

# **The Proper Painting of Fire Hydrants for Maintenance and Color Classification**

**White Paper**

**Mueller Co.**

Reliable Connections™

## Overview

What is more universal than a fire hydrant or a traffic light?

While they are used for different purposes, these two staples of daily life have a number of elements in common. In order to ensure public safety, they must both be in good repair. Additionally, they both rely on colors to convey important information. But while the general public knows what colors mean at a traffic light, it is typically only firefighters or water distribution personnel that know the meaning behind the colors of a fire hydrant. This paper will explore the various color codes of dry barrel fire hydrants, explain the advantages of a universally understood color code system, and demonstrate why proper coating is crucial to their serviceability.

## Colors and Their Meanings

Although there is currently no federally mandated color coding of fire hydrants, municipalities commonly mark their hydrants according to recommendations cited in the National Fire Protection Association (NFPA) Standard 291, dated January 9, 2013. The colors are based upon flow rate and supply system so that responding fire companies can immediately recognize a suitable water source that will provide enough water for their needs.

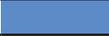
In addition to the colors specified by the NFPA, many municipalities rely on their own systems to communicate information to their local fire companies and water management organizations. For example, some utilities color-code the bonnet to indicate the size of the water main the hydrant is connected to. While Mueller Co. provides solutions for all municipalities, the utility of a fire hydrant is maximized when it conforms to NFPA standards. For example, an NFPA-compliant fire hydrant would efficiently communicate information to neighboring fire companies called in to assist with a large fire.

## Body Colors

Most fire hydrants are universally red; however, even this ubiquitous coating communicates valuable information to firefighters and water distribution personnel. Color coding depends on where each color is located on the hydrant, as the hydrant bodies and bonnets and caps each relay a separate set of information.

As shown in the table to the right, hydrant bodies can be painted different colors to signify the system supplying the water: chrome yellow for a municipal system, red for a private system, and violet for a non-potable/reclaimed water system. In addition to these colors, the NFPA also “grandfathered in” colors commonly used in the 1970s; the body of a fire hydrant is commonly painted white, chrome silver, or lime yellow. While these colors may communicate information according to a local system, they would not be useful to anyone fluent in NFPA regulations. Because the NFPA standard is voluntary, it is not followed by a majority of municipalities. A universal system recognized with the same level of certainty as the colors of a traffic light is something worth consideration.

### ***Body Colors***

<b>Color Name</b>	<b>Color</b>	<b>Supply</b>
Chrome Yellow		Municipal System
Red		Private System
Violet (Light Purple)		Reclaimed System

## Bonnets and Caps

NFPA Standard 291 recommends that bonnets and caps be color coded to signify the “available flow” of the hydrant in gallons per minute (GPM); these flow rates are calculated at 20 psi residual pressure. The color code for 1,500 GPM and above is light blue; 1,000 to 1,499 GPM - green; 500 to 999 GPM - orange; less than 500 GPM - red.

**Bonnet and Cap Colors**

Color Name	Code	Color	Available Flow
Red	C		Less than 500 GPM
Orange	B		500-999 GPM
Green	A		1,000-1,499 GPM
Light Blue	AA		1,500 GPM & above

Chapter five of the above standard which covers the marking of hydrants, recommends that high volume hydrants, or those rated at less than 20 psi (1.4 bar) have the related capacity or pressure stenciled in black on the hydrant top.

## Inoperable Hydrants

Unusable fire hydrants and those that are temporarily inoperable should be wrapped and marked as such. It is advised that hydrants that are permanently out of order be marked, painted black, and/or removed from the system as soon as possible.



## Stress and Maintenance in Severe Service

Most dry barrel fire hydrants are comprised of two main segments: the below-ground segment that connects to the water main and the above-ground hydrant barrel that is commonly recognized. While the below-ground segment is subject to the usual thermal and physical stresses of any buried service infrastructure component, the above-ground segment is subject to a different set of harsh environmental stressors.

Of course, cars or trucks cause the most obvious damage to hydrants because of their location near curbs. On top of vehicle damage, hydrants can be damaged by road salt, UV rays, rain, snow, and wide temperature variations. Vandalism, landscaping accidents, and in-service wear and tear also create “wounds” to the surface coatings that protect the hydrant from corrosion. Because of these and other threats to the integrity of hydrant coatings, the quality of factory-applied primer and paint and subsequent surface maintenance is vital.

While it is not considered damage in the same way as the aforementioned incidents, hydrants are occasionally repainted or concealed by homeowners who think of them as an eyesore. Most communities do a good job of informing residents that hydrants should not be altered or hidden, but it does still occur in some instances. Communicating the critical importance of an unobscured fire hydrant should be essential for all municipalities.

