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Designation: $F2897 - 11a^{\epsilon 1} F2897 - 14$

An American National Standard

Standard Specification for Tracking and Traceability Encoding System of Natural Gas Distribution Components (Pipe, Tubing, Fittings, Valves, and Appurtenances)¹

This standard is issued under the fixed designation F2897; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

e¹ NOTE—Table 5 was editorially corrected in April 2013.

1. Scope Scope*

1.1 This specification defines requirements for the data used in the tracking and traceability base-62 encoding system and the format of the resultant code to characterize various components used in fuel gas piping systems.

1.2 The final output of this specification is a 16 digit alpha-numeric code that defines a standardized approach or methodology for encoding certain characteristics of components that have been established based on consensus recommendations from the respective stakeholder group members. The means of marking or affixing the code to the components, and the means of reading and/or transferring the data or codes are outside the scope of this specification.

NOTE 1—To facilitate compliance with this specification, a web based application has been developed to manage and maintain unique manufacturer identification numbers. The URL for the website is: http://www.componentid.org.

NOTE 2—Meters and regulators are excluded from this specification because traceability marking requirements for these products are defined in ANSI B109.1–B109.4.

1.3 The web based application is only intended to serve as a useful resource for managing the respective manufacturer identification numbers, codes, and other identifiers as per this specification. Any changes to the contents of the web based application are contingent upon subsequent changes to this specification. This specification shall have primacy.

2. Referenced Documents

2.1 ASTM Standards:²

A53/A53M Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless A106 Specification for Seamless Carbon Steel Pipe for High-Temperature Service D1600 Terminology for Abbreviated Terms Relating to Plastics a090-9c2ab62bfd1e/astm-f2897-14 D2513 Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings F412 Terminology Relating to Plastic Piping Systems 2.2 API Standards:³ **API 5L** Specification for Line Pipe 2.3 ANSI Standards:⁴ **B31.8** Gas Transmission and Distribution Piping System B1.20.1 1983 Pipe Threads, General Purpose, Inch B109B109.1 Diaphragm-Type Gas Displacement Meters (Under 500 Cubic-feet-per-hour Capacity) B109.2 Diaphragm-Type Gas Displacement Meters (500 Cubic-feet-per-hour Capacity) **B109.3** Rotary Type Gas Displacement Meters B109.4 Self-Operated Diaphragm Type Natural Gas Service Regulators 2.4 CFR Standards:⁵ 49 CFR Part 192 Pipeline Safety Requirements

*A Summary of Changes section appears at the end of this standard

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from American Petroleum Institute (API), 1220 L. St., NW, Washington, DC 20005-4070, http://www.api.org.

⁴ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

⁵ Available from the Superintendent of Documents, U.S. Government Printing Office, Washington D.C. 20402.

3. Terminology

3.1 *Definitions*—Definitions are in accordance with Terminology F412, and abbreviations are in accordance with Terminology D1600, unless otherwise specified.

3.2 The gas industry terminology used in this specification is in accordance with ANSI B31.8 or 49 CFR Part 192, unless otherwise indicated.

3.3 character, n—an integer from zero (0) to nine (9) or a letter that is upper case and/or lower case from a to z or A to Z.

3.4 component, n-pipe, tubing, fittings, valves, and appurtenances unless specifically stated otherwise.

3.5 *digit*, *n*—an integer from zero (0) to nine (9).

3.6 FPT, n-internal taper thread as defined under ANSI/ASME B1.20.1, or commonly referred to as "female pipe thread".

3.7 MPT, n-external taper thread as defined under ANSI/ASME B1.20.1, or commonly referred to as "male pipe thread".

3.8 *traceability*, *n*—identify the origin of materials and parts used to manufacturer a given component; and/or the product processing or manufacturing history.

3.9 *tracking*, *v*—knowing, documenting, and/or collecting information related to the distribution and location of a given component after delivery from the manufacturer or supplier.

4. Gas Distribution Component Traceability Identifier

4.1 *General*—The gas distribution component traceability identifier shall be comprised of sixteen (16) alphanumeric characters that specify respective attributes (data set) for a given component.

4.1.1 The specified number of characters and order for each data set shall conform to Table 1.

4.1.2 The specified number of characters shall be developed using the base-62 encoding system per section 4.9 and the initial input data requirements per Section 5.

4.1.3 The gas distribution component traceability identifier shall be in a format suitable for downloading the character codes into database systems owned and maintained by the end user.

NOTE 3—An illustrative example is provided in Appendix X2.

4.2 *Identification of Component Manufacturer*—Each component manufacturer shall be identified by a unique two character code which shall be assigned after completing the required registration and activated by the webmaster of the website http://www.componentid.org. The manufacturer identification code shall be unique to that particular company and can only be used by that respective manufacturer/supplier.

4.3 *Identification of Component Manufacturer's Lot Code*—The component manufacturer's lot code shall be identified by a four character code that is developed using the base-62 encoding system per 4.9. The four character code shall be unique in a manner to help ascertain information related to the origin of materials, product processing history, and other information that is agreed upon between the manufacturer and end user.

