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English version

Specification for the identification of plastic pipelines used by utility services in public below ground installations

The draft of the National Technical Specification is published for Public Enquiry and made available towards all interested parties. The draft has been prepared by CYS National Standardisation Technical Committee CYS/TC 8.

The draft has been developed in English language. It may also be published in any other official language of the country and CYS holds the responsibility for the translation.

All interested parties are invited to submit their comments, providing adequate supporting documentation and justification.

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ΚΥΠΡΙΑΚΟΣ ΟΡΓΑΝΙΣΜΟΣ ΤΥΠΟΠΟΙΗΣΗΣ
CYPRUS ORGANISATION FOR STANDARDISATION

Forward

This Technical Specification has been prepared under the direction of the CYS/TC 8 Plastic piping systems, the secretariat of which is managed by CYS.

During the drafting of this standard, special attention has been paid to the requirements of equivalent International and other national standards, as well as the specific conditions and needs of the Cyprus market and stakeholders respectively.

1. Introduction

The growth and expansion of utility and public service's underground networks, the ongoing public development projects, and the increasing number of service providers installing underground pipeline networks, has created a need for an agreed and common code of practice among interested parties for the color coding to be used for public plastic pipe underground networks.

The number of pipes installed in public trenches has increased significantly, causing identification issues among different service providers, especially in the case of revealing and revisiting the network for repairs, upgrades or other development works. Furthermore, the choice of color for different services and conveyed mediums up to present, has not been made according to any international guidelines or standards, but rather by other commercial and industry reasons and constraints. This can lead to possible conflicts in the future, taking into consideration developments like the use of natural gas, digitalization and development of smart infrastructure.

In this scope, all interested parties have agreed to prepare a national technical specification for the color coding of plastic pipelines installed underground on public roads and sidewalks.

The aim of this document is to establish a national code of practice for color coding of underground plastic pipelines.

Based on the current stage of buried underground plastic pipeline networks, the foreseeable growth of such networks in the future, and the current local pipe manufacturing industry capabilities, the specification will not cover at this point any other specific code requirements and/or suggestions, including symbols and marking.

The color identification as described in the clauses of this specification, is considered adequate at the time of publishing this specification. Nevertheless, the specification can be amended to include code identification requirements and guideline, if the market needs change and the relevant interested parties decide this is necessary.

The possibility of plastic pipes conveying fuel or chemicals is recognized but no relevant information is available at the time of drafting this specification. If buried, public, plastic pipe networks occur in the future, then this specification can be amended accordingly.

The products (pipes) used for the purpose of this specification must comply, when existing, with national regulations and other relative requirements that ensure fitness for purpose.

2. Scope

This document specifies the colours for the identification of pipes used by utility services in public below ground installations. The services covered by this specification include the following:

- drinking water
- recycled water
- rainwater
- sewerage/ wastewater
- electrical applications
- electronic communications (telecommunications)
- information & communication technology (ICT) services
- fuel (liquid and gas)
- chemicals

The document also covers the cases where the below ground pipes extend above ground to be connected to above ground networks.

This document applies to PVC-U and PE pipes and the method used is the identification through basic colour assignment and/or other code identifications.

3. Terms and definitions

3.1 Main Colour

Colour used to indicate a media or service carried through a pipe.

3.2 Secondary Colour

Colour used in the form of stripes to complement main colour and help identify a media or service carried through a pipe.

3.3 Above ground installations

Pipe installations, within the building structure, including in-wall or otherwise concealed; any installation not considered below ground.

3.4 Aerial cable installations

An assembly of insulated conductors installed above ground on a pole or similar overhead structures

3.5 Below ground installations

Pipe installations laid in soil or ducts which are in the ground, but not contained within a basement or sub level of a building.

3.6 Connection points of below ground installations

The point of connection between underground installations and pipes installed below ground level, not necessarily buried in the ground, e.g. connection of pipelines below bridges

NOTE 1 **Ducts along Bridges**: These ducts are usually iron ducts and are installed on the sides or under the bridges. Plastic telecommunication ducts situated along the roads shall be somehow connected with the ducts placed along bridges. The above connectivity is enabled with the use of junction boxes or manholes which are constructed on the pavement of the roads close to the bridges' s boundaries and on both lengthwise sides of the bridges.

3.7 Connection with above ground installations

The point of connection where the below ground pipelines extend above ground to be connected to above ground networks.

NOTE 1 **Ducts connecting premises with the public infrastructure**: To enable the connectivity of the internal premise's infrastructure with the public network ducts are installed from the premise's distribution point and up to junction boxes situated on the public pavements. These ducts are usually of grey color and are 56 mm or 90 mm in diameter.

