PART II - LABELLING

10. General Labelling Requirements

i) Contrast

Recommendation

That the contrast of required labelling be required to be at least equal to a 70% screen of black on white, with no single test method to be defined in the Regulations.

Rationale

Contrast has a major effect on the legibility of labelling. This is recognized in the Nonprescription Drug Manufacturers Association's Readability Guidelines, which state:

> "the greater the contrast, the greater the readability",[1]

and in other standards and guidelines.

Lehto recommends:

> "Provide for a brightness contrast of at least 50% between text and background."[2]

Black print on a white background generally has a contrast of well over 80%; this value will not be difficult for label designers to achieve.[3] A professional graphics designer stated:

> "in my professional opinion, the *70% black on white* minimum colour contrast is deemed very acceptable for making precautionary labelling information stand out on the label."[4]

ii) Print Type

Recommendation

That the print used in required labelling be required to be in standard type, that is type which is not compressed, expanded or decorative, is sans serif, has large X height and is clear and legible, and that the signal word, primary hazard statement, specific hazard definition and the words "FIRST AID TREATMENT" be required to appear in upper-case letters.

Rationale

The recommendation is intended to allow label designers flexibility in the choice of print types while ensuring that difficult to read print is not used. Lettering which is ornate, decorative or serif is less legible and is also more prone to degradation during reproduction. This is reflected in ANSI Standards Z35.1-1972, Specifications for Accident Prevention Signs, and Z535.4-1991, Product Safety Signs and Labels, which require sans serif letters[5,6], and in the Nonprescription Drug Manufacturers Label Readability Guidelines, which state:

> "Sans serif type is more easily read by beginning readers and the visually impaired than type with serifs."[7]

Lehto recommends:

> "For short messages or signal words, wherein legibility is of primary concern, text characters should be sans serif."[8]

The requirement that the signal word, primary hazard statement and specific hazard definition appear in upper-case letters ensures maximum visibility and readability. The requirement that the words "FIRST AID TREATMENT" appear in upper-case letters ensures that they are distinct from the surrounding labelling and can be readily found in an emergency.

iii) Colour

Recommendation

That the colour of required labelling not be defined.

Rationale

The extreme variability of background and other colour elements on consumer product labels rules out requirements for specific colours. A requirement that specific colours be used would greatly reduce the range of colours available to label designers for other aspects of labelling. Readability will be ensured with requirements for print type, format and contrast rather than colour.

iv) Transparent Containers

Recommendation

That the labelling requirements not be satisfied by placing the required statements on the back of a label located on the front of a transparent container.

Rationale

The recommendation addresses the degradation in readability resulting from having the product contents between the reader and label. Coloured contents, or clear contents with a refractive index significantly different than air, would obscure the labelling.

11. Required Label Items

i) Structure of Required Label Items

Recommendation

That the following label items be required to appear, as appropriate to the hazard:

- a Hazard Glyph
- a Signal Word
- a Primary Hazard Statement
- a Specific Hazard Definition
- Instructions - Negative
- Instructions - Positive
- a First Aid Statement
- Additional First Aid Statements.

In specific hazard categories some of the statements may not be required.

Rationale

The statements to be required are similar to those required by the current and other regulations, and by various standards. For example, ANSI Standard Z535.4-1991, Product Safety Signs and Labels, requires that every label include:

- a signal word appropriate to the level of hazard;
- a statement describing the hazard;
- a description of the probable consequences of involvement with the hazard;
- instructions on how the hazard can be avoided.[6]

Hazard glyphs are understood by most consumers to indicate that the product is hazardous.[9] Several studies have shown that the more hazardous a product is perceived to be, the more likely that the labelling is to be read.[10,11,12] The prominent placement of the hazard glyph, signal word and primary hazard statement alerts readers/users and significantly increases the incidence of users reading the more detailed precautionary labelling. Pollack-Nelson recommends:

"3. · Attract attention with pictograph".[13]

Lehto and Miller report:

> "research indicates that nonverbal symbols, as opposed to alphabetical symbols, can be perceived at greater distances".[14]

The hazard glyph provides an indication to those with limited ability to read English or French labelling - this includes young children and the literacy-challenged. It is also likely to be seen and noticed at some level by those who choose not to read the other labelling information.

The signal word reinforces and elaborates on the message given by the hazard glyph. The simplicity of the signal word makes it in many ways a glyph; it can be seen and understood without a conscious process of reading. Koller states:

> "it has been shown that graphemic pattern analysis can profitably be distinguished from semantic encoding, and that in many cases may account for recognition without recourse to the mental "contents"."[15]

Graphemic refers to pictorial, where the form of the word or sentence is processed as a picture rather than by reading the letters.

The specific hazard definition is intended to provide a more detailed description of the hazard in smaller print than the primary hazard statement. In some cases the wording is a restatement rather than an elaboration, in order to reinforce the message.

The division of the instructions into negative and positive is intended to ensure that the actions to be avoided are clearly and distinctly laid out before the instructions on positive actions. It is vital that the reader be informed of those actions which must not be carried out if harm is to be avoided. The next most important step is to provide the reader with information on positive steps to take to avoid negative outcomes. de Turck and Goldhaber state:

> "A consistent finding in human information processing research is that negative information exerts more influence on judgements than comparable positive information."

and

> "Negative information is processed more deeply ... than positive information, and, as a result, affects judgement more than positive information."[16]

Pollack-Nelson recommends:

"1. Include a statement of the degree of hazard and the consequences of ignoring it...
2. Include an instruction statement of how to avoid the hazard."[17]

The space available on the front of the container often limits the amount of labelling that can be placed there. Breaking the required statements down and allowing some to be placed elsewhere on the container acknowledges this reality. The recommended requirement for the structure of the labelling is not, however, intended to prevent the label designer from placing all the required material on the container front, if so desired.

Pollack-Nelson, on the basis of a review of numerous studies on the effectiveness of written warnings, recommends:

"3. Use brief sentences broken into meaningful phrases".[18]

Lehto states:

"Use short, simple sentences; complex conditional sentences, particularly those containing negations, should be avoided."[19]

Miller and Lehto state:

"It is unclear how much information, when presented on a warning label, will result in information overload. However, there is evidence that increasing the number of items on a label can cause a division of processing time among the items presented. ... It was found that the subjects remembered important product related information better, if fewer dimensions or items were listed... The referred-to research indicated that increasing the number of messages on a product, by including warning labels, might lead to a division of the human's information processing resources. If so, presenting a long list of messages with a warning label could be quite counter-productive. ... Perhaps the most general rule is to use simple, short sentences, constructed in the subject-verb-object form. Wright (1981) provides such recommendations."[20]

ii) ***Order of Required Statements***

Recommendation

That the required statements be required to appear in the order given under Section 11(i) - Format of Required Label Items.

Rationale

Given with the rationale for Section 10(i) above.

iii) ***Pictographs***

Recommendation

That pictographs not be considered substitutes for required labelling.

Rationale

The hazards to be avoided and behaviour to be carried out in order to minimize the risks posed by consumer chemical products are, in most cases, too complex to portray in a reasonable number of simple pictographs. Pictographs are not generally capable of conveying the amount of information required unless the reader is already very familiar with the meaning of the pictograph. This can be accomplished when training programs accompany the use of labelling, but such programs are not practical for consumer products.

The recommendation is not intended to rule out the use of pictographs to supplement the required labelling.

Johnson notes that it is difficult to convey abstract/complex concepts with pictographs.[21]

Lehto and Miller state:

> "Several studies have uncovered problems in the basic comprehension of non-verbal symbols that appear to be related to internal syntax... The use of symbols is frequently justified on the assumption that their meanings can be inferred across cultures. ... More recent research has shown that this is not necessarily so."[22]

Lehto and Miller also point out:

> "The set of meanings that can be effectively conveyed by safety symbols is likely to be small in comparison to the vast number of meanings conveyed by written language... It is possible that the number of meanings effectively conveyed by safety symbols (when contextual information is missing) is so small that an individual with an equivalent verbal vocabulary would be considered to be at a profound level of illiteracy. If so, the estimates of illiteracy commonly cited to justify the use of safety symbols may be leading us astray."[23]

Schneider states:

> "pictorial warnings may not be as effective as intuition would indicate, and certainly not as effective as other package and label characteristics."[24]

iv) *Small Container Exemption*

Recommendation

That the specific hazard definition, instructions - negative and positive and first aid statements not be required to appear on containers of products with display panel areas less than 35 cm^2, except in the case of adhesives that quickly bond the skin.

Rationale

The recommendation that containers with display panel areas less than 35 cm^2 be exempt from some requirements acknowledges the impracticability of requiring lengthy labelling to appear, in a print size large enough to be read without visual aids, on small containers. Tags or inserts could be used, but they are often of limited effectiveness as they tend to be discarded by product users. A requirement that could only be satisfied by the use of tags or inserts should therefore be applied only when there is a specific rationale.

The current *Consumer Chemicals and Containers Regulations* require only the hazard symbol and signal word to appear on containers of 60 mL volume or less, except in the case of cyanoacrylate adhesives (which quickly bond the skin) and products packaged with a separate outer container. Inappropriate first aid treatment is the greatest hazard in the case of cyanoacrylate adhesives (generally sold to consumers in 1 to 5 mL containers), as users may tear skin while pulling apart bonded tissues. For such products a requirement for the instructions and first aid statement is appropriate even when packaged in small containers.

12. Format of Required Label Items

i) *Hazard Glyphs*

Recommendations

That -

a) the hazard glyph(s) be required to appear on the display panel;

b) the hazard glyph(s) be required to be centred parallel to and near the base of the display panel;

c) containers in the shape of tubes be exempt from the requirement that the hazard glyph(s) be parallel to and near the base of the display panel;

d) each hazard glyph be required to be enclosed in an octagon serving as a frame for the glyph;

e) the diameter of the octagon enclosing the hazard glyph be required to be such that the area of an imaginary circle enclosing the octagon is at least 3% of the display panel area, with a minimum permitted height of 6 mm and a maximum required height of 50 mm, regardless of the display panel area.

