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Reference No. TAC 2023/052 SQ366920 Maestrini Srl
Component and assembly tests on Through-hull fittings, Seacocks and Hosetails in Bronze (EN ISO 9093:2021, sections 4.3 and Annex B, 4.4 and Annex A, 4.5.3, 4.5.4)

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

A.1) Bronze Through-hull outlet (Art. 2051), rated Dn 1/2" through Dn 5": 2051D (Dn 1/2"), 2051E (3/4"), 2051F (1"), 2051G (1-1/4"), 2051H (1-1/2"), 2051I (2"), 2051L (2-1/2"), 2051M (3"), 2051P (4"), 2051Q (5").

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

- Art. 2057 Bronze Through-hull outlet with inclined head: 2057D (Dn 1/2"), 2057E (3/4"), 2057F (1"), 2057G (1-1/4"), 2057H (1-1/2"), 2057I (2"), 2057L (2-1/2"), 2057M (3"), 2057P (4"), 2057Q (5");
- Art. 2043 Bronze Through-hull outlet with flat head: 2043D (Dn 1/2"), 2043E (3/4"), 2043F (1"), 2043G (1-1/4"), 2043H (1-1/2"), 2043I (2");
- Art. 2052 Bronze Through-hull outlet with reverse inclined head: 2052D (Dn 1/2"), 2052E (3/4"), 2052F (1"), 2052G (1-1/4"), 2052H (1-1/2"), 2052I (2"), 2052L (2-1/2"), 2052M (3"), 2052P (4"), 2052Q (5");
- Art. 2054 Bronze Through-hull outlet with hose tail: 2054D (Dn 1/2"), 2054E (3/4"), 2054F (1"), 2054G (1-1/4"), 2054H (1-1/2"), 2054I (2"), 2054L (2-1/2"), 2054M (3"), 2054P (4"), 2054Q (5");
- Art. 2058 Bronze Long Through-hull outlet: 2058E (Dn 3/4"), 2058F (1"), 2058G (1-1/4"), 2058H (1-1/2");
- Art. 2658 Bronze XL Through-hull outlet: 2658F (Dn 1"), 2658G (1-1/4"), 2658H (1-1/2"), 2658I (2"), 2658L (2-1/2"), 2658M (3");
- Art. 2657 Bronze XL Through-hull outlet with inclined head: 2657F (Dn 1"), 2657G (1-1/4"), 2657H (1-1/2"), 2657I (2"), 2657L (2-1/2"), 2657M (3").

Motives for inclusion: the standard-length through-hull fittings (2051, 2057, 2043, 2052, 2054) 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, the same length and thickness of the stem and (save for minor differences due to the different machining cycles) the same overall length of the fitting. The longer fittings are used for installation on thicker hulls where a longer stem is required to pass through the hull. The head of the 2058 fitting has the same shape and diameter as the 2051, while the XL models 2657 and 2658 are made from the same casting and have a head diameter slightly larger than the other fittings.

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A.2) Bronze "high flow" intake strainer with wide slots (Art. 2049), rated Dn 1/2" through Dn 5": 2049D (Dn 1/2"), 2049E (3/4"), 2049F (1"), 2049G (1-1/4"), 2049H (1-1/2"), 2049I (2"), 2049L (2-1/2"), 2049M (3"), 2049P (4"), 2049Q (5").

The type approval of this intake strainer is extended to the following models:

- Art. 2050 Bronze intake strainer: 2050D (Dn 1/2"), 2050E (3/4"), 2050F (1"), 2050G (1-1/4"), 2050H (1-1/2"), 2050I (2"), 2050L (2-1/2"), 2050M (3"), 2050P (4");
- Art. 2064: Bronze round full slot intake strainer with fixing holes: 2064F (Dn 1").

Motives for inclusion: for each value of Dn the stems of the 2050 and 2064 fittings are as long as those of the 2049 or shorter, as per the enclosed Annex 2.

