

## *The Science of Silence* - Engineered Solutions

- Exhaust Systems & Accessories
- SCR & DPF Aftertreatment
- Yacht Cranes, Davits & Passerelles
- Hatches, Doors, Portlights & Windows
- Prop-Shaft Systems
- Noise & Vibration Control
- Environmental Protection
- Halyard Network



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Pleasure Craft

Commercial

Superyacht



**Established in 1979, Halyard has developed an international reputation as market leaders for providing customers with high quality, technically advanced equipment making boating more comfortable.**

Managing engine noise, emissions and vibration, as well as overboard discharges, is becoming increasingly important as we all become far more responsible for the impact we have on the environment and our surroundings.

With in-house design and manufacture of individual components through to complete exhaust systems, Halyard offers the most advanced products available with a range of standard and bespoke solutions designed to suit your needs. We specialise in both water-cooled and dry exhaust systems and as distributors for Emigreen and IMS aftertreatment solutions can also provide DPF and SCR packages to meet the latest emissions requirements.

Whether you require a simple silencer, separator, hose, bellows, tube, connector or a sophisticated full bespoke exhaust system Halyard have the solution. In addition we are also distributors for Aquadrive antivibration drive systems, Seatorque shaft systems, Wave filtration products, Freeman watertight closures, Steelhead deck mounted lifting equipment, and noise insulation materials. We also supply Rubber Design mounts, bellows and bulkhead penetrations and a range of valves, couplings and thermal jackets. All products are supported by Halyard and our distributor and dealer network.

So whatever your project; yacht or cruiser, lifeboat, pilot boat, commercial vessel or superyacht, our designers will get involved from the initial stages, consulting, designing and specifying products and systems to best meet your requirements with a dedicated team managing each project from enquiry through to commissioning.





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Exhaust Systems and Accessories

Watercooled or dry systems, standard or bespoke risers spray heads, silencers, separators, DPF & SCR aftertreatment solutions

Standard product range:

- GRP silencers, separators, tube & connectors
- Moulded silencers & separators
- Rubber & silicone hose, bellows & connectors
- Clamps, supports & accessories

Bespoke solutions:

- Designed to meet customers requirements
- Water cooled or dry silencers
- Solutions for all high & medium speed engines
- Spray rings to DN700
- DPF & SCR solutions by Emigreen & IMS
- Lloyd's Type Approvals
- Underwater exhaust outlet design



The information published by Halyard indicates the general suitability of our products for the types of applications for which they are designed. We cannot accept design responsibility for any specific installation unless we have confirmed in writing that the overall installation design is correct following our approval of detailed drawings or our physical survey of the vessel or equipment in which it will be used.

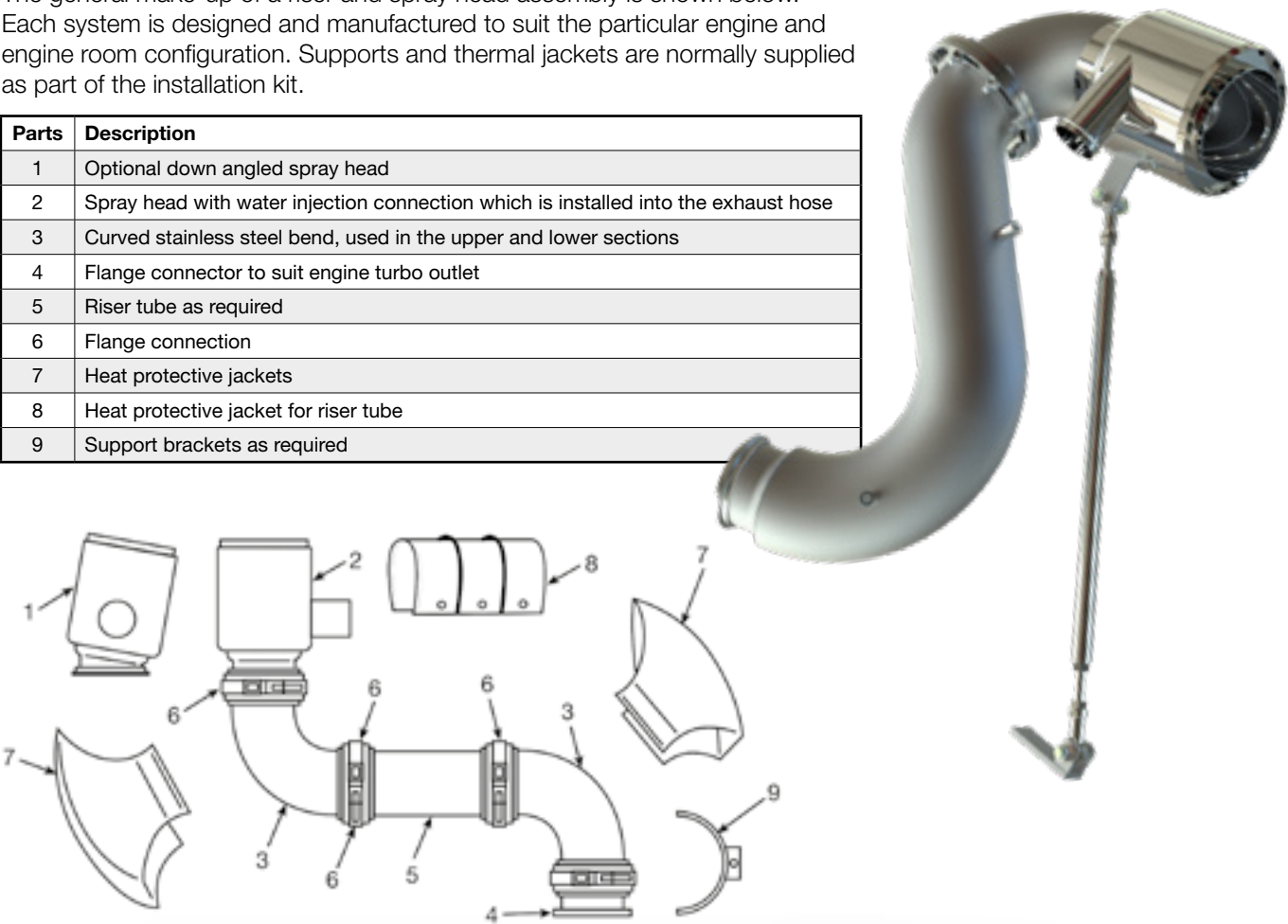


Exhaust Systems and Accessories

Risers and Spray Heads

The general make-up of a riser and spray head assembly is shown below. Each system is designed and manufactured to suit the particular engine and engine room configuration. Supports and thermal jackets are normally supplied as part of the installation kit.

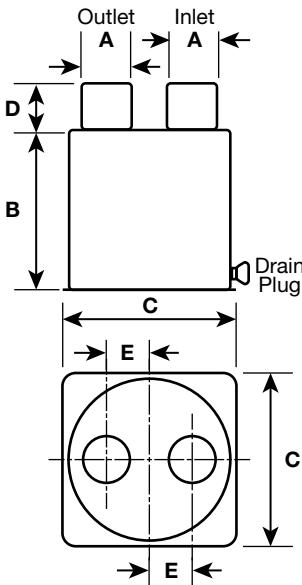
Parts	Description
1	Optional down angled spray head
2	Spray head with water injection connection which is installed into the exhaust hose
3	Curved stainless steel bend, used in the upper and lower sections
4	Flange connector to suit engine turbo outlet
5	Riser tube as required
6	Flange connection
7	Heat protective jackets
8	Heat protective jacket for riser tube
9	Support brackets as required



Composite Silencers and Separators

Lift Silencers - Top In Top Out

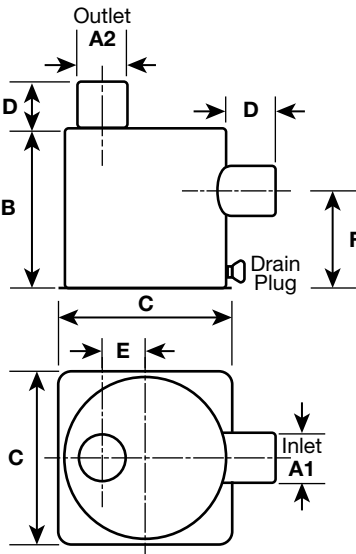
Lift Silencers - Top In Top Out								
Part No.	Reference	A		B	C	D	E	Weight kg
		inch	mm	mm	mm	mm	mm	
H001671	HTT005	1 1/2	38	158	200	60	43.5	1.5
H001673	HTT025	1 5/8	41	158	200	60	43.5	1.5
H001674	HTT030	1 5/8	41	230	200	60	43.5	1.9
H001675	HTT040	1 3/4	45	158	200	70	43.5	1.5
H001676	HTT045	1 3/4	45	230	200	70	43.5	1.9
H001677	HTT055	2	51	158	200	75	43.5	1.6
H001678	HTT065	2	51	255	275	75	68	3.3
H001679	HTT070	2	51	305	324	80	84	4.9
H001680	HTT085	2 3/8	60	255	275	90	68	3.5
H001681	HTT090	2 1/2	63	255	275	100	68	3.5
H001682	HTT110	3	76	255	275	115	68	3.7
H001683	HTT115	3 1/2	89	305	324	90	84	5.6
H001684	HTT120	4	102	305	324	150	70	5.6
H001685	HTT125	5	127	370	446	150	83	10.4
H001686	HTT130	6	152	370	446	150	102	10.7
H010299	HTT135	8	203	521	548	201	122	17.9
New Range of Moulded Lift Silencers - NOT Lloyd's Register Type Approved								
H025134	HTT065M	2	51	260	278	51	65	4.7
H025135	HTT110M	3	76	260	278	76	65	4.8



Drawings and dimensions are for guidance. Alternative sizes and configurations available on request.

Lift Silencers - Side In Top Out

Lift Silencers - Side In Top Out											
Part No.	Reference	A1		A2		B	C	D	E	F	Weight kg
		inch	mm	inch	mm	mm	mm	mm	mm	mm	
H001615	HST005	1 1/2	38	1.5	38	169	200	60	43.5	95	1.5
H001616	HST010	1 1/2	38	1.5	38	230	200	60	43.5	139	1.8
H001617	HST025	1 5/8	41	1.6	41	169	200	60	43.5	95	2.2
H001618	HST035	1 5/8	41	1.6	41	255	275	60	68	165	3.3
H001619	HST055	1 3/4	45	1.77	45	230	200	70	43.5	139	1.9
H009936	HST105	2	51	2	51	230	200	80	43.5	139	1.9
H009525	HST110	2	51	2	51	255	275	75	68	165	3.3
H001623	HST115	2	51	2	51	305	324	80	84	200	4.9
H001624	HST145	2 3/8	60	2.36	60	305	324	90	84	200	5.1
H001625	HST150	2 3/8	60	2.36	60	255	275	90	68	165	3.5
H010352	HST165	2 1/2	63	2.5	64	255	275	90	68	165	3.5
H009937	HST200	3	76	3	76	255	275	115	68	165	4.4
H001629	HST205	3	76	3	76	305	324	115	84	184	6
H001630	HST210	3 1/2	89	3.5	89	305	324	130	84	184	5.6
H001631	HST215	4	102	4	102	305	324	150	60	184	5.6
H001632	HST220	5	127	5	127	370	446	150	99	222	10
H001633	HST225	5	127	5	127	343	342	150	64	219	6.6
H001634	HST230	6	152	6	152	370	446	150	99	254	11.4
H001635	HST235	6	152	8	203	370	446	152	64	222	12.4
H001636	HST240	8	203	8	203	585	500	200	83	392	15.6
H017157	HST250	10	254	10	254	576	635	250	145	400	30.1
New Range of Moulded Lift Silencers - NOT Lloyd's Register Type Approved											
H025129	HST005M	1 1/2	38	1.5	38	260	370	38	65	160	4.7
H025130	HST025M	1 5/8	41	1.6	41	260	370	38	65	160	4.7
H025131	HST110M	2	51	2	51	260	370	51	65	160	4.7
H025132	HST165M	2 1/2	63	2.5	63	260	370	64	65	160	4.7
H025133	HST200M	3	76	3	76	260	370	76	65	160	4.8



Drawings and dimensions are for guidance. Alternative sizes and configurations available on request.