Rationale

See pages 60 - 66.

ii) ***Signal Word***

Recommendations

That -

a) the signal word be required to appear on the display panel;

b) the signal word be required to be centred below the hazard glyph(s);

c) in the case of containers where the height is less than 10 cm and the width of the display panel is at least twice the height, the signal word be required to appear below or beside, but not above, the glyph(s);

d) the signal word be required to appear in upper-case letters;

e) the height of the signal word be required to be at least one quarter the height of the hazard glyph.

Rationale

See pages 60 - 66.

iii) ***Primary Hazard Statement***

Recommendations

That -

a) the primary hazard statement be required to appear on the display panel;

b) the primary hazard statement be required to be centred below the signal word;

c) the primary hazard statement be required to appear in upper case letters;

d) the print used for the primary hazard statement be required to be at least the size indicated in the following table:

Table 15: Size of the Primary Hazard Statement

Display Panel Area	Size of Statement
less than 10 cm^2	at least 4.5 point
10 cm^2 or more but less than 35 cm^2	6 point
35 cm^2 or more but less than 330 cm^2	8 point
330 cm^2 or more	12 point

Rationale

See pages 60 - 66.

iv) ***Specific hazard definition, instructions - negative and positive, first aid statements***

Recommendations

That -

a) the specific hazard definition, instructions - negative and positive, and first aid statements be required to appear on the front, side, top, or back, but not the bottom, of the container;

b) the specific hazard definition, instructions - negative and positive, and first aid statements be required to be enclosed within a border which functions as a visual barrier to prevent the safety labelling from blending in with other information on the label;

c) the visual border may be a line, a series of dots or hatched lines, a difference in colour or shading of the background, or some other graphic device;

d) the specific hazard definition, instructions and first aid statements be required to be flush left justified;

e) the specific hazard definition and the words "FIRST AID TREATMENT" be required to appear in upper-case letters;

f) the print used for the specific hazard definition, instructions - negative and positive, and the words "FIRST AID TREATMENT" be required to be at least the size given in the following table:

Table 16: Size of the Specific Hazard Definition, Instructions and First-Aid Statements

Display Panel Area	Size of Statements
less than 10 cm^2 (only for adhesives that quickly bond the skin)	4.5 point
10 cm^2 or more but less than 35 cm^2 (only for adhesives that quickly bond the skin)	6 point
35 cm^2 or more but less than 330 cm^2	8 point
330 cm^2 or more	12 point

g) the print used for the statements following the words "FIRST AID TREATMENT" be required to be at least 6 point. For containers of adhesives that quickly bond the skin with display panel areas of less than 10 cm^2, the print used for these statements must be at least 4.5 point.

Rationale - *Format of Required Label Items*

Location

The placement of the hazard glyph, signal word and primary hazard statement on the container front are intended to attract the user's attention, even if only unconsciously, to create a feeling of unease and a perception that the product is hazardous. They are to appear on the front of the container to serve as a flag, to be highly visible at time of purchase and to generate at least a general awareness that the product should be used with caution. The intent is to increase the likelihood of the user reading the more detailed precautionary material in the instructions and the directions for use (if present and related to safe use of the product). Lehto recommends:

> "Provide a signal word or word in capital letters at the top of a warning sign or label which indicates the sign or label is a warning."[25]

The specific hazard definition, instructions and first aid statements may appear on the front, sides, top or back of the container. When the front panel material has motivated them, users will seek it out. If not, users may read it while seeking directions for use. This increases the likelihood of users reading at least some of the material.

Order

Pollack-Nelson recommends:

> "Present critical information first; highlight any unique characteristics of the product."[26]

The recommended order accomplishes this by pointing out the dangerous nature of the product first through the large signal word. The placement of the primary hazard statement near the signal word highlights the hazardous characteristic of the product.

Wolgalter et al. state:

> "Two laboratory experiments designed to examine behavioral effectiveness indicated that a warning placed before procedural instructions is more likely to lead to compliance than a warning that follows instructions. Two rating experiments indicated that for greatest perceived effectiveness, environmental warnings generally required a signal word plus hazard, consequence and instructions statements. A third rating experiment suggested that informative, nonredundant statements added to a warning's perceived effectiveness."[27]

In the proposed scheme, the specific hazard definition could be thought of as a "consequences" statement.

The instructions - negative are placed before the instructions - positive because the most important objective is to ensure that dangerous behaviour is not carried out. The next objective is to give information on the positive steps to take in using the product.

The recommended order is similar to that of the current *Consumer Chemicals and Containers Regulations* and numerous other Regulations and standards, including ANSI Standard Z535.4-1991, Product Safety Signs and Labels, and the U.S. Hazardous Substances Regulations.[28]

Size

It is recognized that a minimum glyph and print size is required to ensure that the required information is legible under actual use conditions. It is also recognized that label space is limited, especially on smaller containers, imposing a ceiling on what can reasonably be required. The scheme detailed in Table 1 is based on the largest practical symbol and print size requirements for smaller containers, and on size requirements for larger containers that will ensure legibility.

Visual angles of 5 to 37 minutes have been recommended as the minimum for

printed information and symbols[29]. At a 30.5 cm viewing distance, this translates into print or glyph from 0.4 mm to 3.3 mm in height, and at a 61 cm viewing distance, into glyph or print 0.9 to 6.6 mm in height. The minimum glyph size of 6 mm (or approximately 1/4 inch) in height for the visual frame of the hazard glyph, would thus accord with the upper range of what is estimated to be the minimum size for a 61 cm (two-foot) viewing distance. In addition, a requirement that the level of contrast between the glyph(s) and statements and the background be equivalent to at least a 70% screen of black on white will ensure that the glyph(s) and statements are prominent on the label.

The recommended print size requirements given in Table 1 exceed the requirements of the current Regulations for smaller containers, but are less for larger containers, based on the premise that 12 point print, the recommended maximum required size for required labelling other than the glyph and signal word, will be readily legible whatever the size of the container.

The glyphs and signal word are intended to serve in part as a "flag" and to be obvious at a greater distance than the detailed printed material, necessitating a larger size requirement. A 15 cm viewing distance is applicable to the printed material intended to be read in detail. This translates into print from 0.2 to 1.7 mm in height, based upon 5 to 37 degree visual viewing angles. ANSI Standard Z535-4 1991, Product Safety Signs and Labels, would give a maximum print height of 1 mm (approximately 3 point) for a 15 cm viewing distance under favourable viewing conditions and 2 mm (approximately 6 point) under unfavourable conditions.[31] The recommended minimum requirement for print height for all material but the signal word of 6 point (except on containers with display panel areas less than 10 cm^2), is thus in accordance with the upper range of these estimated minimum print heights, and will ensure that the labelling is accessible to those with moderate visual impairment.

On containers with display panel areas less than 10 cm^2, it may be difficult to find sufficient space to print detailed information in 6 point type. A 4.5 point minimum required print size is therefore recommended for the primary hazard statement, specific hazard definition and additional hazard statements for containers with display panel areas less than 10 cm^2. However, it is also recommended that most small size containers be required to bear only the hazard glyph(s) and signal word. The 4.5 minimum requirement would apply only to products such as adhesives which bond the skin quickly for which the detailed labelling is required on small containers.

Optima Consultants carried out focus group testing of print and glyph sizes. A death's head glyph in an octagon frame was tested in three sizes - 6 mm in height, 13 mm (the recommended height for the label area) and 15 mm (the currently required height for the area of the label). The 6 mm glyph was seen as "much too

small" or "ridiculously small" for the label (43 cm^2 in area), the 13 mm glyph (recommended requirement) was seen as "much better", while the 15 mm glyph (currently required) was seen as the "most eye-catching", by some, as "too big" by others. Most "spontaneously feel that the *13 mm glyph is an adequate size*". The 13 mm glyph is the size which is to be required for the area of the tested label.[30]

Optima Consultants also tested various print sizes. They tested smaller, mid-sized (recommended requirements) and larger fonts on the same-sized label. They found:

> "regarding the label with the *smallest font sizes*, both older and younger panelists spontaneously feel that the 4.5 point font under the FIRST AID TREATMENT section is "much too small". As one panelist exclaims, "You need a magnifying glass to read this!"
>
> When they are shown the *middle size alternative*, both younger and older panelists spontaneously feel that these font sizes are a "vast improvement". The font of the FIRST AID TREATMENT information (6 point) is deemed "legible" and the additional hazard statements under LIQUID AND FUMES HARMFUL is a font size (8 point) that is "very easy to read".
>
> In comparison to the largest font sizes, panelists have mixed reactions. Many *younger* panelists feel that the largest font (10 point) is "unnecessarily large". Conversely, some *older* panelists are drawn to this size because it is "easy to read". Some explain that the large print would be important in an "emergency situation" for people with "poor eyesight".
>
> After probing, the middle alternative seems to be the most preferred for these reasons:
>
> - Most panelists feel that while the font (6 point) of the test under FIRST AID TREATMENT is small, it is "legible". Some older participants suggest that if the FIRST AID INFORMATION were the same *size as the text* under LIQUID AND FUMES HARMFUL (8 point) then the middle alternative label would be "perfect".
>
> - The larger the print size become*s, the more likely that words will be* "cut up" (hyphenated). They explain that hyphenated words are "harder to read".
>
> - A few panelists dislike the fact that in order to accommodate a larger font size, certain *consumer information must be omitted from the label.*"[31]

The recommended format requirements with regard to placement of the labelling are similar to the requirements of the current Regulations, but allow greater flexibility in the placement of the signal word and primary hazard statement(s) below or beside the glyph in certain cases. The ANSI Standard Z535.4-1991, Product Safety Signs and Labels, allows vertical or horizontal layouts.

Layout

Optima Consultants tested a vertical format versus a horizontal format in a mall intercept survey (307 respondents). 68% of respondents favoured a vertical format; 43% of these thought that the warning information was easier to see and stood out better. 16% of respondents favoured a horizontal format; 46% of these thought that the warning information was easier to see and stood out better.[32] The allowance for a horizontal format for smaller, flatter containers recognizes the difficulty that label designers have in placing all the required labelling in a vertical format in the required sizes. A vertical format is to be required for larger containers where there is adequate label space to follow the vertical format.