## Types of Protective Coatings

NFPA and the American Water Works Association (AWWA) recommend that hydrants be painted. However, the use of Fusion Bonded Epoxy (FBE), a type of powder coating, is used by some manufacturers for marking and protecting fire hydrants. As a rule, FBE coatings are applied to castings with no primer and are more susceptible to damage. FBE coatings are also more difficult and expensive to repair than the liquid paint and primer method. Furthermore, there is no ANSI/NSF 61-approved FBE repair kit currently available. The most important considerations when choosing a protective coating should be ease of use, repair cost, and results of maintenance and repairs to hydrants whose coatings have been damaged.

The easiest and most cost-effective approach for corrosion protection and fire hydrant repair is the liquid coating combination of primer and paint. Hydrants can leave the factory fully painted with an undercoating of primer and a topcoat of custom-ordered colors, or in the case of municipalities that keep an inventory of parts in stock, hydrants can be shipped with a primer coat only. This allows the municipality to paint the barrels, bonnets and caps whatever color(s) the location requires. The liquid coating method also makes any painting after installation much easier than with FBE-coated hydrants.

**Comparison of Coating Methods for Fire Hydrants**

Liquid Coating	Fusion Bonded Epoxy
Protects against corrosion	Protects against corrosion
Durable	Durable
Resists scratches	Resists scratches
More color options	Fewer color options
Retains high gloss over time	Tends to chalk over time
Chip resistant	More brittle, easier to chip
Custom colors inexpensive and have shorter lead times, even in small batches	Custom colors more expensive and require more lead time
Easy to touch up	Difficult to touch up

**On-Site Painting/Re-Touching**

The on-site painting or re-touching of a fire hydrant that has been coated with a conventional liquid paint process involves three basic steps: clean, prime, paint. While this process is often associated with weathering of the coating, it is equally important that re-touching before installation returns the new fire hydrant to factory standards.

Before painting, it is helpful to assemble all supplies that may be required to refurbish the hydrant. Here is a list of what may be needed for field repairs to damaged liquid coatings:

- |                          |                       |                                                  |
|--------------------------|-----------------------|--------------------------------------------------|
| Safety glasses           | Scraper/needle scaler | Masking tape                                     |
| Hard hat                 | Primer                | Wire brush/air grinder                           |
| Particulate Mask         | Sand paper/sander     | Paint                                            |
| Mask for base of hydrant | Safety vest           | Paintbrushes                                     |
| Disposable gloves        | Kneeling pad          | 2 buckets (1 for water or solvent, 1 for debris) |
| Rags                     | Hedge shears          |                                                  |

Every item may not be needed for every hydrant, but it will save time and travel to prepare a kit with all of the above tools. For communities that number their hydrants, stencils and black spray need to be added to the kit.

The painting process itself is as follows. Skipping any of these steps leads to a reduced life of the new hydrant coating:

1. Notify homeowners well in advance about upcoming fire hydrant re-painting operations
2. Put on goggles, vest, hard hat and other personal protective equipment (PPE)
3. Visually inspect hydrant to ensure that it is not leaking
4. Hand-tighten caps so that no paint enters threads
5. Clear vegetation from area around hydrant
6. Place cardboard “masks” at base
7. Scrape off loose paint, rust and dirt with scraper or needle scaler



8. Brush off debris with wire brush or air grinder
9. Clean off hydrant with rag
10. Roughen shiny surfaces with sandpaper/sander
11. Use base mask to remove paint, dirt, rust, etc. and transfer from base of hydrant to bucket for proper disposal or recycling. Replace base masks.
12. Mask off QR code label with masking tape.
13. Apply primer to bare metal. Let dry (ideally 24 hours – minimum 1 hour)
14. Apply top coat
15. Allow top coat to dry before using hydrant

Water utilities often tag or label fire hydrants to allow for quick visual identification by firefighters. “Out of service” signs, hydrant caps and hydrant covers can be purchased commercially and are available in vibrant colors that alert first responders to inoperable units.

Tamper-resistant metal tags that are etched with hydrant numbers are another way to immediately inform fire departments of flow rates and other vital data concerning each hydrant within a municipality. The numbers on these tags or labels can be entered into a GIS (Geographic Information System) that stores and integrates hydrant information on a geospatial basis. Firefighters can then access this data on a tablet or other portable device to determine which hydrants have the flow rate or other requirements that conditions demand.

