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MAESTRINI

Reference No. TAC-2021/218-SQTBA Maestrini Srl
Component and assembly tests on Through-hull fittings and Tailpipes in Dezincification-Resistant (DZR) Brass (EN ISO 9093:2021, section 4,4 and Annex A)

A) Articles to be considered for type approval according to EN ISO 9093:2021

A.1) DZR Brass Through-hull outlet with inclined head (Art. 7053), rated Dn 1/2" through Dn 4": 7053D (Dn1/2"), 7053E (3/4"), 7053F (1"), 7053G (1-1/4"), 7053H (1-1/2"), 7053I (2"), 7053L (2-1/2"), 7053M (3"), 7053P (4").

The type approval of this through hull fitting is extended to the following through-hull fittings:

- Art. 7051 DZR Brass Through-hull outlet: 7051D (Dn1/2"), 7051E (3/4"), 7051F (1"), 7051G (1-1/4"), 7051H (1-1/2"), 7051I (2"), 7051L (2-1/2"), 7051M (3"), 7051P (4");
- Art. 7057 DZR Brass Through-hull outlet with inclined head and flanged nut :7057D (Dn1/2"), 7057E (3/4"), 7057F (1"), 7057G (1-1/4"), 7057H (1-1/2"), 7057I (2");
- Art. 7043 DZR Brass Through-hull outlet with flat head: 7043D (Dn1/2"), 7043E (3/4"), 7043F (1"), 7043G (1-1/4"), 7043H (1-1/2"), 7043I (2"), 7043L (2-1/2"), 7043M (3"), 7043P (4");
- Art. 7052 DZR Brass Through-hull outlet with reverse inclined head: 7052D (Dn1/2"), 7052E (3/4"), 7052F (1"), 7052G (1-1/4"), 7052H (1-1/2"), 7052I (2"), 7052L (2-1/2"), 7052M (3"), 7052P (4").

Motives for inclusion: all the through hull fittings are manufactured starting from the same semi-finished part; consequently, as per the enclosed Annex 1, the five models have the same diameter of the head, and the same length and thickness of the stem; the overall length of the fitting is the same for Articles 7057, 7051 and 7053, while Articles 7043 and 7052 are slightly shorter due to the different shape of the head.

A.2) DZR Brass Intra-ke strainer (Art. 7050) rated Dn 1/2" through Dn 4": 7050D (Dn1/2"), 7050E (3/4"), 7050F (1"), 7050G (1-1/4"), 7050H (1-1/2"), 7050I (2"), 7050L (2-1/2"), 7050M (3"), 7050P (4"). The type approval of this intake strainer is extended to the following intake strainers

- Art. 7045 DZR Brass Intake strainer with full-length slotted head: 7045D (Dn1/2"), 7045E (3/4"), 7045F (1"), 7045G (1-1/4"), 7045H (1-1/2"), 7045I (2"), 7045L (2-1/2"), 7045M (3"), 7045P (4");
- Art. 7049 DZR Brass Intake strainer with wide slots: 7049D (Dn1/2"), 7049E (3/4"), 7049F (1"), 7049G (1-1/4"), 7049H (1-1/2"), 7049I (2"), 7049L (2-1/2"), 7049M (3"), 7049P (4");
- Art. 7048 DZR Brass Intake strainer with drilled head: 7048D (Dn1/2"), 7048E (3/4"), 7048F (1"), 7048G (1-1/4"), 7048H (1-1/2"), 7048I (2"), 7048L (2-1/2"), 7048M (3"), 7048P (4").



- Art. 7048 DZR Brass Intake strainer with drilled head: 7048D (Dn1/2"), 7048E (3/4"), 7048F (1"), 7048G (1-1/4"), 7048H (1-1/2"), 7048I (2"), 7048L (2-1/2"), 7048M (3"), 7048P (4").

Motives for inclusion: all the intake strainers are manufactured starting from the same casting and, as per the enclosed Annex 2 are identical except for the shape and dimensions of the slots or drilled holes on the head.

A.3) "Roma" CR Brass heavy duty male threaded hosetail (Art. 7156) rated Dn 1/2" through Dn 4": 7156D*xxx (Dn1/2"), 7156E*xxx (3/4"), 7156F*xxx (1"), 7156G*xxx (1-1/4"), 7156H*xxx (1-1/2"), 7156I*xxx (2"), 7156L*xxx (2-1/2"), 7156M*xxx (3"), 7156P*xxx (4"), xxx being the hose size (18 mm through 100 mm). The complete list of hosetails is shown on the enclosed Annex 3.