Tubes

The optimum positioning of labelling on tubes is dependant upon the shape and length of the tube and the manner in which the tube is displayed for sale. It may be difficult to determine where the "base" is on a long cylinder displayed for sale in a horizontal position. A greater degree of flexibility in determining the appropriate position of the hazard glyph(s) and statements is therefore required. In addition, when tubes are intended to be rolled-up, the labelling near the base is hidden as the contents are used-up. In this case, a requirement for the front panel labelling to be near the base would lead to the labelling being hidden during most of the time the product is used.

Border

The recommendation for a requirement for a border is intended to ensure that the specific hazard definition, instructions and especially the first aid statements are distinct from other labelling. This will ensure that the first aid statement can be readily found during the stressful conditions of an emergency situation, when the reader may not have the time or may be too upset to search for the information.

The recommended border is not intended to replace the hatched line in which WHMIS (Workplace Hazardous Materials Information System) information is required to appear. It is also not intended, in cases of dual labelling where both consumer and industrial-use labelling appears on the same container, that the hatched line required for WHMIS labelling also enclose the precautionary labelling intended for consumers.

ANSI Standard Z535.4-1991, Product Safety Signs and Labels, states that a border may be used to render safety labelling distinctive. The U.S. Poison Prevention Packaging Act of 1970 Regulations require various safety-related labelling to

"appear within the borderline of a square or rectangle".

The U.S. Federal Hazardous Substances Act Regulations state that various safety-labelling items

"shall be separated on all sides from other printed or graphic material, ... by a border line or by a space no smaller than the minimum allowable height of the type size for cautionary material required by the Act."

Pollack-Nelson, in summing up current knowledge, recommends:

"1. Off-set label with size, contrasting colour, border around label, and/or distance from other written material".[33]

Optima Consultants carried out focus group testing of the effectiveness of visual barriers (a solid line versus a space) on a large (4 L) and a small (150 mL) container. They found:

"large container

Glancing at the lower part of the back label, two-thirds (65%) feel that the label with the *solid line border* around the safety information catches their attention better than the *space border*... A similar proportion (66%) feel that the solid line border results in more consumers taking the time to read the *safety information*."

small container

The small label with the solid line border is thought to be more effective in attracting the attention of the reader (39%) or to be equally as eye-catching (45%) as the alternative. This pattern holds true for ability of the labelling design to motivate people to read the safety information... Again the line border is either preferred (38%) or no real difference is perceived (46%)."[34]

Justification

With regard to text justification, Reynolds states:

"There is, however, evidence to suggest that less skilled readers find unjustified text easier to read (Powers, 1962). Gregory and Poulton (1970) found this was particularly true for very short lines, and they concluded that less skilled readers were confused by the uneven spacing and hyphenation associated with justified setting... Thus it would seem that the use of unjustified setting for continuous text can offer practical advantages with no disadvantages in terms of legibility."[35]

The Label Readability Guidelines of the Nonprescription Drug Manufacturers Association state:

"nonright-justified text - by virtue of its irregular shape - provides visual cues to the reader, thereby enhancing readability. Right-justification usually requires hyphenation which tends to hinder readability."[36]

Visual Frame for all Hazard Glyphs

There is a low level of public recognition of the degree of hazard glyphs currently used (triangle, diamond and octagon for CAUTION, WARNING and DANGER respectively). Gallup Canada found that:

> "Compared to the hazard symbols, the degree of hazard symbols or frames are much less understood by the Canadian public ... only 25% - 35% of Canadians have accurate perceptions of the degree of hazard represented by each individual frame." [37]

Retention of the degree of hazard glyphs would therefore serve little purpose.

An octagon is graphically more efficient, as the shape allows the hazard glyph to be larger for the same height of glyph. The shape also allows a thicker line to be used for the frame than would a triangle or a diamond, where the more acute interior angles "fill in" corners when a thick line is used. In addition, use of the octagon minimizes the need to re-educate consumers about the meaning of the glyph.

Optima Consultants tested the current octagon against a point-up triangle currently referenced by Standard CAN Z-321-77 for caution and danger signs. They found that:

> "On a spontaneous basis, an important majority (80%) feel that the label with the octagon frame better attracts their attention than does the label with the point-up triangle (6%)... Most (85%) feel that the octagon frame best signifies that the *product is dangerous*. Three-quarters (75%) feel that the octagon frame would make people more likely to *read the safety information*."[38]

13. Content of Required Label Items

i) ***All Hazard Categories***

<u>Recommendations</u>

That -

a) when two degrees of hazard are involved, the signal word "DANGER" supersede the signal word "CAUTION";

b) for single-use containers exempted from the need to remove a seal during package performance testing, the primary hazard statement "Use entire contents after opening." be required.

Rationale

Danger - Caution

Numerous precautionary labelling systems with three levels of hazard use "DANGER", "WARNING" and "CAUTION" as signal words, including the current *Consumer Chemicals and Containers Regulations*. The revised labelling system will incorporate one or two 2 levels of hazard.

"DANGER" is almost universally used for the higher level of hazard. The choice for the lower level of hazard was between "WARNING" and "CAUTION". A Gallup Poll found that most consumers don't distinguish between subtle variations in hazard levels. 36% of the 1050 subjects interviewed stated that the different warning words would affect their handling of products. Of these 64% stated that "DANGER" would generate the most careful behaviour.[39]

ANSI Z35.1-1972, Specifications for Accident Prevention Signs, uses "DANGER" and "CAUTION".

Miller and Lehto report:

> "One study (Bresnahan and Bryk, 1975) has addressed the terms "danger" and "caution" by industrial workers. Here, it was found that the greater levels of hazard were associated with "danger" than with "caution". Various studies have found that readers do not distinguish between "WARNING" and "CAUTION" to any significant degree (Hardie, 1994)). P.B. Kline et al (1993) asked undergraduate students to evaluate 12 different labels conditions on common commercial household products. "DANGER" was perceived to be more hazardous than products displaying "CAUTION" or "WARNING", but the authors concluded that "CAUTION" and "WARNING" did not differ significantly."[40]

Optima Consultants tested that the word pair "CAUTION-WARNING" with 72 anglophones in a mall survey, and the word pair "CAUTION-ATTENTION" with 77 anglophones... "ATTENTION" was tested because the similarity between the English and French made it a candidate to replace "CAUTION" or "WARNING" if it was found to be as or more effective.

Optima found "CAUTION" to be more effective than "ATTENTION" in communicating that the product is dangerous (79% favoured "CAUTION") and requires careful handling (75%), and in motivating users to read the safety information (81%) and to store the product safely (79%). They found a much

reduced differentiation between the words"CAUTION" and "WARNING". "WARNING" was found to be slightly more effective than "CAUTION" in communicating that the product is dangerous (53% favoured "WARNING"), motivating users to read the safety information (52%), requires careful handling (53%) and to store the product safely (47%). The differences were within the margin of error (± 6% 19 times out of 20 from what would have been obtained if all adult mall shoppers were surveyed). The small difference indicates that "CAUTION" and "WARNING" have a similar impact, and that the choice between the two is somewhat arbitrary. The use of "CAUTION" will maintain the current distinction between highest and lowest levels of hazard.[41]

Single Use Containers

The recommended primary hazard statement for single use containers is intended to be short and unambiguous. Optima Consultants found that:

> "The phrase **use entire contents after opening** seems to be easily understood by anglophones in the sessions. They interpret it to mean that once they open the container, "all of the contents should be used up"."[42]

ii) ***Toxic and Harmful Products***

Recommendation

That the following information be required to appear on containers of Toxic and Harmful (Toxic) products:

Table 17: Labelling of Toxic and Harmful Products

Label Item	Toxic	Harmful
Hazard Glyph		
Signal Word	"DANGER"	"CAUTION"
Primary Hazard Statement	"POISON"	

Label Item	Toxic	Harmful
Specific Hazard Definition	"LIQUID (&/or) FUMES (&/or) SPRAY (&/or) MIXTURE HARMFUL" or "EXTREMELY HARMFUL", as appropriate to the hazard.	"LIQUID (&/or) FUMES (&/or) SPRAY (&/or) MIXTURE HARMFUL", or "MAY BE HARMFUL", as appropriate to the hazard.
Instructions - Negative	"Do not swallow." &/or "Do not get in eyes, on skin, clothing." &/or "Do not breath fumes." as appropriate to the hazard.	
Instructions - Positive	"Keep out of reach of children." and, if appropriate to the hazard, "Use only in a well-ventilated area." &/or "Wear mask (&/or) rubber gloves (&/or) safety glasses." (Specific safety equipment relevant to the hazard to be described, not just a general reference to safety equipment.)	
First Aid Statement	"FIRST AID TREATMENT Contains ... (name of hazardous substance(s).) If swallowed, call Poison Control Centre or doctor immediately."	
Additional First Aid Statements	"If in eyes or on skin, rinse them well with water. If on clothes, remove clothes immediately. If breathed in, move person to fresh air. If person is alert, induce vomiting. (for methanol, glycols, etc.)", as appropriate, in the order shown. Statements may be combined.	

Rationale

The recommended hazard glyph, referenced in the current *Consumer Chemicals and Containers Regulations,* was chosen over a similar death's head glyph referenced in the *Controlled Products Regulations* (WHMIS).[43] A Gallup Survey found relatively high levels of recognition and identification of the death's head glyph referenced in the current Regulations (90% and 77% respectively).[44] Optima Consultants tested the alternative symbols in a mall intercept survey (307 respondents), and found that the current death's head caught the attention (49% versus 13% for the WHMIS death's head), and that approximately two-thirds of those surveyed believed that the current death's head best communicated the four key messages.[45]

"POISON", the recommended primary hazard statement, is very well-known and was judged to convey the sense of the hazard to the average reader to a greater degree than "TOXIC" or "HARMFUL OR FATAL IF SWALLOWED", although it is in some cases not technically correct. It is also bilingual, reducing the demand for label space as the one word will suffice rather than two (or more).