# Exhaust Systems and Accessories

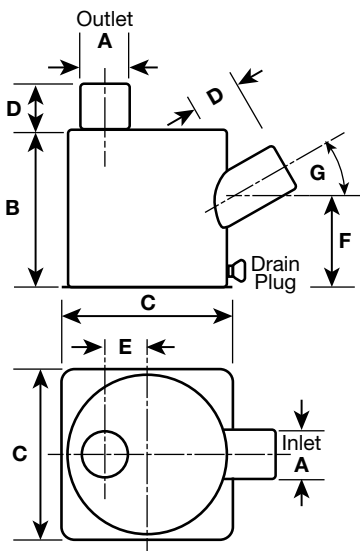
## Composite Silencers and Separators

### Lift Silencers - Side Angle In Top Out



Lift Silencers - Side Angle In Top Out										
Part No.	Reference	A		B	C	D	E	F	G°	Weight kg
		inch	mm	mm	mm	mm	mm	mm		
H001454	HAT015	2 <sup>3</sup> / <sub>8</sub>	60	270	275	60	68	175	30	3.6
H001456	HAT020	3	76	270	275	76	68	175	30	3.9
H001458	HAT025	3 <sup>1</sup> / <sub>2</sub>	89	305	324	91	84	184	30	5.5
H001459	HAT030	3 <sup>1</sup> / <sub>2</sub>	89	266	275	89	50	152	30	4.4
H001460	HAT035	4	102	480	324	130	70	300	35	7.8
H001461	HAT040	4	102	305	324	85	70	184	35	5.7
H001462	HAT043	4 <sup>1</sup> / <sub>2</sub>	114	480	324	135	70	300	35	7.9
H001463	HAT045	5	127	480	324	140	70	300	35	8.7
H001464	HAT050	6	152	370	446	200	100	222	35	11.2
H010302	HAT055	8	203	521	548	201	122	323	55	18.6
H017158	HAT060	10	254	660	650	289	148	374	55	29.6

Drawings and dimensions are for guidance. Alternative sizes and configurations available on request.

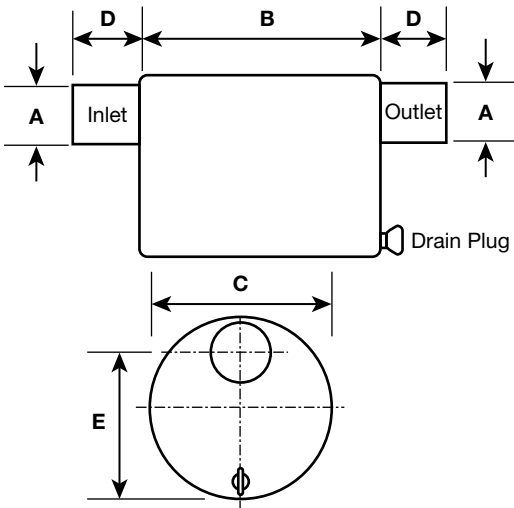


### Lift Silencers - End In End Out



Lift Silencers - End In End Out								
Part No.	Reference	A		B	C	D	E	Weight kg
		inch	mm	mm	mm	mm	mm	
H001496	HEE005	1 <sup>1</sup> / <sub>2</sub>	38	250	178	55	141	1.7
H001497	HEE010	1 <sup>5</sup> / <sub>8</sub>	41	250	178	65	133	1.8
H001498	HEE020	1 <sup>3</sup> / <sub>4</sub>	45	250	178	65	133	1.8
H001499	HEE035	2	51	310	178	65	133	2.1
H001500	HEE040	2	51	420	254	65	195	4.2
H001501	HEE045	2	51	250	178	65	133	1.8
H001502	HEE060	2 <sup>3</sup> / <sub>8</sub>	60	310	254	75	195	3.7
H001503	HEE065	2 <sup>3</sup> / <sub>8</sub>	60	420	254	75	195	4.4
H001504	HEE070	2 <sup>1</sup> / <sub>2</sub>	63	420	254	75	195	4.4
H001505	HEE080	3	76	420	254	80	195	4.7
H001506	HEE090	3 <sup>1</sup> / <sub>2</sub>	89	465	254	89	188	5.2
H001507	HEE095	4	102	462	305	102	222	6.8
H001508	HEE100	4 <sup>1</sup> / <sub>2</sub>	114	462	305	114	220	7.0
H001509	HEE105	5	127	599	305	126	220	8.8
H001510	HEE110	6	152	640	346	152	260	11.4
H010303	HEE115	8	203	695	446	205	297	18.4

Drawings and dimensions are for guidance. Alternative sizes and configurations available on request.

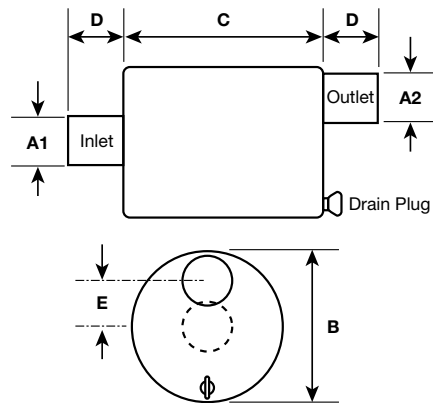


### In-line Round Body Silencers



In-line Round Body Silencers										
Part No.	Reference	A1		A2		B	C	D	E	Weight kg
		inch	mm	inch	mm	mm	mm	mm	mm	
H001524	HILR003	2 <sup>3</sup> / <sub>8</sub>	60	2.38	60	152	212	70	41	1.8
H001525	HILR005	3	76	3	76	203	335	75	59	3.5
H001526	HILR010	3 <sup>1</sup> / <sub>2</sub>	89	3 <sup>1</sup> / <sub>2</sub>	89	203	390	100	53	4.2
H001527	HILR015	4	102	4	102	254	465	102	68	6.4
H001528	HILR020	4 <sup>1</sup> / <sub>2</sub>	114	4 <sup>1</sup> / <sub>2</sub>	114	254	502	114	61	6.8
H001529	HILR025	5	127	5	127	254	546	127	55	7.9
H001530	HILR030	5	127	6	152	305	762	127	65	12.1
H001531	HILR035	6	152	6	152	305	661	152	65	11.4
H001532	HILR040	6	152	8	203	398	880	200	91	22.0
H001533	HILR045	8	203	8	203	395	880	201	88	23.0
H001534	HILR050	10	254	10	254	446	1092	254	87	32.0
H001535	HILR055	12	305	12	305	489	1308	305	87	41.0

Drawings and dimensions are for guidance. Alternative sizes and configurations available on request. All units are made to order and customisable.

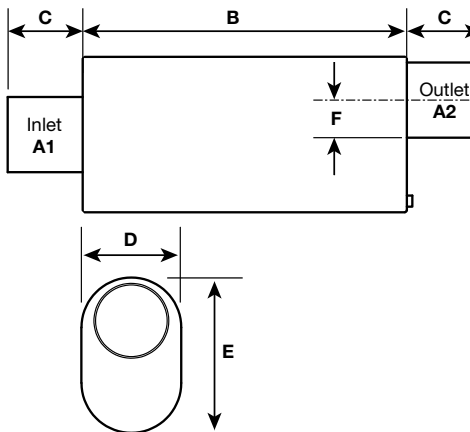


### In-line Oval Body Silencers



In-line Oval Body Silencers										
Part No.	Reference	A1		A2		B	C	D	E	Weight kg
		inch	mm	inch	mm	mm	mm	mm	mm	
H001517	HIL0005	5	127	5	127	520	140	225	385	10.8
H001518	HIL0006	5	127	6	152	640	150	225	385	10.6
H001519	HIL0010	6	152	6	152	640	150	225	385	9.5
H001520	HIL0012	6	152	8	203	928	203	270	420	12.2
H001521	HIL0015	8	203	8	203	876	203	270	420	16.3
H001522	HIL0016	8	203	10	254	758	203	295	465	21.6
H001523	HIL0020	10	254	10	254	1092	254	365	630	39.0

Drawings and dimensions are for guidance. Alternative sizes and configurations available on request. All units are made to order and customisable.

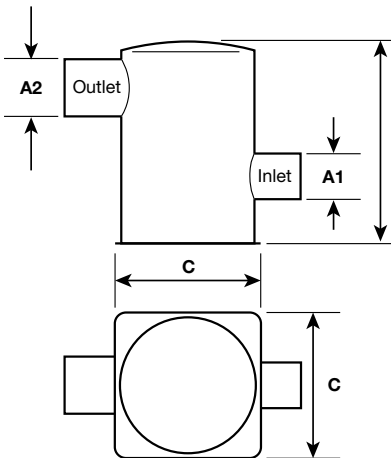


### Dual Chamber Silencers



Dual Chamber Silencers						
Part No.	Reference	A1		A2		C
		inch	mm	inch	mm	
H008419	HDC025	4	102	4	102	600
H001488	HDC035	5	127	5	127	700
H001489	HDC040	5	127	6	152	800
H001490	HDC045	6	152	6	152	800
H001491	HDC050	6	152	8	203	800
H001492	HDC055	8	203	8	203	900
H001493	HDC060	8	203	10	254	900
H001494	HDC065	10	254	10	254	1000
H001495	HDC070	12	305	12	305	1000

Drawings and dimensions are for guidance. Alternative sizes and configurations available on request. All units are made to order and customisable.



# Exhaust Systems and Accessories

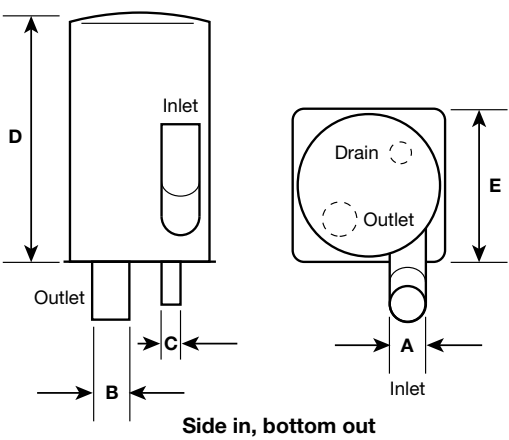
## Composite Silencers and Separators



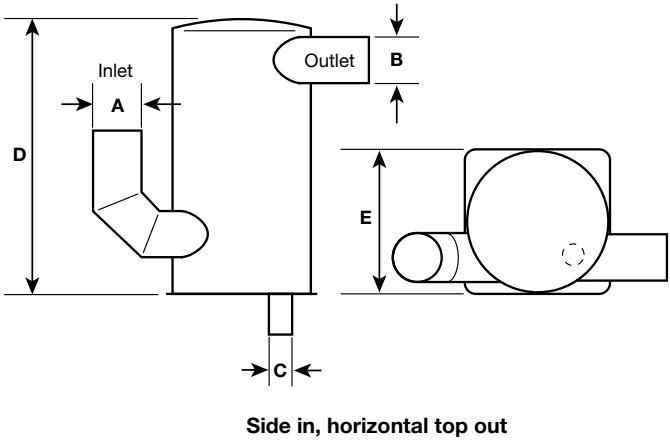
### Combined Silencer / Separators

Combined Silencer / Separators									
Part No.	Type	A		B		C		D	E
		inch	mm	inch	mm	inch	mm	mm	mm
ML-0382-01	Side in, bottom out	3 1/2	89	3 1/2	89	2	51	617	370
ML-0382-02	Side in, bottom out	4	102	4	102	3	76	641	370
ML-0382-03	Side in, bottom out	5	127	5	127	3	76	750	430
ML-0382-04	Side in, bottom out	6	152	6	152	3	76	920	470
ML-0364-01	Side in, horizontal top out	3 1/2	89	3 1/2	89	2	51	595	370
ML-0364-02	Side in, horizontal top out	4	102	4	102	3	76	626	370
ML-0364-03	Side in, horizontal top out	5	127	5	127	3	76	725	430
ML-0364-04	Side in, horizontal top out	6	152	6	152	3	76	904	470

Drawings and dimensions are for guidance. Alternative sizes and configurations available on request. All units are made to order and customisable.



Side in, bottom out



Side in, horizontal top out

### Halyard UK Manufacturing Facilities



Halyard products including stainless steel risers, water injection spray heads, exhaust transom outlets, supports, high temperature GRP silencers and separators, tube and connectors, marine exhaust hose, silicone hoses and bellows are designed and manufactured in-house at our UK manufacturing facilities.

As a result Halyard are uniquely placed to be able to design and manufacture market leading exhaust systems and components to meet your exact requirements.



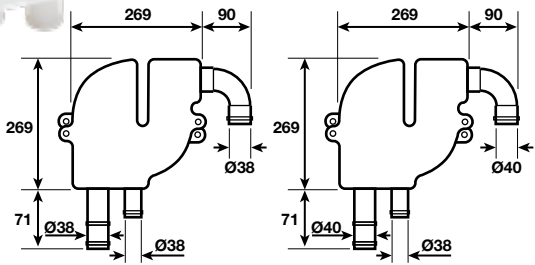
## Moulded Water Separators

### MS4000 Series Water Separator



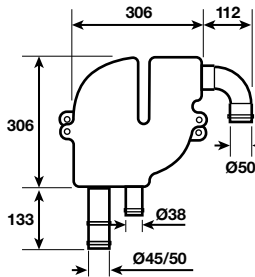
Halyard's exhaust water separator range is available with inlet / outlet diameters from 38mm (1.5") to 76mm (3"). Manufactured from a special high temperature Polyolefin and available from stock.