B) Choice of the representative models and sizes.

The agreed representative models are the following:

- Art. 7053D (1/2"), 7053G (1-1/4") and 7053L (2-1/2");
- Art. 7050D (1/2"), 7050G (1-1/4") and 7050L (2-1/2");
- Art. 7156D*18 (1/2" x 18mm), 7156G*25 (1-1/4" x 25mm) and 7156L*50 (2-1/2" x 50 mm).

C) Component and assembly tests as per EN ISO 9093:2021, section 4.4 and Annex A.

C-1) Component test as per EN ISO 9093:2021, Annex A.2. The components were individually fitted to a rigid baseplate and subjected to the application of the force required according to the nominal size of the component under test:

- Art. 7053D tested with an applied force of 1500N; after this strength test the component showed no visible damage or deformation and no leakage when subjected to an internal pressure of 1 bar, and performed as intended.
- Art. 7050D tested with an applied force of 1500N; after this strength test the component showed no visible damage or deformation and no leakage when subjected to an internal pressure of 1 bar, and performed as intended.
- Art. 7156D*18 tested with an applied force of 1500N; after this strength test the component showed no visible damage or deformation and no leakage when subjected to an internal pressure of 1 bar, and performed as intended.
- Art. 7053G tested with an applied force of 2224N; after this strength test the component showed no visible damage or deformation and no leakage when subjected to an internal pressure of 1 bar, and performed as intended.



- Art. 7050G tested with an applied force of 2224N; after this strength test the component showed no visible damage or deformation and no leakage when subjected to an internal pressure of 1 bar, and performed as intended.
- Art. 7156G*25 tested with an applied force of 2224N; after this strength test the component showed no visible damage or deformation and no leakage when subjected to an internal pressure of 1 bar, and performed as intended.
- Art. 7053L tested with an applied force of 2224N; after this strength test the component showed no visible damage or deformation and no leakage when subjected to an internal pressure of 1 bar, and performed as intended.
- Art. 7050L tested with an applied force of 2224N; after this strength test the component showed no visible damage or deformation and no leakage when subjected to an internal pressure of 1 bar, and performed as intended.
- Art. 7156L*50 tested with an applied force of 2224N; after this strength test the component showed no visible damage or deformation and no leakage when subjected to an internal pressure of 1 bar, and performed as intended..

C-2) Assembly test as per EN ISO 9093:2021, Annex A.2. For each representative nominal size, an assembly consisting of an intake strainer, a DZR brass ball valve Art. 5141 (not to be included in the type approval) complying with the requirements of EN ISO 9093:2021 clause 6.2, and a tailpipe, was installed on a rigid vertical plate, with the stem of the intake strainer adapted in order to simulate an actual installation through the hull and in compliance with the dimensional requirements set in EN ISO 9093:2021 clause 5.3.1. The assemblies were then tested for 30 seconds perpendicular to the inboard end of the assembly applying the required force according to the nominal size:

- 1500N applied to the assembly of 7050D + 5141D + 7156D*18;
- 2224N applied to the assembly of 7050G + 5141G + 7156G*25;
- 2224N applied to the assembly of 7050L + 5141L + 7156L*50.

The assemblies were then disassembled and the components assessed:

- The intake strainer 7050D showed no leakage when subjected to an internal pressure of 1 bar, and did not show any deformation or sign of damage effecting its function; the seacock 5141D (not included in the type approval) did not show sign of damage and remained operable; the tailpipe 7156D*18 showed no leakage when subjected to an internal pressure of 1 bar, and did not show any deformation or sign of damage effecting its function.
- The intake strainer 7050G showed no leakage when subjected to an internal pressure of 1 bar, and did not show any deformation or sign of damage effecting its