4.4 *Identification of Component Production Date*—The production date code shall be identified by a three character code that is developed using the base-62 encoding system per 4.9.

4.5 *Identification of Component Material*—The primary material used to manufacture the pipe or component shall be identified by a single character code per 5.4.

4.6 Identification of Component Type—Each component type shall be identified by a two character code per 5.5.

4.7 *Identification of Component Size*—Each component size shall be identified by a three character code that is developed using the sizing calculation outlined in 5.6 and the base-62 encoding system per 4.9.

TABLE 1 Specified Number of Characters and Order for Gas
Distribution Component Traceability Identifier

Data	Number of Character(s) ^A
Component manufacturer	2
Component manufacturer's lot code	4
Component production date	3
Component material	1
Component type	2
Component size	3
Base 62 Index	1

^A The total number of characters is based on the final resultant after applying the base-62 encoding system in this specification. For different initial input data, the requirements and format are in Section 55 of this specification.



4.8 Identification of Base 62 Index—Each component type shall be identified by a single character code per 5.7.

4.9 Base-62 Encoding System:

4.9.1 The base-62 positional encoding system shall utilize integer values between zero and nine and both uppercase and lowercase alphabet characters with the assigned place values as shown in Table 2.

4.9.2 The assigned place values shown in Table 2 shall be used to convert the initial input data into the final alphanumeric code.

NOTE 4—Detailed examples of converting an initial integer string to a corresponding base-62 alphanumeric character string and vice-versa can be found in Appendix X1.

Note 5—The positional value is the value corresponding to the respective character. For example, the positional value corresponding to the character "T" is 27. The positional value corresponding to the character "T" is 55.

5. Input Data String

5.1 *Component Manufacturer*—Each component manufacturer shall establish a unique two (2) digit identifier by completing the required registration and activated by the webmaster of the website http://www.componentid.org. The manufacturer identification code shall be unique to that particular company and can only be used by that company. In cases where the company undergoes a change in name, acquired, merged with another company, new two (2) digit identifier must be registered and activated if the "aquiring" or "merged with" company does not already have a registered identifier.

5.2 *Component Manufacturer's Lot Code*—Each component manufacturer shall establish a unique seven (7) digit number for their lot code which shall be used as the input into the base-62 encoding system per 4.9. The 7 digit number shall consist of only integer values and cannot contain any other characters such as alphabetic or ASCII characters.

NOTE 6—The 7 digit code can be developed freely by the manufacturer to define individual production lots in a unique way. Elements of the 7 digit code may possibly include production site, extrusion line, injection molding equipment number, operator, shift, etc. The 7 digit code should be capable of providing pertinent traceability information upon request.

5.3 *Component Production Date*—Each component manufacturer shall provide the production date of the respective component consisting of five (5) digits as input into the base-62 encoding system per 4.9.

5.3.1 The first three digits shall correspond to the particular day of the year.

5.3.2 The final two digits shall correspond to the last two digits of the year.

(h	TABLE 2 Position	onal Values for	Base-62 Encodin	g System
	Positional Value	Character	Positional Value	Character
	0	0	36	А
	1	1	37	В
	2	A C' ² NI EO	007 1 38	С
	3	AD 3 NI FZ	07/-139	D

https://standards.iteh.ai/catalog/standards/sist/9416184f-7f9(494e7e-a090-52ab62bfd1e/astm-f2897-14

5	5	41	F
6	6	42	G
7	7	43	Н
8	8	44	I
9	9	45	J
10	а	46	K
11	b	47	L
12	С	48	М
13	d	49	N
14	e	50	0
15	f	51	Р
16	g	52	Q
17	h	53	R
18	i	54	S
19	j	55	Т
20	k	56	U
21	I	57	V
22	m	58	W
23	n	59	Х
24	0	60	Y
25	р	61	Z
26	q		
27	r		
28	S		
29	t		
30	u		
31	V		
32	W		
33	Х		
34	У		
35	Z		



NOTE 7-For example, the date input represented by 23410 implies the 234th day of 2010.

5.4 *Component Material*—Each component manufacturer shall assign a single character code for the primary material used to manufacture the respective component from Table 3.

NOTE 8—The list of material types will be managed by the webmaster of http://www.componentid.org. Additional code numbers are reserved for future use and will be activated upon revision of this specification.

NOTE 9—The "Grade" designation for steel materials will vary based on the standard to which it is manufactured. The user should verify the chemical and mechanical properties in accordance to the specific standard that they are utilizing before making their final selection.

5.4.1 For pipe and tubing made from a single material, the code shall be assigned from the list shown in Table 3.

5.4.2 For multi-layer pipe and tubing, the inner most layer which is in contact with the natural gas shall be assigned from the list shown in Table 3.

5.4.3 For factory assembled transition fittings and risers and transition tees intended to facilitate a change between metallic and non-metallic piping systems, the non-metallic portion shall be identified.

5.4.4 For all components other than factory assembled transition fittings and risers and transition tees, the material code shall correspond to the outer shell or body of the respective component regardless of the piping system to which it is intended to be installed.

