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Asset Lifecycle – Guidance Note

Plant pipe labels & colour

Purpose

The purpose of this Guidance Note is to define a consistent approach to pipe labelling, helping personnel and maintenance staff recognize potential hazardous substances at all facilities and can follow established, safe, best practice procedures, thereby conforming to legislation.

Overview

Watercare assets in both networks and plant facilities include pipes conveying fluids / gases and are identified by attaching a label with an appropriate naming and colour combination. Watercare has historically used two standards to define pipe labelling and colour requirements - ***AI: Data and Asset Information Standard*** and ***DP-19: General Plant Layout and Equipment Selection Principles***.

The Data and Asset and Information Standard and *DP-19* both specify that pipe labelling shall comply with ***NZS 5807:1980*** *Code of practice for industrial identification by colour, wording or other coding*.

The Data and Asset Information Standard: Part E

"2.1 The relevant parts of the following standards shall apply to the labelling of pipework and equipment:

- NZS 5433 PARTS 1&2 Transport of dangerous goods on land - Parts 1 & 2
- NZS 5807: Code of practice for industrial identification by colour, wording or other coding"

DP-19: Part C

"3. t) Pipework shall be labelled in accordance with NZS 5807 and show the pipe content and flow direction. Labels shall be placed to ensure that the pipeline is identified as soon as possible after a person passes through a doorway, around a corner, or any other obstruction that breaks the continuous line of sight."

DP-19 also specifies coating colours of pipes (Part C, 10), which should not be confused with the labelling of pipes. The coating colours of pipes apply when pipes require painting to withstand the environment where it is installed.

Both documents are silent on the type of facility, as the Standard (NZS 5807) is universal and based on the content of the pipe, rather than the type of facility.

References

Watercare

- **AI:** Data and Asset Information Standard
- **DP-19:** General Plant Layout and Equipment Selection Principles

Other

- **NZS 5807: 1980** Code of practice for industrial identification by colour, wording of other coding
- **AS 1345: 1995** Identification of the contents of pipes, conduits and ducts
- New Zealand's **Health and Safety at Work (Hazardous Substances) Regulations 2017**

New Zealand's Health and Safety at Work (Hazardous Substances) Regulations 2017 (dated 5 January 2022) notes that a Person Conducting a Business or Undertaking (PCBU) should mark pipework in accordance with ***AS 1345:1995*** *Identification of the contents of pipes, conduits and ducts.*

Clause 17.78 Markings for pipework connected to above ground stationary tank in stationary container system

"(2) A relevant PCBU must ensure that pipework is marked—

(a) permanently and legibly with the following information:

(i) the applicable colour code in accordance with AS 1345—1995 (3rd Edition); and

(ii) an arrow or arrows indicating the direction in which liquid or gas flows through the pipework; or

(b) in accordance with requirements in a relevant safe work instrument."

"(3) A PCBU who contravenes this regulation commits an offence and is liable on conviction,—

(a) for an individual, to a fine not exceeding $6,000:

(b) for any other person, to a fine not exceeding $30,000."

Comparison between NZS 5807: 1980 and AS 1345: 1995

From the comparison below it is evident that colours associated with services fall within a similar spectrum, whereas AS 1345 provides greater detail when describing specific services associated with a labelling colour.

Therefore, there are no significant differences between these standards. Additional descriptions of substances found across plants have also been added to avoid confusion.

Table 1*: Comparison between NZS 5807: 1980 and AS 1345: 1995*

NZS 5807	***Colour (BS5252)***	***AS 1345***	***Colour (AS 2700)***	***AS 1345 Description***	***Additional Watercare Descriptions***
Water in liquid state	*Forest green / Turtle green (12 C 39)* 	*Water*	*Green G21- Jade* 	• *Drinking water* ***(to include dark blue band for potable use)*** • *Waste water (excludes sewage and other dangerously polluted water)* • *Cooling water, including seawater* • *Heating water* • *Storm water* • *Hydraulic power supply* • *Recycled water*	• *Raw water* • *Back pulse water* • *Ultrafiltration (UF) water* • *Backwash water* • *Biologically activated carbon (BAC) filtered water* • *UV dose water* • *Pond water*

