Colour Coding Standard for Piping System

SALUTI PRIMUM AUXILIO SEMPER

Canadian Coast Guard

Standard

Canada

Published under the Authority of:

Integrated Technical Support Directorate
Fisheries and Oceans Canada
Canadian Coast Guard
Ottawa, Ontario

K1A 0E6

30-000-000-ES-TE-001 (Formerly CGFO 308.00.03)
Colour Coding Standard for Piping System

SECOND EDITION – DECEMBER 2003

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Available on CCG Intranet site at:
http://ccg-gcc.ncr.dfo-mpo.gc.ca

Disponible en français : **Norme relative au code de couleurs pour la tuyauterie**

Printed on recycled paper

Approvals

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		DATE:	DECEMBER 19, 2003

Record of Amendments

#	Date	Description	Initials
1	February 20, 1986	First Edition: This standard was part of the Canadian Coast Fleet Order (Formerly CGFO 308.00.03)	
2	December 08, 2003	Second Edition: Revision and creation of a standard by its own.	

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Foreword

This standard is issued by the Director General Integrated Technical Support, CCG's National Technical Authority under delegation from the Deputy Minister Fisheries and Oceans and the Commissioner of the Canadian Coast Guard.

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CHAPTER 1   INTRODUCTION

1.1   PURPOSE

The purpose of this standard is to implement the policy for the management of a piping colour coding standard.

1.2   POLICY

It is the policy of the Canadian Coast Guard, Integrated Technical Support to ensure that the colour coding of piping systems is standardised and managed effectively to provide optimum safety of all Coast Guard Fleet units.

1.3   APPLICATION

This standard shall apply to all Canadian Coast Guard Fleet units, new construction and units undergoing, and mid-life modernization, to the extent that compliance is reasonable and practical.

1.4   REFERENCE

This standard is issued in accordance with:

- Fleet Safety Manual DFO5737

CHAPTER 2   ROLES AND RESPONSIBILITIES

2.1   THE DIRECTOR, TECHNICAL SERVICES

The Director, Technical Services, is responsible for:

- Developing the Colour Coding Standard for Piping Systems (Chapter 3);

- Ensuring that the standard is available to the Coast Guard Fleet Managers; and

- Ensuring that the Coast Guard Fleet Managers are applying the standard.

2.2   THE REGIONAL DIRECTOR, TECHNICAL SERVICES

The Regional Director, Technical Services is responsible for:

- Ensuring that the standard is available to the Commanding Officers; and

- Ensuring that the Commanding Officers are applying the standard.

2.3   COMMANDING OFFICER

Commanding Officer is responsible for:

- Ensuring that the standard is available to the vessel's officers and crew; and

- Ensuring the vessel's officers and crew are applying the standard.

CHAPTER 3   STANDARD

3.1   PURPOSE

The purpose of this standard is to establish a Colour Coding for Piping Systems for use on CCG vessels, together with written identification, for fluids conveyed in piping systems.

The use of this standard is intended to promote greater safety through user familiarization and to reduce the incidence of error or confusion in the operation of these systems.

This standard does not define the manner or conditions under which these fluids may be used.

3.2   AUTHORITY

This standard is issued by the Director General Integrated Technical Support, CCG's National Technical Authority under delegation from the Deputy Minister Fisheries and Oceans and the Commissioner of the Canadian Coast Guard.

3.3   GENERAL

The standard establishes, defines, and assigns a colour for recognition of fluids in a piping system, and through the use of secondary colour codes the different uses for the fluid. It requires the application of the colour code in a distinctive manner, as a visual aid to the written identification.

3.4   GENERAL REQUIREMENTS

3.4.1   Colours

The colours assigned in the standard are detailed in Annex A. No change shall be made in the assigned colours without the approval from the Director, Technical Services.

The paint colours are to be semi gloss or gloss type and shall conform to the most current standard of the Canadian Guard Standards Board (CGSB).

The colours offered by manufacturers are acceptable for manufactured tapes and markers.

3.4.2   Primary Colour Code

A primary colour code is the colour assigned to a fluid conveyed in a piping system taking into account its function, e.g. for compressed air the primary colour code will be orange. These colours appear as bands on piping systems.

3.4.3   Secondary Colour Code

A secondary colour code is the colour assigned to identify a system taking into account its functions and safety requirements, e.g. if compressed air is used for control systems the secondary colour code is white, if used for service air the secondary colour code is yellow, if used for starting engines the secondary colour code is black. The colours appear as bands and arrows on piping systems.

3.4.4   Finished Surfaces

The finished surfaces of all piping systems shall normally be painted white, unless specified otherwise and fire protection systems shall be painted red, prior to the application of the piping system identification.

3.4.5   Method of Application

Identification of piping systems shall be carried out either by the application of paint or by manufacturers colour code tapes and title markers or combination thereof.

Paints for colour code and title markers shall be in accordance with the most current standards of the Canadian Guard Standards Board (CGSB).