5.4.5 For fittings intended to facilitate a change between PE to another thermoplastic piping systems, the material code shall correspond to the outer shell or body of the respective component connecting to the PE pipe.

NOTE 10—In previous editions of Specification various thermoplastic materials were approved for use under CFR Part 192 requirements. For those other materials which have subsequently deleted but still allowed to be used for repair purposes only, for example. PVC, then PE will take precedence.

5.5 *Component Type*—Each component manufacturer shall assign a two (2) character code for their respective component type from Table 4.

NOTE 11—The component type codes will be managed by the webmaster through the website http://www.componentid.org. Additional code numbers are reserved for future use and will be activated upon revision of this specification.

5.6 *Component Size*—Each component manufacturer shall develop a unique dimensional code, *D*, corresponding to the size of the respective item. The dimensional code shall be used as input into the base-62 encoding system per 4.9.

NOTE 12—A list of commonly used sizes is available on the website www.componentid.org. Future changes and amendments for special sizes not listed will be managed and assigned by the webmaster of the website http://www.componentid.org upon amendment of this specification.

5.6.1 The dimensional code shall be calculated using Eq 1 based on the factors from Tables 5-7 corresponding to the dimensions for a given component:

TABLE 3 List of Material Types

_		71
_	Type <u>ASTM F2897-14</u>	Code
https://standards.iteh.ai/ca	PE2406 tandards/sist/9016184f-7f90-	4e7(Aa090-9c2ab62bfd1e/astm-f2897-14
	PE2708	
	PE3408	C
	PE3608	D
	PE3708	E
	PE3710	F
	PE4608	G
	PE4710	Н
	Poly (Vinyl Chloride) – PVC	J
	Polyamide 11 - PA11	К
	Polyamide 12 - PA12	L
	Steel	М
	Stainless Steel	Ν
	Cast Iron	0
	Copper	P
	Brass	Q
	Malleable Iron	R
	Ductile Iron	S
	Reinforced Epoxy Resin	Т
	Nylon	U
	Glass Filled Nylon	V
	Other	X
_		
	Steel – GRADE A	<u>0</u> 1
	Steel – GRADE B	1
	Steel – GRADE C	2
	Steel – GRADE X42	2 3 4 5 6 7
	Steel – GRADE X46	<u>4</u>
	Steel – GRADE X52	5
	Steel – GRADE X56	<u>6</u>
	Steel – GRADE X60	7
	Steel – GRADE X65	8 9
	Steel – GRADE X70	9
-		

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TABLE 4 List of Component Types

Category Type – General	Subcategory Type	Character
Pipe	Other	10
	Straight	11
	Coiled	12
	Casing	13
Coupling	Other	20
	Socket fusion	21
	Socket fusion with EFV	22
	Electrofusion	23
	Electrofusion with EFV	24
	Mechanical compression or nut follower	25
	Mechanical compression or nut follower	26
	with EFV	
	Mechanical stab	27
	Mechanical stab with EFV	28
	Mechanical interference fit	29
	Mechanical interference fit with EFV	2A
	Welded	2B
	Threaded	20
Adapter Osurling	Flanged	2D
Adapter Coupling	Other	30
	Compression by male pipe thread	31 22
	Compression by female pipe thread	32
	Compression by butt fusion	33 24
	Compression by butt welded	34 25
	Compression by solvent welded	35
	Compression by stab	39
	Stab by male pipe thread	36 37
	Stab by female pipe thread	37 38
End conc	Stab by solvent welded Other	30 40
End caps		40 41
	Socket fusion	41 42
	Electrofusion	4 2 4 3
		43 44
	Mechanical stab	44 45
	Mechanical interference fit	45 46
	Welded	4 0 4 7
	Threaded	4 7 4 8
	1en Threaded eview	4 0 49
Elbows	Other	4 5 50
ED0W5	Butt fusion 90	50 51
	Socket fusion 90	51 52
	Electrofusion 90	52 53
	90	dle/astm- 54 897-14
	Mechanical stab 90	55
	Mechanical interference fit 90	56
	Welded 90	57 57
	Threaded 90	57 58
	Fabricated 90	59
	Butt fusion 45	55 5A
	Socket fusion 45	5 B
	Electrofusion 45	50 50
	Mechanical compression or nut follower	50 50
	45	02
	Mechanical stab 45	5E
	Mechanical interference fit 45	5 F
	Welded 45	5G
	Threaded 45	5H
	Fabricated 45	51
3-way tees	Other	60
	Butt fusion	61
	Socket fusion	62
	Electrofusion	63
	Mechanical compression or nut follower	64
	Mechanical stab	65
	Mechanical interference fit	66
	Welded	67
	Threaded	68
	Fabricated	69
Reducer	Other	70
	Butt fusion	71
	Socket fusion	72
	Socket fusion Electrofusion	72 73

