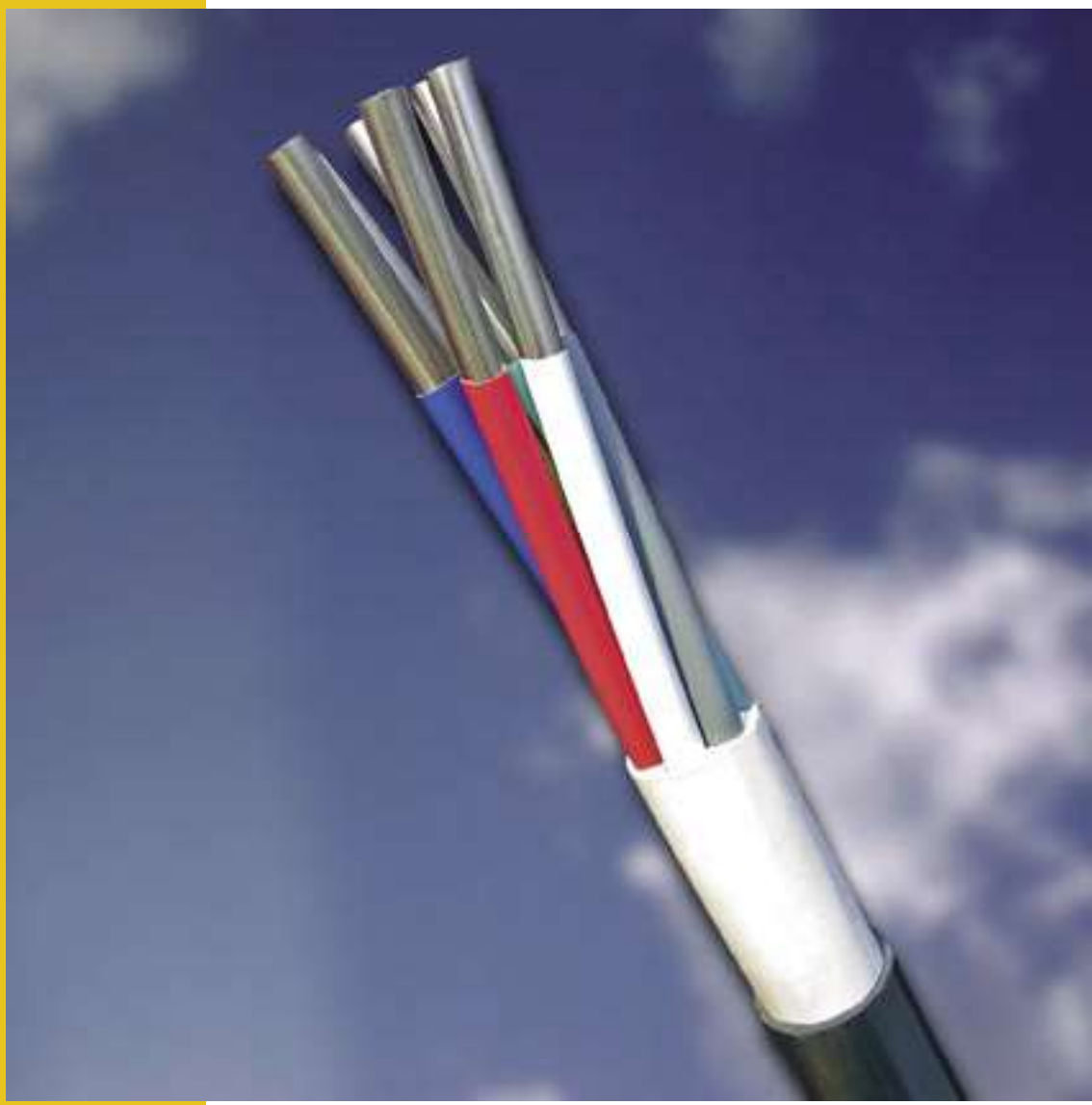
GS-MULTICORE TUBES



GS-HYDRO

GS-Multicore Tubes: Major Technical and Economical Benefits

GS-Hydro's multicore tubes are used within the marine (ship building), offshore, chemical, power and other industries for pneumatic and hydraulic remote control, measuring and monitoring systems.