A.3) Full bronze F.F. drainable ball valve "Vittoria" with polymer ball (Art. 28910), rated Dn 1/2" through Dn 4": 28910D (Dn 1/2"), 28910E (3/4"), 28910F (1"), 28910G (1-1/4"), 28910H (1-1/2"), 28910I (2"), 28910L (2-1/2"), 28910M (3"), 28910P (4"). The type approval of this valve is extended to the following valve models:

- Art. 28210, same as 28910 with ball in bronze instead of acetal polymer: 28210D (Dn 1/2"), 28210E (3/4"), 28210F (1"), 28210G (1-1/4"), 28210H (1-1/2"), 28210I (2"), 28210L (2"1/2), 28210M (3"), 28210P (4");
- Art. 28900 Full bronze F.F. ball valve "Vittoria" with polymer ball (same as 28910 without draining ports): 28900D (Dn 1/2"), 28900E (3/4"), 28900F (1"), 28900G (1-1/4"), 28900H (1-1/2"), 28900I (2"), 28900L (2-1/2"), 28900M (3"), 28900P (4");
- Art. 28200 same as 28900 with ball in bronze instead of acetal polymer: 28200D (Dn 1/2"), 28200E (3/4"), 28200F (1"), 28200G (1-1/4"), 28200H (1-1/2"), 28200I (2"), 28200L (2-1/2"), 28200M (3"), 28200P (4");
- Art. 28920 Full bronze F.F. ball valve "Vittoria" with flanged body and polymer ball (same as 28910 with fixation flange integral to the body): 28920D (Dn 1/2"), 28920E (3/4"), 28920F (1"), 28920G (1-1/4"), 28920H (1-1/2"), 28920I (2");
- Art. 28220 same as 28920 with ball in bronze instead of acetal polymer: 28220D (Dn 1/2"), 28220E (3/4"), 28220F (1"), 28220G (1-1/4"), 28220H (1-1/2"), 28220I (2").

Motives for inclusion: while for each value of Dn the three models of valve share the same dimensional proportions, as per the dimensional tables shown on the enclosed Annex 3, the models 28900 (identical to 28910 but without draining ports) and 28920 (with a flange integral to the valve body for a firmer installation on the hull) can be considered structurally stronger than 28910; for each valve design the model with the bronze ball can be considered stronger than the identical valve with the acetal polymer ball.

A.4) "Roma" Bronze heavy duty male threaded hosetail (Art. 2156) rated Dn 1/2" through Dn 5": 2156D*xxx (Dn1/2"), 2156E*xxx (3/4"), 2156F*xxx (1"), 2156G*xxx (1-1/4"), 2156H*xxx (1-1/2"), 2156I*xxx (2"), 2156L*xxx (2-1/2"), 2156M*xxx (3"), 2156P*xxx (4"),

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2156Q*xxx, xxx being the hose size (19 mm through 127 mm). The complete list of hosetails is shown on the enclosed Annex 4.

B) Choice of the representative models and sizes.

The following representative models and sizes were agreed for the testing:

- Art. 2051D (1/2") and 2051G (1-1/4");
- Art. 2049D (1/2") and 2049G (1-1/4");
- Art. 28910D (1/2") and 28910G (1-1/4").
- Art. 2156D*19 (1/2" x 19 mm) and 2156G*30 (1-1/4" x 30 mm)

C) Component and assembly tests as per EN ISO 9093:2021 section 4.3 and Annex B, section 4.4 and Annex A, section 4.5.3, section 4.5.4.

C-1) Component test as per EN ISO 9093:2021 section 4.3 and Annex B

a) Samples of the representative models 2051D, 2049D, 28910D, 2156D*19, 2051G, 2049G, 28910G and 2156G*30 completed an accelerated test involving cyclic exposure to salt mist, wet and dry conditions as per ISO 14993:2018, consisting of 30 consecutive cycles, each of eight hours, for a total exposure of 240 hours. The test was executed by EN ISO/IEC 17025:2018-accredited PHOENIX TESTLAB GmbH, 32825 Blomberg (FRG), accreditation certificate D-PL-17186-01-03 (Ref. Test Lab Report No. U231213E1, date of issue 28th August 2023).

b) the exposed samples completed the strength 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. 2051D 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. 2049D 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. 28910D 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. 2156D*19 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.