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Category Type – General	Subcategory Type	Character
	Mechanical stab	75
	Mechanical interference fit	76
	Welded	77
	Threaded	78
	Fabricated	79
Tapping tees	Other	80
	Saddle heat fusion by butt fusion outlet	81
	Saddle heat fusion by butt fusion outlet	82
	with EFV	22
	Saddle heat fusion by socket outlet	83
	Saddle heat fusion by socket outlet with	84
	EFV Soddle heat fusion by machanical	85
	Saddle heat fusion by mechanical	60
	compression outlet Saddle heat fusion by mechanical	86
	compression outlet with EFV	00
	Saddle heat fusion by stab outlet	87
	Saddle heat fusion by stab outlet with	88
	EFV	00
	Electrofusion by butt fusion outlet	89
	Electrofusion by but fusion outlet with	8A
	EFV	.
	Electrofusion by socket outlet	8B
	Electrofusion by socket outlet with EFV	8C
	Electrofusion by mechanical compression	8D
	outlet	
	Electrofusion by mechanical compression	8E
	outlet with EFV	
	Electrofusion by stab outlet	8F
	Electrofusion by stab outlet with EFV	8G
	Mechanical by butt fusion outlet	8H
	Mechanical by butt fusion outlet with	8J
	Mechanical by socket outlet	8K
	Mechanical by socket outlet with EFV	8L
		8M
	outlet	
	Mechanical by mechanical compression	8N
	Mechanical by stab outlet	8P
	Mechanical by stab outlet with EFV	8Q
	Mechanical by mechanical interference fit	8R 8S
	Mechanical by mechanical interference fit with EFV	
High Volume Tapping Tees	Other 00-4e7e-a090-9c2ab62bfd1	e/astm- 12 897-1
	Electrofusion by butt fusion	90 91
	Saddle heat fusion by butt fusion	92
	Mechanical by compression outlet	92 93
		94
	Electrofusion by socket outlet	94 95
	Electrofusion by socket outlet Saddle heat fusion by socket outlet	95
	Electrofusion by secket outlet Saddle heat fusion by socket outlet Mechanical by stab outlet	
Branch Saddle	Electrofusion by socket outlet Saddle heat fusion by socket outlet	95 96
Branch-Saddle	Electrofusion by secket outlet Saddle heat fusion by socket outlet Mechanical by stab outlet Mechanical by mechanical interference fit	95 96 97
Branch Saddle	Electrofusion by secket outlet Saddle heat fusion by socket outlet Mechanical by stab outlet Mechanical by mechanical interference fit Other	95 96 97 80
Branch-Saddle	Electrofusion by socket outlet Saddle heat fusion by socket outlet Mechanical by stab outlet Mechanical by mechanical interference fit Other Electrofusion	95 96 97 80 81
Branch Saddle Mechanical saddle	Electrofusion by socket outlet Saddle heat fusion by socket outlet Mechanical by stab outlet Mechanical by mechanical interference fit Other Electrofusion Saddle heat fusion	95 96 97 80 81 82
	Electrofusion by socket outlet Saddle heat fusion by socket outlet Mechanical by stab outlet Mechanical by mechanical interference fit Other Electrofusion Saddle heat fusion Mechanical	95 96 97 80 81 82 82 83
Mechanical saddle	Electrofusion by socket outlet Saddle heat fusion by socket outlet Mechanical by stab outlet Mechanical by mechanical interference fit Other Electrofusion Saddle heat fusion Mechanical No outlet	95 96 97 80 81 82 83 83 83 81
Mechanical saddle	Electrofusion by socket outlet Saddle heat fusion by socket outlet Mechanical by stab outlet Mechanical by mechanical interference fit Other Electrofusion Saddle heat fusion Mechanical No outlet Other	95 96 97 80 81 81 82 83 83 81 81 90
Mechanical saddle	Electrofusion by socket outlet Saddle heat fusion by socket outlet Mechanical by stab outlet Mechanical by mechanical interference fit Other Electrofusion Saddle heat fusion Mechanical No outlet Other Welded by welded	95 96 97 80 84 82 83 83 84 90 94 94 92 93
Mechanical saddle	Electrofusion by socket outlet Saddle heat fusion by socket outlet Mechanical by stab outlet Mechanical by mechanical interference fit Other Electrofusion Saddle heat fusion Mechanical No outlet Other Welded by welded Welded by butt fusion	95 96 97 80 81 82 83 83 83 81 90 90 91 92
Mechanical saddle	Electrofusion by socket outlet Saddle heat fusion by socket outlet Mechanical by stab outlet Mechanical by mechanical interference fit Other Electrofusion Saddle heat fusion Mechanical No outlet Other Welded by welded Welded by butt fusion Welded by thread Welded by compression or nut follower Welded by mechanical interference fit	95 96 97 80 81 82 83 83 81 83 81 90 91 91 92 93 94 95
Mechanical saddle	Electrofusion by socket outlet Saddle heat fusion by socket outlet Mechanical by stab outlet Mechanical by mechanical interference fit Other Electrofusion Saddle heat fusion Mechanical No outlet Other Welded by welded Welded by butt fusion Welded by thread Welded by compression or nut follower Welded by mechanical interference fit Welded by stab	95 96 97 80 81 82 83 83 81 83 81 90 91 94 93 94 95 99
Mechanical saddle	Electrofusion by socket outlet Saddle heat fusion by socket outlet Mechanical by stab outlet Mechanical by mechanical interference fit Other Electrofusion Saddle heat fusion Mechanical No outlet Other Welded by welded Welded by ut fusion Welded by thread Welded by compression or nut follower Welded by mechanical interference fit Welded by stab Thread by welded	95 96 97 80 81 82 83 51 83 51 90 94 93 94 95 90 90 90 90 90 90 90 90 90 90 90
Mechanical saddle	Electrofusion by socket outlet Saddle heat fusion by socket outlet Mechanical by stab outlet Mechanical by mechanical interference fit Other Electrofusion Saddle heat fusion Mechanical No outlet Other Welded by welded Welded by welded Welded by thread Welded by thread Welded by thread Welded by mechanical interference fit Welded by stab Thread by welded Thread by compression or nut follower	95 96 97 80 81 82 83 51 90 94 94 93 94 95 90 94 95 90 90 97
Mechanical saddle	Electrofusion by socket outlet Saddle heat fusion by socket outlet Mechanical by stab outlet Mechanical by mechanical interference fit Other Electrofusion Saddle heat fusion Mechanical No outlet Other Welded by welded Welded by welded Welded by thread Welded by thread Welded by compression or nut follower Welded by mechanical interference fit Welded by stab Thread by welded Thread by compression or nut follower Thread by mechanical interference fit	95 96 97 80 81 82 83 83 81 83 81 89 84 94 92 93 94 95 90 94 95 90 96 97 95
Mechanical saddle	Electrofusion by socket outlet Saddle heat fusion by socket outlet Mechanical by stab outlet Mechanical by mechanical interference fit Other Electrofusion Saddle heat fusion Mechanical No outlet Other Welded by welded Welded by welded Welded by thread Welded by thread Welded by thread Welded by mechanical interference fit Welded by stab Thread by welded Thread by compression or nut follower	95 96 97 80 81 82 83 51 83 51 83 51 83 61 83 84 94 95 94 95 96 97 96 97 96 97 96 97
Mechanical saddle	Electrofusion by socket outlet Saddle heat fusion by socket outlet Mechanical by stab-outlet Mechanical by mechanical interference fit Other Electrofusion Saddle heat fusion Mechanical No outlet Other Welded by welded Welded by welded Welded by butt fusion Welded by thread Welded by compression or nut follower Welded by stab Thread by welded Thread by wechanical interference fit Thread by mechanical interference fit Thread by mechanical interference fit Thread by mechanical interference fit Thread by stab	95 96 97 80 81 82 83 81 83 81 83 81 80 81 82 83 81 80 90 91 92 93 94 95 90 94 95 90 96 97 96 97 96
Mechanical saddle	Electrofusion by socket outlet Saddle heat fusion by socket outlet Mechanical by stab outlet Mechanical by mechanical interference fit Other Electrofusion Saddle heat fusion Mechanical No outlet Other Welded by welded Welded by butt fusion Welded by butt fusion Welded by thread Welded by compression or nut follower Welded by stab Thread by welded Thread by wechanical interference fit Welded by stab Thread by mechanical interference fit Thread by thread Thread by thread Thread by thread	95 96 97 80 81 82 83 61 83 61 83 61 83 61 83 84 83 84 83 84 83 84 85 84 85 86 84 85 86 87 86 87 86 87 86 87 83 83 81 83 83 81 83 83 84 83 83 84 83 83 84 83 83 84 83 84 83 84 83 84 83 84 83 84 83 84 83 84 83 84 84 83 84 84 83 84 84 83 84 84 83 84 84 83 84 84 83 84 84 83 84 84 84 84 84 84 84 84 84 84 84 84 84
Mechanical saddle	Electrofusion by socket outlet Saddle heat fusion by socket outlet Mechanical by stab outlet Mechanical by mechanical interference fit Other Electrofusion Saddle heat fusion Mechanical No-outlet Other Welded by welded Welded by welded Welded by thread Welded by thread Welded by thread Welded by stab Thread by welded Thread by welded Thread by welded Thread by mechanical interference fit Thread by mechanical interference fit Thread by thread Thread by thread	95 96 97 80 81 82 83 81 83 81 83 81 80 91 90 94 95 90 94 95 90 94 95 90 96 97 96 97 96 97 96 97 98 97 83 91 94 95 99 97 83 83 84 97 83 84 97 83 84 97 83 84 97 83 84 97 83 84 97 83 84 97 83 84 97 83 84 97 83 84 97 83 84 97 83 84 97 83 84 97 84 97 83 84 97 83 84 97 84 97 84 84 84 83 84 97 84 97 84 97 84 84 84 84 84 84 84 84 84 84 84 84 84
Mechanical saddle	Electrofusion by socket outlet Saddle heat fusion by socket outlet Mechanical by stab outlet Mechanical by mechanical interference fit Other Electrofusion Saddle heat fusion Mechanical No outlet Other Welded by welded Welded by welded Welded by thread Welded by thread Welded by mechanical interference fit Welded by welded Thread by welded Thread by welded Thread by welded Thread by welded Thread by thread Thread by but fusion	95 96 97 80 81 82 83 51 83 51 83 51 83 84 84 83 84 84 83 84 84 83 84 84 83 84 84 83 84 84 83 84 84 83 84 84 83 84 84 84 84 84 84 84 84 84 84 84 84 84
Mechanical saddle	Electrofusion by socket outlet Saddle heat fusion by socket outlet Mechanical by stab outlet Mechanical by mechanical interference fit Other Electrofusion Saddle heat fusion Mechanical No-outlet Other Welded by welded Welded by welded Welded by thread Welded by thread Welded by thread Welded by stab Thread by welded Thread by welded Thread by welded Thread by mechanical interference fit Thread by mechanical interference fit Thread by thread Thread by thread	95 96 97 80 81 82 83 81 83 81 83 81 80 91 90 94 95 90 94 95 90 94 95 90 96 97 96 97 96 97 96 97 98 97 83 91 94 95 99 97 83 83 84 97 83 84 97 83 84 97 83 84 97 83 84 97 83 84 97 83 84 97 83 84 97 83 84 97 83 84 97 83 84 97 83 84 97 83 84 97 84 97 83 84 97 83 84 97 84 97 84 84 84 83 84 97 84 97 84 97 84 84 84 84 84 84 84 84 84 84 84 84 84

