



2600SEG-301 (BOARD OF INSPECTORS)

MARITIME SAFETY STANDARD FOR COLOR CODING FOR PANAMA CANAL AUTHORITY FLOATING EQUIPMENT AND MARINE TERMINAL PIPING

1.0 PURPOSE

Establish the criteria for the color coding for Panama Canal Authority floating equipment and marine terminal pipelines.

2.0 BACKGROUND

This Standard supersedes the policy on Marine Color Coding recommended by the Maritime Safety Unit (MSU 1993) of the former Panama Canal Commission (PCC).

3.0 SCOPE

This Standard applies to all Panama Canal Authority (ACP) units with floating equipment, their employees, and third parties conducting work or activities in facilities or areas under ACP responsibility.

4.0 AUTHORITY

This Standard is established pursuant to Agreement No. 12 of the Board of Directors of the Panama Canal Authority, Safety and Occupational Health Regulations, Chapter I, Article 9.

5.0 DEFINITIONS

For the purposes of this Standard, the following definitions shall apply:

- 5.1 Piping Systems: Any piping, including their fittings, valves, and piping covers.
- 5.2 Pipe: Hollow tube used for the transport of gases, liquids, semi-liquids or finely divided solids.
- 5.3 Nominal diameter: commercial diameter of the tube.
- 5.4 Description (schedule): see specific value given by ANSI.
- 5.5 Vital system: essential for the safety of the vessel, passengers and crew.
- 5.6 Non-metallic pipe: made from a polyvinyl material which can be used for water, air and some non-flammable chemicals.
- 5.7 Non-ferrous pipe: manufactured from non-ferrous mineral.
- 5.8 RAL: color identification system developed in 1927 based on color spaces.

6.0 GENERAL

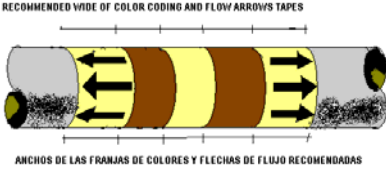
6.1 Piping should be marked at least once in each space, at each bulkhead, or deck penetration, and close to each valve and fittings.

6.2 In addition, markings or stripes should be placed every 3 to 5 meters (10 to 15 feet) along the length of a pipe, or at shorter intervals when warranted by bends, or in the proximity of other pipes, showing the corresponding direction of the flow.

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6.3 The standard consists in applying the following table for markings or stripes depending on the nominal pipe size.

SCHEME FOR IDENTIFICATION OF PIPE MARKING SYSTEMS					
NOMINAL PIPE SIZE		WIDE OF COLOR CODING AND FLOW ARROWS TAPES (WRAPPED AROUND)		SIZE OF LEGEND LETTERS	
					
INCHES (")	MILLIMETERS (mm)	INCHES (")	MILLIMETERS (mm)	INCHES (")	MILLIMETERS (mm)
½ to 1	12.7 to 25	1	25	½	13
1 ¼ to 2	32 to 50	2	50	¾	19
2 ½ to 3 ½	65 to 90	2	50	1 ¼	32
4 to 6	100 to 150	4	100	1 ¼	32
8 to 10	200 to 250	4	100	2 ½	64
12 to 14	300 to 350	4	100	3 ½	89
16 to 18	400 to 450	4	100	3 ½	89
over 20	over 500	4	100	4	100

6.4 The marking could be identified by paint or adhesive tape with the color and size applicable.

6.5 Reference table of primary colors identified by the system:

Main Colors	Pipeline Content or System
Black	Waste (oily waters, exhaust gases, waste water)
Blue	Fresh water
Brown	Fuel oil
Green	Sea water
Gray	Non-flammable gases
Maroon	Masses (dry and wet)
Orange	Oils other than fuel
Silver	Steam
Red	Firefighting and fire protection
Violet	Acids, alkalis
White	Air in ventilation system
Yellow ochre	Flammable gases



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6.6 For the application of color coding to the applicable system and the standard color you must use **Annex 1** of this standard.

7.0 RESPONSIBILITIES

7.1 The manager of the owning unit of the pipeline system shall implement this Standard.

7.2 The owning unit shall keep a log of all pipeline system inspections conducted, as well as diagrams of its pipeline systems, particularly of connections with other sections of a system or mains. These diagrams shall be accessible to personnel working in the area and emergency response personnel.