Manufactured colour code tapes and title markers shall be a pressure sensitive material with protective overcoating and having conformability and dead stretch properties. The tapes and markers shall be suitable for temperature ranges from –40°C (-40°F) to 150°C (300°F); be resistant to abrasion and wear; be waterproof, fungus and weather-resistant; and be in accordance with the detailed requirements of this standard.

3.5   DETAILED REQUIREMENTS

3.5.1   Piping Systems Identification

Piping systems consist of any pipe line or conduit used for the transport of fluids. Valves, fittings, operating accessories, pipe coverings, and pipe installations shall also be considered as part of a piping system. Supports, brackets or other accessories are not considered parts for application of colour codes.

3.5.2   Exact Identification

Exact identification of fluids in any piping system is mandatory and shall be made by means of titled lettering in black and white. These titles shall be prominently displayed adjacent to the colour coding. It is recommended, where the view is unobstructed, that titles be lettered on the two lower quarters of the pipe covering. Lettering in this position is unlikely to be obscured by dirt collection or mechanical damage. Titles shall be clearly visible from operating positions, especially those adjacent to control valves. The use of stencils with standard size letters specified in Table 1 is recommended. For pipe lines smaller than 3" in diameter, securely fastened non-

corrosive metal tags, with lettering etched or filled in with enamel, or waterproof and heat resistant plastic tags are to be used. It is recommended that titles be applied by use of upper case letters and Arabic numerals whenever applicable.

Table 1   Size of stencil letters

Outside Diameter (O.D.) of Pipe or Covering	Size of Stencil Letters
76mm (3") to 152mm (6")	25mm (1")
Over 152mm (6")	50mm (2")

A title is any lettered identification required on a piping system and shall identify the contents by complete names or by abbreviations, symbols, letters, numerals, or combination thereof detailed in Annex A of this standard.

Titles shall be white on fire protection systems and black or white on all other systems, whichever is appropriate.

3.5.3   Primary Colour Code

A primary colour code shall appear on all piping systems in any installation that is colour-coded in accordance with this standard. Primary colour codes shall consist of a single colour applied as a band that completely encircles the pipe. Colour bands shall be applied in conformance with Annex A and dimensional information shown on Figure 1.

All pipe and covering on entire fire protection systems, including all encircling or partially encircled or partially encircling straps, hangars, and supports shall be painted the primary colour code red.

If desired, operating accessories may also be painted with the primary colour code. Vents shall be colour coded with the primary colour code for the fluid in use (e.g. sea suction bay vents should be painted green or suitably identified).

3.5.4   Secondary Colour Code

A secondary colour code shall appear on all piping systems in any installation that is colour-coded in accordance with this standard. Secondary colour codes shall consist of a single colour applied as an arrow, and a band that completely encircles the pipe. When the entire piping system is painted with the primary colour code, the coloured bands and arrows shall appear in all locations specified in section 3.5.5. The arrows shall indicate the normal direction(s) of flow of fluids in the systems. A double-headed arrow shall be placed on lines subject to reverse flow. Colour bands and arrows shall be applied in conformance with Annex A and dimensional information shown on Figure 1.

3.5.5   Location on Piping Systems

Titles and colour codes on piping systems shall be located so that they can be easily seen. Piping systems are to be identified at least once in every space or compartment and are to be identified every 15 meters (50 feet) in open areas. Piping is to be identified on both sides of decks and bulkheads where penetrations occur. Where piping is concealed in a pipe case, tunnel or other confined space, it is to be identified at the point of entry and leaving, and at each access opening. Piping is to be identified at starting and ending points of runs, at each piece of equipment, space permitting, and at branch line junctures. Identify piping systems at major manual and automatic valves immediately upstream of the valves and where this is not possible, place the identification as close to the valve as possible.

3.6   NOTICES

Piping Systems Identification Chart

Annex A shall be posted for ready reference at the following locations:

- Motor Control Room or Station;

- Machinery Spaces;

- Wheelhouse;

- Fire Control Station (other than Wheelhouse); and

- Engineer's Office.

EXACT IDENTIFICATION

By name of the fluid and colour code

PRIMARY COLOUR CODE

Outside diameter of pipe or covering	Width (W) of band
Less than 75mm (3″)	300mm (12″)
Over 75mm (3″)	600mm (24″)

SECONDARY COLOUR CODE

Outside diameter of pipe or covering	Width (W) of band
Less than 75mm (3″)	25mm (1″)
Over 75mm (3″)	50mm (2″)

ARROWS

Outside diameter of pipe or covering less than 3″

75mm (3″)
19mm (3/4″)
12mm (1/2″)
100mm (4″)

Outside diameter of pipe or covering over 3″

100mm (4″)
38mm (1 1/2″)
25mm (1″)
152mm (6″)