In a survey carried out by Reark Research in Australia and reported in Choice, 66% of those surveyed (2677 in total) rated "POISON" as being more hazardous than "TOXIC".[46]

Optima Consultants tested "POISON", "TOXIC/TOXIQUE" and "HARMFUL IF

SWALLOWED/NOCIF OU FATAL SI AVALÉ" (all of which are required for specific products subject to the current *Consumer Chemicals and Containers Regulations*). When "POISON" was tested against "TOXIC/TOXIQUE" in a mall intercept survey, 70% of the 307 subjects surveyed believed that "POISON" more clearly communicated that the product was dangerous. Both anglophones and francophones (73% and 66%, respectively) preferred "POISON". 61% felt that "POISON" was more likely to make people read the safety information. Optima states:

> "In summary, **poison** is perceived to be more effective than **toxic** in communicating the intended messages according to the majority of anglophones and francophones. ... In focus group workshops, poison was preferred (by all francophones and most anglophones) over **harmful or fatal if swallowed.** Indeed, **poison** is described as "simple", "direct", and a term that "people have no trouble understanding"."[47]

The choice of terms for the specific hazard definition allows the packager flexibility in tailoring the wording to fit the specific nature of the hazard. "FUMES" was chosen rather than "GASES", "SPRAYS", "VAPOURS" or "MISTS", because it best conveys in the popular, although not technical, usage, the sense of airborne material which may not be visible. It is also similar to the French "Fumer". No one word is technically correct for gases, fumes, mists and vapours.

Optima Consultants tested "FUMES" against "VAPOURS" and "ÉMANATIONS" against "VAPEURS". They state:

> "Overall, the qualitative results reinforce the trends identified in the survey. Anglophones clearly prefer *fumes* because it is a "familiar" term which means "harmful gases", which often has a "distinct odour". *Vapours* seems to communicate something "less dangerous", perhaps because it is associated with "steam". Conversely, more francophones tend to prefer *vapeurs*, as they feel it will be better understood by "common folk"."[48]

"MAY BE HARMFUL", a recommended specific hazard definition wording for Harmful products, conveys a reduced level of hazard. The words "MAY BE" are not applicable to all products in the category and are only to be used when appropriate.

The "and/or" structure for the instructions - negative is intended to allow the choice of instructions which are specific to the actual hazard, while ensuring that standardized wordings are used. The specific wordings are intended to be as short as possible; "eyes, skin and clothing" are not given articles (your, the, etc.). The use of short sentences or phrases is intended to minimize the demand for label space and minimize reader overload, as discussed in Section 11(i) - Structure of Required Label Items. The choice of specific statement is determined by the

nature of the hazard (dermal, oral or inhalation toxicity) and the form of the product (solid, liquid or gas).

The recommended instructions - positive were structured to provide flexibility while ensuring the use of standardized wordings.

With regard to the reference to calling a poison control centre or doctor in the recommended first aid statement, 98.1% of Canadian households had at least one telephone in 1991, 98.5% in 1990[49]. The majority of the households without telephones have access to a nearby telephone or a radio telephone, as the large majority of remote communities have at least one radio telephone. All telephone directories published in Canada prominently provide the number of a poison control centre. Almost all Canadian households therefore have ready telephone access to a poison control centre, which is the intended initial source of advice in cases of poisonings. The intent is to encourage users to contact the appropriate medical authority rather than attempt to initiate first aid treatment alone.

The word "doctor" is required rather than "physician" because it is simpler, better understood by readers with a limited vocabulary and somewhat shorter. Optima Consultants tested "doctor" against "physician" in focus group sessions, and found:

> "anglophones prefer doctor and francophones médecin. According to panelists, these terms are what "people use most often in their everyday lives"."[50]

The phrase "Contains ... (name of hazardous substance)" is to be placed immediately after the words FIRST AID STATEMENT to ensure that it can be readily found by the users or caregiver of a child who has ingested the product and passed on to a poison control centre or doctor in an emergency situation.

The recommendation is that additional first aid statements are to be required only when appropriate to the hazard, and that they are not required for all products within the hazard category. For example, products posing a dermal toxicity hazard would be required to bear the statement "If in eyes or on skin, rinse them well with water. If on clothing, remove clothing immediately." This provides the dealer with some flexibility, and ensures that the statements are in a standard form when they are required. The wordings are based on current requirements, modified to increase clarity and simplicity.

iii) ***Corrosive and Irritant Products***

Recommendation

That the following information be required to appear on containers of Corrosive and Irritant products:

Table 18: Labelling of Corrosive and Irritant Products

Label Item	Corrosive	Irritant
Hazard Glyph		(none)
Signal Word	"DANGER"	"CAUTION " for products which irritate the skin, but not for products which irritate the eye only
Primary Hazard Statement	"CORROSIVE"	"IRRITANT" for products which - - are not subject to display panel labelling requirements for another hazard category, and - irritate the skin, not the eye only
Specific Hazard Definition	"CAUSES BURNS", and, when appropriate to the hazard, DANGEROUS FUMES FORMED WHEN MIXED WITH OTHER PRODUCTS"	"MAY IRRITATE EYES OR SKIN", and "DANGEROUS FUMES FORMED WHEN MIXED WITH OTHER PRODUCTS" as appropriate to the hazard.
Instructions - Negative	"Do not get in eyes, on skin, clothing." and, if appropriate to the hazard, "Do not breathe fumes." and, when appropriate to the hazard and preceding the other Instructions - Negative, "Do not mix with products such as toilet bowl cleaners, drain cleaners or ammonia."	

Label Item	Corrosive	Irritant
Instructions - Positive	"Handle with care. Keep out of reach of children." and, if appropriate to the hazard, "Use only in a well-ventilated area. (&/or) Wear mask (&/or) rubber gloves (&/or) safety glasses." (Specific safety equipment relevant to the hazard must be described, not just a general reference to safety equipment.)	"Keep out of reach of children."
First Aid Statement	"FIRST AID TREATMENT Contains ... (name of hazardous substance(s)).) If swallowed, call Poison Control Centre or doctor immediately. Do not induce vomiting."	
Additional First Aid Statements	"If in eyes or on skin, rinse them well with water. If on clothes, remove clothes immediately. If breathed in, move person to fresh air.", as appropriate, in the order shown.	"If in eyes or on skin, rinse them well with water."

Rationale

Corrosive Products - Hazard Glyph

The recommended corrosive hazard glyph is referenced in the current *Consumer Chemicals and Containers Regulations* and was chosen over the equivalent glyph referenced in the *Controlled Products Regulations* (WHMIS) (two test tubes dripping liquid onto a hand and a piece of material). Optima Consultants found that the current glyph had higher levels of recognition than the international/ WHMIS glyph - 53% versus 30%, respectively - in a mall intercept survey (307 respondents). 47% of respondents felt that the current glyph communicates that the product is dangerous to the skin, while 43% felt so for the international/ WHMIS glyph.[51]

Optima conducted focus group workshops following the mall survey to provide insight into how consumers view the two glyphs. The current glyph was seen as meaning "harmful to the skin", but was misinterpreted by some as meaning "death", a "radioactive product" or "an x-ray." The international/WHMIS was seen as meaning "burn the skin", "burn other materials or surfaces". Several participants found it very difficult to interpret the international/WHMIS glyph. Several thought it meant "burns" or "flammable". Optima states:

"Furthermore, it is not always clear that the liquid coming out of the test tubes is

intended to represent the product in the container; some panelists think it is "acid". Given these interpretations, it seems that a key problem with this symbol is the *amount of detail* used to convey a more complex safety message to consumers (e.g. burns hands and surfaces)."[52]

An additional factor in the choice of glyphs was the graphic complexity of the international/WHMIS glyph, which may render it difficult to decipher on small containers.

Continuing the current glyph will reduce the need to re-educate users. The validation test panels did not include children, who would have a higher level of recognition of the current glyph than older adults because of numerous in-school programs on the meanings of the hazard glyphs.

Corrosive Products - Primary Hazard Statement

"CORROSIVE", the recommended primary hazard statement for corrosive products, is similar in French and English, is well-known and is used in other systems: the Workplace Hazardous Materials Information System (WHMIS); CHIP (Chemicals (Hazard Information and Packaging) Regulations, UK; the U.S. Hazardous Substances Regulations, and others. [53]

Optima tested "CORROSIVE against "CAUSES BURNS" and "BURNS SKIN". They found:

> "Approximately two-thirds of the respondents believe that **causes burns/cause des brûlures** would more effectively communicate that the product is *harmful to the skin* (65%), make people *read safety information* (59%) and *handle the product carefully* (59%), and to a lesser extent, *store in a safe place* (52%)."

and

> "both anglophones and francophones clearly prefer **burns skin** over **corrosive**. The phrase is seen as conveying a direct and clear message. In contrast, **corrosive** seems to be systematically misunderstood, failing to communicate a basic message of "harmful to the skin". In fact, **corrosive** is commonly associated with "rust" or "corrosion" on a car".[54]

Corrosive Products - Specific Hazard Definition

The recommendation that "CAUSES BURNS" be the specific hazard definition, rather than the primary hazard statement, will allow harmonization of the primary hazard statement with other systems while ensuring that the information is

conveyed to the product user. The two terms used in conjunction will convey the message much better than either in isolation.

The words "OTHER PRODUCTS", rather than "ACIDS" as referenced in the current Regulations, are recommended for the specific hazard definition because acids are not the only substances of concern. The intention is to discourage the user mixing any product not specifically identified as suitable for mixing on the directions for use (such as bleaches). The Working Group felt that it was inadvisable to state "MIXED" without a qualifier ("WITH OTHER PRODUCTS") in order not to create a false sense of alarm. The intention is to ensure that users read the directions for use.