7.3 Supervisors shall exercise direct supervision to ensure compliance with these standards.

7.4 Employees shall inform their supervisor of any deficiencies or deviations from this Standard.

7.5 Maritime Safety Unit (OPXI-S) floating equipment inspectors shall conduct periodic inspections of pipeline systems on floating equipment and marine terminal facilities.

8.0 INQUIRIES

Any information or clarification of the content or application of this Standard must be requested in writing to the Maritime Safety Unit (OPXI-S).

9.0 EXCEPTIONS

Any requests for changes or temporary exceptions to this Standard must be made in writing to the Maritime Safety Unit (OPXI-S).

10.0 TERM

This Standard shall remain in force until amended or revised.

11.0 REFERENCES

- 11.1 ISO/DIS Standard 14726-1:1999(E)
- 11.2 ISO/DIS Standard 14726-2:2002(E)
- 11.3 Modern Marine Engineer's Manual Vol. 1 third edition
- 11.4 IACS Classifications Societies Rules
- 11.5 IMO: International Maritime Organization
- 11.6 SAE: Society of Architect and Engineers
- 11.7 ASME: American Society of Mechanical Engineers
- 11.8 ASTM: American Society of Testing and Materials
- 11.9 ANSI American National Standards Institute



Panama Canal Authority (ACP)
Operations Department
Board of Inspectors – Maritime Safety Unit
ANNEX 1, 2600SEG-301 MARITIME SAFETY STANDARD COLOR CODING FOR PANAMA
CANAL AUTHORITY FLOATING EQUIPMENT AND MARINE TERMINAL PIPELINES

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Main and additional colors		Standard Basic / additional colour Example	ORIGINAL DATE AUG-10-2006	NOTE
Name of colour	Letter code		<i>System (Medium) Substance</i> <i>Different media and / or functions</i>	
Black	BK	RAL 9005	Waste Media	N/A
Black with blue stripes	BK-BU-BK		Black water	N/A
Black with brown stripes	BK-BN-BK		Waste oil / Used oil (contaminated oil)	N/A
Black with green stripes	BK-GN-BK		Bilge Water	N/A
Black with gray stripes	BK-GY-BK		Exhaust gas	N/A
Black with white stripes	BK-WH-BK		Grey water	N/A
Black with yellow stripes	BK-YEO-BK		Sewage, contaminated	N/A
Blue	BU	RAL 5015	Fresh Water	N/A
Blue with brown stripes	BU-BN-BU		Fresh water sanitary	N/A
Blue with green stripes	BU-GN-BU		Potable water	N/A
Blue with gray stripes	BU-GY-BU		Distillate water	N/A
Blue with orange stripes	BU-RD-BU		Gas-turbine wash water	N/A
Blue with silver stripes	BU-SR-BU		Feed water	N/A
Blue with violet stripes	BU-VT-BU		Cooling fresh water	N/A
Blue with white stripes	BU-WH-BU		Chilled water	N/A
Blue with yellow stripes	BU-YEO-BU		Condensate	N/A
Brown	BN	RAL 8001	Fuel Oil	N/A
Brown with black stripes	BN-BK-BN		Heavy fuel (HFO) fuel oil # 6 or Bunker C	N/A
Brown with blue stripes	BN-BU-BN		Aviation fuel	N/A
Brown with red stripes	BN-RD-BN		Petrol (Gasoline)	N/A
Brown with violet stripes	BN-VT-BN		Biological fuel	N/A
Brown with white stripes	BN-WH-BN		Gas turbine fuel	N/A
Brown with yellow stripes	BN-YEO-BN		Diesel Fuel (MDO) mix MGO and HFO diesel #4	N/A
Green	GN	RAL 6018	Sea Water	N/A
Green with blue stripes	GN-BU-GN		Decontamination water	N/A
Green with brown stripes	GN-BN-GN		Sea water, sanitary	N/A
Green with violet stripes	GN-VT-GN		Ballast water	N/A
Green with yellow stripes	GN-YEO-GN		Cooling sea water	N/A
Gray	GY	RAL 7001	Non-flammable gases	N/A
Gray with blue stripes	GY-BU-GY		Oxygen	N/A
Gray with brown stripes	GY-BN-GY		Inert gas	N/A
Gray with green stripes	GY-GN-GY		Nitrogen	N/A
Gray with maroon stripes	GY-MN-GY		Refrigerant	N/A
Gray with orange stripes	GY-OG-GY		Compressed air LP (Low Pressure)	N/A
Gray with red stripes	GY-RD-GY		Compressed air HP (High pressure)	N/A
Gray with violet stripes	GY-VT-GY		Control air / regulating air	N/A
Gray with white stripes	GY-WH-GY		Breathing air	N/A
Gray with yellow stripes	GY-YEO-GY		Breathing gas	