Foto: Courtesy Kvaerner Masa-Yards

In addition to the multicore tubes, GS-Hydro also supplies the necessary connection tools and accessories such as heat shrinkable products, tube joint fittings, tube cutter and bending tools as well as trays, supports and binding tape for installation.

The main advantages of multicore tubes are:

- Fast, easy and cost-effiecient installation
- Completely maintenance-free and extremly well protected against mechanical damage, abrasion and corrosion
- Saves space
- Minimum waste of material
- Minimum amount of connections

GS-Hydro is the world's leading supplier of non-welded piping technology - "Piping without Welding" - whose experience and expertise range from engineering and prefabrication to installation, flushing and testing of complete piping systems. GS-Hydro's full range of products and services covers complete prefabricated *Piping systems*, customised *Piping modules* and all individual *Piping components* and *Pipes & Tubes* required for a total piping system. In addition, GS-Hydro also supplies machines for prefabrication and preparation of non-welded piping systems.

PIPING WITHOUT WELDING

INNOVATIVE TECHNOLOGY FOR...

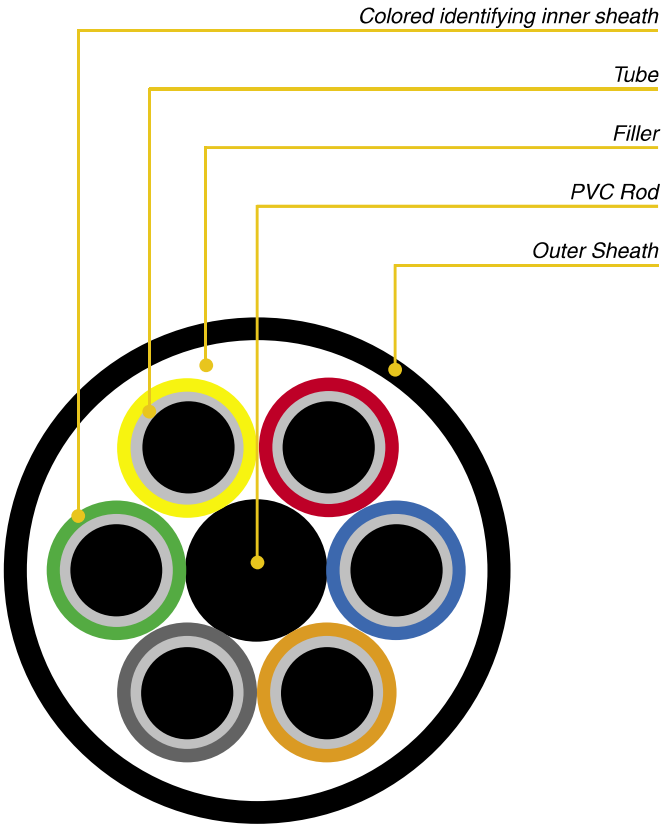
The multicore tube consists of one to nine stainless steel, copper or copper-alloy tubes laid up spirally inside an extruded outer PVC sheath.

Technical Data

Tube type	• Bare tube • Sheathed single tube • Multicore tube
Materials	• Stainless steel AISI 304/316/316L • Copper • Copper-nickel
Lenght	• Standard 100–300 m, up to 600 m packed on wooden drum
Tube diameter	• 6–15 mm (1/4”–1/2”)
Tube wall thickness	• 0.5–2.0 mm
No. of tubes per bundle	• 1–9 (max. 9core)
Outer sheath	• PVC, black color with marking
Individual tube sheath	• PVC, color identification

For easy identification and protection purposes each individual tube is PVC sheathed in a different color. The extruded outersheath is made of oil and sea water resistant, weather-proof, flame-retardant, corrosion and acid resistant PVC. The multicore tube outer sheath is continuously marked at every one meter throughout the entire length for easy installation. Heat shrinkable products provide complete water sealing and abrasion and corrosion protection under all conditions.