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- Art. 2051G 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. 2049G 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. 28910G 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. 2156G*30 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) Component test as per EN ISO 9093:2021, Section 4.4 and Annex A.2. The components were individually fitted to a rigid baseplate and subjected to the application of the force requided according to the nominal size of the component under test:

- Art. 2051D 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. 2049D 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. 28910D 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. 2156D*19 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. 2051G 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. 2049G 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.

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- Art. 28910G 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. 2156G*30 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-3) Assembly test as per EN ISO 9093:2021, Section 4.4 and Annex A.3. For each representative nominal size, an assembly consisting of a through-hull outlet 2051, a valve 28910 and a hosetail 2156 was installed on a rigid vertical plate, with the stem of the through-hull outlet 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 2051D + 28910D + 2156D*19; the assembly showed no leakage to the outside of the assembly when subjected to an internal water pressure of 1 bar and the seacock remained operable;
- 2224N applied to the assembly of 2051G + 28910G + 2156G*30; the assembly showed no leakage to the outside of the assembly when subjected to an internal water pressure of 1 bar and the seacock remained operable;

The assemblies were then disassembled and the components assessed:

- The through-hull outlet 2051D did not show any deformation or sign of damage effecting its function; the seacock 28910D did not show sign of damage and remained operable; the hosetail 2156D*19 did not show any deformation or sign of damage effecting its function.
- The through-hull outlet 2051G did not show any deformation or sign of damage effecting its function; the seacock 28910G did not show sign of damage and remained operable; the hosetail 2156G*30 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, 3 and 4.

C-4) High temperature operating test as per EN ISO 9093:2021, Section 4.5.3

The seacocks 28910D and 28910G were filled with water and kept at 60°C for 24 hours, retaining their operability at the end of the conditioning.

C-5) Low temperature operating test as per EN ISO 9093:2021, Section 4.5.4

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The seacocks 28910D and 28910G were filled with salt water (as defined in ISO 14993:2018 clause 4, NaCl concentration 50 +/- 5 g/l) and kept at 0°C for 24 hours, retaining their operability at the end of the conditioning.

Quarona, 25th October 2023

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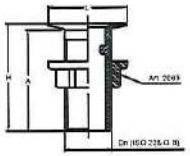
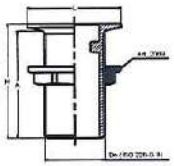
2052



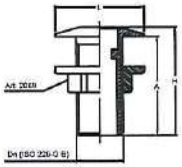
L	49	49	56	65	72	84	112	124	150	190
H	62	71	89	81,5	99,3	109	109,5	99,3	210	252
A	58	66	64	76,5	94	95	123	151	202	251
Dn	1/2"	3/4"	1"	1"1/4	1"1/2	2"	2"1/2	3"	4"	5"

2043



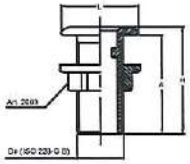
L	49	49	56	65	72	84	
H	62	71	89	89	99	109	
A	58	66	64	76	94	95	
Dn	1/2"	3/4"	1"	1"1/4	1"1/2	2"	

2057



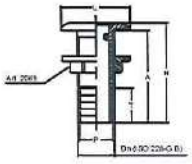
L	49	49	56	65	72	84	112	124	150	191
H	64	72,5	89,5	91,5	109	102,5	132,3	169	209,5	242,5
A	58	66	63	75	93	95	123	153,5	203	252
Dn	1/2"	3/4"	1"	1"1/4	1"1/2	2"	2"1/2	3"	4"	5"

2051



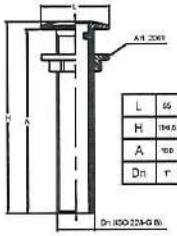
L	49	49	56	65	72	84	112	124	150	191
H	63	71	89	81,5	99,3	109	132	169	209	252
A	58	66	63	76	93	95	123	151	200	252
Dn	1/2"	3/4"	1"	1"1/4	1"1/2	2"	2"1/2	3"	4"	5"