ATTENTION!!! Appearance depends on Computer and Printer settings. For best viewing experience, color samples should be viewed on RAL-K7 Color Fan deck



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Main and additional colors		Standard Basic / additional colour Example	ORIGINAL DATE AUG-10-2006	NOTE
Name of colour	Letter code		<i>System (Medium) Substance</i> <i>Different media and / or functions</i>	
Maroon (Copper)	MN	RAL 8015	Masses (dry and wet)	N/A
Orange	OG	RAL 2003	Oils other than fuel	N/A
Orange with black stripes	OG-BK-OG		Used oil (not contaminated)	N/A
Orange with blue stripes	OG-BU-OG		Thermal oil	N/A
Orange with green stripes	OG-GN-OG		Lubricating oil for gas turbines	N/A
Orange with gray stripes	OG-GY-OG		Hydraulic fluid	N/A
Orange with silver stripes	OG-SR-OG		Lubricating oil for steam turbines	N/A
Orange with violet stripes	OG-VT-OG		Lubricating oil for gears	N/A
Orange with yellow stripes	OG-YEO-OG		Lubricating oil for internal combustion engines	N/A
Silver	SR	RAL 9006	Steam	N/A
Silver with black stripes	SR-BK-SR		Steam for heating purpose	N/A
Silver with white stripes	SR-WH-SR		Exhaust steam	N/A
Silver with yellow stripes	SR-YEO-SR		Supply steam	N/A
Red	RD	RAL 3000	Fire fighting and fire protection	N/A
Red with green stripes	RD-GN-RD		Fire-fighting water	N/A
Red with gray stripes	RD-GY-RD		Fire-fighting gas (CO2, HALON)	N/A
Red with orange stripes	RD-OG-RD		Sprinkler water	N/A
Red with violet stripes	RD-VT-RD		Spray water	N/A
Red with white stripes	RD-WH-RD		Fire-fighting powder	N/A
Red with yellow stripes	RD-YEO-RD		Fire-fighting foam	N/A
Violet	VT	RAL 4001	Acids & Alkalis	N/A
White	WH	RAL 9010	Air in ventilation systems	N/A
White with black stripes	WH-BK-WH		Discharge air	N/A
White with blue stripes	WH-BU-WH		Mechanical supply air, cold	N/A
White with brown stripes	WH-BN-WH		Natural exhaust air	N/A
White with green stripes	WH-GN-WH		Atmospheric air	N/A
White with gray stripes	WH-GY-WH		Mechanical exhaust air	N/A
White with maroon stripes	WH-MN-WH		Decontaminated supply air	N/A
White with orange stripes	WH-OG-WH		Mechanical recirculated air	N/A
White with silver stripes	WH-SR-WH		Mechanical supply air, warm	N/A
White with red stripes	WH-RD-WH		Smoke clearance	N/A
White with violet stripes	WH-VT-WH		Conditioned supply air	N/A
White with yellow stripes	WH-YEO-WH		Natural supply air	N/A
Yellow-ochre	YEO	RAL 1021	Flammable gases	N/A
Yellow with blue stripes	YEO-BU-YEO		Hydrogen	N/A
Yellow with gray stripes	YEO-GY-YEO		Acetylene	N/A
Yellow with violet stripes	YEO-VT-YEO		Liquid gas	N/A

ATTENTION!!! Appearance depends on Computer and Printer settings. For best viewing experience, color samples should be viewed on RAL-K7 Color Fan deck