<b>MS4020</b> 38mm 90° Outlet <b>MS4025</b> 40mm 90° Outlet
Exhaust: 38mm and 40mm
Gas Outlet: 38mm and 40mm
Maximum Water Flow: 18 Litres Per Minute
Weight: 1kg

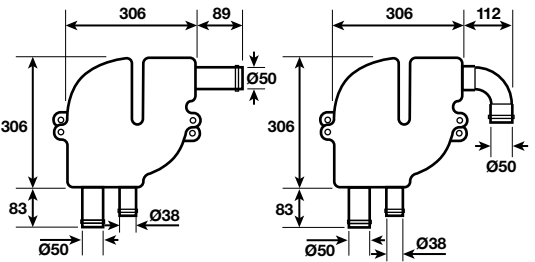


### MS5000 Series Water Separator

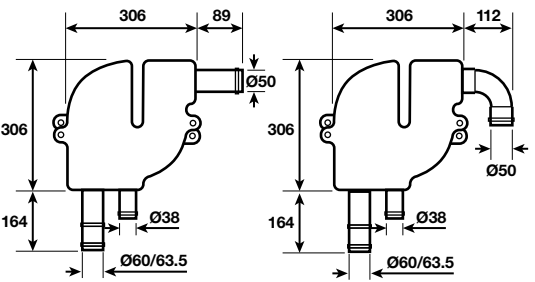
<b>MS5020</b> 45mm and 50mm 90° Outlet
Exhaust: 45mm and 50mm
Gas Outlet: 50mm
Maximum Water Flow: 42 Litres Per Minute
Weight: 1.7kg



<b>MS5010</b> 50mm Straight Outlet <b>MS5025</b> 50mm 90° Outlet
Exhaust: 50mm
Gas Outlet: 50mm
Maximum Water Flow: 42 Litres Per Minute
Weight: 1.7kg

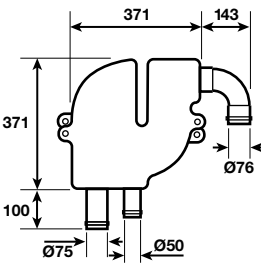


<b>MS5015</b> 60mm and 63.5mm Straight Outlet <b>MS5030</b> 60mm and 63.5mm 90° Outlet
Exhaust: 60mm and 63.5mm
Gas Outlet: 50mm
Maximum Water Flow: 42 Litres Per Minute
Weight: 1.7kg



### MS7000 Series Water Separator

<b>MS7510</b> 76mm 90° Outlet
Exhaust: 76mm
Gas Outlet: 76mm
Maximum Water Flow: 65 Litres Per Minute
Weight: 3.3kg





# Exhaust Systems and Accessories

## GRP Water Separators

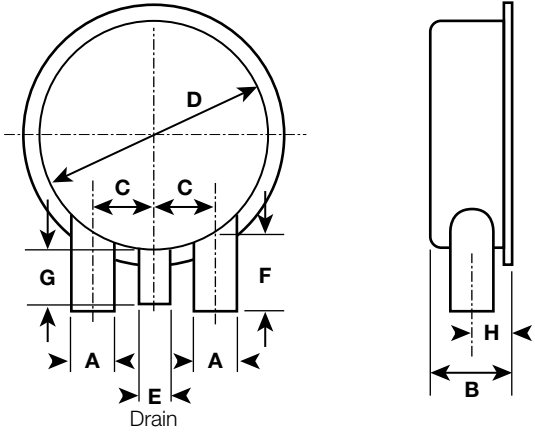
GRP Low Profile Water Separator

Lloyd's Register

GRP Low Profile Water Separator												
Part No.	Reference	A		B	C	D	E		F	G	H	Weight kg
		inch	mm	mm	mm	mm	inch	mm	mm	mm	mm	
H014054	HFS020	2	51	125	75	305	1 1/2	38	96	76	65	4.4
H001511	HFS025	2 1/2	63	140	100	346	1 1/2	38	144	100	70	4.8
H001514	HFS030	3	76	140	110	398	2	51	144	100	70	6.5
H001515	HFS035	3 1/2	89	140	110	398	2	51	144	107	70	6.5
H001516	HFS040	4	102	170	110	398	2	51	144	107	85	7.0
H007116	HFS050	5	127	175	125	494	2 1/2	63	140	107	88	12.5
H010304	HFS060	6	152	215	151	594	2 1/2	63	175	107	105	17.1

Drawings and dimensions are for guidance. Alternative sizes and configurations available on request.

This separator has universal inlet and outlet tubes. The tubes marked 'A' can be used as either inlet or outlet

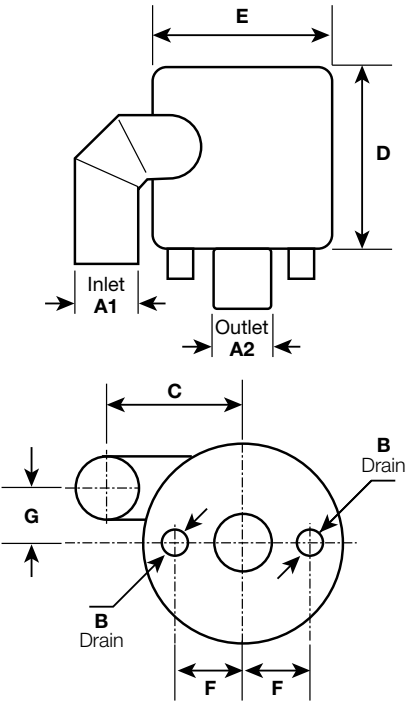


GRP General Water Separator

Lloyd's Register

GRP General Water Separator									
Part No.	Reference	A1	A2	B	C	D	E	F	G
		mm	mm	mm	mm	mm	mm	mm	mm
H001687	HWS030	76	76	38	240	356	346	120	110
H001688	HWS035	89	89	38	264	356	346	120	110
H001689	HWS040	102	102	38	282	356	346	120	100
H001690	HWS050	127	127	51	310	406	398	150	110
H001691	HWS060	152	152	51	335	406	398	158	100

Drawings and dimensions are for guidance. Alternative sizes and configurations available on request.



## GRP Tubes & Connectors

GRP Tube

Lloyd's Register

GRP Tube						
Part No.	Reference	A Nominal O.D.		Nominal Wall Thickness	Weight kg per m	B Standard Length
		inch	mm			m
H000526	HT001	3/4	19	3.5	0.25	1.2
H000527	HT005	1	25	2.6	0.33	1.2
H000528	HT010	1 1/2	38	4	0.5	1.2
H000529	HT015	1 5/8	41	2.3	0.5	1.2
H000530	HT020	1 3/4	45	2.5	0.6	1.2
H009939	HT030	2	51	2.5	0.7	3
H009940	HT040	2 3/8	60	3	0.9	3
H009953	HT045	2 1/2	63	3.5	1	3
H009954	HT055	3	76	4	1.3	3
H009965	HT060	3 1/2	89	4	1.5	3
H009966	HT065	4	102	4	1.9	3
H010014	HT070	4 1/2	114	4	2.2	3
H010017	HT075	5	127	4	2.5	3
H010018	HT080	6	152	4	2.9	3
H010028	HT082	7	178	4.5	3.7	3
H010030	HT085	8	203	4.5	4.5	3
H010034	HT090	10	254	4.5	5.5	3
H010036	HT095	12	305	4.5	6.8	3
H010040	HT100	13 5/8	346	5	7.7	3
H010041	HT105	15 43/64	398	4.5	8.9	3
H010371	HT115	19 13/32	493	5	10.9	3
H010042	HT120	23 11/32	593	5	14.7	3

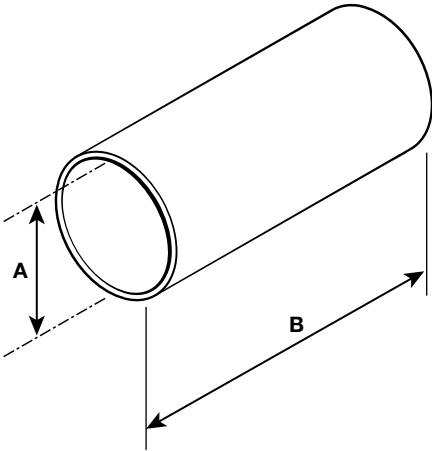
Drawings and dimensions are for guidance. Alternative sizes and up to 1000mm O.D. configurations available on request.

Diameters from 2" to 24" are supplied with peel-ply wrapping - a special layer which the customer peels off to leave a coarse surface requiring minimal preparation.

Lloyd's Approved resins with special temperature ratings are used in the manufacture of this tube (applies to tube over 2"/ 51mm only).

**Part numbers H000526 – H000530, do not have Lloyd's Approval.**

**Note:** Lloyd's Type Approval is applicable for Halyard GRP products in exhaust system applications.



# Exhaust Systems and Accessories

## GRP Tubes & Connectors

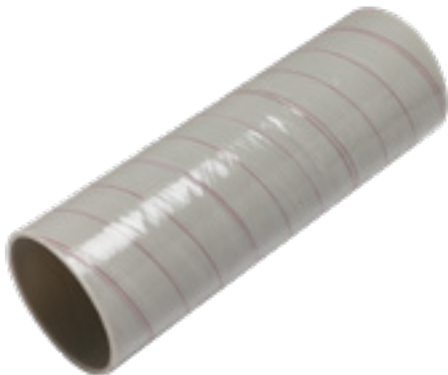
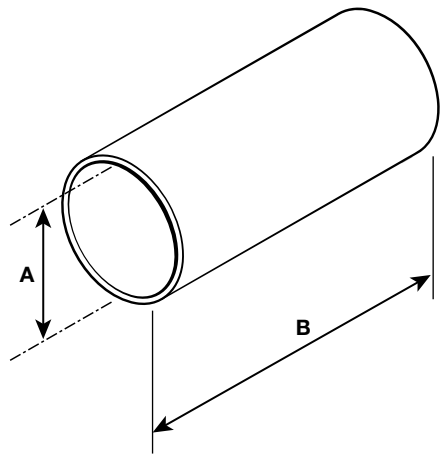
### GRP Exhaust Connectors



GRP Exhaust Connectors					
Part No.	Reference	A Nominal O.D.		B	Weight kg
		inch	mm		
H001536	HJ010	1 1/2	38	175	0.1
H001537	HJ015	1 5/8	41	175	0.1
H001538	HJ020	1 3/4	45	175	0.1
H001539	HJ030	2	51	200	0.15
H001540	HJ040	2 3/8	60	200	0.2
H001541	HJ045	2 1/2	63	200	0.25
H001542	HJ055	3	76	250	0.4
H001543	HJ060	3 1/2	89	250	0.5
H001544	HJ065	4	102	300	0.65
H001545	HJ070	4 1/2	114	300	0.75
H001546	HJ075	5	127	300	0.85
H001547	HJ080	6	152	350	1.1
H007269	HJ082	7	178	350	1.35
H001548	HJ085	8	203	350	1.7
H001549	HJ090	10	254	400	2.4
H001550	HJ095	12	305	400	2.7

Drawings and dimensions are for guidance. Alternative sizes and configurations available on request.

**Note:** Lloyd's Type Approval is applicable for Halyard GRP products in exhaust system applications.



### GRP Bow Thruster Tube

GRP Bow Thruster Tube		
Part No.	Reference	Description
H008493	HBT140/15	140mm I.D. by 5mm wall x 1.5m
H001470	HBT185/15	185mm I.D. by 6mm wall x 1.5m
H001477	HBT250/15	250mm I.D. by 8mm wall x 1.5m
H001482	HBT300/15	300mm I.D. by 9mm wall x 1.5m

Drawings and dimensions are for guidance. Alternative sizes and configurations available on request.

