3.1 MEDICAL GAS NETWORK

3.1.1 Copper Pipes and Parts (medical grade)
(PCMGS series)

G. Samaras can offer all necessary medical gas network parts. Copper pipes are in accordance with EN13348, DIN 1786 and DIN 17671 standards. Available temper types R290 (SF Cu/F37), R250 Half Hard, or R220 Soft, arsenic free, oil free, protected to their ends, characterized according to the regulations (K-L-M type, metric/imperial) for use in medical gases installations using silver welding of 40% content in silver, in neutral gas (N2) environment. G. Samaras SA uses **antimicrobial** copper pipes and connection parts for the construction of medical gas networks. This kind of copper is suitable for the prevention and/or elimination of various microbes, bacterias, fungi and viruses, ensuring maximum purity in supplying medical gases to the patient. The pipe flections are permitted up to diameter of 18mm according to the standard EN13348 and regulations DIN 1786 by using a special tool.

The copper fittings are oil free, suitable for medical gases installations and according to DIN 2856 and ISO 2016. They are manfactured by materials compatible and properly degreased in accordance with the standard ISO 15001.

CE Medical Grade

93/42 MED

Standard Copper Pipe EN13348 and Copper Connection Parts according to ISO2016

Diameter O.D. (mm)	Pipe (mm) Thickness (mm)				Copper Fitting Elbows (90°)	Copper Fitting Elbows (45°)	Copper Fitting Tees	Copper Fitting Couplings	Copper Fitting Couplings Reducing
8	0.6	**0.7**	**0.8**	–	–	–	–	–	–
10	0.6	**0.7**	**0.8**	**1.0**	•	•	•	•	–
12	0.6	**0.7**	**0.8**	**1.0**	•	•	•	•	→10
15	0.7	1.0	–	–	•	•	•	•	→12
18	0.9	1.0	–	–	•	•	•	•	→12, →15
22	0.9	1.0	–	–	•	•	•	•	→12, →15, →18
28	0.9	1.0	–	–	•	•	•	•	→15, →18, →22
35	1.0	1.2	1.5	–	•	•	•	•	→15, →18, →22, →28
42	1.0	1.2	1.5	–	•	•	•	•	→15, →18, →22, →28, →35
54	1.0	1.2	2.0	–	•	•	•	•	→22, →28, →35, →42
64	1.2	2.0	–	–	•	•	•	•	→54
66.7	1.2	–	–	–	–	–	–	–	–
76	1.5	2.0	–	–	•	•	•	•	→54, →64
89	1.5	2.0	–	–	•	•	•	•	→54, →64, →76
108	1.5	2.0	2.5	–	•	–	–	•	→42, →54, →76,→89

*CE0653 EN 13348, TEMPERS: **R220-Soft,** R250-Half Hard, R290-Hard, More dimensions are available on request in minimum quantity of 500kgrs/dimension, **Red:** Kitemark*

Brass Connection Parts for Welding

Diameter O.D.	Adapters		Racors			Tees
						
(mm)	Male	Female	Male	Female	Male-Female	Female
10	3/8″					
12	1/2″	1/2″	1/4″, 1/2″	1/2″	12×12	1/2″
15	1/2″, 3/4″	1/2″, 3/4″	1/2″, 3/4″	1/2″, 3/4″	15×15	1/2″
18	1/2″, 3/4″, 1″	1/2″, 3/4″, 1″	1/2″, 3/4″	1/2″, 3/4″	18×18	1/2″
22	1/2″, 3/4″, 1″, 1¼″	3/4″, 1″, 1¼″	3/4″	3/4″	22×22	1/2″, 3/4″
28	1/2″, 3/4″, 1¼″, 1½″	1″, 1¼″, 1½″	1″	1″	28×28	
35	1¼″, 1½″, 2″	1″, 1¼″, 1½″, 2″	1¼″		35×35	
42	1¼″, 1½″, 2″	1¼″, 1½″, 2″	1½″, 1¼″		42×42	
54	2″, 2½″	2″, 2½″				
64		2″, 2½″				

(other sizes or thicknesses can be delivered on request)

The brass connection parts are frequently being used within the Medical central or auxiliary gas systems. They are separated in two categories (Welding or with Thread) according to their mode of use. The specific items are suitable for use in systems where high pressure is applied.