Cross Section View



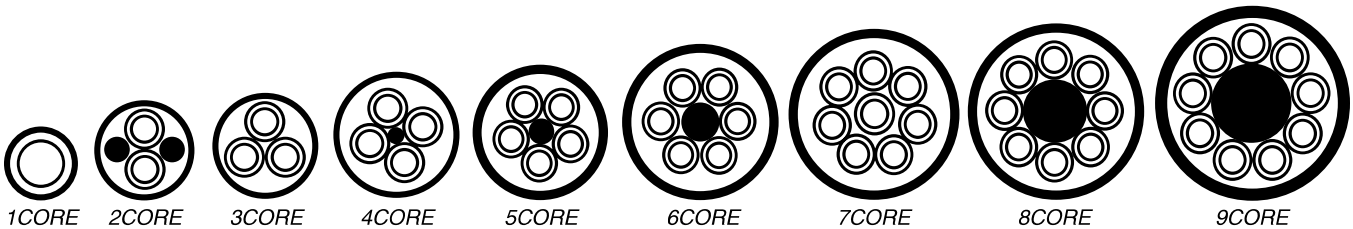
Tube Material

Material	National Standards			
	KS	JIS	ASTM	DIN
Stainless Steel	STS 304	SUS 304	304	1.4301
	STS 316	SUS 316	316	1.4401
	STS 316L	SUS 316L	316L	1.4404
Copper	C1220	C1220	C12200	SF–Cu
Copper–Nickel(90/10)	C7060	C7060	C70600	CuNi10Fe1Mn

Sheath Material

Name	Material	Remark
Rod	PVC	• Seawater and oil resistant • Flame retardant (IEC 60332 flammability test criteria) or halogen free (LDPE/HDPE)
Colored identifying sheath	PVC	
Filler	Synthetic rubber	
Outher sheath	PVC	

Schematic Structural Diagram



FAST, EASY AND COST-EFFICIENT INSTALLATION

The installation of the multicore tubes - the uncoiling from the wooden shipping drum, straightening, running and cutting – is done in the same manner as when installing electrical cables.

The multicore tubes are uncoiled directly from sturdy wooden reels onto ladder, perforated or flat-bar (or eq.) trays. Deck and/or bulkhead penetrations are made by either coaming or by appropriate penetration fittings. Suitable fittings such as straight union, male/female connector, penetration gland etc. are utilised for connection or termination of the tube. Multicore tubes can also be welded but the use of bite type fittings is recommended.

Repeated bending at the same point should be avoided in order to avoid breakage. Where there is a possibility of expansion and/or contraction along the line, proper provisions should be made for loops and curves along the tube line.