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Category Type – General	Subcategory Type	Character
	Mechanical saddle by mechanical interference fit	Đ C
	Mechanical saddle by stab	ÐJ
Service saddles	Other	E0
	Single strap	=0 E1
	Double strap	E2
Transition Fitting	Other	Ŧθ
	Welded end	10 T1
	Thread end	T2
	Flanged end	T3
Riser	Other	RO
	Factory Assembled, Anodeless	R1
	Factory Assembled, Anodeless	R2
	Factory Assembled, Non-Anodeless	R3 R4
	Field Assembled, Anodeless	
	Field Assembled, Anodeless, Flexible	R5
	Field Assembled, Non-Anodeless	R6
Valve	Other	VO
	Ball valve	V1
	Butterfly valve	\2
	Check valve	V3
	Relief valve	₩4
	Gate valve	₩5
	Needle valve	₩6
	Plug valve	₩7
Excess Flow Valve	Excess flow valve	EF
Meter set assembly and components	Other	MO
	Meter set assembly	M3
	Meter bar	M4
	Meter swivel	M5
	Meter nut	M6
Filter i en i	Other 2 Constant	FO
	Pilot	F1
	Sonvice and mains	F2
Anode (https://sta	Strainer	
Anode (IIIII) S.//SUC	Other	AO
	Cast iron	A1
		A2
	Magnesium	A 3
	Zine	A3 A4
Pressure control fitting	Other	P0
ressure control nutrig	Split repair	P1
	TMF Bottom out	P2
		. –
https://standards.iteh.ai/catalog/standards/sist/9	01618 ^{Top tap} 90-4e7e-a090-9c2ab62bfd	1e/astm-12897-1
Union	Non-Insulated	U1
	Insulated	UX
Repair clamp	Other	60
	Repair clamps	C1