2054



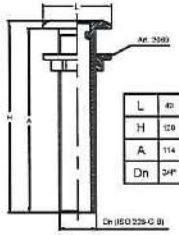
P	19,5	24	36	38,5	44	50	71,5	84,5	100	135
L	49	49	56	65	72	84	112	124	150	190
H	63	71	89	81,5	99,3	109	132	169	209	252
A	58	65	63	75	93	95	123	151	200	252
T	23	25	36	36	36	42	46	60	63	68
Dn	1/2"	3/4"	1"	1"1/4	1"1/2	2"	2"1/2	3"	4"	5"

2057



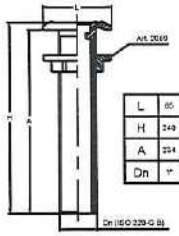
L	65	75	85	100	120	150
H	194,5	167	197,3	195,5	249	249
A	169	169	190	190	230,5	230,5
Dn	1"	1"1/4	1"1/2	2"	2"1/2	3"

2058



L	40	56	65	72
H	126	126	126	120
A	114	114	113,5	113,5
Dn	3/4"	1"	1"1/4	1"1/2

2056



L	65	75	85	100	120	150
H	240	240	240	240	240	240
A	224	224	222	222	221	221
Dn	1"	1"1/4	1"1/2	2"	2"1/2	3"

Representative model: Art. 2051 Bronze Through-hull Outlet, representative of through hull outlets 2043, 2052, 2054, 2057, 2058, 2657, 2658.

Component test (EN ISO 9093:2021 section 4.3 and Annex B):
- 2051D (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.
- 2051G (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.

Component test (EN ISO 9093:2021 section 4.4 and Annex A.2):
- 2051D (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.
- 2051G (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.

Assembly test (EN ISO 9093:2021 section 4.4 and Annex A.3), on an assembly consisting of:
- 2051 Bronze Through-hull Outlet, representative of through hull outlets 2043, 2052, 2054, 2057, 2058, 2657, 2658 as well as of intake strainers 2049, 2050, 2054;
- 28910 Full Bronze F.F. drainable ball valve "Vittoria" w. polymer ball, representative of valves 28210, 28900, 28200, 28920, 28220;
- 2156 Bronze hosetail.

- 2051D + 28910D + 2156D*19: Applied force 1500 N, the assembly showed no leakage to the outside of the assembly when subjected to an internal pressure of 0,1 MPa (1 bar), the seacock remained operable.
- 2051G + 28910G + 2156G*30: Applied force 2224 N, the assembly showed no leakage to the outside of the assembly when subjected to an internal pressure of 0,1 MPa (1 bar), the seacock remained operable

Assessment of the components after the disassemby:
- Through hull outlet 2051D: did not show any deformation or sign of damage effecting its function.
- Through hull outlet 2051G: did not show any deformation or sign of damage effecting its function.
- Seacock 28910D: did not show sign of damage and remained operable.
- Seacock 28910G: did not show sign of damage and remained operable.
- Hosetail 2156D*19: did not show any deformation or sign of damage effecting its function.
- Hosetail 2156G*30: did not show any deformation or sign of damage effecting its function.

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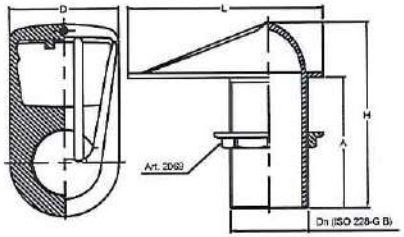


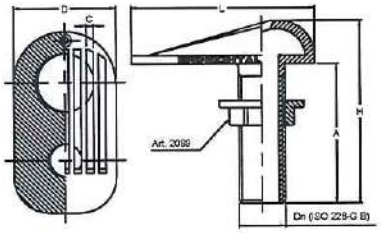


Fig. 1

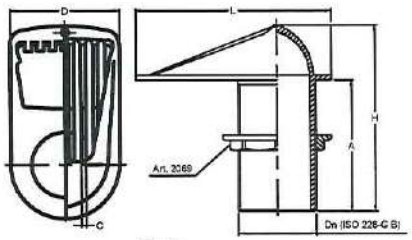
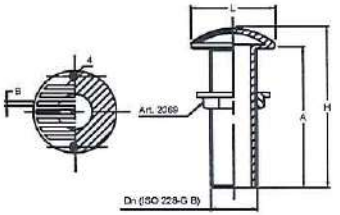