**Note:** Lloyd's Type Approval is applicable for Halyard GRP products in exhaust system applications.

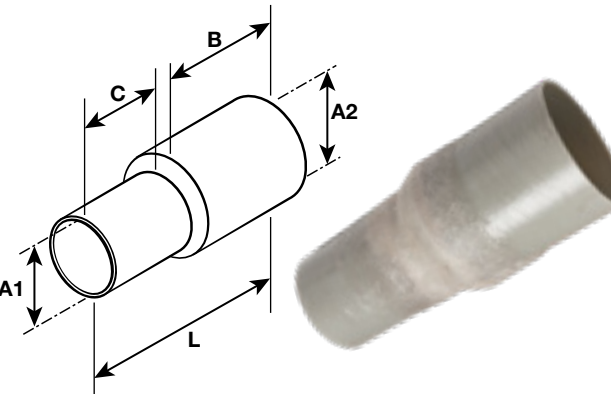


### GRP Connectors



GRP Reducers								
Part No.	Reference	A1 O.D.		A2 O.D.		B	C	L
		inch	mm	inch	mm			
H001442	HA020	2	51	3	76	102	78	205
H001443	HA035	2 1/2	63	3	76	102	95	222
H001444	HA050	3	76	3 1/2	89	125	102	252
H001445	HA055	3	76	4	102	142	102	269
H001446	HA060	3 1/2	89	4	102	142	125	293
H001447	HA065	3 1/2	89	4 1/2	114	140	125	290
H001448	HA070	4	102	5	127	158	142	326
H001449	HA075	4	102	6	152	177	142	370
H001450	HA095	5	127	6	152	177	158	361
H001451	HA096	6	152	7	178	240	177	467
H001452	HA110	6	152	8	203	225	177	452
H001453	HA115	8	203	10	254	279	225	555

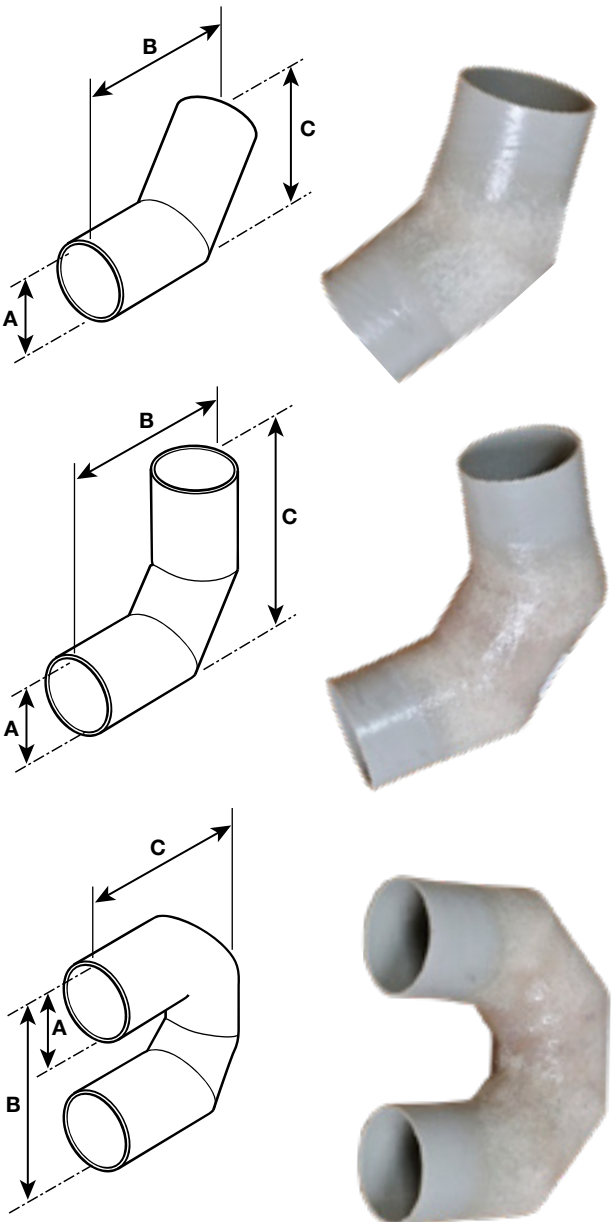
**Note:** Lloyd's Type Approval is applicable for Halyard GRP products in exhaust system applications.



GRP 45° Elbows						
Part No.	Reference	A1 Nominal O.D.		B	C	Weight kg
		inch	mm			
H001409	H45025	2	51	161	103	0.2
H001410	H45035	2 3/8	60	166	111	0.3
H001411	H45040	2 1/2	63	188	123	0.4
H001412	H45050	3	76	213	142	0.6
H001414	H45055	3 1/2	89	282	181	0.8
H001415	H45060	4	102	243	173	0.7
H001417	H45065	4 1/2	114	181	208	1.0
H001418	H45070	5	127	339	230	1.2
H001419	H45075	6	152	376	263	2.0
H007270	H45077	7	178	599	374	2.5
H001420	H45080	8	203	710	438	4.5
H001421	H45085	10	254	776	501	5.5

GRP 90° Elbows						
Part No.	Reference	A1 Nominal O.D.		B	C	Weight kg
		inch	mm			
H001422	H90005	1 1/2	38	121	121	0.3
H001424	H90025	2	51	150	150	0.4
H001425	H90035	2 3/8	60	158	158	0.5
H001426	H90040	2 1/2	63	177	177	0.5
H001427	H90050	3	76	197	197	0.8
H001428	H90055	3 1/2	89	229	229	1.0
H001429	H90060	4	102	242	242	1.2
H001430	H90065	4 1/2	114	269	269	1.5
H001431	H90070	5	127	308	308	1.8
H001433	H90075	6	152	358	358	2.5
H001435	H90077	7	178	542	542	4.0
H001436	H90080	8	203	580	580	5.6
H010290	H90085	10	254	659	659	6.5
H001438	H90090	12	305	762	762	8.0

GRP 180° Elbows						
Part No.	Reference	A1 Nominal O.D.		B	C	Weight kg
		inch	mm			
H001398	H180015	1 3/4	45	133	124	0.3
H001399	H180025	2	51	153	154	0.6
H001400	H180035	2 3/8	60	181	150	0.6
H001401	H180040	2 1/2	63	192	166	0.7
H001402	H180050	3	76	214	187	1.1
H001403	H180055	3 1/2	89	268	219	1.6
H001404	H180060	4	102	293	228	1.8
H001405	H180070	5	127	380	310	3.0
H001406	H180075	6	152	427	327	3.6
H007310	H180080	7	178	531	455	5.0
H001407	H180085	8	203	684	547	7.0



Alternative sizes and configurations available on request.



# Exhaust Systems and Accessories

## Flexible Connectors

Flexible Exhaust Bends

Lloyd's Register

Flexible 45° Black EPDM Bends 100°C Continuous									
Part No.	Reference	I.D.		A	B	C	D	W	Hose Clamp
		inch	mm	mm	mm	mm	mm	mm	
H003337	CBR450040	2	51	125	125	50	50	5	H000510
H003338	CBR450050	3	76	145	145	50	50	6.5	H000515
H003339	CBR450055	3 1/2	89	155	155	50	50	6.5	H000517
H003340	CBR450060	4	102	160	160	50	50	7	H004246
H003341	CBR450065	5	127	240	240	50	50	8	H004249
H003342	CBR450070	6	152	350	350	60	60	8	H004250
H003343	CBR450075	8	203	400	400	65	65	10	H004252
H003344	CBR450080	10	254	425	425	65	65	12	H004253

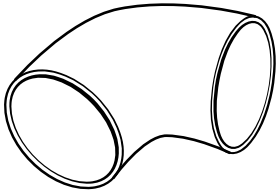
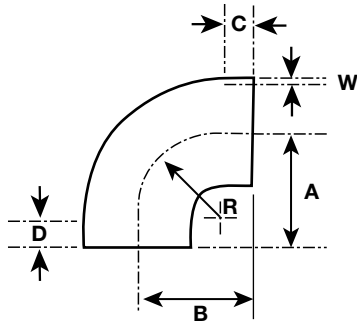
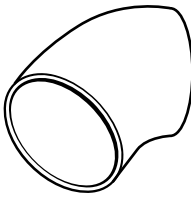
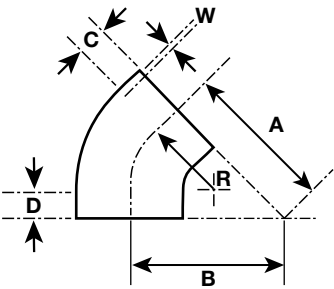
Flexible 90° Black EPDM Bends 100°C Continuous										
Part No.	Reference	I.D.		A	B	C	D	R	W	Hose Clamp
		inch	mm	mm	mm	mm	mm	mm	mm	
H003345	CBR90040	2	51	125	125	50	50	50	5	H000510
H003346	CBR90045	2 1/2	63.5	145	145	50	50	95	5	H000513
H003347	CBR90050	3	76	145	145	50	50	95	6.5	H000515
H003348	CBR90055	3	89	155	155	50	50	100	6.5	H000517
H003349	CBR90060	4	102	160	160	50	50	110	7	H024246
H003350	CBR90065	5	127	240	240	50	50	187	8	H024249
H003351	CBR90070	6	152	350	350	60	60	250	8	H024250
H003352	CBR90075	8	203	400	400	65	65	300	10	H024252
H003353	CBR90080	10	254	425	425	65	65	350	12	H024253

Flexible 45° Silicone Bends 180°C Continuous										
Part No.	Reference	I.D.		A	B	C	D	R	W	Hose Clamp
		inch	mm	mm	mm	mm	mm	mm	mm	
H003319	CB45040	2	51	125	125	50	50	50	5.5	H000510
H003320	CB45050	3	76	145	145	50	50	95	7	H000515
H003321	CB45055	4	102	160	160	50	50	110	7	H024247
H003322	CB45065	5	127	240	240	50	50	187	7	H000487
H003318	CB45070	6	152	350	350	60	60	250	7	H024251

Flexible 90° Silicone Bends 180°C Continuous										
Part No.	Reference	I.D.		A	B	C	D	R	W	Hose Clamp
		inch	mm	mm	mm	mm	mm	mm	mm	
H003324	CB90040	2	51	125	125	50	50	50	5.5	H000510
H003325	CB90045	2 1/2	63.5	145	145	50	50	95	5.5	H000513
H003326	CB90050	3	76	145	145	50	50	95	7	H000515
H003327	CB90055	3	89	155	155	50	50	100	7	H000517
H003328	CB90060	4	102	160	160	50	50	110	7	H024247
H003329	CB90065	5	127	240	240	50	50	187	7	H000487
H003330	CB90070	6	152	350	350	60	60	250	7	H024251
H003331	CB90075	8	203	400	350	65	65	300	7	H024252

### Options

- Extremely high temperature Nomex bends rated to 260°C
- Alternative sizes and configurations



## Marine Diesel Exhaust Hose

Wire Reinforced Standard Range Exhaust Hose

Lloyd's Register

Wire Reinforced Standard Range Exhaust Hose						
Temperature rating - Continuous: 100°C						
Part No.	Reference	I.D.		Bend Radius	Max. Length	Hose Clamp
		inch	mm	mm	metres	
H000518	HS32	1 1/4	32	130	60	H000505
H000519	HS38	1 1/2	38	150	60	H000507
H000520	HS41	1 5/8	41	160	60	H000507
H000521	HS45	1 3/4	45	170	60	H000509
H000522	HS51	2	51	180	60	H000510
H000523	HS60	2 3/8	60	190	60	H000512
H000524	HS63	2 1/2	63	200	60	H000512
H000525	HS76	3	76	250	60	H000514
H013763	HS90	3 1/2	89	330	60	H000517
H013764	HS102	4	102	410	60	H024246
H018617	HS127	5	127	560	60	H024249
H019437	HS152	6	152	680	12	H024250
Wired to end only						



Wire Reinforced 'HalFlex' Ultra Flexible Exhaust Hose

Lloyd's Register

Wire Reinforced 'HalFlex' Ultra Flexible Exhaust Hose							
Temperature rating - Continuous: 100°C							
Part No.	Reference	I.D.		Bend Radius	Max. Length	Hose Clamps	Hose Clamp Soft Cuffed Ends
		inch	mm	mm	metres	Wired to End	
H022112	HFX38	1 1/2	38	75	11	H000508	H000507
H022113	HFX41	1 5/8	41	85	6	H000509	H000507
H022114	HFX45	1 3/4	45	90	12	H000510	H000509
H022115	HFX51	2	51	105	12	H000511	H000510
H022116	HFX60	2 3/8	60	120	12	H000513	H000512
H022117	HFX63	2 1/2	63.5	125	6	H000513	H000513
H022118	HFX76	3	76	175	12	H000516	H000515
H022119	HFX89	3 1/2	89	205	12	H000517	H000517
H022120	HFX102	4	102	235	12	H024247	H024246
H022121	HFX113	4 1/2	113	260	11	H024248	H000485
H022122	HFX127	5	127	295	12	H000487	H024249
H022123	HFX152	6	152	350	12	H024251	H024250
H022124	HFX177	7	177	410	6	H000491	H000491
H022125	HFX203	8	203	470	6	H024252	H024252
H022126	HFX254	10	254	700	6	H024253	H024253
H022127	HFX305	12	305	840	6	H024254	H024254
H022128	HFX356	14	356	N/A	4.5	H024255	H024255
H022129	HFX406	16	406	N/A	3.5	H018627	H018627
H022130	HFX458	18	458	N/A	2	H017611	H019339
Available as wired to end or with soft cuffed ends to aid hose clamping							