Category Type-General	Subcategory Type	Character	
Pipe	Other	10	
	Straight	11	
	Coiled	12	
	Casing	13	
	Seamless Line Pipe, API 5L, PSL1, Single Coat	1A	
	Seamless Line Pipe, API 5L, PSL1, Dual Coat	1B	
	Seamless Line Pipe, API 5L, PSL2, Single Coat	1C	
	Seamless Line Pipe, API 5L, PSL2, Dual Coat	1D	
	Electric Resistance Weld, API 5L, PSL1, Single Coat	1E	
	Electric Resistance Weld, API 5L, PSL1, Dual Coat	1F	
	Electric Resistance Weld, API 5L, PSL2, Single Coat	<u>1G</u>	
	Electric Resistance Weld, API5L, PSL2, Dual Coat	<u>1H</u>	
	Seamless and Welded, ASTM A53/A53M	<u>1J</u>	
	Seamless Carbon Steel, ASTM A106	<u>1K</u>	
Coupling	Other	20	
	Socket fusion	<u>21</u>	
	Socket fusion with EFV	22	
	Electrofusion	<u>23</u>	
	Electrofusion with EFV	24	
	Mechanical compression or nut follower	25	
	Mechanical compression or nut follower with EFV	26	
	Mechanical stab	10 11 12 13 1A 1B 1C 1D 1E 1F 1G 1H 1J 1K 20 11 22 23 24 25 26 7 28 29	
	Mechanical stab with EFV	28	
	Mechanical interference fit	<u>29</u>	

