Fiberglass pipe is used in many industries for myriad applications. Its durability, strength, and corrosion resistance eliminate the need for interior linings, exterior coatings, and cathodic protection. fiberglass pipe systems offer great design flexibility, and fiberglass pipe is available in a multitude of diameters ranging from very small to very large. M45, Fiberglass Pipe Design, delivers both technical and general information for the design, specification, procurement, installation, and understanding of fiberglass pipe and fittings. This manual covers:

- The history and use of fiberglass pipe across multiple industries
- The composite materials, including the different types of glass fiber reinforcements and resins
- The physical properties, including the chemical, temperature, and abrasion resistance of fiberglass pipe
- The various methods of manufacturing, including filament winding and centrifugal casting
- How to determine the hydraulics in fiberglass pipe, depending on the type of flow and level of accuracy required
- How to design a buried fiberglass pipe system, complete with calculations to determine appropriate soils, loading, and more
- The installation of underground and aboveground fiberglass pipe and appropriate thrust restraints
- The design and installation of an aboveground fiberglass pipe system
- Shipping, handling, storage, and repair
- The physical properties, including the chemical, temperature, and abrasion resistance of fiberglass pipe
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Fiberglass Pipe Design


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Fiberglass Pipe Design

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1. History and Use

1.1 INTRODUCTION

INTRODUCTION

Fiberglass pipe is made from glass fiber reinforcements embedded in, or surrounded by, cured thermosetting resin. This composite structure may also contain aggregate, granular or platelet fillers; thixotropic agents; and pigments or dyes. By selecting the proper combination of resin, glass fibers, fillers, and design, the fabricator can create a product that offers a broad range of properties and performance characteristics. Over the years, this has led to the development of a variety of names for fiberglass pipe. Among these are reinforced thermosetting resin pipe (RTRP), reinforced polymer mortar pipe (RPMP), fiberglass reinforced plastic (GRP), and fiberglass reinforced plastic (FRP). Regardless of the many possible combinations, the most common and useful designation is simply “fiberglass pipe.” This name encompasses all of the various available products and allows consideration as a unique and general class of engineering materials.

HISTORY

Fiberglass pipe was introduced in 1948. The earliest application for fiberglass piping, and still one of the most widely used, is in the oil industry. Fiberglass pipe was selected as a corrosion-resistant alternative to protected steel, stainless steel, and other more exotic materials. Over the years, product lines expanded to include applications of increasingly high pressure and temperature as well as threaded connections. In the late 1950s, larger diameters became available, and fiberglass pipe was selected as the composite material of choice in the manufacture of down-hole tubing. In the late 1960s, larger diameters became available, and fiberglass pipe was selected as the composite material of choice in the manufacture of down-hole tubing.