a container has had a treatment such as fluorination?*

- You need to check with recycling operators who process your products. Secondary processes may enhance the product but impact on recycling opportunities.

3. *What if a container is mainly one base polymer type, but has some additives as well? (An example of this would be 95% HDPE with 5% anti-oxidants or UV inhibitors.)*

Recyclers are best placed to advise companies on what can be recycled. Consultation is important, especially during product design.

4. *Do I have to use the code on plastic containers?*

- Use of the code system is voluntary. At the time of review of the code, there were no legal penalties for not using it. However companies are advised to consider their product stewardship responsibilities and accountability.

5. *Can I use the code on plastic items that are not containers?*

- The code was originally meant to improve recycling outcomes for containers and designed for these products. However other items such as film products and durables can use the code to help achieve sustainable outcomes.

6. *What if we can't fit the code on the bottom of the container?*

- As near as technically possible to the base is the next best thing – as low as possible on the heel of the container is then preferred.

7. *Can I use the code to advertise our environmental commitment?*

- No. The code identifies the material the container is made from. It is not meant to influence consumer purchasing decisions.[3]

8. *How do we label a container made with degradable plastics?*

- Specific guidelines are being developed to manage this issue. Cross contamination of traditional resins with degradable resins can pose a serious threat to established recycling operations.
  Again, you may need to consult recyclers.