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	TABLE 4 Continued	
Category Type-General	Subcategory Type	Character
	Mechanical interference fit with EFV	24
	Welded	28
	Threaded	20
		20
Adaptar Coupling	Flanged	20
Adapter Coupling	<u>Other</u>	30
	Compression by male pipe thread	31
	Compression by female pipe thread	32
	Compression by butt fusion	33
	Compression by butt welded	<u>34</u>
	Compression by solvent welded	<u>35</u>
	Compression by stab	<u>39</u>
	Stab by male pipe thread	<u>36</u>
	Stab by female pipe thread	<u>37</u>
	Stab by solvent welded	<u>38</u>
End caps	Other	40
	Butt fusion	41
	Socket fusion	42
	Electrofusion	43
	Mechanical compression or nut follower	44
	Mechanical stab	45
	Mechanical interference fit	46
	Welded	47
	Threaded	<u></u> 48
	Fabricated	49
Elbows	Other	<u></u> 50
EIDOWS		50
	Butt fusion 90 Socket fusion 90	2A 2B 2CD 30 31 32 33 45 39 36 37 80 411 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58
		52
	Electrofusion 90	53
	Mechanical compression or nut follower 90	54
	Mechanical stab 90	55
	Mechanical interference fit 90	<u>56</u>
		<u>57</u>
	Threaded 90	<u>58</u>
	Fabricated 90	<u>59</u>
	Butt fusion 45	5A
	Socket fusion 45	<u>5B</u>
	Electrofusion 45	5C
	Mechanical compression or nut follower 45	59 5A 5B 5C 5D 5E
	Mechanical stab 45	5E
	Mechanical interference fit 45	5F
	Welded 45	5G
	Threaded 45	5H
	Fabricated 45 ASTM F2897-14	5J
3-way tees	SOther ai/catalog/standards/sist/9016184f-7f90-4e7e-a090-9c2ab	$6\frac{60}{60}$ fd 1 e/astm-f2897-14
3-way lees ps://standard	Butt fusion	660 fd1e/astm-f2897-14
	Socket fusion	
	Electrofusion	62 63 64 65 66
	Mechanical compression or nut follower	64
	Mechanical stab	<u>65</u>
	Mechanical interference fit	00
	Welded	<u> </u>
	Threaded	<u>69</u>
		60
Poducor	Eabricated Other	70
Reducer	Other Butt fusion	<u>70</u> 71
		$\frac{71}{70}$
	Socket fusion	$\frac{72}{72}$
	Electrofusion	<u>/3</u>
	Mechanical compression or nut follower	<u>74</u>
	Mechanical stab	<u>75</u>
	Mechanical interference fit	<u>76</u>
	Welded	77
	Threaded	<u>78</u>
	Fabricated	<u>79</u>
Tapping tees	Other	67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 88 88 88 88 88 88 88 88
	Saddle heat fusion by butt fusion outlet	<u>81</u>
	Saddle heat fusion by butt fusion outlet with EFV	82
	Saddle heat fusion by socket outlet	83
	Saddle heat fusion by socket outlet with EFV	84
	Saddle heat fusion by mechanical compression outlet	85
	Saddle heat fusion by mechanical compression outlet with EFV	86
	Saddle heat fusion by stab outlet	87
	Saddle heat fusion by stab outlet with EFV	88
	Electrofusion by butt fusion outlet	89
	Electrofusion by but fusion outlet with EFV	80 80
	Electrofusion by socket outlet	8B
		<u></u>

