

# Purchasing Specification Guidelines for Marking Polyethylene Gas System Components

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## 1.0 General

- 1.1 The purpose of this document is to provide operators with guidance on purchasing specification language to communicate with vendors regarding the purchase of products having barcode and alphanumeric marking conforming to ASTM product specifications and ASTM F2897.
- 1.2 This document is limited to plastic gas system components (pipe, fittings and appurtenances) where ASTM product specifications include requirements for barcode and alphanumeric marking of information encoded per ASTM F2897. This document provides guidance only for barcode and alphanumeric format markings. It does not include guidance for Radio Frequency Identification (RFID) or other Near Field Communication (NFC) technologies.
- 1.3 ASTM standards for plastic gas pipe and components such as ASTM D2513 require product marking in barcode and alphanumeric format with encoded information that is in compliance with ASTM F2897.

## 2.0 Marking Techniques

- 2.1 Vendors may use any marking technique (including etching, ink-fusing, labeling and tags) but must ensure that the selected marking technique does not compromise the integrity of the pipe, components, joints and/or the joining process in accordance with ASTM D2513 marking requirements.

## 3.0 Marking Format

### 3.1 Symbology

- 3.1.1 All pipe, fittings and appurtenances are to be marked with a 16-character gas distribution component tracking and traceability identifier in accordance with ASTM F2897. The 16-character code is to be expressed in alphanumeric format and Code 128 barcode format with a minimum bar thickness value of 0.005 inches or an alternative 1D or 2D bar code symbology.
- 3.1.2 1-D barcodes compliant with Code 128 industry standard symbology and as agreed upon between manufacturer and end user are to be used.
- 3.1.3 2-D barcodes compliant with Code 128 industry standard symbology such as ECC 200 DataMatrix, Aztec Code, Quick Response (QR) Code or similar symbology as agreed upon between manufacturer and end user are to be used.

### 3.2 Readability

- 3.2.1 Barcode symbology is to be verified with a minimum quality grade of 'C' in accordance with ASTM F1851/ ANSI INCITS 182-1990 (R2000).
- 3.2.2 The 16-character code expressed in alphanumeric format is to be readable with the naked eye or with corrective lenses (preferably machine readable). The font used for the alphanumeric code is to provide unique and specific character differentiation between upper and lower case letters and numbers. See Appendix A for examples.

### 3.3 Size

- 3.3.1 Barcode symbology is to be sized in accordance with the type of symbology used.

## 4.0 Marking Durability

- 4.1 Barcode marking durability requirements apply to pipe, fittings and appurtenances and apply to the barcode marking on the actual component. Barcode markings on packaging alone do not meet the requirements of this section.
- 4.2 Barcode markings are to be readable at the time of installation in accordance with ASTM F1851/ ANSI INCITS 182-1990 (R2000). The time of installation is defined as not more than 36 months before exposing the pipe or fitting to installation embedment for direct burial or any pull-in or push-in techniques that involve pipe sliding through soil or a host pipe such as ploughing, planting, horizontal directional drilling (HDD), and insertion.
- 4.3 Barcode markings are to be able to withstand at least 36 months<sup>1</sup> of outdoor exposure including sunlight and ultra-violet (UV) radiation, moisture and submersion in water, acid rain, salt water and extreme temperature ranges. The barcode markings are to be able to withstand abrasion associated with normal storage and transportation operations.

## 5.0 Marking Placement

### 5.1 Pipe

- 5.1.1 Barcode markings are to be placed in a prominent location on the pipe.
- 5.1.2 Pipe is to be marked with a barcode every 24 inches along its length.
- 5.1.3 Barcode markings are to be placed as close to the print line as possible.
- 5.1.4 Barcode markings are to be printed as large as practical to increase visibility and to increase the probability that a sufficient amount of the barcode will be intact to be read in case of barcode damage.
- 5.1.5 Barcode markings are always required on the actual pipe but must also be placed on packaging and supporting documentation to allow barcode scanning in situations where barcodes are unreadable.

### 5.2 Fittings

- 5.2.1 Barcode markings are to be placed in a prominent location on the fitting.
- 5.2.2 Barcode markings are to be placed in a location to maximize post-installation

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<sup>1</sup> Some pipe materials, such as black pipe, have UV resistance limits up to ten years. It is desirable to have barcode markings with durations similar to pipe UV resistance.

visibility from the outside of the excavation.

- 5.2.3 Barcode markings are to be printed as large as practical to increase visibility and to increase the probability that a sufficient amount of the barcode will be in-tact to be read in case of barcode damage.
- 5.2.4 Where practical, barcode markings are not to be placed on a removable piece of a fitting that is subject to change-out in the future.
- 5.2.5 Barcode tags may be applied to a fitting where stickers or printing is not feasible. Tags can be composed of any material so long as the integrity of the pipe, components, joints and/or the joining process are not compromised in accordance with ASTM D2513 marking requirements.

## **6.0 Quality Control**

Vendors are to develop a program of systematic management controls to insure that products faithfully represent encoding meeting the requirements of ASTM F2897. The program will have provisions to manage the flow of materials and components through the facility while maintaining their identity to the point of the application of the barcode.

Vendors are to manage the quality and performance of the printing processes used to generate the barcode markings. Vendors are to employ barcode verifiers in accordance with ANSI INCITS 182-1990 (R2000). Verification is to be in accordance with ASTM F1851-98.

Vendors are to make facilities and program documentation accessible to the purchasing operator or their designated agents to verify compliance.

## Acronym List

HDD	Horizontal Direction Drilling
NRC	Near Field Communication
RFID	Radio Frequency Identification
QR	Quick Response
UV	Ultra-violet

## Referenced Documents

ASTM F2897-11a - Standard Specification for Tracking and Traceability Encoding System of Natural Gas Distribution Components (Pipe, Tubing, Fittings, Valves, and Appurtenances).

ASTM D2513-12ae1 - Standard Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings

ASTM F1851 – 98 (2009) Standard Practice for Bar Code Verification

ANSI INCITS 182-1990 (R2000) – Bar Code Print Quality Guidelines

ANSI INCITS 182-1990 (R2002) Guideline for Bar Code Print Quality

## Appendix A

## Acceptable

MS Reference Sans Serif		
Lowercase	Uppercase	Number
c	C	
i	I	1
j	J	
k	K	
l	L	
m	M	
n	N	
o	O	0
s	S	

Veranda		
Lowercase	Uppercase	Number
c	C	
i	I	1
j	J	
k	K	
l	L	
m	M	
n	N	
o	O	0
s	S	

Consolas		
Lowercase	Uppercase	Number
c	C	
i	I	1
j	J	
k	K	
l	L	
m	M	
n	N	
o	O	0
s	S	

## Unacceptable

Microsoft Sans Serif		
Lowercase	Uppercase	Number
c	C	
i	I	1
j	J	
k	K	
l	L	
m	M	
n	N	
o	O	0
s	S	

Lucida Sans		
Lowercase	Uppercase	Number
c	C	
i	I	1
j	J	
k	K	
l	L	
m	M	
n	N	
o	O	0
s	S	