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4.1 - 01: 8

4.1.1 μ 8

4.1.2 μ 8

4.1.3 μ - μ 9

4.2 - 02 : 10

4.2.1 μ - μ 10

4.2.2 10

4.2.3 10

4.2.4 μ μ 11

4.2.5 μ - μ 11

4.3 - 03: 12

4.3.1 μ 12

4.3.2 12

4.3.3 μ μ 12

4.4 - 04 : 14

4.4.1 μ 14

4.4.2 14

4.4.3 μ 14

4.4.4 14

4.4.5 15

4.4.6 μ 15

4.4.7 $\mu\mu$ μ 15

4.4.8 μ 15

4.4.9 μ 16

4.4.10 μ μ 16

4.5 - 05: (HDPE) 17

4.5.1 μ 17

4.5.2 μ μ 17

4.5.2.1 μ μ 17

4.5.3 μ μ 18

4.5.4				20
4.5.4.1				20
4.5.5	μ			21
4.5.6		-	μ	22
4.5.6.1				22
4.5.7			μ	22
4.5.8				23
4.5.9	μ			23
4.5.9.1				23
4.5.9.2		μ		24
4.5.9.3		μ		24
4.5.9.4		μ		25
4.5.9.5			μ	25
4.5.10		μ		25
4.5.10.1		μ	μ	25
4.5.10.2		μ	μ	25
4.6	-06:			27
4.6.1		μ		27
4.6.2			μ μ	27
4.6.2.1		μ	μ	27
4.6.2.2				27
4.6.2.3		μ		28
4.6.2.4		μ		29
4.6.3			- μ	30
4.6.3.1				30
4.6.3.2			μ	33
4.6.3.3		μ		34
4.6.3.4				35
4.6.3.5		μ		37
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4.6.4.1		μ	μ	38
4.6.4.2				38
4.6.4.3			μ μ	39
4.6.5				39
4.6.5.1				39
4.6.5.2				39
4.6.6		μ		40
4.6.6.1		μμ	μ μ	40
4.6.6.2		μ		40
4.6.6.3		μ		40
4.6.6.4		μ	μ	40
4.6.6.5		μ	μ μ	40
4.7	- 078:		-	42
4.7.1		μ		42
4.7.2				42

4.7.3	$\mu\mu$ μ ().....	42
4.8	-08:	43
4.8.1	μ	43
4.8.2	43
4.8.3	μ	43
4.8.4	44

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(www.ggde.gr).

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 μ μ 26/04-10-2012.

/	1501-" +	T	
1	01-01-01-00	μ μ	Concrete production and transportation
2	01-01-02-00	μ	Concrete casting
3	01-01-03-00	μ	Concrete curing
4	01-01-04-00	μ μ	Work site concrete batching plants
5	01-01-05-00	μ μ	Concrete compaction by vibration
7	01-01-07-00		Mass concrete
8	01-02-01-00	μ μ	Steel reinforcement for concrete
11	01-04-00-00	μ ()	Concrete formwork
17	02-04-00-00	μ	Excavations for foundation works
18	02-05-00-00	μ	Management of excavation materials and exploitation of dumping sites
21	02-07-02-00	μ μμ	Refill of excavations for foundation works
26	02-08-00-00	μ	Dealing with public networks during excavation works
29	03-02-02-00		Clay bricks masonry

/	' . 1501-" +	T	
30	03-03-01-00	μ μ μ	Coatings using in-situ mortars
54	03-08-02-00	μ	Steel windows and doors
57	03-08-07-01		Single layer and laminated glass glazing
63	03-10-02-00	μ μ μ	Render and plaster painting
174	08-01-03-01	μ	Trench excavations for utility networks
175	08-01-03-02	μ	Underground utilities trench backfilling
204	08-06-07-02		Cast iron gate valves
208	08-06-07-07	-	Double orifice air relief valves
213	08-06-08-06	μ μ μ	Prefabricated concrete manholes
219	08-07-01-05	μ	Manhole steps

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(1) 150, μ 15cm μ μ μ ,

(2) μ C16/20, 15cm.

4.2.4 μ μ μ , μ , μ , μ .