# Exhaust Systems and Accessories

## Marine Diesel Exhaust Hose

### Wire Reinforced ‘HalFlex-HT’ High Temperature Hose

Wire Reinforced ‘HalFlex-HT’ High Temperature Hose							
Temperature rating - Continuous: 140°C							
Part No.	Reference	I.D.		Bend Radius	Max. Length	Hose Clamps Wired to End	Hose Clamp Soft Cuffed Ends
		inch	mm	mm	metres		
H022131	HFXHT38	1 1/2	38	75	11	H000508	H000507
H022132	HFXHT41	1 5/8	41	85	6	H000509	H000508
H022133	HFXHT45	1 3/4	45	90	12	H000510	H000509
H022134	HFXHT51	2	51	105	12	H000511	H000510
H022135	HFXHT60	2 3/8	60	120	12	H000513	H000512
H022136	HFXHT63	2 1/2	63.5	125	6	H000513	H000513
H022137	HFXHT76	3	76	175	12	H000515	H000515
H022138	HFXHT89	3 1/2	89	205	12	H000517	H000517
H022139	HFXHT102	4	102	235	12	H024247	H024246
H022140	HFXHT113	4 1/2	114	260	11	H024248	H000485
H022141	HFXHT127	5	127	295	12	H000487	H024249
H022142	HFXHT152	6	152	350	12	H024251	H024250
H022143	HFXHT177	7	178	410	6	H000491	H000491
H022144	HFXHT203	8	203	470	6	H024252	H024252
H022145	HFXHT254	10	254	700	6	H024253	H024253
H022146	HFXHT305	12	305	840	6	H024254	H024254
H022147	HFXHT358	14	356	N/A	4.5	H024255	H024255
H022148	HFXHT406	16	406	N/A	3.5	H018627	H018627
H022149	HFXHT458	18	458	N/A	2	H017611	H019339
Available as wired to end or with soft cuffed ends to aid hose clamping							



Lloyd's approval. Please contact Halyard for further information

### Silicone Exhaust Hose

Silicone Exhaust Hose					
Temperature rating - Continuous: 180°C					
Part No.	Reference	I.D.		Max. Length	Hose Clamp
		inch	mm	metres	
H022160	SS38	1 1/2	38	11	H000508
H022161	SS41	1 5/8	41	6	H000508
H022162	SS45	1 3/4	45	12	H000509
H022163	SS51	2	51	12	H000511
H022164	SS60	2 3/2	60	12	H000513
H022165	SS63	2 1/2	63.5	6	H000513
H022166	SS76	3	76	12	H000515
H022167	SS89	3 1/2	89	12	H000517
H022168	SS102	4	102	12	H024247
H022169	SS113	4 1/2	114	11	H024248
H022170	SS127	5	127	12	H000487
H022171	SS152	6	152	12	H024248
H022172	SS177	7	178	6	H000491
H022173	SS203	8	203	6	H024252
H022174	SS254	10	254	6	H024253
H022175	SS305	12	305	6	H024254
H022176	SS356	14	356	4.5	H024255
H022177	SS406	16	406	3.5	H018627
H022178	SS456	18	456	2	H017611

This product is designed for short flexible connections only – Please contact Halyard for further information

- Options**
- Extremely high temperature Nomex rated to 260°C
  - Alternative sizes and configurations



### Wire Reinforced Silicone Exhaust Hose

Wire Reinforced Silicone Exhaust Hose					
Temperature rating - Continuous: 180°C					
Part No.	Reference	I.D.		Max. Length	Hose Clamp
		inch	mm	metres	
H022181	SW38	1 1/2	38	6	H000509
H022182	SW41	1 5/8	41	5	H000510
H022183	SW45	1 3/4	45	6	H000511
H022184	SW51	2	51	6	H000512
H022185	SW60	2 3/8	60	6	H000514
H022186	SW63	2 1/2	63.5	6	H000510
H022187	SW76	3	76	6	H000515
H022188	SW89	3 1/2	89	6	H000517
H022189	SW102	4	102	6	H000485
H022190	SW113	4 1/2	114	6	H000486
H022191	SW127	5	127	6	H000488
H022192	SW152	6	152	6	H000490
H022193	SW177	7	178	5	H000492
H022194	SW203	8	203	5	H000494
H022195	SW254	10	254	5	H012776
H022196	SW305	12	305	5	H019846
H022197	SW356	14	356	4	H019851
H022198	SW406	16	406	3	H018627
H022199	SW456	18	456	1.5	H017611
Available as wired to end or with soft cuffed ends to aid hose clamping					

**Note:** Lloyd's approval is not applicable for Halyard Wired Reinforced Silicone Exhaust Hose ID sizes SW254 – SW456



- Options**
- Extremely high temperature Nomex rated to 260°C
  - Alternative sizes and configurations

### Silicone Flexible Bellows

Silicone Flexible Bellows						
Temperature rating - Continuous: 180°C						
Part No.	Reference	I.D.		Length Overall	Single/Dual Hump	Hose Clamp
		inch	mm	mm		
H003300	CB1063	2 1/2	63	150	Single	H000513
H003301	CB1076	3	76	170	Single	H000515
H003302	CB1090	3 1/2	89	220	Single	H000517
H003303	CB1102	4	102	220	Single	H024247
H003304	CB1127	5	127	220	Single	H000487
H003305	CB1152	6	152	220	Single	H024251
H003306	CB1178	7	178	220	Single	H000491
H003307	CB1203	8	203	220	Single	H024252
H003308	CB1254	10	254	250	Single	H024253
H003309	CB1305	12	305	300	Single	H024254
H010251	CB1356	14	356	300	Single	H024255
H017078	CB1406	16	406	300	Single	H018627
H003310	CB2102	4	102	350	Double	H024247
H003311	CB2152	6	152	350	Double	H024251
H003312	CB2178	7	178	350	Double	H000491
H003313	CB2203	8	203	350	Double	H024252
H003314	CB2254	10	254	350	Double	H024253
H003315	CB2305	12	305	350	Double	H024254
H003316	CB2324	12 3/4	324	350	Double	H010478
H003317	CB2355	14	356	400	Double	H024255
H003317	CB2406	16	406	400	Double	H018627

- Options**
- Extremely high temperature Nomex rated to 260°C
  - Large range of alternative sizes also available
  - Variants with different end to end diameters available





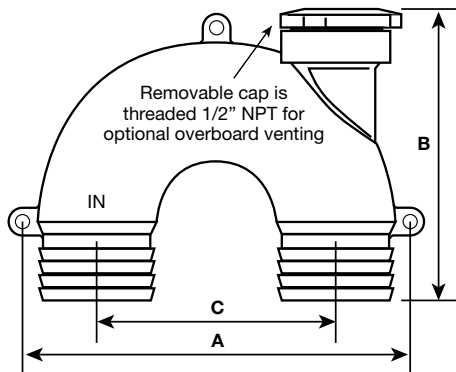
# Exhaust Systems and Accessories

## Bronze Siphon Breakers

This range of siphon breakers are made from corrosion resistant bronze.

The siphon permits air to enter, but does not permit air and odours to escape. The cap is threaded 1/2" NPT to accept a barb fitting to facilitate overboard venting. Overboard venting is required if used in an exhaust system.

Vented loops assure clog-free anti-siphon protection for sanitation or engine exhaust systems. The oversized vent valve can easily be removed for inspection or cleaning.

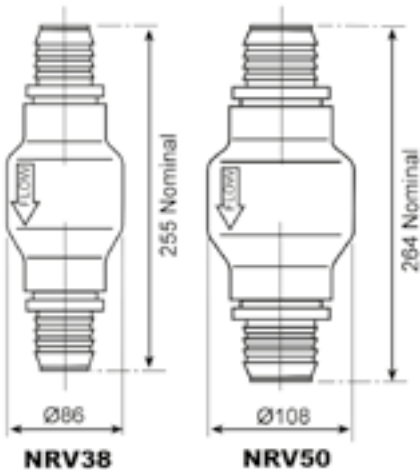


Bronze Siphon Breakers										
Part No.	Reference	Description	Hose I.D.		A Mount Holes		B Height		C Hose Centres	
			mm	inch	mm	inch	mm	inch	mm	inch
H021061	SB050	Siphon breaker 1/2"	13	1/2	120	4 3/4	109	137/64	76	3
H021062	SB0750	Siphon breaker 3/4"	19	3/4	120	4 3/4	109	137/64	76	3
H018133	SB100	Siphon breaker 1"	25	1	120	4 3/4	109	137/64	76	3
H018134	SB150	Siphon breaker 1 1/2"	38	1 1/2	170	6 11/16	109	137/64	101	4
H021063	SB200	Siphon breaker 2"	51	2	185	7 9/32	137	5 25/64	114	4 1/2
H018171	N/A	90 degree hose barb for overboard venting								

## Separator Non-Return Valves

Designed for use where there is a risk of water being pushed back up the separator drain or other vessel equipment.

Separator Non-Return Valves			
Part No.	Reference	Inlet/Outlet Dia. inch	Inlet/Outlet Dia. mm
H008743	NRV38	1 1/2	38
H008744	NRV50	2	51



**Note:** When part of an overboard system valves must not be installed below the waterline.

## Hot Lag

Hot Lag		
Part No.	Reference	Description
H000532	HTL05090	5m x 100mm wide, 6mm thick

Hot lag is designed for lagging hot exhaust systems with a thermal insulator which is asbestos free. It has a nominal width of 100mm (4") by 5mm (1/2") and may be held in place with stainless steel wire or hose clamps.



## Thermal Insulation Jackets

Thermal insulation jackets can be supplied to suit your new exhaust system or can also be made and supplied as replacements for your existing system.

These are available with either a grey or black finish.



# Exhaust Systems and Accessories

## Stainless Steel Hose Clamps

Stainless Steel Hose Clamps			
Part No.	Reference	Hose O.D. Range - mm	Material
H000501	HCSS4043	31-34	W4 S/S
H000502	HCSS4751	37-40	W4 S/S
H000505	HCSS4751	40-43	W4 S/S
H000506	HCSS5559	43-47	W4 S/S
H000507	HCSS5963	47-51	W4 S/S
H000508	HCSS6873	51-55	W4 S/S
H000509	HCSS6873	55-59	W4 S/S
H000510	HCSS8591	59-63	W4 S/S
H000511	HCSS97104	63-68	W4 S/S
H000512	HCSS104112	68-73	W4 S/S
H000513	HCSS131139	73-79	W4 S/S
H000514	HCSS150162	79-85	W4 S/S
H000515	HCSS162174	85-91	W4 S/S
H000516	HCSS188200	91-97	W4 S/S
H000517	HCSS201213	97-104	W4 S/S
H024246	HCSS109117	109-117	300SS
H024247	HCSS114122	114-122	300SS
H000485	HCSS213226	121-130	W4 S/S
H024248	HCSS126133	126-133	300SS
H000486	HCSS260280	131-139	W4 S/S
H024249	HCSS134142	134-142	300SS
H000487	HCSS252265	140-150	W4 S/S
H000488	HCSS300324	150-162	W4 S/S
H024250	HCSS159167	159-167	300SS
H024251	HCSS165173	165-173	300SS
H000490	HCSS315325	174-187	W4 S/S
H000491	HCSS361387	188-200	W4 S/S
H000492	HCSS370380	201-213	W4 S/S
H024252	HCSS211227	211-227	300SS
H000494	HCSS413439	226-239	W4 S/S
H024253	HCSS262278	262-278	300SS
H012776	HCSS278291	278-291	W4 S/S
H024254	HCSS316332	316-332	300SS
H024255	HCSS367383	367-383	300SS
H000504	HCSS382395	382-395	W4 S/S
H015470	HCSS395408	395-408	W4 S/S
Stainless Steel Double Bolt Clamps			
H019846	HCSS300324	300-324	W4 S/S
H000500	HCSS312336	312-336	W4 S/S
H019851	HCSS361387	361-387	W4 S/S
H018627	HCSS413439	413-439	W4 S/S

**Note:**

Please contact Halyard or your local distributor or dealer to verify correct clamp size to suit your Halyard hose, connector or bellows.



## Exhaust Alert System



### Water Cooled Exhaust Overheat Alert System

- IP67 waterproof 52mm gauge
- Self test functionality
- Touch screen control
- Single and twin engine monitoring
- Single and dual station display
- Easy installation
- Fail-safe functionality

*Halyard's Exhaust Alert provides a class leading exhaust overheat alert system housed in a stylish new standard 52mm diameter, IP67 waterproof gauge.*

The new system incorporates self-test functionality with touch screen control and is supplied as a 12/24 dual voltage unit. Available with a choice of chrome or black bezel and black or white gauge faces to compliment your existing gauges.