Optima Consultants tested, in focus group sessions, the phrase "DANGEROUS GAS FORMED WHEN MIXED WITH SOME PRODUCTS", and found that "GAS" and "SOME PRODUCTS" were not as effective in conveying the hazard as "FUMES" and "OTHER PRODUCTS". The recommended wording was accordingly amended.[55]

Corrosive Products - Instructions

A requirement for the statement "Handle with care." is recommended for all corrosive products because the hazard is posed by contact not only with the skin or eye but also with some other materials. A list of the materials would be too lengthy; the statement is intended to encourage cautious use, including reading the directions for use. The statement "Keep out of reach of children." is intended to alert users to the need to keep the product out of the hands of children, and to store the product securely. The severe consequences of exposure to a corrosive product warrants this statement.

The recommended statement "Do not breathe fumes." is intended for products containing substances such as ammonia.

Corrosive Products - First Aid Statements

The rationale for the recommended requirement for the first aid statements is the same as that for Toxic products, with the exception of the statement "Do not induce vomiting.", which is based on advice from the representative of a poison control centre.

Irritant Products - Hazard Glyph

The hazard does not warrant a glyph.

Irritant Products - Primary Hazard Statement

"IRRITANT", the recommended primary hazard statement for Irritant products, is a common word, is similar in French and English and is used in other systems: the *Controlled Products Regulations*; CHIP (Chemicals (Hazard Information and Packaging) Regulations, UK; and the U.S. Hazardous Substances Regulations.

It is recommended that the primary hazard statement for irritants not be required for products subject to labelling requirements for another hazard category (except Combustible products). The intent of labelling on the display panel is to direct users to safe usage and first aid labelling elsewhere on the product. This objective will already have been accomplished when a signal word and primary hazard statement for flammability, corrosivity or toxicity already appears on the display panel. A requirement for a hazard glyph and a signal word in such cases would be excessive in relation to the minimal hazard to consumers, i.e., by definition, unlike corrosive materials, tissue damage does not occur from irritants which produce reversible inflammatory changes to dermal tissue. The above comments do not apply to corrosive materials, which produce irreversible tissue damage to the skin as a result of chemical reaction between the product and dermal tissue.

Irritant Products - Specific Hazard Definition

The recommended specific hazard definition is intended to supplement the primary hazard statement, "IRRITANT", to ensure that the reader is aware of the meaning and specific hazard.

iv) Flammable, Combustible and Spontaneously Combustible Products

Recommendation

That the following information be required to appear on containers of Flammable, Combustible and Spontaneously Combustible products:

Table 19: Labelling of Flammable, Combustibls and Spontanously Combustible Products

Label Item	Flammable	Combustible	Spontaneously Combustible
Hazard Glyph		(none)	
Signal Word	"DANGER"	(none)	"CAUTION"
Primary Hazard Statement	"FLAMMABLE" or, as appropriate to the hazard, "EXTREMELY FLAMMABLE"	(none)	"READ INSTRUCTIONS BEFORE USING"
Specific Hazard Definition	"LIQUID (&/or) FUMES (&/or) MIXTURE MAY CATCH FIRE"	(none)	"DANGER OF COMBUSTION"
Instructions - Negative	"Do not smoke."	(none)	(none)
Instructions - Positive	"Use only in well-ventilated areas. Keep away from flame or spark." or, if appropriate to the hazard, "Keep away from flames or objects which cause sparks, such as pilot lights or electric motors."	"Keep away from flame or spark."	"Materials such as rags used with this product may begin to burn by themselves. After use, put rags in water or hang flat to dry, then discard."
First Aid Statement	(none)	(none)	(none)
Additional First Aid Statements	(none)	(none)	(none)

Rationale

Flammable Products - Hazard Glyph

The choice of hazard glyph for Flammable products was between the flame glyph referenced in the current *Consumer Chemicals and Containers Regulations* and that referenced in the *Controlled Products Regulations* (WHMIS). Gallup found relatively high levels of recognition and identification of the glyph referenced in the current Regulations (86% and 90% respectively).[56] Optima Consultants found that

> "the consumer flammable symbol has slightly higher levels of recognition among group members than the industrial alternative." [57]

Flammable Products - Primary Hazard Statement

"FLAMMABLE", the recommended primary hazard statement for Flammable products, is commonly understood and is similar in both French and English. The similarity increases the likelihood of recognition; a user that fails to notice the term in one language may notice it in the other. "FLAMMABLE" and "INFLAMMABLE" are used in other systems and regulations: CHIP (Chemicals (Hazard Information and Packaging) Regulations (UK), the U.S. Hazardous Substances Regulations, the *Controlled Products Regulations* (WHMIS) and the *Transportation of Dangerous Goods Regulations*, among others.[58] The widespread use of these words ensures that the large majority of consumers will have encountered them previously.

Optima Consultants tested "FLAMMABLE/INFLAMMABLE" against "MAY CATCH FIRE/PEUT PRENDRE FEU" and found:

> "Members from both language groups feel that **flammable/inflammable** will be "readily understood" by consumers as it is a "familiar" term that people are used to seeing. Flammable conveys the message that the product "can easily catch on fire". **May catch fire** is judged to be "too vague" because of the words *may catch*."[59,74]

Flammable Products - Specific Hazard Definition

The words "CATCH FIRE" in the recommended required wording of the specific hazard definition for flammable products are well recognized and simple. The wording is intended to supplement the message given by the primary hazard statement "FLAMMABLE" by indicating what specific flammability hazard is present. This is especially important in the case of fumes or vapours, which are often not considered as hazardously flammable by consumers. Frantz, Miller and Lehto found in their study on the labelling of extremely flammable adhesives:

> "although the flame symbol conveys a general message about adhesive flammability to nearly everyone, many users are not able to infer the specific concept of vapour flammability."[60]

The word "FUMES" was recommended for the specific hazard definition for flammable products for the reasons discussed under 13(ii) - Toxicity.

Flammable Products - Instructions

The recommended required wording for the instructions-negative for flammable products is intended to be short and concrete. It may be misinterpreted as a generic prohibition against smoking, but that was considered acceptable. The references regarding short, concrete sentence construction are given in Section 11(i) - Structure of Required Label Items.

The wording of the "Keep away from ... motors" instruction is based upon that currently required for flammable products and that proposed for flammable adhesives, modified somewhat to fit the revised structure. The intent is that products which emit flammable vapours bear that statement rather than the alternative "Keep away from flame or spark."

Optima Consultants tested "well-ventilated" against "well-aired" and "bien aéré" against "bien ventilé" in focus groups sessions. They found that "well-ventilated" was most effective for anglophones, and "bien aéré" was more effective for francophones:

> "**Well-ventilated** is described as a "more precise" term because it implies changing the air in a room through various measures, such as opening windows, doors or relying on air filtration/exchange systems to supply fresh air. In this context, reference to "ventilation" implies that the product can be used in an enclosed, but well-ventilated space. A well-aired space seems to be limited to a room that has windows and doors that can open to let outdoor air in. Conversely, francophone panelists clearly favour **bien aéré**. They feel that it is more "simple" and that it clearly communicates the intended message."[61]

Spontaneously Combustible Products - Hazard Glyph

No glyph used in the other labelling systems examined was judged to convey the specific hazard posed by Spontaneously Combustible products to the untrained reader. It is unlikely that a glyph could be formulated that would convey the complex information required to understand and deal with this specific hazard. The flammability hazard symbol referenced in the current Regulations was judged to convey a sense of fire hazard, encouraging product users to read the directions. A glyph was judged necessary because the complex nature of the hazard would be difficult to communicate by use of a simple primary hazard statement alone. It is intended that the flame glyph plus the statement "READ INSTRUCTIONS BEFORE USING" leads the product user to the detailed information in the instructions and the dealer's directions for use.

Spontaneously Combustible Products - Primary Hazard Statement

There is no simple phrase that accurately conveys the type of hazard posed by spontaneously combustible products, as the hazard relates not to the actual use of the product but to the storage of materials used with the product and to clean up after use. The intent of the recommended required wording of the primary hazard statement is to increase, as much as practical, the likelihood of the users reading the directions. The wording was not subject to testing during the validation because it was felt that little would be gained by asking subjects what "READ INSTRUCTIONS BEFORE USING" meant.

Spontaneously Combustible Products - Specific Hazard Definition

No simple single word was found to adequately convey the specific hazard for Spontaneously Combustible products. "DANGER OF COMBUSTION" was thought to be more accessible to the general public than "SPONTANEOUSLY COMBUSTIBLE". It is intended that the phrase induce readers to read the instructions; the word "DANGER" is intended to convey the importance of doing so.

Spontaneously Combustible Products - Instructions

The intent of the recommended wording of the instructions-positive for the Spontaneous Combustion Hazard Category is to specify what spontaneous combustion entails; hence the statement "They may begin to burn by themselves". It was also felt necessary to qualify the statement "rags" because other materials, such as paper-towels or clothing, are also of concern. to provide instructions which are simple yet sufficiently detailed.

Combustible Products - Hazard Glyph

The hazard posed by Combustible products was not deemed sufficient to warrant a hazard glyph. The hazard is less that of ease of ignition than of adding to a fire load in the presence of a fire. The hazard is somewhat more complex than simple flammability and would not be adequately conveyed by a flame glyph. The current Regulations do not require a hazard glyph for combustible products.

Combustible Products - Signal Word, Primary Hazard Statement, Specific Hazard Definition

The intent of the Combustible Hazard Category is to have fewer labelling requirements than for the flammability category. This is the case for regulated products with flash points between 20°C and 65°C under the current *Consumer Chemicals and Containers Regulations* which do not require a hazard glyph, signal word, primary hazard or first aid statements for combustible products. Several other

precautionary labelling systems do use the word "COMBUSTIBLE".