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 μ μ 500mm μ μ μ μ
 μ μ μ μ 320kgr μ μ
 μ μ μ μ 26kgr/mm2. μ μ
 μ μ 5mm. μ μ μ μ
 μ μ μ μ 45° μ μ 5mm.
 μ μ μ μ μ μ μ 40mm μ
 200mm. μ μ μ μ μ μ
 160mm. μ μ μ μ μ μ
 2kgr μ μ μ μ 400mm, μ μ μ μ
 μ μ μ μ μ μ μ μ
 μ μ μ μ μ μ μ μ 90 μ μ 50mm.

4.4.10

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4.5 - 05: (HDPE)

4.5.1 μ (HDPE) PE 80 PE 100.

4.5.2 μ μ

4.5.2.1 μ μ () :
 • (HDPE) 2 3 .
 • μ μ ,

3 μ μ 16 atm (PE 100). μ (PE 80, PE 100).

HDPE (High Density Polyethylene), μ
 LDPE (Low Density Polyethylene) (PP)

μ , μ μ μ μ
 μ μ 2000 40.000.

HDPE

		μ	μ
MFI 190/5	g/10min	ISO 1133:2000-021	0,3 - 0,7
μ	23°C	50%	
	/mm ²	ISO 527-1:1996 ²	22
μ μ	%	ISO 527-1:1996 ²	15
μ	/mm ²	μ	32
μ	%	125 mm/min	>800
μ	/mm ²	ISO 178:2003 ³	28
μ	/mm ²		800
Shore D	-	D 53505:2000-08 ⁴	60
	-	ISO 8256:2004 ⁵	
μ			

	°C		130
$\mu\mu$	-1	ASTM D 696-03 ⁶	$1.7 * 10^{-4}$
μ μ 20°C	W / m •	DIN 52612-1 ⁷	0.43
μ 20°C		50%.	
	• cm	ASTM D257-99 ⁸	$> 10^{16}$
		ASTM D257-99 ⁸	$> 10^{13}$

¹ Plastics - Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics (ISO 1133:1997) -- μ μ μ (MFR)

² Plastics - Determination of tensile properties - Part 1: General principles (ISO 527-1:1993 including Corr 1:1994). -- μ 1: .

³ Plastics - Determination of flexural properties (ISO 178:2001) -- μ μ

⁴ Testing of rubber - Shore A and Shore D hardness test -- μ Shore A

⁵ Plastics - Determination of tensile-impact strength (ISO 8256:2004) -- μ

⁶ Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C With a Vitreous Silica Dilatometer -- μ μ μμ μ
 μ -30°C 30°C, μ μ μ

⁷ Testing of Thermal Insulating Materials; Determination of Thermal Conductivity by the Guarded Hot Plate Apparatus; Test Procedure and Evaluation. μ μ μ

⁸ Standard Test Methods for DC Resistance or Conductance of Insulating Materials -- μ
 μ μ (DIN 53482 ,
)

4.5.3 μ μ

EN 12201-1:2003 Plastics piping systems for water supply - Polyethylene (PE) - Part 1: General -- μ ().
 1: .

EN 12201-2:2003 Plastics piping systems for water supply - Polyethylene (PE) - Part 2: Pipes -- μ .
 2: .

EN 12201-3:2003 Plastics piping systems for water supply - Polyethylene (PE) - Part 3: Fittings -- μ .
 3: μ

EN 12201-4:2001	Plastics piping systems for water supply - Polyethylene (PE) - Part 4: Valves -- μ 4:
EN 12201-5:2003	Plastics piping systems for water supply - Polyethylene (PE) - Part 5: Fitness for purpose of the system. -- μ 5: μ μ
EN 13244-1:2002	Plastics piping systems for buried and above-ground pressure systems for water for general purposes, drainage and sewerage - Polyethylene (PE) - Part 1: General -- μ (). 1:
EN 13244-2:2002	Plastics piping systems for buried and above-ground pressure systems for water for general purposes, drainage and sewerage - Polyethylene (PE) - Part 2: Pipes -- μ (). 2:
EN 13244-3:2002	Plastics piping systems for buried and above-ground pressure systems for water for general purposes, drainage and sewerage - Polyethylene (PE) - Part 3: Fittings -- μ μ (PE)- 3: μ , μ
EN 13244-4:2002	Plastics piping systems for buried and above-ground pressure systems for water for general purposes, drainage and sewerage - Polyethylene (PE) - Part 4: Valves -- μ μ (PE)- 4:
EN 13244-5:2002	Plastics piping systems for buried and above-ground pressure systems for water for general purposes, drainage and sewerage - Polyethylene (PE) - Part 5: Fitness for purpose of the system -- μ μ (PE)- 5: μ .
EN 1680:1997	μ Plastics piping systems - Valves for polyethylene (PE) piping systems – Test method for leaktightness under and after bending applied to the

operating mechanisms -- μ -
 μ () - μ
 μ μ μ μ

EN 10284:2000 Malleable cast iron fitting with compression ends for polyethylene (PE) piping systems -- μ μ μ
 μ (PE).