Exhaust Systems and Accessories

Exhaust Alert - Gauge System

Part No.	Reference	Exhaust Alert System
Sets		
H021248	AS125	Single engine single station gauge display with removable through hose sensor with 16 metre cable
H021250	AS145	Single engine dual station gauge displays with removable through hose sensors with 16 metre cable
H021252	AS225	Twin engine single station gauge displays with removable through hose sensors with 16 metre cable
H021254	AS245	Twin engine dual station gauges with removable through hose sensors with 16 metre cable
H020170	AS701	Master display suitable for 1-2 engines, 52mm diameter gauge with white card and Chrome bezel
H020171	AS702	Repeater display to be used in conjunction with master display for a second station
H024728	AS905	120 degree Hose Sensor
H024729	AS906	140 degree Hose Sensor
H021389	AS780	Connector block for wiring in displays to power and sensors

Gauge	Removable through hose sensor
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Part No.	Reference	Exhaust Alert System
OEM -Kits		
H000424	AS180	OEM Control Box kit (12/24 Volt) with single through hose sensor with 16 metre cable
H000433	AS280	OEM Control Box kit (12/24 Volt) with twin through hose sensors with 16 metre cables
H000439	AS380	OEM Control Box kit (12/24 Volt) with triple through hose sensors with 16 metre cables

Exhaust Alert - Options

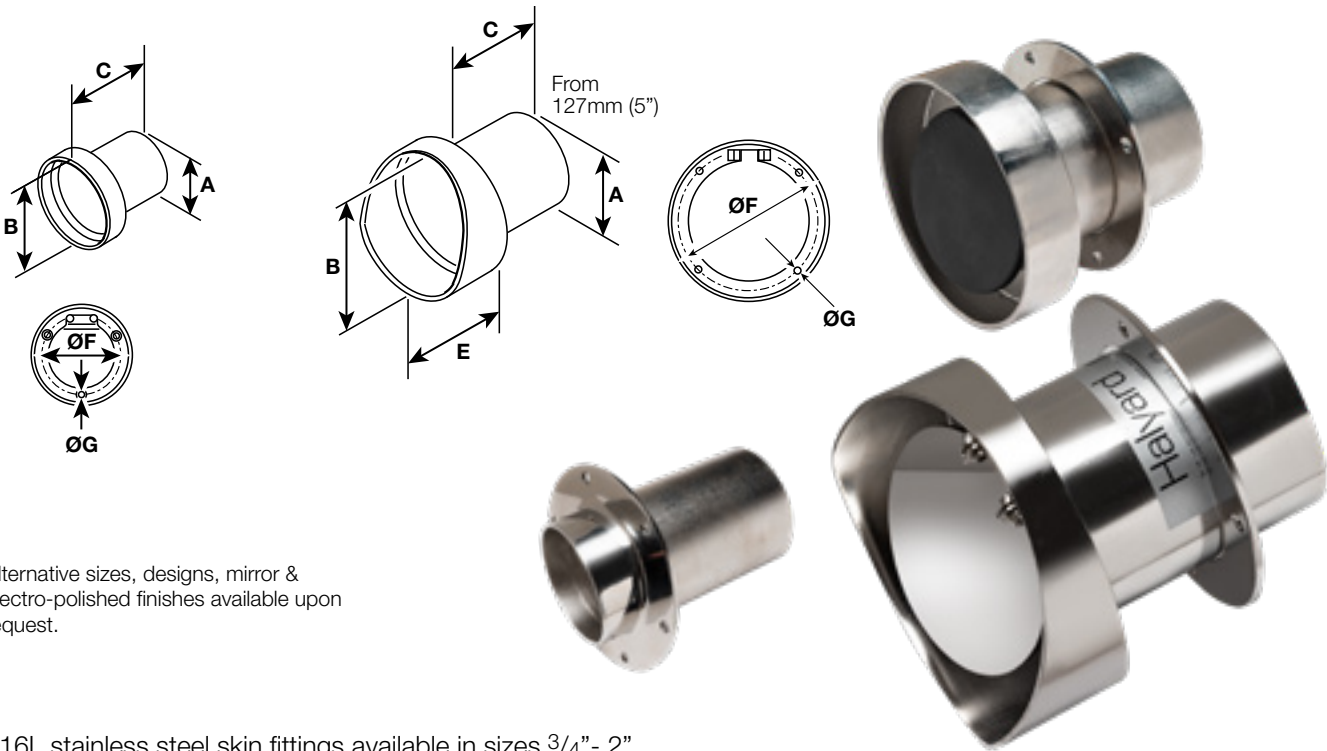
Part No.	Reference	Exhaust Alert System
Options		
H000447	AS777	Optional 120dB siren to supplement buzzer on helm display
OEM Control Box - For Vessel Display Integration		
H024727	AS705/AS706	Control box suitable for use with Halyard exhaust alert sensors, used to integrate into vessel alarm system/display, 12/24V input, common alarm output matches input voltage

Siren	OEM Control Box
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316L Stainless Steel Through-Hull Exhaust Outlets

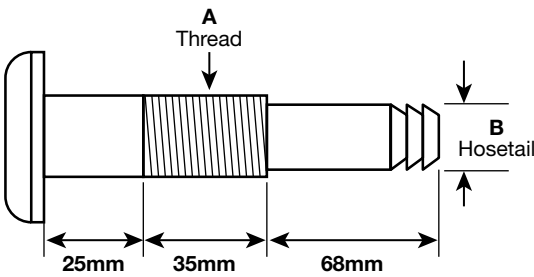
Stainless steel through-hull exhaust outlets												
Part No.	Reference	A		B O.D.	C	E	Fixing	G	No. of Fixing Holes	Flap Material*	Bolting Flange Y/N	Weight
		inch	mm	mm	mm	mm	PCD F	mm				
H002524	HF004	1¾	45	89	80	25	65	5.5	3	NBR	N	0.5
H002525	HF005	2	51	102	80	25	80	5.5	3	NBR	N	0.7
H002526	HF006	2⅜	60	114	87	25	90	5.5	3	NBR	N	1
H002527	HF010	3	76	127	95	30	102	6.5	3	NBR	N	1.15
H002528	HF015	3½	89	140	110	35	118	6.5	4	NBR	Y	1.5
H002529	HF020	4	102	152	123	35	130	6.5	4	NBR	Y	1.9
H002531	HF025	5	127	195	145	78	165	9	4	SS	Y	4
H002532	HF030	6	152	220	175	90	190	9	4	SS	Y	5
H002533	HF035	8	203	273	220	100	240	11	4	SS	Y	7.65
*NBR = Nitrile Rubber, SS = Stainless Steel												



Alternative sizes, designs, mirror & electro-polished finishes available upon request.

316L stainless steel skin fittings available in sizes 3/4" - 2" BSP supplied with S/S washer and back nut.

- Mirror polished outlet
- Price on application
- Alternative sizes available on request



A Thread BSP	B Hosetail O.D.
Inches	
3/4	3/4
1	1
1 1/2	1 1/2
2	2

# Exhaust Systems and Accessories

## 316L Stainless Steel Deck Drain Manifolds

316L stainless steel manifolds available in 3/8" to 4" connections.

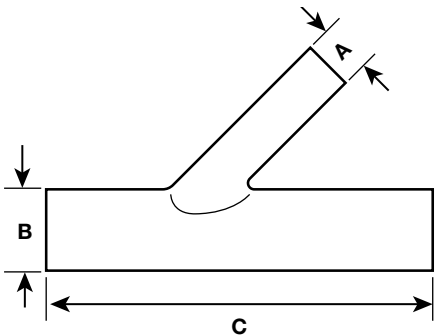
- Manufactured to customer specification
- Optional mounting brackets
- Electro polished
- Price on application



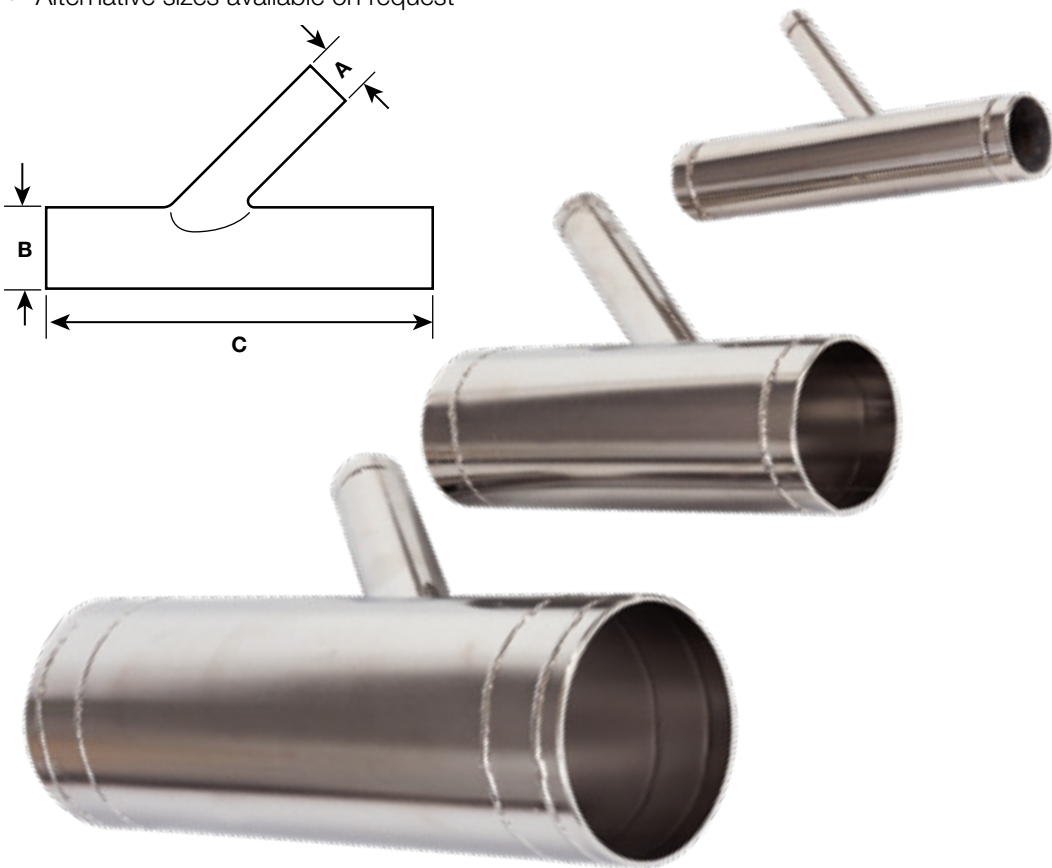
## 316L Stainless Steel Branch Connectors

316L stainless steel branch connectors made to order.

- Electro polished
- Price on application
- Alternative sizes available on request



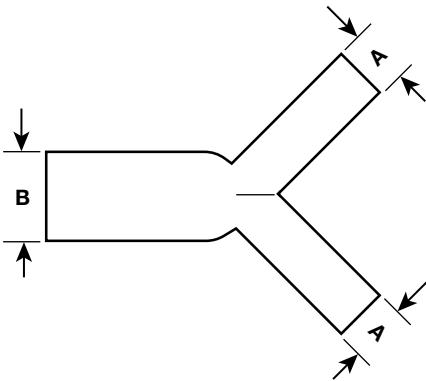
A	B	C
Inches BSP		
1/2	3/4	5
1/2	1	5
1/2	1 1/4	6
1/2	1 1/2	6
1/2	2	7
1/2	2 1/2	8
1/2	3	10
3/4	3/4	5
3/4	1	5
3/4	1 1/2	6
3/4	1 1/2	6
3/4	2	7
3/4	2 1/2	8
3/4	3	10
1	1	5
1	1 1/4	6
1	1 1/2	6
1	2	7
1	2 1/2	8
1	3	10
1.25	1 1/4	6
1.25	1 1/2	6
1.25	2	7
1.25	2 1/2	8
1.25	3	10
1 1/2	1 1/2	7
1 1/2	2	8
1 1/2	2 1/2	8
1 1/2	3	10
2	2	8
2	2 1/2	10
2	3	10
2 1/2	2 1/2	8
2 1/2	3	10
3	3	10



## 316L Stainless Steel Y Connectors

316L stainless steel Y hose connectors made to order.

- Electro polished
- Ten off minimum order
- Price on application
- Alternative sizes available on request

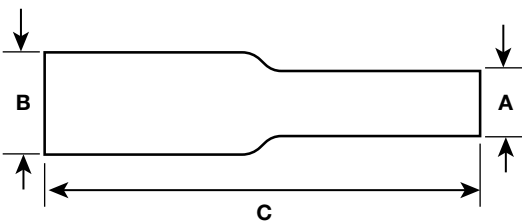


A	B
Inches	
1/2	1/2
1/2	3/4
1/2	1
3/4	3/4
1	1
1	1 1/4
1	1 1/2
1 1/4	1 1/4
1 1/4	1 1/4
1 1/2	1 1/4
1 1/2	2
2	2
2	2 1/2
2 1/2	2 1/2

## 316L Stainless Steel In-line Reducers

A range of 316L stainless steel in-line reducers made to order.