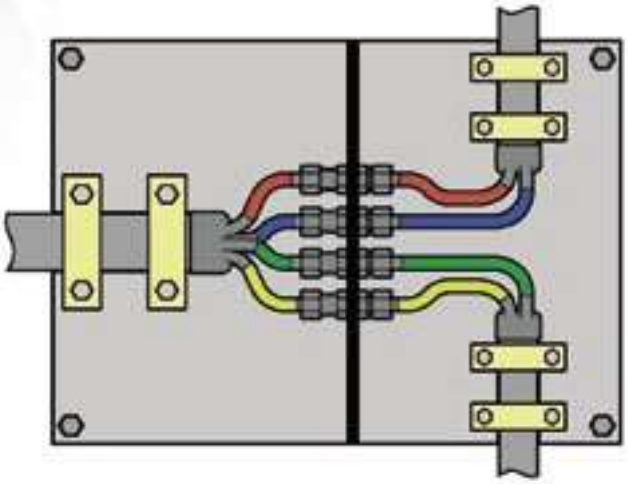
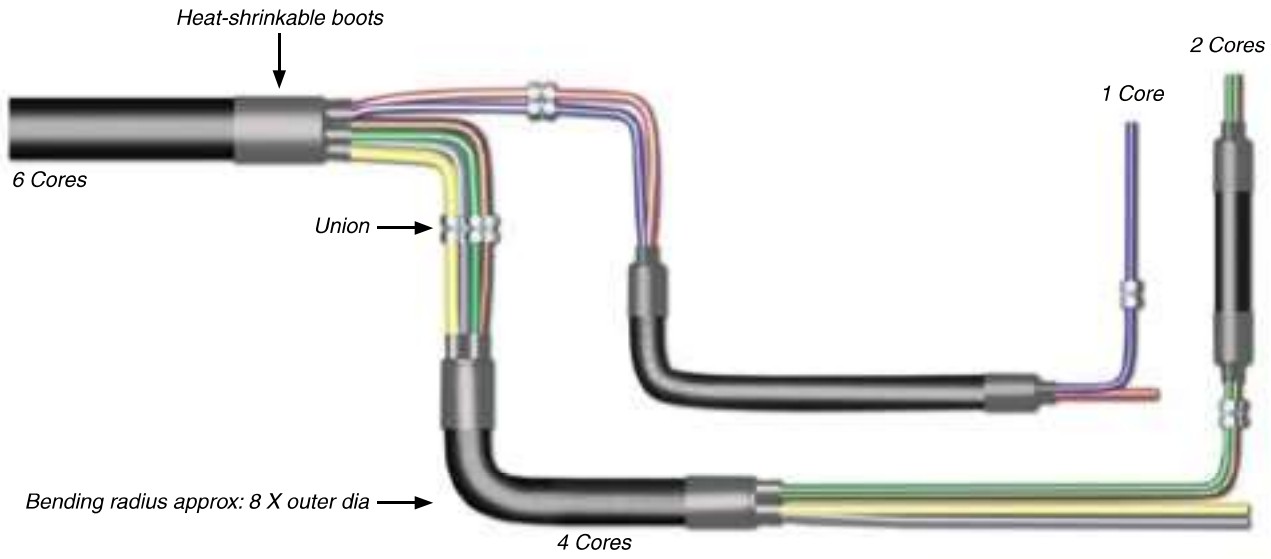


Foto: Courtesy Kvaerner Masa-Yards


Heat-shrinkable boots
2 Cores
1 Core
6 Cores
Union
Bending radius approx: 8 X outer dia
4 Cores

TECHNICAL DATA

Multicore Tubes – Metric Sizes

O.D. (mm) x Core	Bundle Weight (kg/m)						Overall diameter approx. (mm)
	Stainless Steel			Copper & Copper alloy			
	Wall Thickness (mm)			Wall Thickness (mm)			
	0.5	0.8	1.0	0.8	1.0	1.2	
6 x 1	0.15	0.18	0.20	0.20	0.22	-	9
6 x 2	0.60	0.67	0.71	0.70	0.74	-	19
6 x 3	0.75	0.86	0.92	0.90	0.97	-	20
6 x 4	0.82	0.96	1.04	1.10	1.19	-	23
6 x 5	0.90	1.08	1.18	1.14	1.25	-	24
6 x 6	1.04	1.25	1.37	1.34	1.47	-	27
6 x 7	1.15	1.39	1.53	1.40	1.56	-	27
6 x 8	1.40	1.68	1.84	1.60	1.78	-	32
6 x 9	1.60	1.92	2.01	1.85	2.05	-	34
8 x 1	0.20	0.25	0.28	0.27	0.31	0.34	11
8 x 2	0.73	0.83	0.89	0.87	0.94	0.97	23
8 x 3	0.85	1.02	1.12	1.07	1.18	1.28	24
8 x 4	1.00	1.20	1.33	1.29	1.43	1.56	28
8 x 5	1.30	1.52	1.67	1.59	1.77	1.93	31
8 x 6	1.50	1.82	2.00	1.94	2.15	2.34	33
8 x 7	1.63	1.93	2.15	2.08	2.33	2.56	33
8 x 8	1.90	2.35	2.60	2.52	2.80	3.04	41
8 x 9	2.10	2.67	2.95	2.88	3.20	3.49	43
10 x 1	-	0.30	0.34	-	0.37	0.41	13
10 x 2	-	1.10	1.18	-	1.24	1.32	28
10 x 3	-	1.50	1.60	-	1.68	1.81	29
10 x 4	-	1.80	1.97	-	2.09	2.26	33
10 x 5	-	2.00	2.20	-	2.33	2.55	37
10 x 6	-	2.15	2.40	-	2.57	2.83	40
10 x 7	-	2.28	2.52	-	2.80	3.10	40
10 x 8	-	2.95	3.20	-	3.60	3.95	48
10 x 9	-	3.30	3.80	-	4.15	4.54	51
12 x 1	-	0.36	0.41	-	0.39	0.45	15
12 x 2	-	1.38	1.42	-	1.44	1.50	33
12 x 3	-	1.81	1.96	-	1.91	2.08	38
12 x 4	-	2.13	2.37	-	2.26	2.53	39
12 x 5	-	2.44	2.70	-	-	-	40
12 x 6	-	2.70	3.00	-	-	-	48