The hazard presented by combustible products is difficult to convey in a simple phrase. Main et al. found that the difference between combustible and flammable, as defined in the U.S. Hazardous Substances Regulations and the National Fire Protection Regulations, are not understood by the general public. Approximately half of those surveyed (46 delivery truck drivers) stated that "Combustible" products were more flammable than "Flammable" products (47.8%), while only 23.9% stated that "Flammable" represented the greater fire hazard. 26.1% equated "Combustible" with explosive. The subjects strongly indicated that flammable products were less hazardous than combustible products.[62]

Optima Consultants tested "COMBUSTIBLE" against "BURNS IF IGNITED" for anglophones in a mall survey and in focus groups. Neither phrase was found to effectively convey the hazard. In both cases the difference between "flammable" and "combustible" was not recognized. Optima found that, with regard to "COMBUSTIBLE":

> "There is some confusion as to the correct meaning of this term. While some feel that this term means "flammable", others associate it with "spontaneous combustion". In other words, it can "explode" or "catch on fire if stored in the wrong place." The phrase **will burn if ignited** ... is liked because it is "simple" and "to the point". However, some panelists think it is "silly" (e.g., "of course it will burn if you take a match to it"). There seems to be some confusion with "flammable".[63]

Combustible Products - Instructions

The recommended wording of the instructions - positive for the Combustible Hazard Category is based on that in the current Consum*er Chemicals and Containers Regulations*, modified to fit the revised structure.

v) Pressurized Containers

Recommendation

That the following information be required to appear on pressurized containers:

Table 20: Labelling of Pressurized Containers

Label Item	Pressurized Containers
Hazard Glyph	(none)
Signal Word	"CAUTION"
Primary Hazard Statement	"CONTENTS UNDER PRESSURE"

Label Item	Pressurized Containers
Specific Hazard Definition	"CONTAINER MAY EXPLODE IF HEATED"
Instructions - Negative	"Do not puncture. Do not burn."
Instructions - Positive	"Store away from heat."
First Aid Statement	(none)
Additional First Aid Statements	(none)

Rationale

Gallup Canada found a comparatively low level of recognition of the exploding grenade hazard glyph referenced in the current *Consumer Chemicals and Containers Regulations* (60% recognition, 67% correct identification, versus 90% and 77% for the death's head glyph)[64]. Another factor in the decision not to recommend that the glyph be required is that the *Transport of Dangerous Goods Regulations* have the effect of requiring the testing in a water bath of all consumer-use pressurized containers (often called aerosol containers). This greatly reduces the likelihood their random bursting, although this does not eliminate the possibility of rupturing due to misuse or accidents.

Optima Consultants tested the exploding grenade glyph required by the current *Consumer Chemicals and Containers Regulations*, and found:

> "Overall, the explosive symbol has low levels of recognition. Among certain panelists, it is thought to communicate "something exploding"." [65]

The recommended wordings for required statements are based upon statements required by the current *Consumer Chemicals and Containers Regulations*, modified to fit the revised structure. The recommended wordings for the instructions - negative and positive are much simpler than the equivalent statements required by the current Regulations. It was felt that shortening and simplifying the wordings would increase the effectiveness, in accordance with the rationale given for Section 11(i) – Structure of Required Label Items.

vi) *Adhesives that Quickly Bond the Skin*

Recommendation

That the following information be required to appear on containers of adhesives that quickly bond the skin:

Table 21: Labelling of Adhesives that Quickly Bond the Skin

Label Item	Adhesives that Quickly Bond the Skin
Hazard Glyph	(none)
Signal Word	"CAUTION"
Primary Hazard Statement	"BONDS SKIN INSTANTLY"
Specific Hazard Definition	(none)
Instructions - Negative	"Do not get on eyes or skin."
Instructions - Positive	"Keep away from children."
First Aid Statement	"FIRST AID TREATMENT Eyelid bonding: see a doctor. Skin bonding: soak skin in water and call a poison control centre. Do not force apart."
Additional First Aid Statements	(none)

Rationale

The recommended wording is based on current requirements, but simplified and adapted to the recommended structure. Reference to contact with the mouth, present in the current Regulations, was omitted at the suggestion of a poison control centre representative.

Notes to Part II - Labelling

1. Nonprescription Drug Manufacturers Association, Label Readability Guidelines: 13.

2. Lehto, Mark R. (1992). Designing warning signs and warning labels: Part I - Guidelines for the practitioner, *International Journal of Industrial Ergonomics*. 10: 109.

3. Lehto, Mark R. and Miller, J.M. (1986). *WARNINGS, Volume 1, Fundamentals, Design and Evaluation Methodologies*. Fuller Technical Publications. 1986: 159.

4. Optima Consultants (1994). *Assessment of Proposed Requirements for Precautionary Labelling Elements*. conducted on behalf of the Product Safety Bureau of Health Canada: 82.

5. American National Standards Institute (ANSI), Standard Z35.1-1972, American National Standard for Specifications for Accident Prevention Signs.

6. American National Standards Institute (ANSI), Standard Z535.4-1991, American National Standard for Product Safety Signs and Labels: 6.

7. Nonprescription Drug Manufacturers Association; Label Readability Guidelines: 10.

8. Lehto. 109.

9. Gallup Canada (1989). *Consumer Survey on the Labelling and Packaging of Hazardous Consumer Chemical Products*. conducted on behalf of the Product Safety Branch of Consumer and Corporate Affairs Canada: 21.

10. Pollack-Nelson, C., (1991). Estimated Effectiveness of Warning Labels. Washington. D.C. U.S. Consumer Product Safety Commission. March: 2 - 5.

11. Godfrey, S., Allender, L., Laughery, K., and Smith, V., (1983). Warning Messages: Will the Consumer Bother to Look? *Proceedings of the 27th Annual Meeting of the Human Factors Society*. Santa Monica, CA. The Human Factors Society: 950-954.

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14. Lehto and Miller. 64.

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18. Pollack-Nelson. 8.

19. Lehto. 110.

20. Lehto and Miller. 64.

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22. Lehto and Miller. 80-81.

23. Lehto, M. R. and Miller, J. M., (1988). The Effectiveness of Warning Labels. *Journal of Products Liability*, **11**: 245.

24. Schneider, K.C., (1977). Prevention of Accidental Poisoning Through Package and Label Design. *Journal of Consumer Research*, **4**: 71.

25. Lehto. 109.

26. Pollack-Nelson. 9.

27. Wolgalter, Michael S., Godfrey Sandra S., Fontenelle, Gail A. et al., (1987). Effectiveness of Warnings. *Human Factors*. **29(5)**: 599.

28. U.S. Consumer Product Safety Commission, Code of Federal Regulations Part 1500.3 (b) (14), Federal Hazardous Substances Act Regulations.

29. Lehto and Miller (1986). *WARNINGS, Volume 1*. 160.

30. Optima Consultants. 65-66.

31. Optima Consultants. 69.

32. Optima Consultants. 55.

33. Pollack-Nelson. 8.

34. Optima Consultants. 59 - 61.

35. Reynolds, Linda. The legibility of printed scientific and technical information. *In Information Design*. edited by R. Easterby and H. Zwaga. Toronto. J. Wiley & Sons: 204.

36. Nonprescription Drug Manufacturers Association, Label Readability Guidelines: 10.

37. Gallup Canada. 14.

38. Optima Consultants. 51.

39. Gallup Canada: 15 -18.

40. Lehto, M. R. and Miller, J. M., (1988). The Effectiveness of Warning Labels. *Journal of Products Liability*, 11: 237.

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43. Canada Gazette, Part III. (1987). Hazardous Products Act - Amendment (Part I) and Controlled Product Regulations. December 31, 1987. 45.

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48. Optima Consultants. 78.

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50. Optima Consultants. 79.

51. Optima Consultants. 43 - 45.

52. Optima Consultants. 47 - 48.

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PART III - PACKAGING

14. General Packaging Requirements and Guidelines

i) *Leakage*

Recommendations

That the *Consumer Chemicals and Containers Regulations* be revised to require that containers of hazardous liquid products not leak for the useful life of the product.

Method of Testing

The container should be opened and re-closed using the opening and closing torque recommended by the manufacturer. Any seal that is present under the lid should be removed according to the manufacturer's instructions or simply punctured if no instructions are present. The container and its contents should be at the same temperature, and maintained at 23 ± 2°C during the entire test. The container should be tested in an inverted position, where the lid of the container is positioned at a 45 degree angle below the horizontal line, and a blotter placed beneath the lid. The container is considered to leak if a trace of liquid is detected on the blotter within a period of one hour.

A single-use product, that is, a non-reclosable container where the entire contents must be used-up immediately after it is opened, will be exempt from requiring it to be opened, re-closed and the seal to be removed or punctured, before testing for leakage.

Sealed Containers

A seal is defined as any device or membrane that covers the opening of the container to prevent the contents from escaping once the cap has been removed. The seal does not include a liner or any mechanism intended as an integral part of a closure but includes any membrane that is part of the container (such as heat induction seals or sonic seals).

Rationale

The purpose of this requirement is to prevent exposure to hazardous consumer chemical products. This requirement applies to containers of consumer chemical products that fall under the various hazard criteria being developed, whether or not they are packaged in child-resistant containers.

The Oxford Dictionary defines a leak as a "hole caused by injury, wear, etc., through which fluid makes its way out of a vessel that contains it". A small discharge on impact would not be considered as a leak.

The quantity of leakage within the test period is not specified for reasons of simplicity and clarity. Since this requirement applies to products which are inherently hazardous, any visible evidence of leakage was of concern. It was felt that corrective or enforcement action required as a result of discovering a leaking container should be related to the risk, that is, the quantity of product delivered and the nature of the hazard posed by the product. However, it was deemed as too complex to attach different leakage criteria to the different hazard categories in the Regulations.

Since the Product Safety Bureau does not have any records of complaints of injuries regarding leaking containers of non-liquid products such as portland cement or plaster of paris, this requirement is limited to liquid products.

Life of Product

The "life of a product" is not defined. Industry had liability concerns, as well as concerns that some manufacturers would try to manipulate the real "life of a product" in order to prevent consumer returns. It was the intent that the container of a hazardous chemical product should not leak, including when transported, when found on the store shelf for sale or when in the consumer's home for the number of openings and closings normally required for the container's size and contents.

Sealed Containers

Experiments conducted by industry and the Product Safety Bureau Laboratory showed that sonic-sealed containers will leak when the seal has been removed or simply punctured. When the same type of container/closure systems have not previously been sonic sealed, containers were found to leak far less.