- Electro polished
- Ten off minimum order
- Price on application
- Alternative sizes available on request



A	B	C
Inches		
3/4	1	5
1	1 1/2	6
1 1/2	2	7
2	2 1/2	8
2 1/2	3	10
3	3 1/2	10
3 1/2	4	10



### 316L Stainless Steel OEM Replacement Exhaust Injection Elbows

Suitable for both normally aspirated and turbocharged installations

- Replacement for OEM units: Ford Sabre, Ford Mermaid, Ford Lehman, Perkins, Perkins Sabre, Cummins, Volvo Penta, Yanmar etc.
- Electro or mirror polished to customer requirements
- Price on application
- Thermal jackets also available
- May require original unit as pattern



### Replacement Water Jacketed Manifolds

To suit normally aspirated and turbo installations mild steel or stainless steel water jacketed hot aluminium sprayed

- Replacement for OEM units including: Ford Sabre, Ford Mermaid, Ford Lehman, Perkins, Perkins Sabre and others on request
- Price on application
- May require original unit as pattern



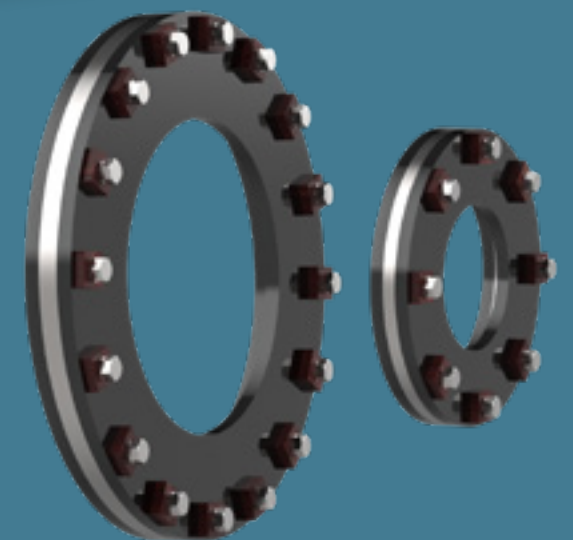
**Rubber Design**  
vibration and noise control



## Antivibration Mounts, Flanged Bellows & Bulkhead Penetrations

- Significant reduction of vibration into the vessel structure from the engine including through the exhaust system
- Specification and design support to ensure correctly specified and efficient systems
- Over 40 years of experience in vibration, noise, and shock control

**Halyard is a preferred supplier for Rubber Design products**





Hanging/Standing Fixed Point and Stabiliser Mounts

Rubber Design are global leaders in noise, vibration and shock control solutions for the worldwide marine market. Halyard is an authorised reseller of Rubber Design antivibration exhaust equipment. Halyard have a long-standing partnership with Rubber Design utilizing their products in Halyard exhaust systems and other applications. We can also offer these as standalone products to meet customer requirements.

Noise and Vibration Reduction

A significant reduction in the radiated noise and vibrations can be achieved by using rubber-metal elements between the exhaust gas system and ships structure. This is because the transmission speed of sound through rubber is only 45 to 90m/sec, while it is around 5000m/sec through steel. With a smart design and using rubber-metal elements a reduction of 8 to 10dB (A) can be obtained across the majority of the frequency range of 63 to 4000Hz.

Types of Mounting

For exhaust systems, two basic types of mountings are used, hanging/standing fixed support mountings and stabiliser mountings. The fixed support mountings take the static and dynamic forces and determine the direction of the expansion in the exhaust system. The stabiliser mountings guides the thermal expansion caused by the high temperature of the exhaust to the applied stainless steel bellows in the exhaust system. the stabiliser mountings also support the weight of the pipe.

Thermal Insulation

It is important to protect the rubber from the high temperature of the exhaust system. To obtain a long life time of the mountings the temperature must be below 80°C. To achieve this our fixed supports are equipped with suitable thermal insulators. By using this material, as well as providing a minimum air gap

of 25mm between the exhaust mounting and the outside exhaust insulation, the temperature can be controlled to around 50°C. The above is applicable for the flexible fixed points, for the stabilisers the thermal insulation is attained by the length of the threaded rod. For more details refer to the installation instructions.

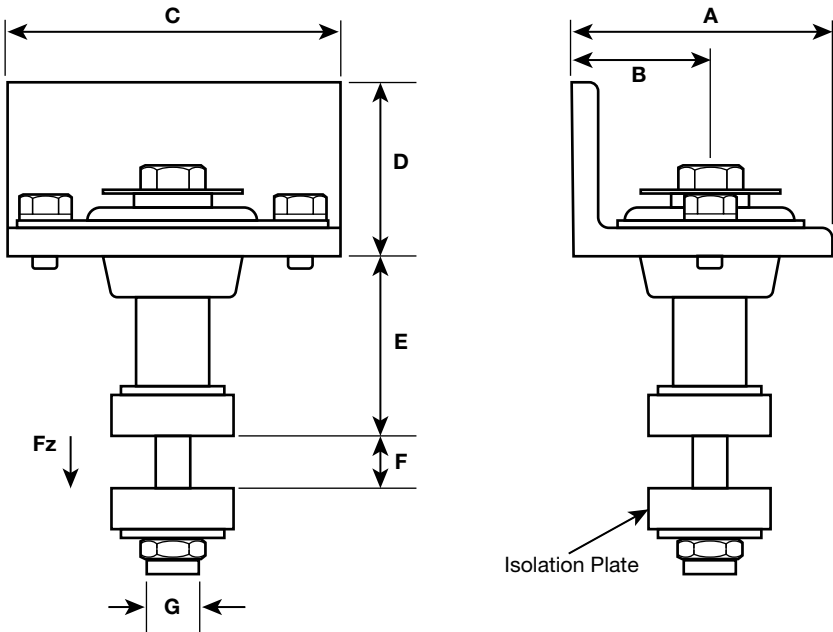
Mounting Selection

Generally these products are part of a complete system, therefore it is advisable to seek expert advice from our engineering team. Halyard, with the support from Rubber Design, can take total responsibility for the complete design including the vibration calculations of the flexible suspended exhaust systems. Besides flexible exhaust supports, Rubber Design also produce stainless steel bellows, flexible fire proof and/or watertight bulkhead penetrations, funnel deck passages. All according to the latest design standards and regulations. With the best design and products a maximum reduction of vibrations and life span of your exhaust gas system will be achieved.



Fixed Point Mounts

Hanging fixed points are mainly used to support horizontal exhaust pipes, isolate the engine vibrations and control the dynamic forces which occur while the vessel is in operation. Besides this they determine the direction of the expansion due to thermal growth of the exhaust pipe. The fixed points can also be installed close to the engine outlet to avoid thermal expansion from the exhaust system towards the engine bellows. This to protect the turbo against external forces from the exhaust system.

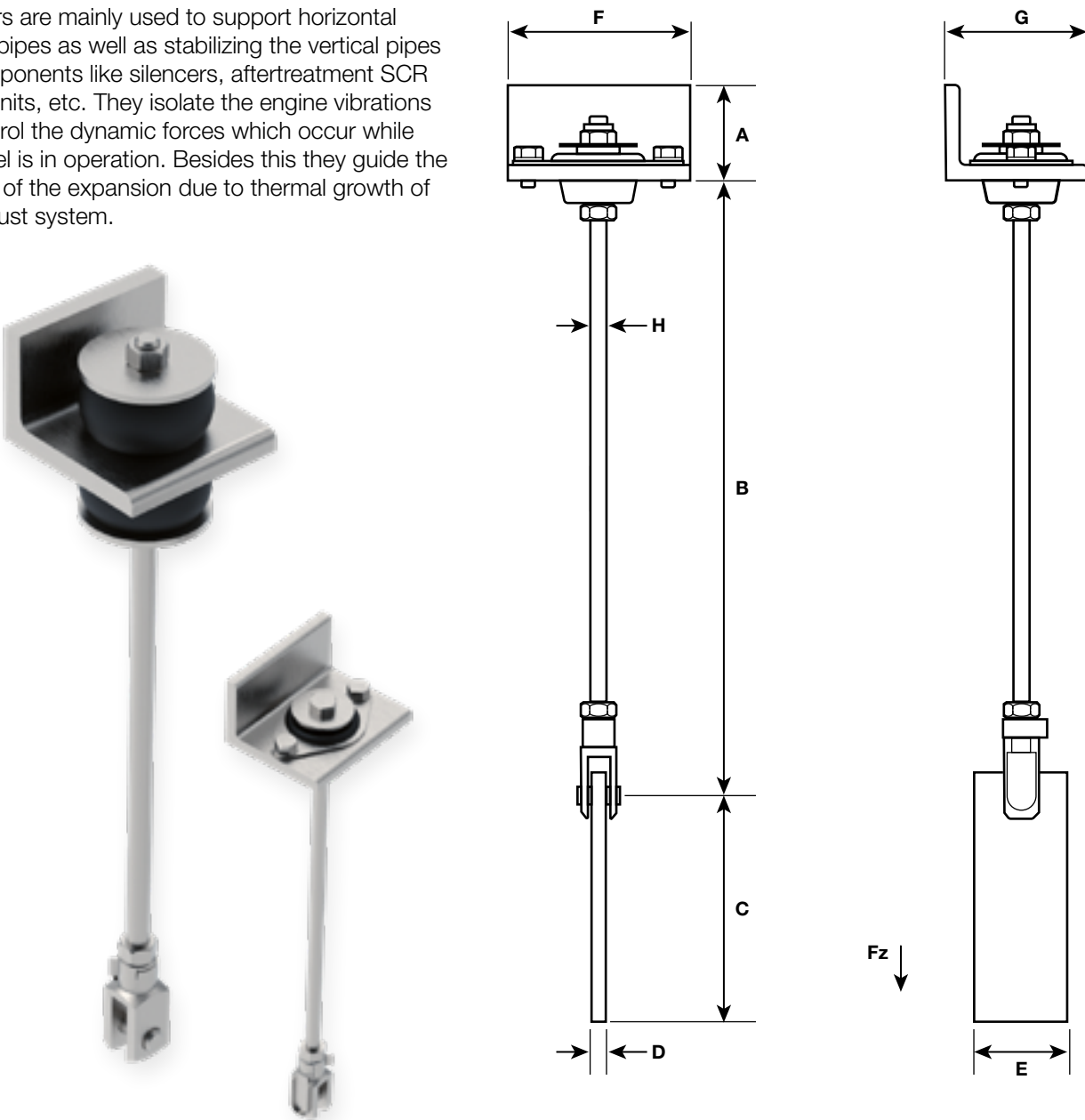


Fixed Point Mounts											
Reference	A	B	C	D	E	F	G	Isolation Plate	Weight kg	Fz Max N	Hardness °S h. A
	mm	mm	mm	mm	mm	Max. mm					
RD101	75	40	95	50	50	15	M10	35x35x12	0.9	500	45
										900	60
										2300	60
RD251	100	55	110	65	92	15	M12	40x40x12	2.1	4200	70
										4300	45
										4000	45
RD501	120	68	135	80	97	12	M16	50x50x12	3.3	6200	60
										8750	70
										6500	45
RD1001	150	80	150	100	115	15	M24	60x60x12	7.3	9000	65
RD2001	200	110	180	125	110	15	M30	70x70x16	10.9	10000	45
										15000	65
										16000	45
RD3001	200	110	230	125	155	20	M36	80x80x16	17.0	36000	65



Stabiliser Mounts

Stabilisers are mainly used to support horizontal exhaust pipes as well as stabilizing the vertical pipes and components like silencers, aftertreatment SCR or DPF units, etc. They isolate the engine vibrations and control the dynamic forces which occur while the vessel is in operation. Besides this they guide the direction of the expansion due to thermal growth of the exhaust system.