	TABLE 4 Continued	
Category Type-General	Subcategory Type	Character
<u> </u>	Electrofusion by socket outlet with EFV	80
	Electrofusion by mechanical compression outlet	8C 8D 8E 8F 8G
	Electrofusion by mechanical compression outlet with EFV	8E
	Electrofusion by stab outlet	8F
	Electrofusion by stab outlet with EFV	8G
	Mechanical by butt fusion outlet	8H
	Mechanical by but fusion outlet with EFV	8H 8J 8K 8L
	Mechanical by socket outlet	8K
	Mechanical by socket outlet with EFV	8
	Mechanical by societ outer with Liv	8
	Mechanical by mechanical compression outlet with EFV	8N
	Mechanical by theorem compression outlet with 21 v	8P
	Mechanical by stab outlet with EFV	80
	Mechanical by mechanical interference fit	8B
	Mechanical by mechanical interference fit with EFV	85
High Volume Tapping Tees	Other	90
right volume happing tooo	Electrofusion by butt fusion	91
	Saddle heat fusion by butt fusion	92
	Mechanical by compression outlet	93
	Electrofusion by socket outlet	<u>95</u> <u>94</u>
	Saddle heat fusion by socket outlet	95
	Mechanical by stab outlet	96
	Mechanical by stab outer Mechanical by mechanical interference fit	97
Branch Saddle	Other	B BQ BQ
	Electrofusion	<u>=</u> B1
	Saddle heat fusion	B2
	Mechanical	<u>B3</u>
Mechanical saddle	No outlet	<u>S1</u>
Service tee or Valve tee	Other	DO
	Welded by welded	<u>D1</u>
		202
	Welded by butt fusion Welded by thread	D2 D3 D4
	Welded by compression or nut follower	D4
	Welded by mechanical interference fit	D5
	Welded by stab	D5 DD
	Thread by welded	D6
	Thread by compression or nut follower	D7
		DE
	Thread by mechanical interference fit ment Preview	DF
	Thread by thread	DG
	Thread by butt fusion	DH
	Mechanical anddle by welded	D8
	Mechanical saddle by Welded Mechanical saddle by Butt fusion	D9
	Mechanical saddle by thread Mechanical saddle by compression or nut follower	$6\frac{\text{DA}}{\text{DB}}$ fd1e/astm-f2897-14
	Mechanical saddle by echanical interference fit	DC
	Mechanical saddle by mechanical interference	
Service saddles	Other	EO
Cervice saddles	Single strap	E0 F1
	Double strap	
Transition Fitting	Other	
	Welded end	ŤŤ
	Thread end	T2
	Flanged end	T0 T1 T2 T3 R0
Riser	Other	BO
	Factory Assembled, Anodeless	R1
	Factory Assembled, Anodeless, Flexible	R2
	Factory Assembled, Non-Anodeless	B3
	Field Assembled. Anodeless	B4
	Field Assembled, Anodeless, Flexible	85
	Field Assembled, Non-Anodeless	B6
Valve	Other	Vo
	Ball valve	$\frac{1}{V1}$
	Butterfly valve	$\frac{1}{\sqrt{2}}$
	Check valve	$\frac{1}{\sqrt{3}}$
		<u>vo</u>
	Relief valve	
	Relief valve	$\frac{\sqrt{4}}{\sqrt{5}}$
	Gate valve	$\frac{V4}{V5}$
	Gate valve Needle valve	$\frac{V4}{V5}$ V6
Evenes Flow Vehice	Gate valve Needle valve Plug valve	
	Gate valve Needle valve Plug valve Excess flow valve	R3 R4 R5 R6 V0 V1 V2 V3 V4 V5 V6 V7 E IS
Meter set assembly and	Gate valve Needle valve Plug valve	V4 V5 V6 V7 EF M0
Meter set assembly and	Gate valve Needle valve Plug valve Excess flow valve Other	MO
Excess Flow Valve Meter set assembly and components	Gate valve Needle valve Plug valve Excess flow valve Other Meter set assembly	MO M3
Meter set assembly and	Gate valve Needle valve Plug valve Excess flow valve Other	MO

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TABLE 4 Continued

Category Type-General	Subcategory Type	Character
	Meter nut	M6
Filter	Other	FO
	Pilot	F1
	Service and mains	F2
	Strainer	F3
Anode	Other	AO
	Cast iron	<u>A1</u>
	Graphite	<u>A2</u>
	Magnesium	<u>A3</u>
	Zinc	<u>A4</u>
Pressure control fitting	Other	<u>P0</u>
	Split repair	<u>P1</u>
	Bottom out	<u>P2</u>
	Top tap	<u>P3</u>
Union	Non-insulated	<u>U1</u>
	Insulated	UX
	Other	M6 F0 F1 F2 F3 A0 A1 A2 A3 A A P0 P1 P2 P3 UUX C0 C1
Repair clamp	Repair clamps	<u>C1</u>

$$D = (C_1 * 378) + C_2 + 1 \tag{1}$$

where:

 C_1 = factor corresponding to the first dimension, D_1 , and C_2 = factor corresponding to the second dimension, D_2 .

5.6.1.1 The second dimension, D_2 , shall always be the larger dimension for a given component as shown in Eq 2:

$$D_2 > D_1$$
 (2)

5.6.1.2 For the case of a pipe, tubing, or other in-line components where there is no dimensional change, then $D_1 = D_2$ and $C_1 =$ C_2 .

5.6.1.3 For components other than various risers and transition fittings or other using metallic parts, the second dimension, D_2 , shall be expressed by the connection to the main.

5.6.1.4 In the case of various types of risers and transition fittings or others using metallic parts, the second dimension, D_2 , shall be expressed by the metallic size, for example, MPT or FPT.

NOTE 13—For the case of a 2" IPS SDR9.33 pipe, $D_1 = D_2$ and $C_1 = C_2 = 37$. Then from Eq 1, the resulting value for D = (37*378)+37+1 = 14024. NOTE 14—For the case of a 2" IPS SDR9.33 × $\frac{1}{2}$ " CTS 0.090 saddle fitting (electrofusion, molded saddle fusion, mechanical), $D_2 = 2$ " IPS with $C_2 = 2$ " IPS with C_2 37; $D_1 = \frac{1}{2}$ °CTS 0.090 with $C_1 = 4$. Then from Eq 1, the resulting value for D = (4 * 378) + 37 + 1 = 1550.

5.7 Base 62 Index—The sixteenth character shall be a single character code per Table 8.

5.7.1 Unless otherwise specified, the sixteenth character shall be a null value of "0".

6. Keywords

6.1 base-62 encoding system; component; gas distribution; marking; pipe; traceability; tracking