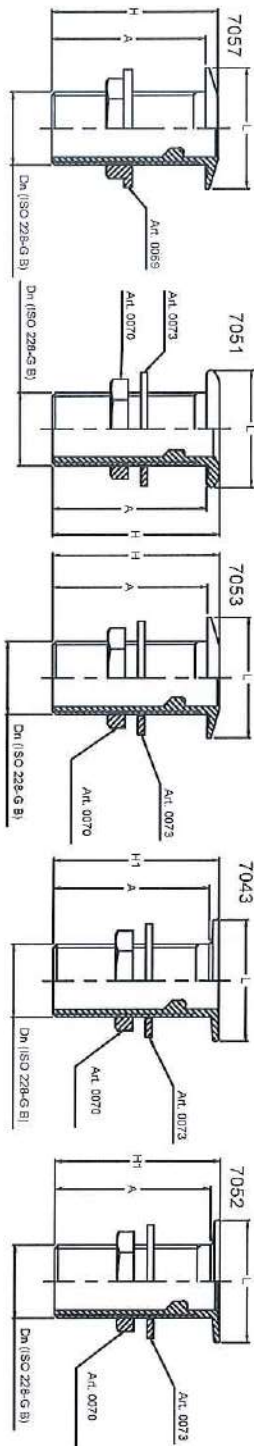


function; the seacock 5141G (not included in the type approval) did not show sign of damage and remained operable; the tailpipe 7156G*25 showed no leakage when subjected to an internal pressure of 1 bar, and did not show any deformation or sign of damage effecting its function.

- The intake strainer 7050L showed no leakage when subjected to an internal pressure of 1 bar, and did not show any deformation or sign of damage effecting its function; the seacock 5141L (not included in the type approval) did not show any deformation or sign of damage and remained operable; the tailpipe 7156L*50 showed no leakage when subjected to an internal pressure of 1 bar, and did not show any deformation or sign of damage effecting its function.

The detailed results of the component and assembly tests are available on annexes 1, 2 and 3.

Quarona, 8th November 2022



7057-7051-7053
7043-7052

L	40	49	59	65	72	84	112	124	148
H	63,5	73	77	83	84,5	102	132	160	209
H1	82	71	79	81,5	83	100	130	158	207
A	58	66	71	76,5	78	95	123	151	200
Dn	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"

Representative model: Art. 7053 Through-hull Outlet w. Inclined Head, representative of through hull outlets 7051, 7057, 7043, 7052.

Component test (EN ISO 9093:2021 section 4.4 and Annex A.2):

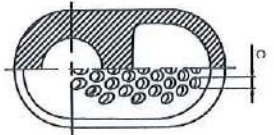
- 7053D (Dn 1/2"): Applied force 1500 N, no leakage detected when subjected to an internal pressure of 0.1 MPa (1 bar), no sign of damage effecting its function.
- 7053G (Dn 1 1/4): Applied force 2224 N, no leakage detected when subjected to an internal pressure of 0.1 MPa (1 bar), no sign of damage effecting its function.
- 7053L (Dn 2 1/2): Applied force 2224 N, no leakage detected when subjected to an internal pressure of 0.1 MPa (1 bar), no sign of damage effecting its function.

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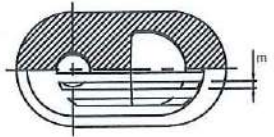
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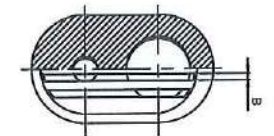




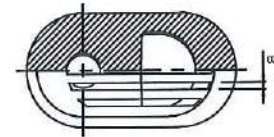
7048



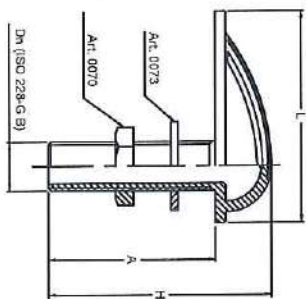
7049



7045



7050



	L	91	106	108	118	133	157	201	237	287
H	97	103	104	105	113	128	154	183	278	
A	72,5	77	77	79	82	91	112	133	200	
B	3	3	3	3	3	3	5	5	5	5
C	-	6	6	6	6	6	6	6	6	6
E	4	4	4	4	4	4	4	6	6	6
Dn	1/2"	3/8"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	

Representative model: Art. 7050 DZR Brass Intake Strainer, representative of intake strainers 7045, 7048, and 7049 for the purpose of the Component test.

Component test (EN ISO 9093:2021 section 4.4 and Annex A.2):

- 7050D (Dn 1/2"), Applied force 1500 N, no leakage detected when subjected to an internal pressure of 0,1 MPa (1 bar), no sign of damage effecting its function.
- 7050G (Dn 1"1/4), Applied force 2224 N, no leakage detected when subjected to an internal pressure of 0,1 MPa (1 bar), no sign of damage effecting its function.
- 7050L (Dn 2"1/2), Applied force 2224 N, no leakage detected when subjected to an internal pressure of 0,1 MPa (1 bar), no sign of damage effecting its function.