EN 12100:1997 Plastics piping systems - Polyethylene (PE) valves - Test method for resistance to bending between supports -- μ
- () - μ
 μ μ μ .

μ

EN 12099 Plastics Piping Systems - Polyethylene Piping Materials and Components - Determination of Volatile Content -- μ -
 μ - μ

EN 921:1994 Plastics piping systems - Thermoplastics pipes - Determination of resistance to internal pressure at constant temperature -- μ
- μ - μ
 μ .

EN 12119:1997 Plastics piping systems - Polyethylene (PE) valves - Test method for resistance to thermal cycling -- μ -
() - μ
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4.5.4

4.5.4.1

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- μ - μ
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 μ :

- HDPE,
 - μ / μ μ (ISO/IEC 17025:2005-08: General requirements for the competence of testing and calibration laboratories -- μ),

μμ
 - / μ ,
 - / μ ,
 - μ μ μ μ
 - / .
 μ μ / .
 μ μ μ ISO 9000:2000- 12
 (Quality management systems - Fundamentals and vocabulary -- μ -)
 μ
 μ , μ , μ (. . DVGW, Drinking Water Inspectorate for use in Public Water Supply and Swimming pools).

4.5.5 μ

μ μ μ μ μ μ
 μ , μ . PE 100:
 - HDPE/ PN 12,5

XXXX=YYYY=ZZZZ=PE 100 =

:

HDPE =

= μ μ

PN 12,5 = atm bar

XXXX = μ

YYYY = μ μ μ μ

ZZZZ = μ μ μ

PE 100 =

4.5.9.4

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4.6.1 μ

4.6.2 μ μ

4.6.2.1 μ μ

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- μ μ μ μ μ ,
- μ .

4.6.2.2

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9001:2000-12

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μ 10027.

281: μ , μ , .

496: - μ .

497: - μ .

() , μ

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μ)

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μ μ μ .

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10217-1:2002 Welded steel tubes for pressure purposes - Technical delivery conditions - Part 1:
Non-alloy steel tubes with specified room temperature properties --

1: μ μ μ μ

μ .

μ ISO 17025.

μ μ μ :

AWWA C203:2002 Coal Tar Protective Coatings and Linings for Steel Water pipelines - Enamel and Tape-Hot applied --
 μ - μ μ μ .

AWWA C206:1997 Field welding of steel water pipe --
 μ .

AWWA C200:1997 Steel water pipe 6" (150 mm) and longer -- μ
 μ 150 mm .

AWWA C208:2000 Fabricated steel water pipe fittings - Dimensions -- μ
 μ - .

BS 534:1990 Specification for steel pipes, joints and specials for water and sewage --
 , μ μ .

S 4147:1980-10-31 Specification for bitumen-based hot-applied coating materials for protecting iron and steel, including suitable primers where required --
 μ μ μ .

AWWA anual M11 Steel pipe - a guide for design and installation.
 μ

USBR Welding manual (μ
).

4.6.2.3 μ
 μ , μμ μ μ μ μ ,
 , , . .
 μ
 μ μμ μ μ . μ μ μ
 μμ μ μ μ μ μ μ
 μ (1092-1:2001:
 Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated - Part 1:
 Steel flanges -- μ μ . , ,
 μ μ , μ μ μ . 1: μ).
 , μ 1665:1997 (Hexagon
 bolts with flange - Heavy series -- μ .),
 4D DIN 267-2:1984-11 (Fasteners; Technical delivery conditions; Design and
 dimensional accuracy -- μ μ
). μ μ ASTM 766-86:2003 (Standard
 Specification for Electrodeposited Coatings of Cadmium -- μ).

- 1092-1:2001 Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated - Part 1: Steel flanges --
- DIN 2501-1:2003-05 Flanges - Part 1: Mating dimensions --
- AWWA C208:2000 Fabricated steel water pipe fittings - Dimensions --

4.6.2.4

() ,

30°C.