Brass Connection Parts with Thread

Diameter O.D.	Nipple		American	English	Elbow				Caps		Racor
(inches)	Male	Reducing	Reducing	Reducing	Female-Female	Male-Female	Tees	Couplings	Male	Female	Straight
1/8	1/8	1/4	1/4	1/4							
1/4	1/4	3/8, 1/2	3/8, 1/2	3/8, 1/2							
3/8	3/8	1/2	1/2	1/2	3/8	3/8	3/8	3/8			
1/2	1/2	3/4, 1	3/4, 1	3/4, 1	1/2	1/2	1/2	1/2	•	•	1/2
3/4	3/4	1	1	1	3/4	3/4	3/4	3/4	•	•	3/4
1	1	1¼	1¼	1¼	1	1	1	1	•	•	1
1¼	1¼	1½	1½	1½	1¼	1¼	1¼	1¼	•	•	1¼

(other sizes or thicknesses can be delivered on request)

G.SAMARAS SA uses clamps and railways for the stabilization of the various network's pipes whereas they are being supplied according to the thickness of the pipes. The characterization of networks becomes with special self-adhesive stripes of various colors and signs that are indicated by ISO 7396-1, NFPA 99 standards. G.SAMARAS SA provides also copper welding materials which are consisted by the Corrosive Brazing Flux and the respective rods (Copper or Silver). The Copper rods are used for molding copper parts whereas the Silver rods are used for molding copper and bronze parts.

CLAMP FOR PIPE

Ø (mm)	Ø (in)
10	(1/8″)
12-15	(¼″)
15-19	(3/8″)
20-22	(½″)
25-30	(3/4″)
32-37	(1″)
40-45	(1¼″)
48-53	(1½″)
54-58	(2″)
59-63	(2″)
74-78	(2½″)
89-92	(3″)

RAILWAY

Railway MS 27/18
T-head Bolt M8×30
Cable Galvanized DIN 975 M8
Metal Anchor 8×30
Steel Anchors - Bolt 16×170
Steel Anchors - Bolt 20×234
up to Ø108

GS Rail aluminum
Set M8 Bolt/Nut
up to Ø35

TAPES FOR MEDICAL GASES

for Direction - Exhaust
for O_2 (White RAL 9010)
for N_2O (Blue RAL 5010)
for VAC (Yellow RAL 1018)
for AGSS (Magenta RAL 4010)
for AIR 8bar (Black RAL 9005 & white RAL 9010)
for Medical Air (Black RAL 9005 & White RAL 9010)
for N_2 (Black RAL 9005)
for CO_2 (Gray RAL 7037)

According to norms 7396-1, 5359, EN ISO 1089-3

COPPER WELDING MATERIALS

Silver Rods without Flux*
Copper Rods
Corrosive Brazing Flux

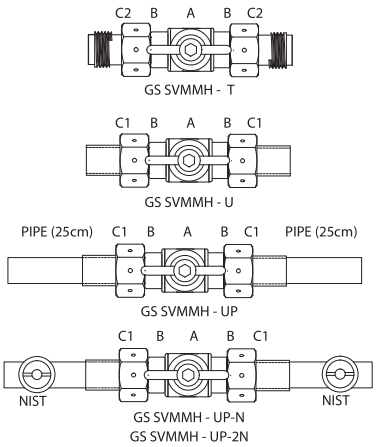
*from 10% up to 41% silver

CE Medical Grade

3.1.2 Racors / Shut-off valves / Nickel brass valves / Non-return valves for medical use / Electromagnetic motorized valves / Safety valves, in compliance with the directive PED 97/23/EC and 93/42/EC

93/42 MED MOP40bar

SET BALL VALVE-UNION

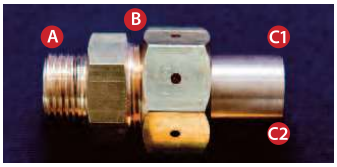


M-M ball valve*	Nut	Nipple C1 (output)	Nipple C2 (output)
A (input)	B (input)	welded	threaded
1/2″	1/2″	Ø15	3/8″
3/4″	3/4″	Ø18	1/2″
1″	1″	Ø22	3/4″
1¼″	1¼″	Ø28/Ø35	1″
1½″	1½″	Ø35/Ø42	1¼″

*available also in lockable version

G.SAMARAS SA uses Racors for minimum operation pressure of up to 40bar according to HTM 02-01. Internally they are flat and they bear a PTFE ring. In case of service, a red ring is placed inside the Racor whereas there is indication when it is open.