The Product Safety Bureau Laboratory observed that containers with punctured sonic seals leaked within the same amount of time as those where the sonic seal was completely removed. It is unlikely that consumers will be meticulous to the point that they will take the time to completely remove the seal. Some may simply puncture the seal with a tool or a key, while others may rip the seal or make an opening large enough to allow the liquid to flow out. It was not seen as feasible to develop a standardized method that would simulate the removal of the seal by consumers. It is therefore proposed that, for testing, the seal be removed according to instructions or otherwise punctured.

Large differences in the leaking quantities were not observed between "just

punctured" seals or "completely removed" seals. In view of this, no recommendations were made regarding the quantity of product that leaked.

The exemption for opening, re-closing and breaking the seal on refills and other single-use containers recognizes that these containers are intended to be opened only once and not re-closed. To avoid possible accidents and help ensure that consumers do not re-close such containers, a recommendation to require that single-use containers be labelled: "Use entire contents after opening." has been made.

Length of Testing

When a container leaks, it will usually happen within a period of one hour. Extending the test for more than one hour does not increase the number of leaking containers. Industry found that this one hour testing period would not interfere with their production requirements.

Temperature of Testing

Often, in many packaging locations, plastic containers coming from their molds are hot, while the products that go into them may be very cold, especially in winter when exterior storage tanks are used. This difference in temperature creates a stress between the closure and the container which could make the package leak. However, once the two temperatures equilibrate and the product is in the hands of consumers, the performance of the package may be different. Thus it was recommended that the leakage test be carried out with both the container and the contents at the same temperature. The temperature of 23 ± 2°C is recommended as this is the average temperature most likely to be found throughout the lifetime of a container.

Container Position

An incline of 45 degrees below the horizontal line has been developed and used by Product Safety Inspectors for the last four years whenever they examine containers in manufacturing facilities. It was established that this position simulates the motion and the position of an infant attempting to drink the product. Inclining a container at an angle of 45 degrees will also increase the pressure of the contents against the closure compared with having the container on its side.

ii) Screening Tests

<u>Recommendations</u>

That the following non-mandatory screening tests be presented as guidelines (not as regulatory requirements) to support the leakage requirement:

a) *Field Test:* take a container, without exerting any torque on the lid, and invert it at an angle of 45 degrees below the horizontal line for a period of five minutes.

b) *Aging Test:* subject the container to the one-hour leakage test after it has been filled for a minimum of six months. Accelerated aging tests could be made at higher temperatures, as a supplementary indication of aging performance.

c) *Life Test:* subject the container to the one-hour leakage test after it has been opened and re-closed according to the manufacturer's instructions or, if no instructions are present, a minimum of 50 times to a maximum of 100 times.

d) *Drop Test*: No guideline is recommended for a drop test.

e) *Coding System*: the use of a coding system, which may be lot numbering or some other system, is recommended as a quality control mechanism. Date coding should be avoided.

Rationale

Field Test

To help Product Safety inspectors ascertain whether compliance testing would be required, a screening test could be performed in the field. Detection of any trace of liquid on a blotter placed beneath the lid would mean that the container might leak, and compliance testing according to the mandatory test should be carried out.

Aging Test

Since a filled container may deteriorate over time, manufacturers and importers could conduct ageing tests to insure the product will comply with the leakage requirement during its feasible shelf-life.

A study carried out by the Canadian Manufacturers of Chemical Specialties Association in October of 1989 found that the average period of time between the moment a product is manufactured and the moment it reaches the consumer's home is six months. This corresponds with Transport Canada guidelines.

An accelerated test at 50°C for 28 days was considered and recommended as a supplementary test for the following reasons:

- the accelerated test is a simulation of what might occur at ambient temperatures for six months; and

- the CSA and ORTECH reports observed that most of the leakages from containers stored at 50°C occurred within seven days of ageing.

However, the six-month test is preferred because:

- keeping certain solvents at 50°C for 28 days may be unsafe; and

- the 50°C test will only examine the effect of the temperature on the containers and may have very little to do with measuring any interactions between the product and the container or aging over time.

Life Test

To ensure that the container will not leak for the number of openings and closings needed to enable all of the product to be dispensed, manufacturers and importers could perform a life test. This test verifies the ruggedness of the closure during its anticipated life expectancy.

The suggestion of 100 openings and re-closings comes from the CSA Standard Z-76 and is based upon the average life of a 250 mL container.

This test is not intended for single-use containers, since these containers are designed to opened once and not re-closed.

Although part of the mandatory testing requirements for child-resistant containers incorporates a life test, this guideline also applies to hazardous products for which child-resistant containers are not needed. Since child-resistant containers must continue to function with security for the useful life of the product (recommendation 2.2), manufacturers may wish to perform the life test on filled child-resistant containers as well.

Drop Test

Out of the 61 complaints received at the Product Safety Bureau for leaking containers from 1978 to 1992, 11% (7 complaints) occurred after the products were dropped from shelves or hands. It was felt that the data supplied by Ortech on drop heights would make it difficult to establish a relationship between leakage and the dropping of containers from reasonable heights. There was also concern that a drop test would create difficulties for brittle materials, such as glass or PVC, which may be necessary due to the nature of the product, and thus restrict their use strictly because of a failure to withstand dropping.

Coding System

Such coding is perceived as an efficient quality control mechanism because it is a simple way of differentiating between lots. If a problem is found with a product, enforcement and corrective actions could be limited to the specific problem lot and not the entire product line. It will also facilitate the work of Poison Control Centres in having up-to-date product ingredient information when there has been a change in formula.

This requirement may pose problems for some specific products and/or manufacturing systems. Therefore, in the absence of a lot number, all units would be considered as coming from a single lot. Date coding should be avoided because, unlike food or drugs, many household products have no real expiry date and both retailers and consumers might be misled by date coding.

Some sectors of the industry, such as those packaging solvent-based products, may find it more difficult and/or more expensive to put lot numbers on every unit because most of the coding inks are not solvent resistant. This difficulty, as well as the economic impact associated with coding, led to the recommendation that this provision be non-mandatory.

Method Development For the Above Tests

To find test methods to support the general packaging guidelines, numerous standards, including those of the U.S., U.K., Transport Canada, the CSA and the A.S.T.M. were examined. Since none of these standards were found to be satisfactory, information from standards was combined with practical experience, using technical and scientific support provided by Health Canada. In order to validate the different test procedures developed, two laboratories were engaged to carry out tests on containers of consumer chemical products. Detailed discussion of the results are available in two reports titled "Physical and Mechanical Testing of Consumer Chemical Products".

The tasks were divided as follows:

1. Ortech - Drop tests, ageing tests, and leak tests were conducted on fourteen different types of consumer chemical products. The containers tested were of plastic or metal construction, from 250 mL to 4 L in size. One plastic container was a flexible bag type refill pack intended for one-time use only.

   The drop test involved dropping the containers from varying heights on either the base or the side of the container to determine the height at which the average container would be expected to fail. All container types were tested to the point of failure.

   The leak test consisted simply of placing the container flat on its side at an

angle of 45 degrees below the horizontal line for one hour to determine if any of the contents leaked out.

The ageing test involved placing 15 containers of each product type in an oven at 50°C and removing 5 containers after 7 days, another 5 containers after 14 days and the last five after 28 days. After cooling to ambient temperature the containers were subjected to a leak test and a drop test.

2. Canadian Standards Association - The CSA evaluated three mechanical tests: ageing, life and durability. The ageing test was conducted at varying durations on a variety of consumer chemical packages available at the retail level to determine whether there has been any leakage of the product. The life test used different endpoints or definitions of "life" on packages available at the retail level. Criteria affecting the permanency and legibility of labelling were identified and existing test methods used to test the durability of the labelling were evaluated.

iii) ***Label Permanency***

Recommendation

No recommendation is made for a specific test to determine whether the labelling information will be sufficiently durable to remain legible under normal conditions of transportation, storage, sale and use.

Rationale

It is recommended that the Regulations require that hazard warnings remain legible throughout the lifetime of the product, and not fade, run, rub off or peel off under normal use. This issue of a test method to support this requirement was examined in the CSA report "Physical and Mechanical Testing of Consumer Chemical Packages", where a sample of food and chemical containers were tested according to a solvent abrasion test that is required for electrical products, specified in the standard CAN/CSA-C22.2 No.0.15-M90 "Adhesive Label". Although the abrasion test separated the performance of marginal labels from higher quality labels, this test was limited to examining a small piece of label cut-out from the container, not the entire filled package. Some modification to the testing apparatus (at high cost) would be necessary, to accommodate finished products. Since one of the requirements of the guidelines was that the tests should not require the use of expensive equipment, modifying the test apparatus and validating the test method for filled containers was judged as prohibitive.

A dry abrasion test on the finished product based on proposed regulations for children's strollers was also considered. However, there was no verification that

these tests would reflect the actual performance of chemical packaging during its transportation, storage and use.

15. CHILD-RESISTANT PACKAGING

i) *Child-Resistant Container Test Protocol*

Recommendations

a) *Harmonization of Test Methods* - That acceptable standards for child-resistant containers include: the Canadian Standards Association Standard CAN/CSA-Z76.1-M90 "Reclosable Child-Resistant Packages", the International Standards Organization ISO 8317 "Child-resistant packaging - Requirements and testing procedures for reclosable packages", the U.S. Code of Federal Regulations Title 16 CFR 1700 and the British Standards Institute Standard BS 7236.

b) *Re-testing* - That container designs which meet the current Regulations will not require re-testing to the standards named in (i) above.

Rationale

This recommendation allows for international harmonization. Since there is no significant difference between these standards, compliance with any of them would result in packages which have the same child-resistant characteristics.

ii) *Mechanical Testing of Child-Resistant Packaging*

Recommendations

That the current requirements, requiring the container to continue to function as a child-resistant container when filled with the product and for the useful life of the product, be maintained. This requirement does not entail the re-testing of filled containers according to the child-test protocol.

That every manufacturer/filler/importer of products which must be packaged in a child-resistant container must have, available in Canada, information or evidence that the container/closure system(s) has been tested for compliance with that standard. This evidence may be developed by the manufacturer/filler/importer or may be obtained from the closure manufacturer.

