

# ISO 12176-5:2021 (E)

## Plastics pipes and fittings — Equipment for fusion jointing polyethylene systems — Part 5: Two-dimensional data coding of components and data exchange format for PE piping systems

---

### Contents

	Foreword
	Introduction
1	Scope
2	Normative references
3	Terms, definitions and abbreviated terms
3.1	Terms and definitions
3.2	Abbreviated terms
4	Barcode type, structure and contents
4.1	General
4.2	Contents
4.2.1	Revision of data coding definition (region 0)
4.2.2	Identification components type (characters of region 1)
4.2.3	Jointing process information (characters of region 2)
4.2.4	Traceability (characters of region 3)
4.2.5	Additional factory information (characters of region 4)
4.2.6	Checksum
5	Data retrieval system
5.1	General
5.2	Data model
5.2.1	Data types
5.2.2	Protocol object
5.2.3	Fusion equipment data object
5.2.4	Jointing data object
5.2.5	Component data object
5.2.6	Electro-fusion data object
5.2.7	Fusion phase object
5.2.8	Butt fusion data object
5.2.9	Infrared butt fusion data object
5.3	Mapping data retrieving model to JSON
5.4	Mapping data retrieval model to CSV
5.4.1	General
5.4.2	CSV-file format and data type representation
5.4.3	Header names, keys and order of fields
5.5	Mapping data retrieval model to other formats
Annex A	(normative) Electro-fusion process information
A.1	Structure of the coding
A.1.1	Introduction
A.1.2	Sub-field 1
A.1.3	Sub-field 2
A.1.3.1	General
A.1.3.2	Characters 1, 2,3 and 4: Value of nominal resistance
A.1.3.3	Character 5: Tolerance on value of nominal resistance
A.1.3.4	Character 6: Variation of nominal resistance
A.1.4	Sub-field from 3 to n+2
A.1.5	Sub-field no. n+3

<b>A.2</b>	<b>Fusion phase information</b>
<b>A.2.1</b>	<b>General</b>
<b>A.2.2</b>	<b>Character 1: Type of regulation</b>
<b>A.2.3</b>	<b>Characters 2, 3, 4 and 5: Level of regulation</b>
<b>A.2.3.1</b>	<b>Principle</b>
<b>A.2.3.2</b>	<b>Mode U-t and U-E</b>
<b>A.2.3.3</b>	<b>Mode I-t and I-E</b>
<b>A.2.3.4</b>	<b>Mode P-t and P-E</b>
<b>A.2.4</b>	<b>Characters 6, 7, 8 and 9: Nominal target heating time or nominal target energy</b>
<b>A.2.4.1</b>	<b>General</b>
<b>A.2.4.2</b>	<b>Nominal target heating time</b>
<b>A.2.4.3</b>	<b>Nominal target heating energy</b>
<b>A.2.5</b>	<b>Characters 10 and 11: Heating time or heating energy correction</b>
<b>A.3</b>	<b>Coding examples</b>
<b>A.3.1</b>	<b>Introduction</b>
<b>A.3.2</b>	<b>Process information encoding of examples from ISO 13950:2007, A.10</b>
<b>A.3.3</b>	<b>Example for multilevel fusion</b>
<b>Annex B (normative) Message codes for data retrieval</b>	
<b>B.1</b>	<b>Message codes for electro-fusion</b>
<b>B.2</b>	<b>Message codes for butt fusion</b>
<b>B.3</b>	<b>Message codes for infrared butt fusion</b>
<b>Annex C (informative) JSON mapping of Data Retrieval System</b>	
<b>C.1</b>	<b>JSON schema for mapping of fusion equipment data model</b>
<b>C.2</b>	<b>Example</b>
<b>Annex D (informative) CSV header of Data Retrieval System</b>	
<b>D.1</b>	<b>General</b>
<b>D.2</b>	<b>Other processes</b>
<b>D.3</b>	<b>Electro-fusion</b>
<b>D.4</b>	<b>Butt fusion</b>
<b>D.5</b>	<b>IR fusion</b>
<b>Annex E (informative) Example of figures coded in two-dimensional format</b>	
<b>E.1</b>	<b>Data encoded in figures</b>
<b>E.2</b>	<b>Figures</b>
<b>Annex F (informative) Example of checksum calculation for 2-byte encoding characters</b>	
<b>F.1</b>	<b>General</b>
<b>F.2</b>	<b>Examples for calculating the checksum</b>