O.D. (mm) x Core	PVC Sheathed Tube Weight (kg/m)						Overall diameter approx. (mm)
	Stainless Steel				Copper & Copper alloy		
	Wall Thickness (mm)				Wall Thickness (mm)		
	1.0	1.2	1.5	2.0	1.0	1.2	
10 x 1	0.34	0.38	0.43	0.51	0.37	0.41	13
12 x 1	0.41	0.46	0.53	0.63	0.44	0.49	15
15 x 1	0.52	0.58	0.67	-	0.56	0.63	18

Multicore Tubes – Imperial Sizes

O.D. (in.) x Core	Bundle Weight (kg/m)						Overall diameter approx. (mm)
	Stainless Steel				Copper & Copper alloy		
	Wall Thickness				Wall Thickness		
	0.035"	1.0 mm	0.049"	1.2 mm	0.035"	0.049"	
1/4" x 1	0.20	0.21	0.24	0.24	0.21	0.26	9
1/4" x 2	0.75	0.77	0.83	0.81	0.78	0.87	23
1/4" x 3	1.00	1.04	1.12	1.10	1.04	1.18	23
1/4" x 4	1.10	1.15	1.26	1.28	1.16	1.34	24
1/4" x 5	1.20	1.26	1.40	1.36	1.27	1.50	27
1/4" x 6	1.40	1.47	1.64	1.60	1.49	1.76	34
3/8" x 1	0.32	0.34	0.38	0.37	0.34	0.41	13
3/8" x 2	1.14	1.18	1.27	1.25	1.18	1.33	27
3/8" x 3	1.55	1.62	1.75	1.72	1.62	1.84	28
3/8" x 4	1.90	1.98	2.16	2.12	1.99	2.28	33
3/8" x 5	2.15	2.25	2.48	2.43	2.26	2.63	37
3/8" x 6	2.35	2.47	2.74	2.68	2.47	2.86	39
1/2" x 1	-	0.42	0.48	0.47	-	0.52	16
1/2" x 2	-	1.36	1.49	1.48	-	1.57	36
1/2" x 3	-	1.97	1.94	1.92	-	2.06	38
1/2" x 4	-	2.32	2.70	2.65	-	2.85	43

Maximum allowable working pressure

The maximum allowable working pressure (bar) for stainless steel, copper and copper-n ickel multicore tubes are as follows:

Seamed Stainless Steel Tube						
O.D. (mm)	Wall Thickness (mm)					
	0.5	0.8	1.0	1.2	1.5	2.0
6	160	270	350	-	-	-
8	120	195	250	310	-	-
10	95	155	195	240	310	-
12	-	125	160	195	250	350
15	-	-	125	155	195	270