4.6.3

– μ

4.6.3.1

10296-1:2003 (Welded circular steel tubes for mechanical and general engineering purposes - Technical delivery conditions - Part 1: Non-alloy and alloy steel tubes --

1: μ μ μ).

3.1 μ μ

10204:2004 (Metallic products - Types of inspection documents --).

(Double Fusion Butt Weld)

μ μ μ

μ (μ) μ . (2,00m).

μ

μ μ , μ μ

DIN 2605-1,-2

(DIN 2605-1:1991-02. Part 1: Steel butt-welding pipe fittings; Elbows and bends with reduced pressure factor. - Part 2: Full correlation of utilization -- 1: μ

μ . μ

μ μ

2:

μ),

(Butt Weld).

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(SAW),

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(straightening),

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- μ (μ) μ
 - (μ) μ

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 (μ) . μ μ μ μ
 O μ μ μ
 μ μ 10217-1:2002.

μ μ AWWA C206 Welding anual USBR.
 (FI, High Frequency Induction) μ
 μ , μ

μ μ μ (Double Submerged Arc Weld) μ μ
 μ μ μ
 (ultra sonic test). μ μ μ

μ μ μ μ 10217-
 1:2002 μ μ

1. μ AWWA C203 & BS
 4164:2002 (Specification for coal-tar-based hot-applied coating materials for protecting iron and steel,
 including a suitable primer --
 μ μ μ μ
 μ) μ :

μ (shot blasting) SA 2.5, μ μ ISO 8501-1:2001.

μ (sand blasting) SA 2.5, μ μ ISO 8501-1:20012.

μ μ μ /

2. _____

μ μ BS 534:1990 BS
4147:1980-10-31. , μ μ
primer μ ().

:

μ μ :	
88,9 μ 168,3 mm	3 mm
168,3 μ 323,9 mm	4,5 mm
323,9 μ 2.220 mm	6 mm

μ μ μ μ μ μ

μ μ μ μ μ μ μ μ μ μ

3. _____ (PE), _____ (PP) _____ (FBE - Fusion Bonded Epoxy).

μ PE μ μ AWWA C215:2004 Extruded Polyolefin Coatings for the Exterior of Steel Water Pipelines -- μ μ μ μ μ ().

4.6.3.3

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(Ultrasonic test),

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I.I.W. (International Institute of Welding).

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- (Lack of fusion):

- μ

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- (Incomplete penetration): μ

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4.6.4.3

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4.6.5

4.6.5.1

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 - μ μ .
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 - μ .
- μ μ μ μ .
- μ μ

4.6.5.2

μμ 92/57/EE, « » μμ μ
 μ μ (. . 17/96 . . 159/99 . .).
 μ μ () .
 :

μ	EN 863:1995: Protective clothing - Mechanical properties - Test method: Puncture resistance - μ .
	EN 388:2003: Protective gloves against mechanical risks -- μ .
	EN 397:1995: Industrial safety helmets (Amendment A1:2000) -- .
	EN 345-2:1996: Safety Footwear for Professional Use - Part 2. Additional Specifications Superseded by EN ISO 20345:2004 - μ μ (EN ISO 20345:2004).
μ	165-95: Mesh type eye and face protectors for industrial and non-industrial use against mechanical hazards and/or heat -- μ μ μ μ μ μ μ μ

4.6.6 μ

4.6.6.1 $\mu\mu \mu \mu$

- μ $\mu\mu \mu \mu$
- $\mu\mu$ μ, μ μ μ
- $\mu \mu$ $\mu \mu$ μ μ μ μ
- μ , μ μ μ μ μ
- μ $\mu \mu$
- : :
- () μ
 - :
 - $\mu \mu \mu$ ($\mu \mu$)

4.6.6.2 μ

μ ($\mu, , \mu .$) μ
s (kg),

4.6.6.3 μ

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 μ , μ μ

4.6.6.4 $\mu \mu$

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- , μ :
- μ, μ , μ
 - μ
 - $\mu \mu$ $\mu \mu$
 - $\mu \mu$, μ
 - μ $\mu \mu \mu$ $\mu \mu$
- $\mu \mu$

4.6.6.5 $\mu \mu \mu$

- μ $\mu \mu \mu$ μ
- (NDT) μ

• μ

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4.8.1 μ

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4.8.2

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2	,	D 6914, 6915 6916
3	,	D 7989 7990

μ μ .

4.8.3 μ

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4.8.4

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, 03.08.2016

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3 μ ' μ

3 μ B' μ

μ . 238/2016

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