Fig. 2



2049

H	96	146	146	130	140	158	187	217	265	365
A	72	115	115	94	100	112	128	152	200	250
L	92	110	110	124	137	158	202,5	221,5	286	376
D	50	54	54	65	71	82	111	124	148,5	190
Dn	1/2"	3/4"	1"	1"1/4	1"1/2	2"	2"1/2	3"	4"	5"

2050

C	4	4	4	4	4	4	5,5	5,5	5,5
H	96	103,5	108	117	129	144	167	217	265
A	72	78,5	81,5	89	99	109	128	152	200
L	92	103	107	118	132	152	202,5	221,5	286
D	50	58	61	65	70	85	111	124	148,5
Dn	1/2"	3/4"	1"	1"1/4	1"1/2	2"	2"1/2	3"	4"
Fig.	1	1	1	1	1	1	2	2	2

2064

L	59
H	114,5
A	100
B	3
Dn	1"

Representative model: Art. 2049 Bronze "high flow" intake strainer w. wide slots, representative of intake strainers 2050, 2064.

Component test (EN ISO 9093:2021 section 4.3 and Annex B):
- 2049D (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.
- 2049G (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.

Component test (EN ISO 9093:2021 section 4.4 and Annex A.2):
- 2049D (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.
- 2049G (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.

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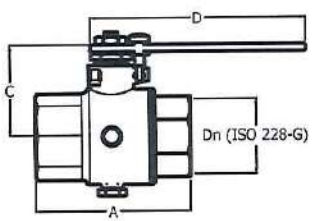
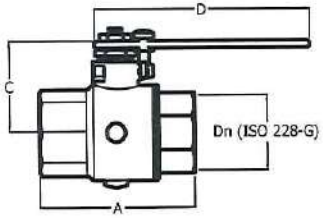
28210 - 28910



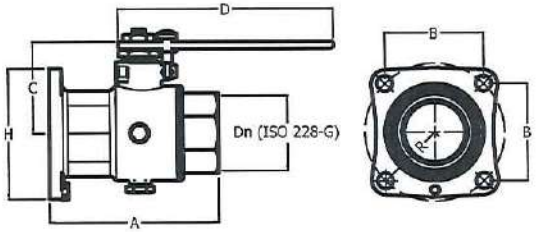
A	56	72	86	97	105	126	161	178	223
C	37	41	49	57	69	80	104	111	132
D	85	85	120	120	152	152	211	211	290
Dn	1/2"	3/4"	1"	1"1/4	1"1/2	2"	2"1/2	3"	4"

28200 - 28900



A	56	72	86	97	105	126	161	178	223
C	37	41	49	57	69	80	104	111	132
D	85	85	120	120	152	152	211	211	290
Dn	1/2"	3/4"	1"	1"1/4	1"1/2	2"	2"1/2	3"	4"

28220 - 28920



A	60	78	94	105	115	135	170	188	235
C	37	41	49	57	69	80	104	111	132
D	85	85	120	120	152	152	211	211	290
H	55	63	75	92	93	111	155	164	185
B	39	43,5	53,5	59,5	70	80	121,5	130	148,5
R	27,5	30,5	37,5	42	48,5	56,5	86	92	105
Dn	1/2"	3/4"	1"	1"1/4	1"1/2	2"	2"1/2	3"	4"

Representative model: Art. 28910 Full Bronze F.F. drainable ball valve "Vittoria" w. polymer ball, representative of valves 28210, 28900, 28200, 28920, 28220.

Component test (EN ISO 9093:2021 section 4.3 and Annex B):
- 28910D (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.
- 28910G (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.

Component test (EN ISO 9093:2021 section 4.4 and Annex A.2):
- 28910D (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.
- 28910G (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.