PIC Symbols

Reproduction Master

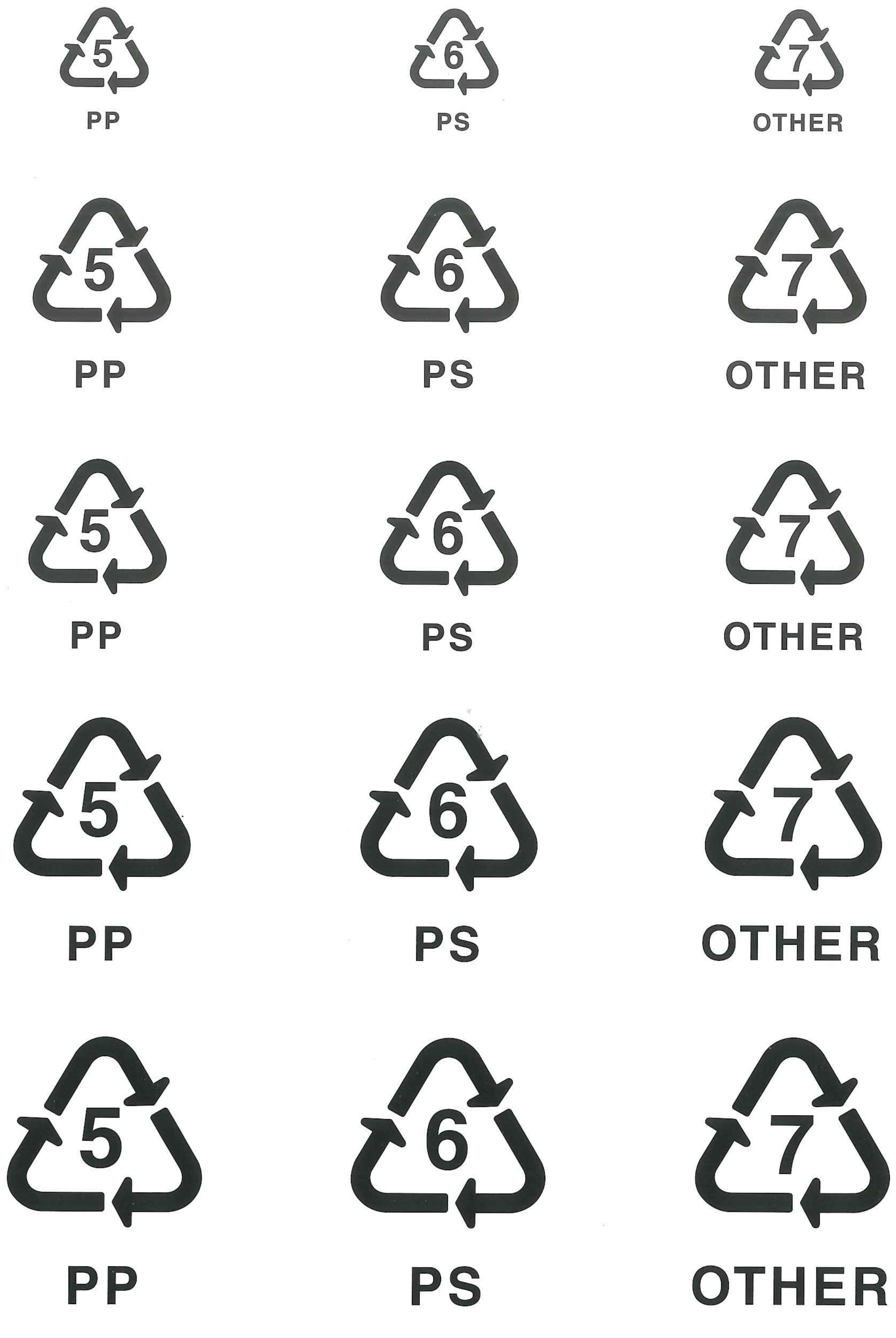

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Fig. 1 Engraving Master

12.5 mm Symbol, Numbers & Letters

Reference drawing for construction of Engraving Master for:

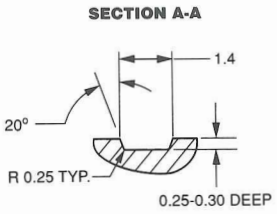
12.5 mm Symbol, Numbers & Letters (Scale 6 : 1)

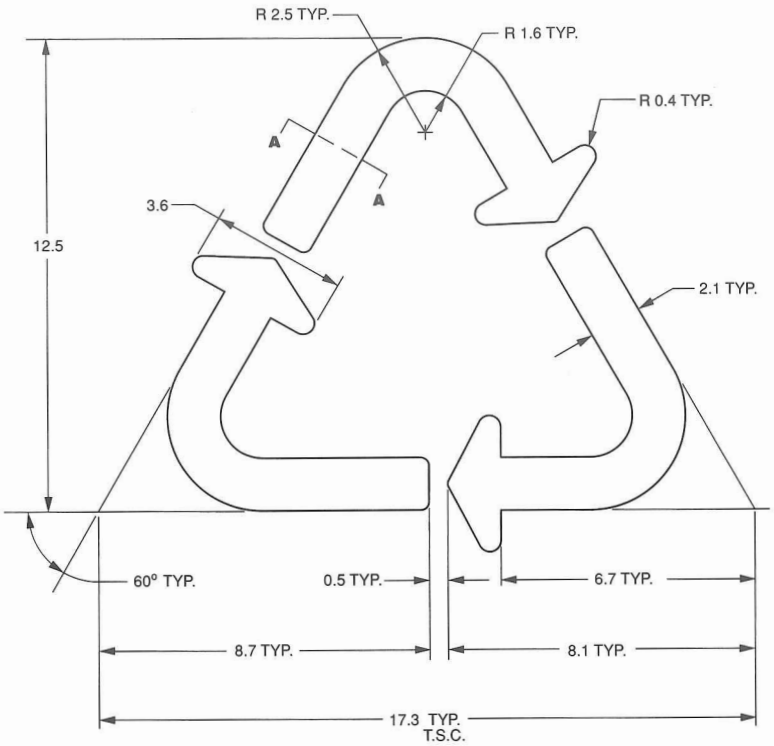
All characters in Helvetica Bold.

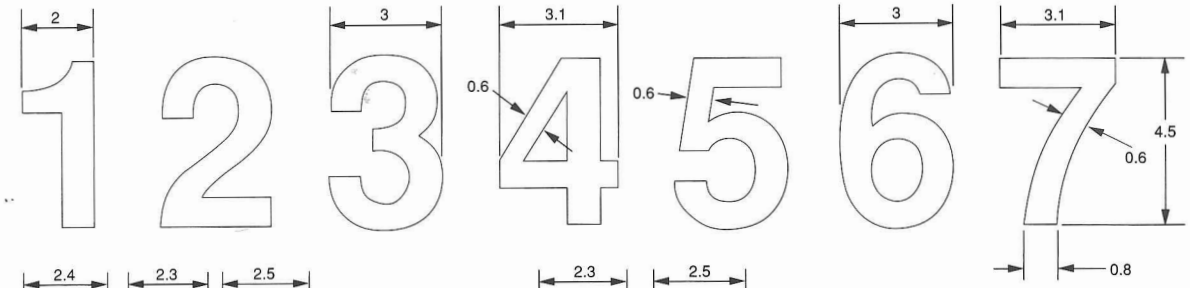
Approximate printing point size for:

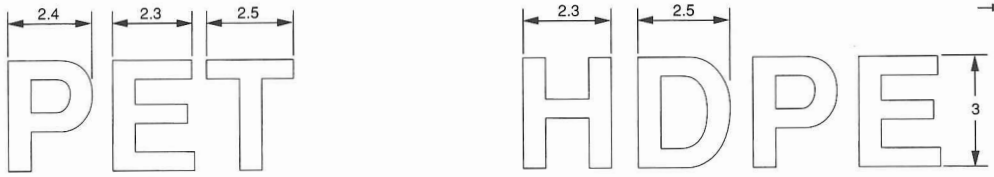
Numbers - 13pts

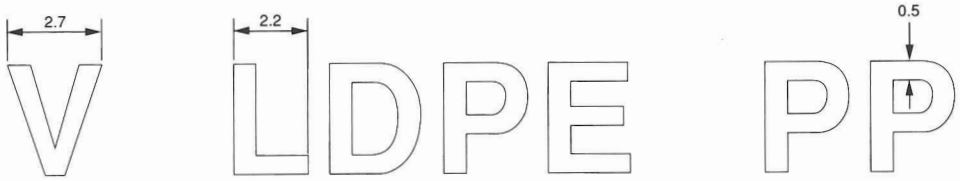
Letters - 9pts











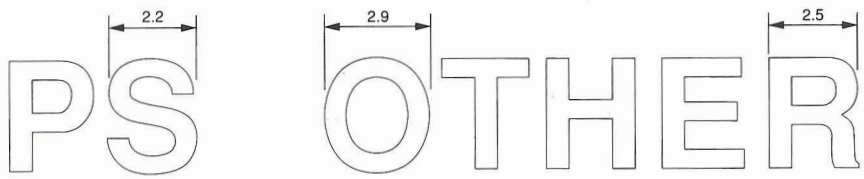


Fig.2 Engraving Master

19 mm Symbol, Numbers & Letters

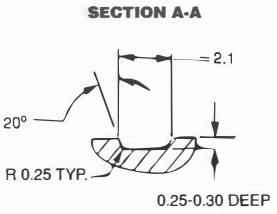
Reference drawing for construction of Engraving Master for:

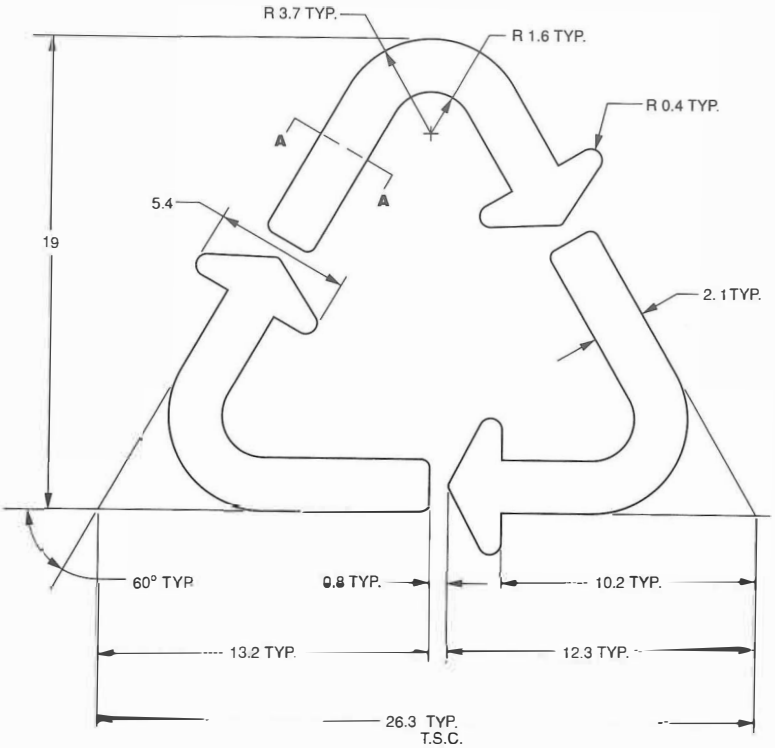
19 mm Symbol, Numbers & Letters (Scale 4 : 1)