That every manufacturer/filler/importer must have specifications for all packaging materials in direct contact with their products or materials which are critical to the package containment function. The specifications should include, as a minimum,

the physical measurements necessary to ensure that the container/closure system will perform as originally designed, the application torque, as well as the compatibility of the container/closure system with the material to be put in the package. The specifications may be obtained from the supplier of packaging materials or may be developed by the manufacturer/filler/importer.

That every manufacturer/filler/importer must have records, available in Canada, showing that every lot or batch of packaging material used by him has been examined/ tested to ensure compliance with its specifications. A time frame is to be specified.

Rationale

The *Consumer Chemicals and Containers Regulations* currently require that the container continue to function as a child-resistant container when filled with the product and for the useful life of the product. A retail survey in 1992 of more than 4500 products (representing 140 types of products fitted with 17 different types of child-resistant closures) revealed that 10% of child-resistant containers available for sale were not functioning properly. Commonly cited problems included:

- improper torquing of the cap;
- jamming of two-piece caps due to improper stacking during storage; and
- poor quality control.

Previous to this survey, in 1981, a specific problem was identified with a closure designed to turn off after lifting an outer ring. When it was used to package petroleum distillate-based products, large numbers of these containers were found to be non-child-resistant at retail. Accelerated exposure tests by the Product Safety Laboratory showed that the solvent caused the inner ring to swell and engage the outer ring, allowing it to be simply unscrewed. Thousands of products were recalled and fitted with new caps.

Although part of the mandatory testing requirements for child-resistant containers includes a life test, to ensure that the container is capable of maintaining its security for the number of uses corresponding to the normal depletion of the product, this test is not performed on filled containers, but on empty container prototypes or with a placebo. To ensure that filled containers maintain their security when in contact with the product that it contains, the recommended revisions to the Regulations would require quality control assurance as well as record keeping. Records would be shown to a Product Safety Inspector on request.

It was felt that dimensional problems with the container, where the container is out of specification with the measurements supplied by the manufacturer, would be the most common reason for the failure of a child-resistant container to function

as intended.

The recommendations do not specify the method of testing the packaging materials, but leaves this up to the industry. For example, the filler may decide to test the package himself or use the information provided by the supplier or manufacturer of the container closure system. The information that a Product Safety Inspector would require may be provided either by a certificate of analysis from the supplier or one from the filler's own testing laboratory. It is expected that, in the majority of cases, the container or closure supplier would be able to provide the filler with the data necessary to satisfy these requirements.

The recommendation that manufacturers/fillers/importers be required to have specifications for all packaging materials in direct contact with their products is intended to ensure that the container/closure system will perform as originally designed. It will motivate fillers to check the application torque as well as determine the compatibility of the container/closure system with the material to be put in the package. Fillers will have to develop their own specifications or use those from their supplier of packaging materials.

Mechanical Evaluation

A simple mechanical test to verify the continued proper functioning of the filled child-resistant container, once the design prototype was deemed to be child-resistant according to the child-test protocol, was sought. A study, commissioned by the Product Safety Bureau and carried out by the CSA ("Mechanical Testing for Child Resistant Closure Systems Containing Consumer Chemical Products"), identified all existing types of child-resistant closure systems available on the market as well as any mechanical tests currently available.

Extensive literature searches were conducted to identify child-resistant containers used in western industrialized nations as well as those under development. In addition, patents were searched, enquiries were made to various national and international standards associations and extensive interviews were conducted with major Canadian packaging manufacturers. Fifty eight closure systems were identified and categorized according to engineering or design similarities. Five different types of closure systems were identified as being predominant in Canada: press down and turn (continuous thread); press down and turn (lug-type); align two features and push off (snap cap); actuate tab and pull off (press dot and remove); and align tab and slide off (toilet bowl).

In order to identify all existing mechanical tests or protocols that could be used to help validate child-resistant closure systems, a detailed international search was conducted. Packaging manufacturers were also interviewed to determine what company-developed test methods may exist and what test methods were common

to the industry. Approximately 25 different mechanical tests were discovered, the most common from the American Society for Testing and Materials (ASTM) and the British Standards Institute (BSI). ASTM standard test methods for continuous thread and snap caps (listed in the ASTM document Standard Classification of Child-Resistant Packages - D3475-88), are all interrelated and demonstrate the effectiveness of the assembly of a child-resistant closure system by determining certain performance elements such as down-force, reverse ratchet, removal torque and shelling forces. These tests are performed extensively within the packaging industry and are widely accepted as the most appropriate. Well documented results and validations exist to support this.

Due to the vast number of child-resistant containers available, and since different systems have different performance characteristics, manufacturers set their own limits based on their individual products and research, and good manufacturing practices. It was observed, however, that the closures produced by packaging manufacturers are usually combined with other components into a container system that is in turn purchased by an independent filler who fills it with a consumer product from an entirely separate and unrelated company. Thus fillers are often far removed from the original manufacture of the container's components as well as the product contained within the package. As a result, the performance of the filled product is not necessarily reflected in the performance of its components.

In addition, no generally accepted mechanical tests are available for either "actuate tab and lift-off" or "align tab and pull off"-type closure systems. In view of this, packaging representatives have declared that the mechanical tests identified by the CSA report would not be applicable to 70% of the closures found in the Canadian market (eg. windshield washer closures and varsol closures).

Since mechanical tests would have to be adapted for each type of closure, a recommendation for the general mechanical testing of child-resistant closure systems was not put forward.

iii) Seniors and Child-Resistant Packaging

Recommendations

That the Consumer Chemicals Containers Regulations not be revised to deal with problems that child-resistant packaging may pose to seniors.

That the Canadian Seniors Packaging Advisory Council be established to address the needs of seniors with respect to packaging.

Rationale

In order to address the needs of seniors with respect to packaging, a vehicle for dialogue between industry and seniors, the Canadian Seniors Packaging Advisory Council (CASPAC) was established in 1991. A joint initiative of One Voice - The Canadian Seniors Network, and representatives of the Canadian consumer products and packaging industry, the Council was given a principal mandate of examining the issues and problems faced by seniors with packaging and identifying and promoting appropriate solutions. It was felt that the voluntary approach of CASPAC would continually address the needs of seniors and should be given time to work.

The Council decided to meet at least twice a year and to report to the Director of the Product Safety Bureau. The Council took on a broad mandate, considering packaging not only of hazardous products but also medication, grocery products and packaging in general. In 1993, CASPAC was the first enterprise to be granted funding under Health Canada's "Ventures in Independence" program, intended to support voluntary initiatives where industry and seniors work together to exchange ideas and resources for the purpose of protecting an aging population from health risks and discomfort.

This funding enabled CASPAC to pursue two projects. Project "*Silver Market*" strives to effect voluntary changes in packaging by making manufacturers, designers and packagers aware of seniors' needs. CASPAC seminar presentations, trade-show booth displays and media communications have been received with much enthusiasm. Project "*Open Sesame*" is designed to inform seniors on the safe use of product packaging and how to open difficult containers, such as child-resistant caps. The major output of this project is "*TIPS* - Tips and Information on Packaging Solutions" - a learning program comprised of a video, pamphlets, a leader's guide and a feedback mechanism to communicate back to the Council. To support this work, the Council also conducted a survey, titled "National Survey on Packaging Experiences".

U.S. developments on this issue were considered. The U.S. Consumer Product Safety Commission had been holding hearings on proposed changes to the testing protocol for child-resistant closures. Among the proposed changes was the addition of a "senior test", to ensure that seniors could use child-resistant packaging. The chemical specialties industry in the U.S. has resisted this proposal, claiming that few existing child-resistant containers could pass the new test. The serious implications of this fact for older consumers were noted. In addition, the U.S. proposed changes apply mainly to pharmaceutical products, where an inability to gain immediate access may have serious life-threatening consequences, while an inability to gain quick access to chemical specialty products does not affect health. Seniors representatives indicated that seniors would tolerate the frustration of

removing a child-resistant closure if a product were labelled: "DANGER: HARMFUL OR FATAL IF SWALLOWED". Moreover, chemical specialties do not generally have to be opened daily or many times a day.

In view of the above considerations, no recommendation was made for the addition of a senior test group to the Canadian regulations at this time. It is recommended that further U.S. developments in this area be followed. An important factor is the importance of harmonizing Canadian and U.S. regulations regarding the testing protocol for child-resistant closures, so that the Regulations do not place Canadian manufacturers at a competitive disadvantage.

iv) Stacking

Recommendation

Manufacturers and retailers will be advised of the proper stacking procedures to follow with containers of hazardous consumer chemical products.

Rationale

One cause of improperly functioning child-resistant containers is the improper stacking of containers, causing two-piece caps to jam, disengaging the child-resistant feature. A non-regulatory solution was developed; a communiqué was sent to the Packaging Association of Canada and to the Canadian Retail Hardware Association to inform their members of the problem and the corrective actions. The Packaging Association of Canada distributed this communiqué in their September 1991 Bulletin, reaching 1600 members of the Association. The Canadian Retail Hardware Association did not respond to either the suggestion of sending this communiqué to their members or the request for a list of their members.

16. Pressurized Containers

Recommendation

No recommendation is made regarding durability requirements for pressurized (aerosol) containers.

Rationale

Transport Canada (under the *Transportation of Dangerous Goods Act*) and the U.S. Department of Transport have requirements for the testing of consumer-use hand-held pressurized containers. Quality control measures that must be carried out by the pressurized container packaging industry are well implemented and the industry

is well-regulated. For example, every unit is subject to a water-bath test at 50°C, and one sample out of 25,000 units produced is tested to destruction. All products must be registered at Transport Canada and must be labelled with a symbol indicating the container type. However, the requirements are limited to containers of metal construction with capacities between 125 and 820 mL.

There have been no reports of serious accidents involving the failure of consumer-use hand-held pressurized containers at ambient conditions at the industry level. The complaint analysis system of the Product Safety Bureau confirms this situation.

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