NZS 5807	Colour (BS5252)	AS 1345	Colour (AS 2700)	AS 1345 Description	Additional Watercare Descriptions
Steam	Silver grey or aluminium/ Quill Grey (00 A 01)	Steam	Silver-grey	• Live steam • Process steam • Exhaust steam • Space heating steam	
Mineral, vegetable and animal oil, combustible liquids	Brown / Peru Tan (06 D 45)	Oils, flammable and combustible liquids	Brown X53 – Golden Tan	• Fuel and lubricating oils • Animal and vegetable oils for food • processing • Petrol, diesel, and other light fraction • fuels • Other flammable or combustible liquid • substances	
Gases in either gaseous or liquified condition (except air)	Light buff (08 C 35)	Gases	Yellow-ochre Y44 – Sand	• Fuel gases • Process gases • Liquefied gases under pressure • Pneumatic transport of particulate solids • Exhaust gases and fumes • Medical gases	• Hydrogen (H_2) gas • Carbon dioxide (CO_2) gas • Chlorine gas • Natural gas • LPG gas • Biogas
Acids and Alkalis	Violet / Trendy Pink (24 C 37)	Acids and Alkalis	Violet P23 – Lilac	• All corrosive liquids and gases	• Sodium hypochlorite (Hypo) • Carbon dioxide (CO_2) solution • Lime • Hydrfluosilicic acid (HCA) • Polyaluminium chloride (PACl) • Acetic acid • Aluminium sulphate • Soda ash • Sulphuric acid • Ferric chloride • Polymer
Air	Light Blue / Boston Blue (18 E 51)	Air	Light Blue B25 – Aqua	• Compressed air • Instrument air • Vacuum • Ventilation • Pneumatic conveyor	• Process air

NZS 5807	Colour (BS5252)	AS 1345	Colour (AS 2700)	AS 1345 Description	Additional Watercare Descriptions
Electrical conduit and ducting	*Orange / Trinidad (06 E 55)*	*Electric power*	*Orange X 15 – Orange*	• *Electricity supply circuits*	
Other liquids	*Black*	*Other liquids*	*Black*	• *Chemical mixtures in water or organic* • *solvent* • *Liquid foodstuffs (see Note 2)* • *Sewage, organic waste* • *Chemical and process wastes*	• *De-gritted supernatant* • *Thickener Supernatant* • *Thickened sludge* • *Centrifuge centrate* • *Filter backwash / filter to waste* • *Membrane overflow* • *Wastewater air to odour treatment*
Fire Services	*Safety Red*	*Fire Services*	*Red R13 – Signal Red*	• *Dedicated water, foam, other fire* • *extinguishing supply lines*	• *Safety shower*

Recommended approach

Although some plants have been labelled by referencing historic documentation and standards, the expectation is that from the date of this document, all Watercare facilities should adopt the proposed recommendation, and existing facilities transition to conform with ***AS1345:1995*** over a period of 1 year - creating consistency across all plants. Watercare's Standards (***Data and Asset and Information Standard*** and ***DP-19***) will therefore be updated accordingly.

To avoid confusion, the summary below outlines a practical approach to implementing this standard.

Pipe Label Requirements

For corrosion resistant pipe materials (e.g., stainless steel) not requiring protective coating systems, pipe labels should be used - refer to "*Pipe Label Size*" below. This will generally be the case for most facilities.

Existing pipes that require corrosion protection coatings shall be painted *Pipeline Grey – N43 (AS 2700)* or *Ironside Grey – 10 A09 (BS5252)* for the next planned maintenance schedule after which the appropriate labelling colour needs to be applied.

Pipe Label Placement

Pipe labels should be positioned so that they are clearly visible from a standing position on the ground. If the pipe is elevated above the sightline of an operator, the label should be positioned below the spring line of the pipe. Similarly, if the pipe is located below the sightline, the label should be positioned above the spring line. Pipe labels should be located at the following positions:

- Every 8m along straight pipe runs
- Adjacent to fittings or junction boxes
- Within 1m of every valve
- Where pipes pass through walls, doors or floors (either side if accessible)
- Bulkheads
- Service appliances

Pipe Label Size

The label size is determined by the diameter of the pipe carrying the substance as shown in the table below:

***Table 2**: Label dimensions required based on pipe size*

Outside Diameter of Pipe	*Minimum Height of Label*	*Minimum Height of Text*
< 40mm	Continuous band around pipe	4mm
40 – 75mm	25mm	12mm
> 75mm	50mm	24mm

Note: <u>All text should be in upper-case</u>

The length of a label should **not be less than 375mm** – longer lengths may be required depending on the description of the substance.