All characters in Helvetica Bold.
Approximate printing point size for:

Numbers - 20 pts

Letters - 13 pts





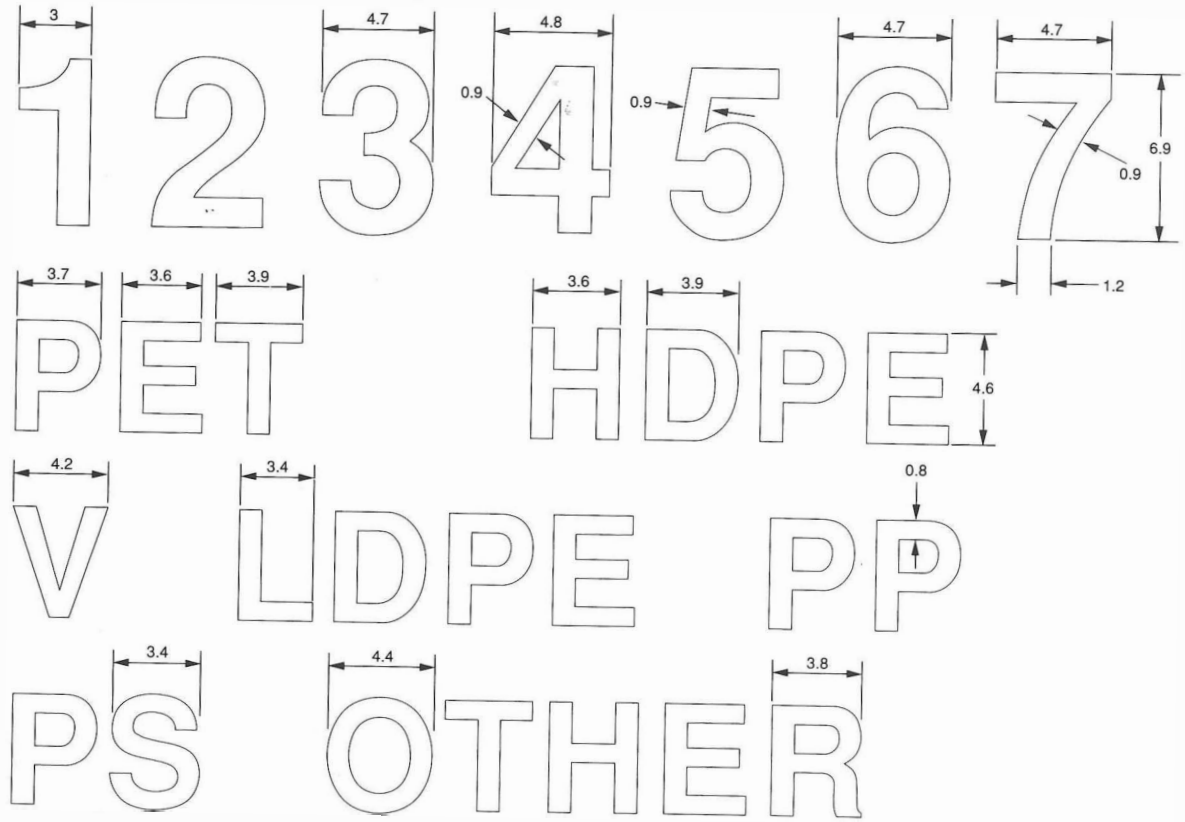


Fig.3 Engraving Master

25 mm Symbol, Numbers & Letters

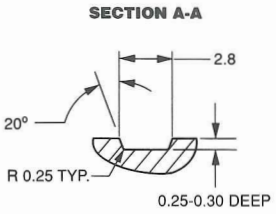
Reference drawing for construction of Engraving Master for:

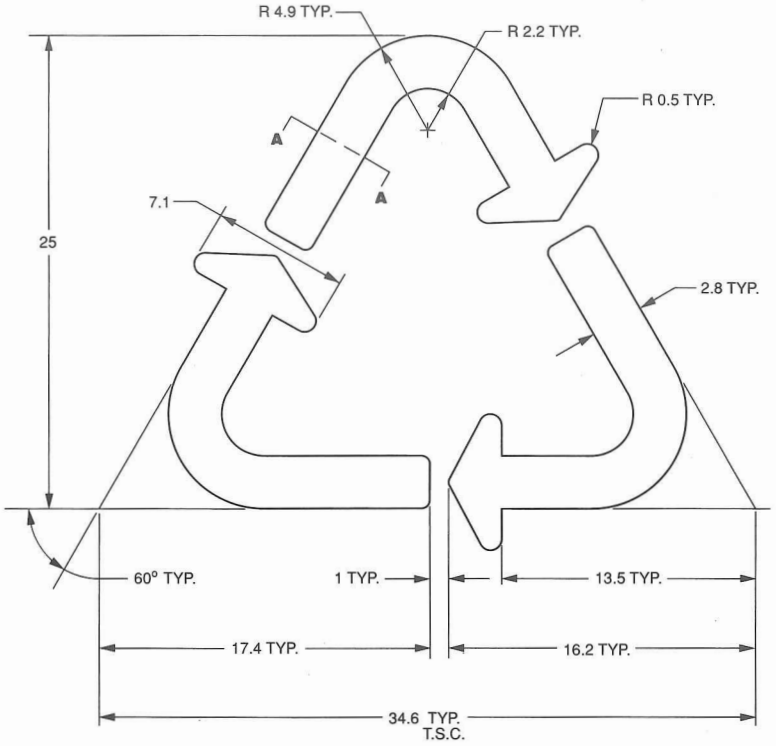
25 mm Symbol, Numbers & Letters (Scale 3 : 1)

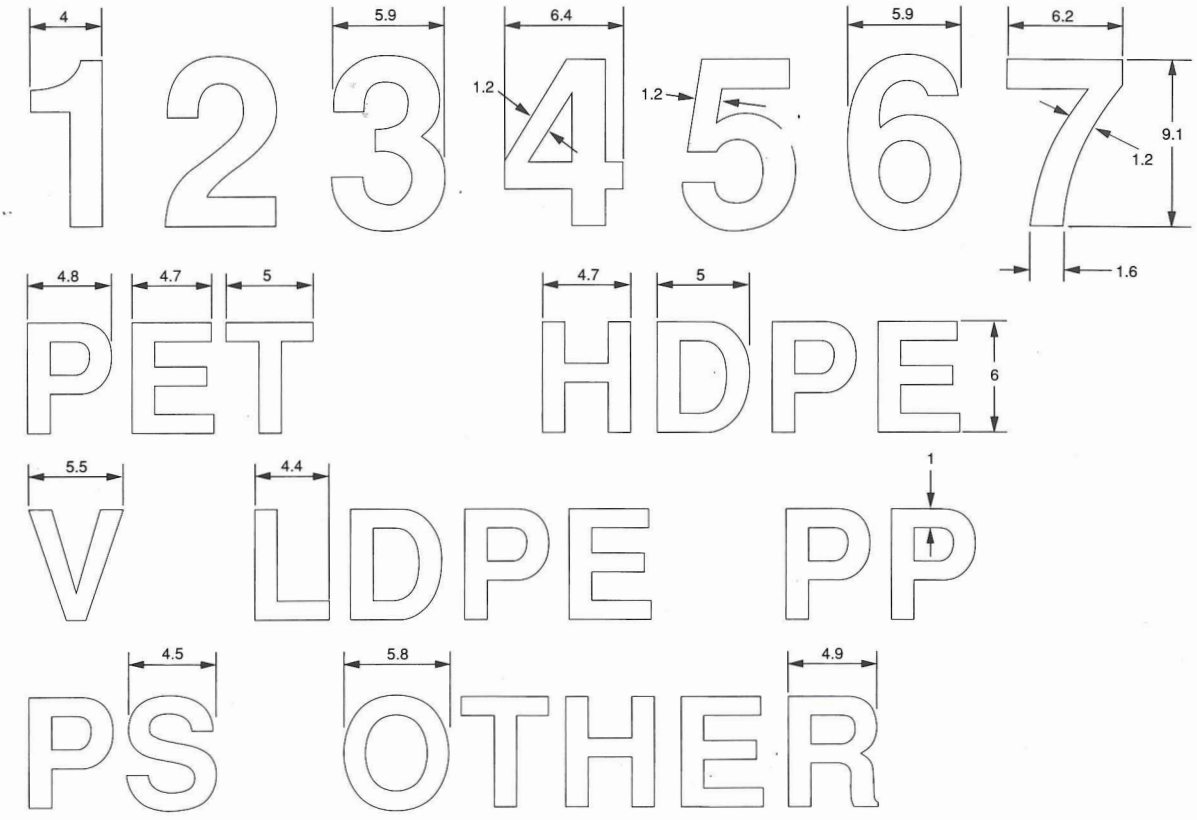
All characters in Helvetica Bold.
Approximate printing point size for:

Numbers - 26pts

Letters - 17 pts







Specific Gravities of Polymers

(PP)	Polypropylene	0.90
(EVA)	Poly (Ethylene-co-Vinyl Acetate)	0.92
(LDPE)	Low-Density Polyethylene	0.92
(HDPE)	High-Density Polyethylene	0.96
H_20	Water	1.00
ABS	Acrylonitrile Butadiene Styrene	1.05
(PS)	Polystyrene	1.06
(PVC)	Poly Vinyl Chloride	1.35
(PET)	Polyethylene Terephthalate	1.38

Other references for further reading

- "PACIA review of the Plastics Coding System", PACIA, May 2001
- "AS/ANZ ISO 14021: 2000 – Environmental Labelling and Declarations – Self declared environmental claims (Type II environmental labelling)", Standards Australia, 2001
- "National Packaging Covenant" Australian and New Zealand Environment and Conservation Council (ANZECC), August 1999.
- "Environmental Code of Practice for Packaging" as included in the National Packaging Covenant
- Publications from the National Drugs and Poisons Schedule Committee (Therapeutic Goods Administration / Australian Department of Health and Aging)
- "Standard for Uniform Scheduling of Drugs and Poisons", June 2002
- "Guide to labelling of Drugs and Poisons", June 2000
- "Guide to the packaging, labelling and regulations of paints, tinters and related products" July 2000
- Various Federal and State laws and regulations, standards, codes of practice and guides regarding packaging and labelling of various substances including: dangerous goods; hazardous substances; drugs; veterinary chemical products and agricultural chemical products.
  - National Occupational Health and Safety Commission including, but not limited to:
  - "Australian code for the transport of dangerous goods by road and rail" 1987
  - "National Code of Practice for the Storage and Handling of Workplace Dangerous Goods [NOHSC:2017(2001)]" 2001
  - "National Model Regulations for the Control of Workplace Hazardous Substances [NOHSC:1005(1994)] (Updated for Amendments)" 1994 and updated amendments
- Australian Council of Recyclers – guides published for various plastics (eg: PET, HDPE)
- "Recycling claims for used consumer packaging", Australian Competition and Consumer Commission, 1995.

Useful websites

- PACIA: www.pacia.org.au
- EcoRecycle Victoria: www.ecorecycle.vic.gov.au
- Basell Australia Pty Ltd: www.basell.com
- Australian Competition and Consumer Commission: www.accc.gov.au
- Australian Council of Recyclers: www.acor.org.au
- Beverage Industry Environment Council: www.biec.com.au
- National Occupational Health and Safety Commission: www.nohsc.gov.au
- National Packaging Covenant: www.ea.gov.au/industry/waste/covenant
- Packaging Council of Australia: www.packcoun.com.au
- Standards Australia: www.standards.com.au
- Therapeutic Goods Administration: www.health.gov.au/tga

Footnotes

1. Independent Assessment of Kerbside Recycling, Nolan ITU, Envirosris, SKM Economics, January 2001
2. Recycling claims for used consumer packaging, Australian Competition and Consumer Commission, 1995.
3. AS/ANZ ISO 14021: 2000 – Environmental Labelling and Declarations – Self declared environmental claims (Type II environmental labelling), Standards Australia, 2001

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