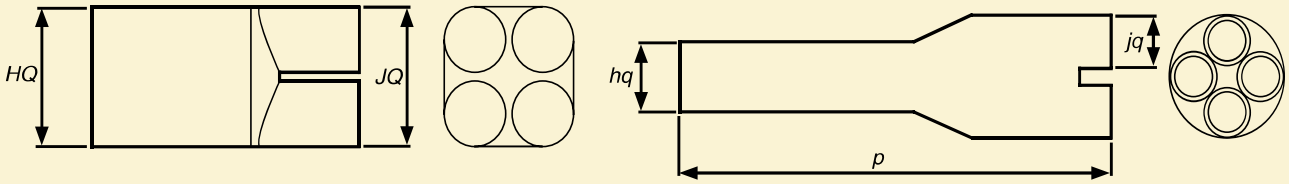
Seamed Stainless Steel Tube		
O.D. (in.)	Wall Thickness (in.)	
	0.035	0.049
1/4	275	410
3/8	180	264
1/2	140	200

Copper Tube						
O.D. (mm)	Wall Thickness (mm)			O.D. (in.)	W.T. (in.)	
	0.8	1.0	1.2		0.035	0.049
6	120	150	180	1/4	130	180
8	85	110	130	3/8	85	110
10	-	85	100	1/2	-	85
12	-	70	85			

Cu-Ni (90/10) Tube			
O.D. (mm)	Wall Thickness (mm)		
	1.0	1.4	1.5
10	130	190	200
12	-	160	170

Heat Shrinkable Boot

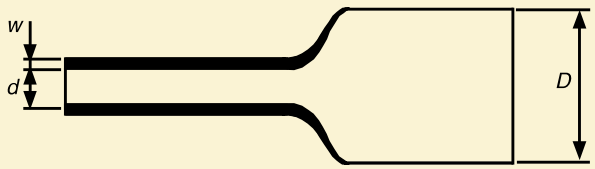
Material	Cross - linked polyolefin (flame retardant)	
Temperature	Operating temperature range	- 55°C ~ 100°C
	Minimum shrinking temperature	135°C



Type	Part no		Recovered (min.)			Suitable multicore tube
	HQ	JQ	hq	jq	p	
DCHB-02-1	30	15	9	4.1	70	O.D. 6 mm X 2CORE O.D. 8 mm X 2CORE
DCHB-02-2	50	21	23	7.6	119	O.D. 10 mm X 2CORE O.D. 12 mm X 2CORE
DCHB-03-1	35	15	17	4.6	76	O.D. 6 mm X 3CORE O.D. 8 mm X 2CORE
DCHB-03-2	43	21	23	7.6	99	O.D. 10 mm X 3CORE O.D. 12 mm X 3CORE
DCHB-04-1	35	15	12	3.0	95	O.D. 6 mm X 4CORE O.D. 8 mm X 4CORE
DCHB-04-2	47	21	23	6.4	165	O.D. 10 mm X 4CORE O.D. 12 mm X 4CORE
DCHB-05	60	30	24	7.5	180	O.D. 8 mm X 5CORE O.D. 10 mm X 5CORE O.D. 12 mm X 5CORE
DCHB-06-1	35	12	16	4.0	75	O.D. 6 mm X 6CORE O.D. 8 mm X 6CORE
DCHB-06-2	61	21	37	8.9	152	O.D. 10 mm X 6CORE O.D. 12 mm X 6CORE

Heat Shrinkable Sleeve

Material	Cross - linked polyolefin (flame retardant)	
Temperature	Operating temperature range	- 55°C ~ 100°C
	Minimum shrinking temperature	135°C



Type	D	d (min.)	w (nom.)
	Expanded	Recovered	Wall thickness Recovered after heating
DCHT 6/2	6	2	1.5
DCHT 12/4	12	4	1.5
DCHT 19/6	19	6	2.0
DCHT 27/8	27	8	2.0
DCHT 38/12	38	12	2.5
DCHT 50/118	50	18	2.5
DCHT 70/26	70	26	2.5

TOOLS AND ACCESSORIES

Tools and accessories include heat shrinkable products, tube joint fittings, tube cutter and bending tools as well as trays, supports and binding tape.