UNION-RACOR G.S.
with indication holes, according to HTM 02-01



		NIPPLE		
Nipple A (input)	Nut B (input)	C1 (output) welded	C2 (output) threaded	C3 (output) pressed
3/8″	1/2″	Ø15	3/8″	3/8″
1/2″	3/4″	Ø18	1/2″	1/2″
3/4″	7/8″	Ø22	3/4″F1	–
1″	M38×2,5	Ø28/Ø35F2	1″F2	–
–	1″	Ø22	3/4″	3/4″
–	1¼″	Ø28/Ø35	1″	1″
–	1½″	Ø35/Ø42	1¼″	1¼″
–	2″	Ø54/Ø42	1½″	2″

* F1: 3/8″ 36μm
F2: 12x28mm 100μm

C3 version and ball valve can be connected directly to flexible pipe

The nickel plated brass ball valves GS for medical gases and O_2 use are produced and certified in accordance with the European standards EN ISO 9001, EN ISO 13485 and EN ISO 15001. They are approved in accordance with the European standard for gas appliances in medical oxygen use in compliance with the directive PED 97/23/EC and 93/42/EC. They are suitable for gas at low pressure (up to 40bar). Available in the following sizes:

SHUT - OFF BALL VALVES MOP 40 bar **NON RETURN VALVES** MOP 16 bar

NPS Inches	DN (mm)	Suitable fittings	F-M with handle GS SVFMH	M-M with handle GS SVMMH	F-F with handle GS SVFFH	F-F with handle Lockable GS SVFFH-L	F-F with butterfly GS SVFFB	F-F with sensor for operation GS SVFFH-S	GS NV
1/4″	8	Ø10	•	•	•	•	•	–	•
3/8″	10	Ø12, Ø15	•	•	•	•	•	•	•
1/2″	15	Ø18	•	•	•	•	•	•	•
3/4″	20	Ø22	•	•	•	•	•	•	•
1″	25	Ø28	•	•	•	•	•	•	•
1¼″	32	Ø35	•	•	•	•	•	•	–
1½″	40	Ø42	•	•	•	•	•	•	–
2″	50	Ø54	•	•	•	•	•	•	–
2½″	65	Ø76	•	•	•	•	•	•	–
3″	80	Ø108	•	•	•	•	•	•	–

F: Female, M: Male, NV: Non return valve

Ball valve (S) Complete with sensor (it conveys an electrical impulse when operated) PN 40 ranging from DN1/4″ to DN2″ISO 228/I threaded ends.

Electromagnetic valve available in motorized 15,30 or 60 sec or manually (MOT)

F-F ball valve with handle - Lockable

M-M ball valve

Nipple valve

SAFETY VALVES

CE (D.E. 97/23/CE) / ATEX / ASME VIII Div. I UV

GSSV 0-16bar 1/2" or 3/8"

The Safety valves play a significant role for the MEDICAL GAS SOLUTIONS. Once the pressure exceeds the preset limit,the valve operates in order to relief the network and prevent from any potential damage. It is ideal for Medical Oxygen use and comes either in piped or free outlet in a range of 0.3-150 bar.

3.1.3 Special Tools for Pipe Network Installation

G. SAMARAS SA can provide special tools for copper pipes used in medical gas installations. The main advantages of those tools are the following:

- Accurate cutting, expanding, deburring and bending
- Perfect installation
- Cost effective (elimination of any additional spare parts)
- Compatibility to EN13348 and DIN1786

Deburring Tool for copper

Set expander
Ø10, Ø12, Ø15, Ø18, Ø22, Ø28, Ø35, Ø42

Mini Cutter up to ∅22

Normal Cutter up to ∅3–42

Set Bender manual ∅10-22

Extra size Cutter ∅6–67

3.1.4 Antistatic tubes - Plastic transparent flexible tubes - Fittings and nipples

The antistatic tubes are used, according to ISO 7396-1, in specific departments (MRI, where there is a demand for non magnetized materials), as flexible connection between pendants (surgeon, anesthesiologist, ICU) and suspended BHU and the medical gases network.

The antistatic tubes are manufactured according to EN ISO 5359 (replacing EN 739:1998) by PVC materials free of cadmium.

Antistatic Tubes
for O_2 (white RAL 9010) Ø6mm
for VAC (yellow RAL 1018) Ø6mm
for N_2O (blue RAL 5010) Ø6mm
for CO_2 (gray RAL 7037) Ø6mm
for AIR (black RAL 9005) Ø6mm
for AGSS (transparent)* Ø15,875mm

Antistatic flexible tubes for various medical gases

Antistatic flexible transparent tube made of PVC used in AGSS

Fittings and nipples for antistatic tubes