Utilities can use the GIS system as an asset management tool to accurately monitor and maintain the fire hydrants within their potable water delivery system.

Mueller Co. attaches a QR code to fire hydrants as they are produced in its Albertville, Alabama plant. When scanned, the QR code directs the municipal worker to a website that contains information specific to that hydrant, including model, size, nozzle details and color(s) ordered. Whether a QR code or hydrant tag is installed by the utility, it is important these are masked off and not painted over.

### **The Mueller® Solutions: 2 Part Epoxy Primer and Polyurethane Top Coat**

Mueller Co. has created the highest quality surface treatment to match their top grade hydrant designs and manufacturing processes. The surface treatment consists of two layers: a primer and a topcoat. Each layer was chosen to perform not only its respective task but also to work together to protect the fire hydrant throughout its useful life.

In order to provide maximum protection, Mueller hydrant castings are sprayed with a two-component epoxy coating before leaving the foundry. After the proper surface clearing and preparation, the 2-part epoxy primer for harsh environments is applied on the inside and outside of the castings. Grey is commonly used on the portions of the hydrant where a topcoat will be applied: upper barrels, bonnets, and caps. Black is typically used on the below ground portions: shoes and lower barrels.

#### ***Hydrant Color Match Options for Repairs***

Federal Standard Color Number (FED-STD)	<a href="http://www.federalstandardcolor.com">www.federalstandardcolor.com</a>
RAL Color Number (RAL)	<a href="http://www.ralcolor.com">www.ralcolor.com</a>
Pantone Matching System	<a href="http://www.pantone.com/color-finder">www.pantone.com/color-finder</a>

A 2-part epoxy primer was specifically chosen as the primer coating for Mueller hydrants because it is NSF/ANSI 61-certified and AWWA C550-compliant. Thanks to its superior anti-corrosive properties, the 2-part epoxy primer is routinely used for severe service applications such as tank exteriors, offshore platforms, ship hulls, and piping in chemical plants, refineries, and pulp and paper mills. Dry Film Thickness (DFT) exceeds minimum requirements.

The polyurethane top coat is a two-component, full-gloss, exterior grade finish. Its durability, safety features (free of chromate and lead hazards), and high gloss finish make it the natural complement to Mueller Co.'s rugged primer. This near-automotive grade coating is tough and UV-resistant, and it is regularly used on construction equipment and large trucks.

Even for municipalities that require hydrants in custom colors, Mueller Co. offers a solution with more than 700 color combinations and a streamlined ordering process to match custom topcoat colors. Repair paint can be ordered directly from the manufacturer in a variety of convenient sizes including gallon, quart or spray cans; 3 oz. pens; or 6 oz. brush-cap bottles. For convenience, a downloadable order form is available on [www.muellercompany.com](http://www.muellercompany.com). The simplified method that Mueller Co. has established for the repainting or repair of protective coatings on their fire hydrants saves municipalities time and money.

Instructions for the coating repair of liquid-coated hydrants are simple and easy to follow and are also available online at [www.muellercompany.com](http://www.muellercompany.com).

## **Summary**

While NFPA Standard 291 provides recommended color coding for fire hydrants, most municipalities and private water systems have elected to develop their own system for quick identification for the professionals that operate it. Mueller Co. supports the universal adoption of NFPA Standard 291; however, they will continue to provide the color variations demanded by municipalities in products that comply with ANSI/NSF and AWWA standards.

To protect fire hydrants from damage in severe service, municipalities should employ a liquid coating combination of primer and paint rather than a Fusion Bonded Epoxy that is more prone to damage and difficult repair. Mueller Co.'s 2-Part Epoxy Primer and Polyurethane Top Coat is a reliable solution for municipalities and water management systems seeking to maximize the lifetime performance of their fire hydrants.

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AWWA C503, "Wet-Barrel Fire Hydrants."

ANSI/NSF 61, "Drinking Water System Components – Health Effects."

AWWA C550, "Protective Interior Coatings for Valves and Hydrants."

NFPA Standard 24, "Standard for the Installation of Private Fire Service Mains and Their Appurtenances."

### About Mueller Company

Mueller Co., LLC is a subsidiary of Mueller Water Products, Inc. (NYSE:MWA), a leading manufacturer and marketer of products and services used in the transmission, distribution and measurement of water in North America. Our broad product and service portfolio includes engineered valves, fire hydrants, metering products and systems, leak detection and pipe condition assessment. We help municipalities increase operational efficiencies, improve customer service and prioritize capital spending. Visit us at [muellercompany.com](http://muellercompany.com)



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