NOTE 2 **Pole Ducts**: These ducts are installed between the junction boxes situated along the pavements and the base of the poles to connect the poles with the rest of the telecommunication infrastructure. There are also cases where these ducts extend at about 1,5 meters above ground level and along the lower part of the poles. These are conduit pipes and could be white with diameters of 20 – 25 – 32 mm or grey with a diameter of 56 mm or purple or black with a diameter of 90mm.

3.8 Public installations/ networks

Pipe installations laid in public areas e.g. roads, pavements.

3.9 Service pipe networks

Pipe network used for public services such as drinking water, recycled water, sewerage, wastewater, electricity, telecommunications, telemetry, fuel (liquid and gaseous), chemicals etc.

4. General

Due to the obvious difficulty in changing the installed buried pipeline infrastructure, the existing colour coding used can be adopted, although it might not comply with pipe identification best practices. In order to avoid any confusion in identifying existing and new installations both the current and suggested colours used are represented in this document. Tables 5-1 to 5-3 in paragraph 5.2, demonstrate the pipe colours currently used in existing underground plastic pipelines on public roads and sidewalks by utility services, along with the suggested colour coding, to be followed as good practice, for future installations.

Furthermore, Tables 5-4 to 5-6 specify only the suggested identification colours of underground plastic pipe networks, including the adopted current colours.

Tables shall be amended in the cases of:

1. new service providers of identified services
2. modification of existing service
3. a new type of service

In the case of a new service provider, using underground plastic pipes for its operation, the service provider and/or the relevant authority should refer to this specification to select the suggested colour allocated for the specific service or select one of the available colors.

In the case of a new type of service, the service provider and/or the relevant authority should refer to this specification to avoid selecting one of the currently used colours for other services and utilities and select an available colour and/or code for identification.

In the above cases that an available color and/or code identification is either allocated to a new service provider or a new type of service, the service provider and/or the relevant authority should inform Cyprus Organisation for Standardisation, and CYS/TC 08 and provide the details of the type of service, pipe color and material used, in order to proceed with the revision of the specification.

5. Identification colours

5.1 Colour coding systems

5.1.1 PANTONE MATCHING SYSTEM (PMS)

www.pantone.com/

5.1.2 RAL Deutsches Institut für Güte-sicherung und Kennzeichnung

www.ral-farben.de/en/all-ral-colours

5.2 Current & suggested identification colours

Tables 5-1 to 5-4 show the current and suggested identification colours with color samples, based on the relevant colour coding systems. The color sample might not be an exact match to the actual pipe colour but is based on the manufacturer and/or service provider declaration of colour.

Table 5-1 Current and suggested pipe identification colours for water/ wastewater related services

Service/ Utility	Material	Colour description	Colour code	Status	
				existing	suggested
Drinking water					
Main pipelines	U-PVC	Grey	RAL 7011		
	U-PVC	Grey/ Blue stripes *	RAL 7011/ RAL 5015		
** Subject to pipe manufacturer capacity to produce striped U-PVC pipes*					
Domestic connections	HDPE	Black/Blue stripes	RAL 9004/ RAL 5015		
	HDPE	Blue	RAL 5015		
Ducting (corrugated)	CHDPE	Black/Blue stripes	RAL 9004/ RAL 5015		
Ducting	U-PVC	Grey	RAL 7037		
Irrigation water					
	U-PVC	Grey	RAL 7011		
	HDPE	Black/Blue stripes	RAL 9004/ RAL 5015		
	HDPE	Black	RAL 9004		
	HDPE	Black/Green stripes	RAL 9004/ RAL 6032		
Recycled water					
	PE	Black/ Red stripes	RAL 9004/ RAL 3020		
Rainwater					
Corrugated pipe	CHDPE	Black	RAL 9004		
	U-PVC	Grey	RAL 7037		

Service/ Utility	Material	Colour description	Colour code	Status	
				existing	suggested
	U-PVC	Iron Grey	RAL 7011		
	U-PVC	Orange brown	RAL 8023		
	U-PVC	Black/ Grey stripes *	RAL 9004/ RAL 7035		
** Subject to pipe manufacturer capacity to produce striped U-PVC pipes*					
Sewerage/ Wastewater					
Sewerage	U-PVC	Orange brown	RAL 8023		
Sewerage (pressure pipes) *	HDPE	Black	RAL 9004		
	HDPE	Black with brown stripes	RAL 8023		
Sewerage (pressure pipes) *	U-PVC	Iron Grey	RAL 7011		
	U-PVC	Light brown	RAL 8001		
Sewerage (large diameter)	CHDPE	Black	RAL 9004		
	GRP	White	RAL 1014		
** Subject to pipe manufacturer capacity to produce requested pipe sizes*					

Table 5-2 Current and suggested pipe identification colours for electrical application related services

Service/ Utility	Material	Colour description	Colour code	Status	
				existing	suggested
Electrical applications					
High Voltage (132kV)	U-PVC	Sky blue	RAL 5015		
Distribution network	U-PVC	Sky blue	RAL 5015		