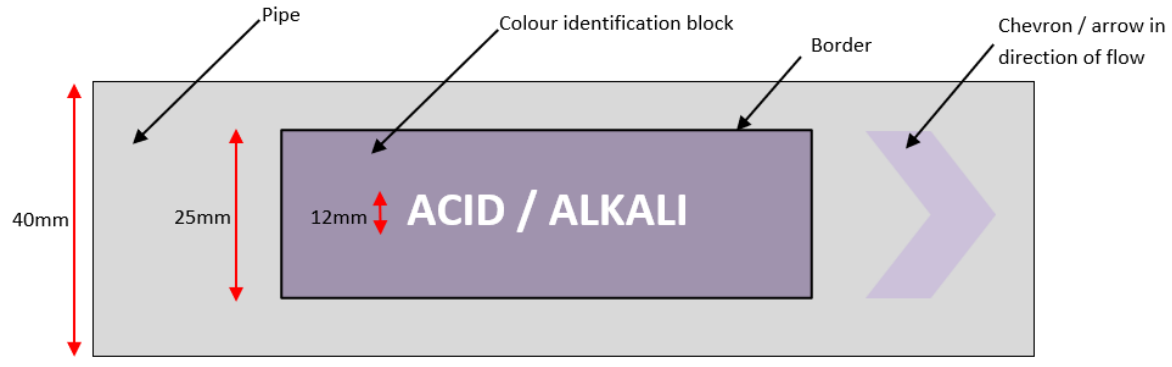

***Figure 1**: Typical Pipe Marker for pipe size 40 - 75mm, as per AS 1345:1995*

***Figure** 2: Examples of labels at existing facilities*

Pipes with consumable contents

Pipes that carry substances for human consumption e.g., potable water should be identified with an additional dark blue colour (e.g., AS 2700: B21) band or patch-marker (for very large pipes). This helps plant operators differentiate between potable and mildly contaminated substances grouped in the "Water" category.

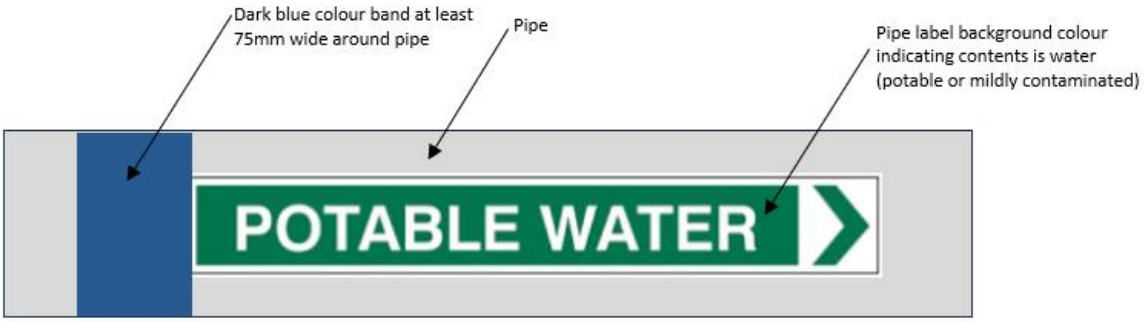

***Figure 3**: Example of a dark blue band around a potable water / service water pipe.*

Special Hazards

Pipes presenting special hazards to operators shall have additional identification which includes a yellow and black band or patch marker as shown in the table below.

***Table** 3: Special hazard categories*

Hazardous Services	*Biological Hazard*	*Ionizing Radiation*
		

***Figure** 4: Example of an alternating diagonal yellow and black band (smaller diameter pipes)*

Pipe Label Suppliers

Below is a list of potential pipe label suppliers conforming with AS1345:1995

- Segno Visual Safety Solutions: https://www.segno.co.nz/shop/products/pipe-labels-tape/
- DeNeefe: https://www.deneefe.com/products/safety-signs/
- Allproof Industries: https://allproof.co.nz/product/pipe-id-labels/