Assembly test (EN ISO 9093:2021 section 4.4 and Annex A.3), on an assembly consisting of:

- 7050 DZR brass intake strainer, representative of intake strainers 7045, 7049, 7048 as well as of through hull outlets 7053, 7051, 7057, 7043, 7052;
- 5141 DZR brass ball valve, complying with EN ISO 9093:2021 section 6 (for assembly composition purposes only, not to be considered in the test assessment);
- 7156 DZR brass tailpipe.

- 7050D, Applied force 1500 N, no leakage detected when subjected to an internal pressure of 0,1 MPa (1 bar), no sign of damage effecting its function.
- 7050G, Applied force 2224 N, no leakage detected when subjected to an internal pressure of 0,1 MPa (1 bar), no sign of damage effecting its function.
- 7050L, Applied force 2224 N, no leakage detected when subjected to an internal pressure of 0,1 MPa (1 bar), no sign of damage effecting its function.
- 7156D*18, Applied force 1500 N, no leakage detected when subjected to an internal pressure of 0,1 MPa (1 bar), no sign of damage effecting its function.
- 7156G*25, Applied force 2224 N, no leakage detected when subjected to an internal pressure of 0,1 MPa (1 bar), no sign of damage effecting its function.
- 7156L*50, Applied force 2224 N, no leakage detected when subjected to an internal pressure of 0,1 MPa (1 bar), no sign of damage effecting its function.

Valves 5141D, 5141G, 5141L remained operable after the assembly test

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Representative models: DZR Brass tailpipes Art. 7156D*18 (1/2" x 18 mm), 7156G*25 (1"1/4 x 25 mm), 7156L*50 (2"1/2 x 50 mm)

Component test (EN ISO 9093:2021 section 4.4 and Annex A.2):

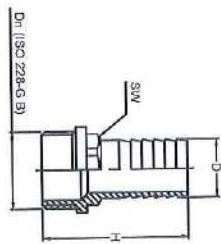
- 7156D*18, Applied force 1500 N, no leakage detected when subjected to an internal pressure of 0.1 MPa (1 bar), no sign of damage effecting its function.
- 7156G*25, Applied force 2224 N, no leakage detected when subjected to an internal pressure of 0.1 MPa (1 bar), no sign of damage effecting its function.
- 7156L*50, Applied force 2224 N, no leakage detected when subjected to an internal pressure of 0.1 MPa (1 bar), no sign of damage effecting its function.

Assembly test (EN ISO 9093:2021 section 4.4 and Annex A.3), on an assembly consisting of:

- 7050 DZR brass intake strainer, representative of intake strainers 7045, 7049, 7048 as well as of through hull outlets 7053, 7051, 7057, 7043, 7052;
- 5141 DZR brass ball valve, complying with EN ISO 9093:2021 section 6 (for assembly composition purposes only);
- 7156 DZR brass tailpipe.

- 7156D*18, Applied force 1500 N, no leakage detected when subjected to an internal pressure of 0.1 MPa (1 bar), no sign of damage effecting its function.
- 7156G*25, Applied force 2224 N, no leakage detected when subjected to an internal pressure of 0.1 MPa (1 bar), no sign of damage effecting its function.
- 7156L*50, Applied force 2224 N, no leakage detected when subjected to an internal pressure of 0.1 MPa (1 bar), no sign of damage effecting its function.
- 7050D, Applied force 1500 N, no leakage detected when subjected to an internal pressure of 0.1 MPa (1 bar), no sign of damage effecting its function.
- 7050G, Applied force 2224 N, no leakage detected when subjected to an internal pressure of 0.1 MPa (1 bar), no sign of damage effecting its function.
- 7050L, Applied force 2224 N, no leakage detected when subjected to an internal pressure of 0.1 MPa (1 bar), no sign of damage effecting its function.

Valves 5141D, 5141G, 5141L remained operable after the assembly test



Dn	D	H	SW
1/2"	18	56	21
1/2"	19	56	21
1/2"	20	58	22
3/4"	19	58,5	21
3/4"	20	60,5	22
3/4"	26	60,5	28
1"	19	61	22
1"	20	61	22
1"	25	63	28
1"	27	63	30
1"	30	63	32
1"	32	66	36
1"	33	66	36
1"	35	66	38
1"1/4	25	72	28
1"1/4	30	72	33
1"1/4	32	75	35
1"1/4	33	72	37