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Assembly test (EN ISO 9093:2021 section 4.4 and Annex A.3), on assembly consisting of:
- 2051 Bronze Through-hull Outlet, representative of through hull outlets 2043, 2052, 2054, 2057, 2058, 2657, 2658 as well as of intake strainers 2049, 2050, 2064;
- 28910 Full Bronze F.F. drainable ball valve "Vittoria" w. polymer ball, representative of valves 28210, 28900, 28200, 28920, 28220;
- 2156 Bronze hosetail.

- 2051D + 28910D + 2156D*19: Applied force 1500 N, the assembly showed no leakage to the outside of the assembly when subjected to an internal pressure of 0.1 MPa (1 bar), the seacock remained operable.
- 2051G + 28910G + 2156G*30: Applied force 2224 N, the assembly showed no leakage to the outside of the assembly when subjected to an internal pressure of 0.1 MPa (1 bar), the seacock remained operable.

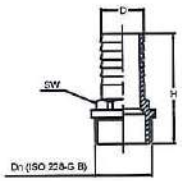
Assessment of the components after the disassembly:
- Through hull outlet 2051D: did not show any deformation or sign of damage effecting its function.
- Through hull outlet 2051G: did not show any deformation or sign of damage effecting its function.
- Seacock 28910D: did not show sign of damage and remained operable.
- Seacock 28910G: did not show sign of damage and remained operable.
- Hosetail 2156D*19: did not show any deformation or sign of damage effecting its function.
- Hosetail 2156G*30: did not show any deformation or sign of damage effecting its function.

High temperature operating test on seacocks(EN ISO 9093:2021 section 4.5.3)

- Seacock 28910D: filled with water and kept at 60 degrees C for 24 hours, at the end of the conditioning retained its operability.
- Seacock 28910G: filled with water and kept at 60 degrees C for 24 hours, at the end of the conditioning retained its operability.

Low temperature operating test on seacocks(EN ISO 9093:2021 section 4.5.4)

- Seacock 28910D: filled with salt water (as defined in ISO 14993:2018 clause 4, NaCl concentration 50 +/- 5 g/l) and kept at 0 degrees C for 24 hours, at the end of the conditioning retained its operability.
- Seacock 28910G: filled with salt water (as defined in ISO 14993:2018 clause 4, NaCl concentration 50 +/- 5 g/l) and kept at 0 degrees C for 24 hours, at the end of the conditioning retained its operability.



Dn	1/2"	1/2"	3/4"	3/4"	3/4"	3/4"	1"	1"	1"	1"	1"	1"1/4	1"1/4	1"1/4	1"1/4	1"1/4	1"1/2	1"1/2	1"1/2
D	19	20	16	19	20	25	20	25	30	32	35	30	32	33	35	38	40	38	40	45
H	54,5	54,5	56	56	56	57	59	59	60	60	60	70	70	70	70	71	71	71	71	71
SW	22	23	19	22	23	26	22	28	34	34	39	34	36	37	39	42	44	42	44	50

Dn	1"1/2	2"	2"	2"	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2	3"	3"	3"	3"	4"	4"	4"	5"	5"
D	50	50	51	60	60	63	64	65	70	75	76	75	76	77	90	100	102	110	125	127	
H	71	81	81	81	89	89	89	89	90	91	91	99,5	99,5	99	101,5	115	115	115	136,5	136,5	
SW	55	55	55	64	65	67	67	67	75	81	81	81	81	80	96	107	110	118	133	135	

Representative models: Bronze male threaded hosetails Art. 2156D*19 (1/2" x 19 mm) and Art. 2156G*30 (1-1/4" x 30 mm).

Component test (EN ISO 9093:2021 section 4.3 and Annex B):
- 2156D*19 (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.
- 2156G*30 (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.

Component test (EN ISO 9093:2021 section 4.4 and Annex A.2):
- 2156D*19 (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.
- 2156G*30 (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.