Table 5-3 Current and suggested pipe identification colours for electronic communications (telecommunications) related services

Service/ Utility	Material	Colour description	Colour code	Status	
				existing	suggested
Electronic communications					
	U-PVC	Traffic purple	RAL 4006		
	U-PVC	Signal white	RAL 9003		
	U-PVC	Bright red orange	RAL 2008		
	U-PVC	Yellow	Pantone 123		
	U-PVC	Sky blue	RAL 5015		

Table 5-4 Current and suggested pipe identification colours for information & communication technology related services

Service/ Utility	Material	Colour description	Colour code	Status	
				existing	suggested
ICT services					
3-pipe system	PE	Sky blue	RAL 5015		
Micro duct	PE	Orange	RAL 2008		
Micro duct	PE	Traffic purple	RAL 4006		
Micro duct	PE	Black/ purple stripes	RAL 9004/ RAL 4006		
Micro duct	PE	Black	RAL 9004		
Smart cities (network)	U-PVC	Green	RAL 6032		
Traffic signals	U-PVC	Grey	RAL 7037		
Intelligent Transport Systems	U-PVC	Grey	RAL 7037		

Service/ Utility	Material	Colour description	Colour code	Status	
				existing	suggested
ICT services					
Enforcement systems (cameras)	U-PVC	Grey	RAL 7037		
	U-PVC	Green	RAL 6032		

Tables 5-5 to 5-8 specify the suggested identification colours with color samples, to be used as a good practice for future installations. The tables include both new suggested color and also adopted current colours.

Table 5-5 Suggested pipe identification colours for water/ wastewater related services

Service/ Utility	Material	Colour description	Colour code	Sample
Drinking water				
	U-PVC	Grey/ Blue stripes *	RAL 7011/ RAL 5015	
** Subject to pipe manufacturer capacity to produce striped U-PVC pipes*				
Irrigation water				
	U-PVC	Grey	RAL 7011	
	HDPE	Black/Green stripes	RAL 9004/ RAL 6032	
Recycled water				
	HDPE	Black/ Red stripes	RAL 9004/ RAL 3020	
Rainwater				
Corrugated pipe	CHDPE	Black	RAL 9004	
	U-PVC	Black/ Grey stripes *	RAL 9004/ RAL 7035	
** Subject to pipe manufacturer capacity to produce striped U-PVC pipes*				
Sewerage/ Wastewater				
Sewerage	U-PVC	Orange brown	RAL 8023	

Service/ Utility	Material	Colour description	Colour code	Sample
Sewerage (pressure pipes) *	PE	Black with brown stripes	RAL 8023	
Sewerage (pressure pipes) *	U-PVC	Light brown	RAL 8001	
Sewerage (large diameter)	CHDPE	Black	RAL 9004	
	GRP	White	RAL 1014	
** Subject to pipe manufacturer capacity to produce requested pipe sizes*				

Table 5-6 Suggested pipe identification colours for electrical application related services

Service/ Utility	Material	Colour description	Colour code	Sample
Electrical applications				
High Voltage (132kV)	U-PVC	Sky blue	RAL 5015	
Distribution network	U-PVC	Sky blue	RAL 5015	

Table 5-7 Suggested pipe identification colours for electronic communications (telecommunications) related services

Service/ Utility	Material	Colour description	Colour code	Sample
Electronic communications				
	U-PVC	Traffic purple	RAL 4006	
	U-PVC	Signal white	RAL 9003	
	U-PVC	Bright red orange	RAL 2008	
	U-PVC	Yellow	Pantone 123	
	U-PVC	Sky blue	RAL 5015	

Table 5-8 Suggested pipe identification colours for information & communication technology related services.

Service/ Utility	Material	Colour description	Colour code	Sample
ICT services				
3-pipe system	PE	Sky blue	RAL 5015	
Micro duct	PE	Orange	RAL 2008	
Micro duct	PE	Traffic purple	RAL 4006	
Micro duct	PE	Black/ purple stripes	RAL 9004/ RAL 4006	
Micro duct	PE	Black	RAL 9004	
Smart cities (network), Traffic signals, Intelligent Transport Systems, Enforcement systems (cameras)	U-PVC	Green	RAL 6032	

Table 5-8 specifies available colours, based on the technical capacity of local pipe manufacturers to produce, which provide the necessary contrast to serve the purpose of efficient identification of the pipeline, when installed with other pipes coloured as mentioned in the previous tables.

The table can be amended to include more colour and/or materials, considering the technological developments and other market related conditions.

Table 5-9 Available colours

Available colours	Material	Colour description	Colour code	Sample
	U-PVC	Pink	RAL 3015	
	U-PVC	Light green	RAL 6019	

Bibliography

1. *BS 1710:2014 Specification for identification of pipelines and services*