Dn	D	H	SW
1"1/4	35	75	38
1"1/4	38	75	40
1"1/4	40	75	43
1"1/2	25	72	28
1"1/2	32	75	35
1"1/2	38	75	40
1"1/2	39	75	42
1"1/2	40	75	43
1"1/2	45	77	48
1"1/2	50	77	54
1"1/2	51	77	54
2"	38	84	54
2"	45	85,5	48
2"	50	85,5	53
2"	51	85,5	53

Dn	D	H	SW
2"1/2	50	90	53
2"1/2	51	90	53
2"1/2	60	97,5	64
2"1/2	62	97	65
2"1/2	63	97,5	67
2"1/2	64	97,5	66
2"1/2	65	97,5	66
2"1/2	70	97	75
2"1/2	75	97,5	80
2"1/2	76	97,5	80
3"	75	101,5	80
3"	76	101,5	80
3"	80	103,5	85
3"	90	103,5	95
4"	100	115,5	107

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Mr. Daniele Magnaghi (LR)





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TEST CERTIFICATE

CERTIFICATO DI COLLAUDO


Type / Tipo 3.1 Reference / Riferimento UNI EN 10204:2005

Sample Result Name	Type	Measure Date	Recalculation Date	Origin	Method Name	Method Version	Operator Name	Correction Type	Type Corr Sample Name
FONDEREX/13.1022/3 -7050D-1	Unknown	2022-10-13 3:37:55 PM	2022-10-13 3:37:55 PM	Measured	Cu-20MIC			None	
Check Type	Check Status	Grade Verification Name		Grade Verification Similarity		Grade Search Name		Grade Search Similarity	
Grade/Variating	OK	CB770S		100 %				0 %	
FORNITORE	NR. BOLLA	ARTICOLO	LEGA	RIF.NORMA	CLIENTE	DATA BASE	NOTE		
FONDEREX	13.1022	3-7050D-1	CB770S			MAESTRINI			

Elements

Conc.

Meas.	Zn	Pb	Sn	P	Mn	Fe	Ni	Si	Mg	Cr
	%	%	%	%	%	%	%	%	%	%
	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.
W. Min	32.39	0.20	0.19	0.086	0.021	0.13	0.056	0.018	0.002	0.004
Mean	34.99	1.53	0.19	0.086	0.021	0.13	0.056	0.018	0.002	0.004
W. Max	36.34	1.60	0.30	0.100	0.30	0.20	0.20	0.020		
Meas.	AS	Sb	Cd	Bi	Ag	Co	Al	S	Be	Cu
	%	%	%	%	%	%	%	%	%	%
	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.
W. Min	0.040						0.50			
Mean	0.085	0.063	0.005	0.067	0.013	0.014	0.68	0.036	<0.0000	62.0
W. Max	0.14						0.70			


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Type / Tipo 3.1 Reference / Riferimento UNI EN 10204:2005

Sample Result Name	Type	Measure Date Time	Recalculation Date Time	Origin	Method Name	Method Version	Operator Name	Correction Type	Type Corr Sample Name
NODARI/440/7156F-25/ EN12164:2011	Unknown	2022-10-19 4:59:05 PM	2022-10-19 4:59:05 PM	Measured	Cu-20MC			None	
Check Type	Check Status	Grade Verification Name		Grade Verification Similarity		Grade Search Name		Grade Search Similarity	
GradeWarning	OK	CW602N		100 %				0 %	
FORNITORE	NR. BOLLA	ARTICOLO	LEGA	RIF.NORMA	CLIENTE	DATA BASE	NOTE		
NODARI	440	7156F-25	CW602N	EN12164:2011	MAESTRINI				

Elements

Conc.

Mass	Zn	Pb	Sn	P	Mn	Fe	Ni	Si	Mg	Cr
	%	%	%	%	%	%	%	%	%	%
	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.
W. Min	33.20	1.70	0.098	0.019	<0.0009	0.100	0.033	0.006	0.0009	<0.001
Mean	34.44	2.09	0.098	0.019	<0.0009	0.100	0.033	0.006	0.0009	<0.001
W. Max	36.43	2.80	0.100	0.019	0.100	0.100	0.30	0.006	0.0009	<0.001
Mass	AS	Sb	Cd	Bi	Ag	Co	Al	S	Be	Cu
	%	%	%	%	%	%	%	%	%	%
	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.
W. Min	0.020									
Mean	0.062	0.029	0.004	0.009	0.014	0.005	0.035	0.012	<0.0000	63.0
W. Max	0.15						0.050			


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