Assembly test (EN ISO 9093:2021 section 4.4 and Annex A.3), on an assembly consisting of:
- 2051 Bronze Through-hull Outlet, representative of through hull outlets 2043, 2052, 2054, 2057, 2058, 2657, 2658 as well as of intake strainers 2049, 2050, 2064;
- 28910 Full Bronze F.F. drainable ball valve "Vittoria" w. polymer ball, representative of valves 28210, 28900, 28200, 28920, 28220;
- 2156 Bronze hosetail.

- 2051D + 28910D + 2156D*19: Applied force 1500 N, the assembly showed no leakage to the outside of the assembly when subjected to an internal pressure of 0.1 MPa (1 bar), the seacock remained operable.
- 2051G + 28910G + 2156G*30: Applied force 2224 N, the assembly showed no leakage to the outside of the assembly when subjected to an internal pressure of 0.1 MPa (1 bar), the seacock remained operable

Assessment of the components after the disassembly:
- Through hull outlet 2051D: did not show any deformation or sign of damage effecting its function.
- Through hull outlet 2051G: did not show any deformation or sign of damage effecting its function.
- Seacock 28910D: did not show sign of damage and remained operable.
- Seacock 28910G: did not show sign of damage and remained operable.
- Hosetail 2156D*19: did not show any deformation or sign of damage effecting its function.
- Hosetail 2156G*30: did not show any deformation or sign of damage effecting its function.

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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 Time	Recalculation Date Time	Origin	Method Name	Method Version	Operator Name	Correction Type	Type Corr Sample Name
FONDERIA MODERNA/270/3-2050D-1	Unknown	2023-05-26 3:21:51 PM	2023-05-26 3:21:51 PM	Measured	Cu-50MO			None	

Check Type	Check Status	Grade Verification Name	Grade Verification Similarity	Grade Search Name	Grade Search Similarity
GradeWarning	Ok	CB499K-UBA	100 %		0 %

FORNITORE	NR. BOLLA	ARTICOLO	LEGA	RIF.NORMA	CLIENTE	DATA BASE	NOTE		
FONDERIA MODERNA	270	3-2050D-1	CB499K-UBA			MAESTRINI			

Elements **Conc.**

Meas.	Zn	Pb	Sn	P	Mn	Fe	Ni	Si	Cr	As
	%	%	%	%	%	%	%	%	%	%
	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.
W. Min	4.00	0.20	4.00				0.100			
Mean	5.61	2.98	4.54	<0.002	<-0.001	0.16	0.48	<-0.002	<-0.0002	0.013
W. Max	6.00	3.00	6.00	0.040		0.30	0.60			

Meas.	Sb	Bi	Ag	Al	S	Cu				
	%	%	%	%	%	%				
	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.				
Mean	0.027	<-0.018	0.021	<-0.004	0.024	86.2				
W. Max	0.100				0.040					

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CERTIFICATO DI COLLAUDO

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
SCROLAVEZZA/26.10.21/3-2049M-1/EN	Unknown	2021-10-26 3:08:52 PM	2021-10-26 3:06:52 PM	Measured	Cu-50MO			None	

Check Type	Check Status	Grade Verification Name	Grade Verification Similarity	Grade Search Name	Grade Search Similarity
GradeWarning	Ok	CB491K.	100 %		0 %

FORNITORE	NR. BOLLA	ARTICOLO	LEGA	RIF.NORMA	CLIENTE	DATA BASE	NOTE
SCROLAVEZZA	26.10.21	3-2049M-1	CB491K.	EN		MAESTRINI	

Elements **Conc.**

Meas.	Zn	Pb	Sn	P	Mn	Fe	Ni	Si	Cr	As
	%	%	%	%	%	%	%	%	%	%
	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.
W. Min	4.00	4.00	4.00							
Mean	5.55	5.68	4.62	0.012	<-0.001	0.089	0.46	<0.004	<0.0005	0.013
W. Max	6.00	6.00	6.00	0.100		0.30	2.00	0.010		

Meas.	Sb	Bi	Ag	Al	S	Cu				
	%	%	%	%	%	%				
	Conc.	Conc.	Conc.	Conc.	Conc.	Conc.				
Mean	0.024	<-0.011	0.018	<-0.003	0.036	83.5				
W. Max	0.25				0.100					

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