EXAMPLE

W/6   W/6   W/6

TITLE

W
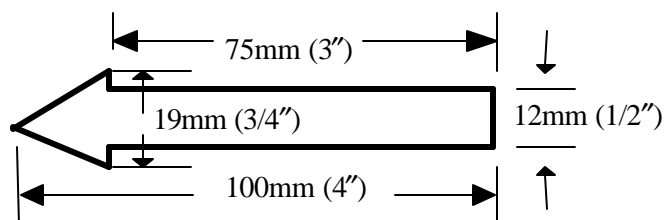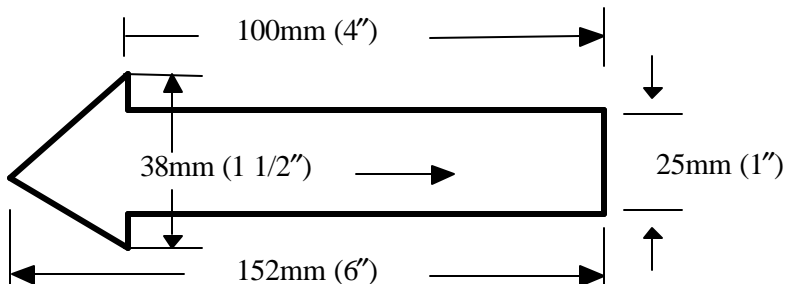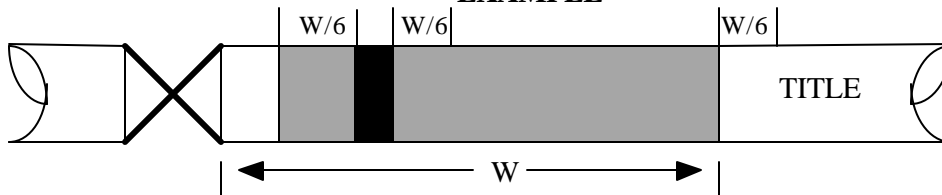
**Figure 1**

ANNEX A   PRIMARY AND SECONDARY COLOUR CHART

FLUID	Primary Colour Code	SYSTEM	TITLE ABBREVIATION	SECONDARY COLOUR CODE	
CO_2	RED	Fire	CO_2	●	Yellow
Foam		Fire	FOAM	○	White
Halon 1301		Fire	HALON 1301	●	Blue
Steam		Steam Smothering Fire	STM SMOTH FIRE	●	Purple
Sea (Raw) Water		Fire Main	FIRE MN	●	Green
Sea (Raw) Water		Fire Monitor	FIRE MONIT	●	Green
Sea (Raw) Water		Fire Sprinkler	FIRE SPRINK	●	Green
Combustion Exhaust	WHITE	Main Engine	#____ M E EXH	●	Red
		Ship Service Engine	# ____ S S EXH	●	Red
		Emergency Service Engine	E S EXH	●	Red
		Emergency Fire Pump Engine	E F P EXH	●	Red
		Emergency Compressor Engine	E C EXH	●	Red
		Boiler Exhaust	BLR EXH	●	Red
Oils	YELLOW	Lube Oil Transfer	L O TRANS	○	White
		Lube Oil Service	L O SERV	●	Green
		Dirty Oil	D OIL	●	Black
		Hydraulic Oil Transfer	HYD OIL TRANS	●	Blue
		Hydraulic Oil Service	HYD OIL SERV	●	Purple
		Synthetic Oil	SYN OIL	●	Red
Air	ORANGE	Starting Air	START AIR	●	Black
		Service Air	SERV AIR	●	Yellow
		Control Air	CONT AIR	○	White
Bilge (BLACK)	●	Suction	BILGE SUCT	○	White
		Discharge	BILGE DISCH	●	Yellow
Sewage (BLACK)	●	Sewage Drains	SEW DRNS	●	Red
Grey Water (GREY)	●	Grey Water Drains	G W DRNS	●	Black
Refrigerant	WHITE	Domestic	#____ DOM R ____	●	Orange
		Cargo	#____ CAR R ____	●	Orange
		Air Conditioning	#____ A C R ____	●	Orange
Sea (Raw) Water	GREEN	Sea Water Cooling	SWC	○	White
		Sea Water Service	SW SERV	●	Yellow
		Ballast	SWB	●	Black
	RED	Fire Main	FIRE MN	●	Green
		Fire Monitor	FIRE MONIT	●	Green
		Fire Sprinkler	FIRE SPRINK	●	Green
Fresh Water	BLUE	Jacket Water Cooling	JWC	●	Red
		Hot Potable Water	H POT WAT	○	White
		Cold Potable Water	C POT WAT	○	White
		Hot Non-Potable Water	H NON-POT WAT	●	Green
		Cold Non-Potable Water	C NON-POT WAT	●	Green
		Condensate Return	COND RETN	●	Black
		Boiler Feed Water	BLR FD W	●	Yellow
Steam	PURPLE	Superheated Steam	SUPER STM	●	Red
		Saturated Steam	SAT STM	●	Yellow
		Exhaust Steam	EXH STM	○	White
		Drains Steam	DRNS STM	●	Black
(RED)	●	Steam Smothering Fire	STM SMOTH FIRE	●	Purple
Fuel Oil	BROWN	Heavy	HFO	○	White
		Diesel	DFO	●	Yellow
		Aviation	AFO	●	Red