Stabiliser Mounts											
Reference	A mm	B mm	C mm	D mm	E mm	F mm	G	H	Weight kg	Fz Max N	Hardness °S h. A
RD101	50	320	118	8	50	95	75	M10	1.4	500 900	45 60
RD251D	65	300	135	10	60	100	100	M12	2.6	1750 3000	45 60
RD501D	80	470	130	15	70	120	120	M16	5.0	3000 4500	45 60
RD1001	100	530	115	10	40	150	150	M24	9.7	6500 9000	45 65
RD2001	100	530	130	10	50	180	200	M30	14.6	10000 15000	45 65
RD3001	125	555	215	15	65	230	200	M36	29.9	16000 36000	45 65

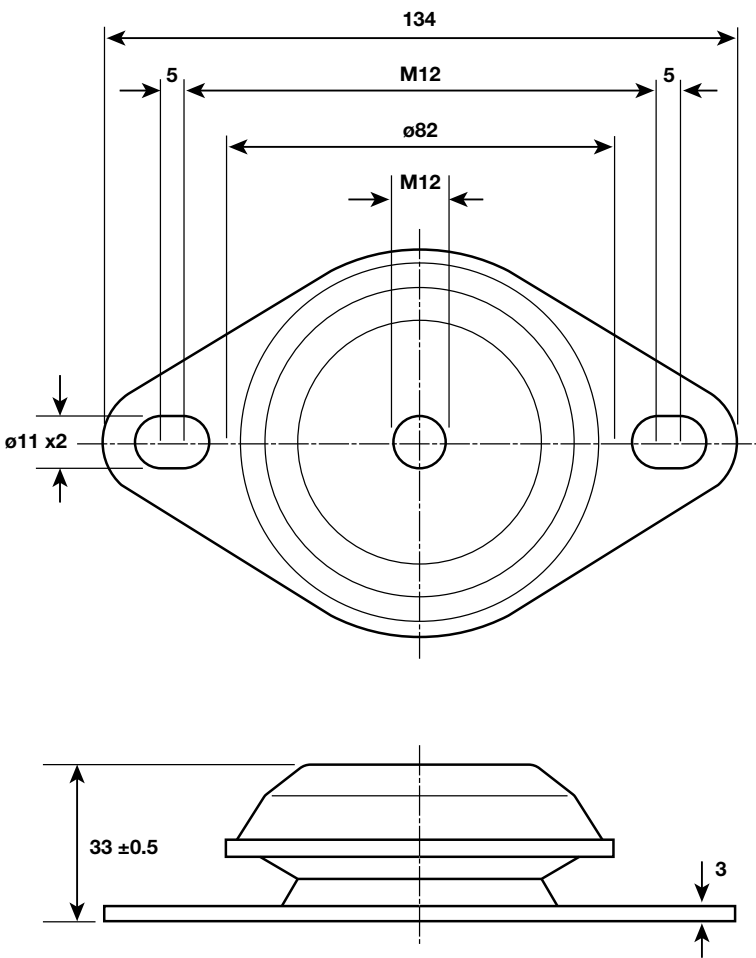
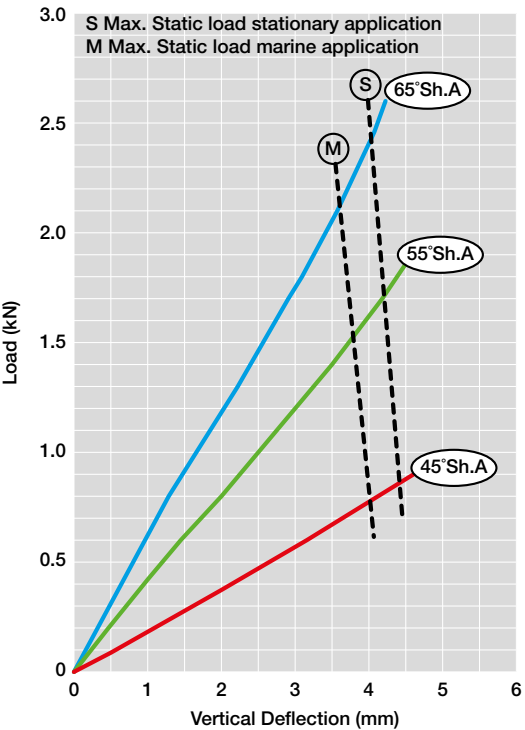
MP2 Series Compression Mounts

The MP-mountings (Multi Purpose) are developed to offer excellent passive and active vibration isolation for various applications.

Next to offering excellent isolation the MP-mountings internal deflection limiter avoids overload and allows use for mobile applications on for example trucks and ships. The geometry of the metal top offers protection to the natural rubber against oil and ozone. Also available in stainless steel.

Typical applications:

- Generators
- Engines
- Fans
- AC-units
- Cooling equipment
- Electro motors
- Cabinets



MP2 Series					
Reference	Max. Load Marine	Max. Load Static	Max. Vertical Deflection Marine	Max. Vertical Deflection Static	Cz Stiffness
	kN	kN	mm	mm	N/mm
MP2-45	0.8	0.9	4.0	4.4	200
MP2-55	1.5	1.7	3.8	4.2	400
MP2-65	2.1	2.4	3.6	4.0	600

Flanged Rubber Bellows

Rubber Design rubber bellows red ring are made from EPDM rubber and provide resistance to water up to 90°C, however this is influenced by the working pressure.

Rubber bellows with flanges have a special flow assisting convoluted shape of the bellows which minimize detrimental turbulence of the medium and pressure loss. High tensile strength texture cord plies combined with proven synthetic rubber mixes guarantee maximum reliability and an extended working life.

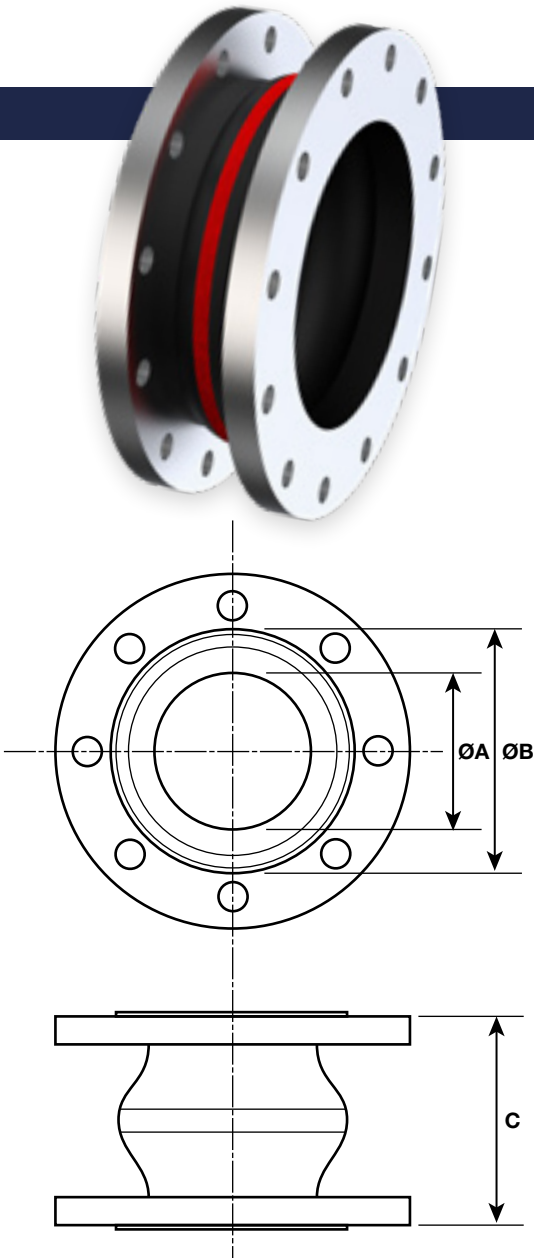
The rubber bellows are produced with a vulcanized steel ring to guarantee a perfect sealing of the profiled sealing rings in the special chamber of the swivel flanges. Average installed insulation is about 25dB, a figure which is further improved by compressed installation.

Alternative specification bellows including yellow ring single and double are available, contact Halyard for details

Pressure

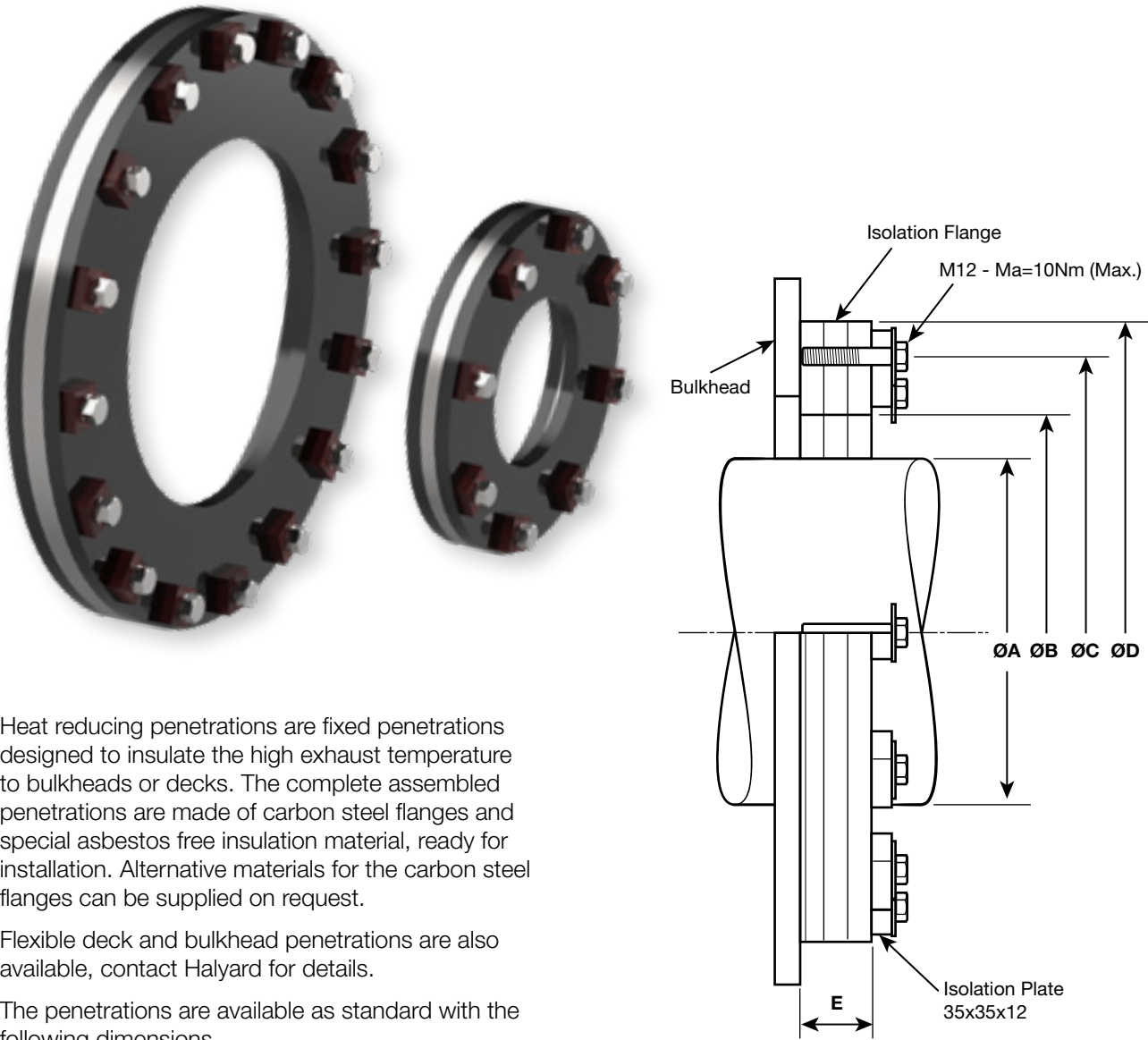
The maximum working pressure is 16Bar (10Bar\*) with a test pressure of 25Bar and even a burst pressure of over 60Bar (30Bar\*)

(\*For bellows larger than NB150)



1 A Red Ring Flanged Rubber Bellows												
Reference	ØA	ØB	C	Ax	Lat.	Angle	Bellows Area	Weight	Pressure (abs)		Installation Length	
	mm	mm	mm	mm	mm	Degrees	cm²	kg	kPa	MPa	Min. mm	Max. mm
KR025R110A000	25	72	130	-30/+20	±20	±35	35	1.9	20	1.6	120	135
KR032R110A000	32	72	130	-30/+20	±20	±35	35	2.0	20	1.6	120	135
KR040R110A000	40	79	130	-30/+20	±20	±35	50	3.5	20	1.6	120	135
KR050R110A000	50	89	130	-30/+20	±20	±35	74	4.3	20	1.6	120	135
KR065R110A000	65	104	130	-30/+20	±20	±30	87	5.5	20	1.6	120	135
KR080R110A000	80	120	130	-30/+20	±20	±30	120	6..2	30	1.6	120	135
KR100R110A000	100	139	130	-30/+20	±20	±25	143	7.7	40	1.6	120	135
KR125R110A000	125	164	130	-30/+20	±20	±25	210	8.7	60	1.6	120	135
KR150R110A000	150	189	130	-30/+20	±20	±15	283	11.3	60	1.6	120	135
KR200R110A000	200	237	130	-30/+20	±20	±15	525	16.2	70	1.0	115	140
KR250R110A000	250	289	130	-30/+20	±20	±10	636	20.5	70	1.0	125	140
KR300R110A000	300	338	130	-30/+20	±20	±10	897	24.0	80	1.0	125	140
KR350R110A000	350	390	200	-30/+20	±20	±10	1290	34.0	80	1.0	190	210
KR400R110A000	400	455	200	-30/+20	±20	±10	1628	37.5	80	1.0	190	210
KR500R110A000	500	555	200	-30/+20	±20	±10	2546	47.0	80	1.0	190	210
Standard flange range made of carbon steel S235JR, drilled according to DIN PN10/16, electrolytic galvanised												

Heat Reducing Bulkhead Penetration



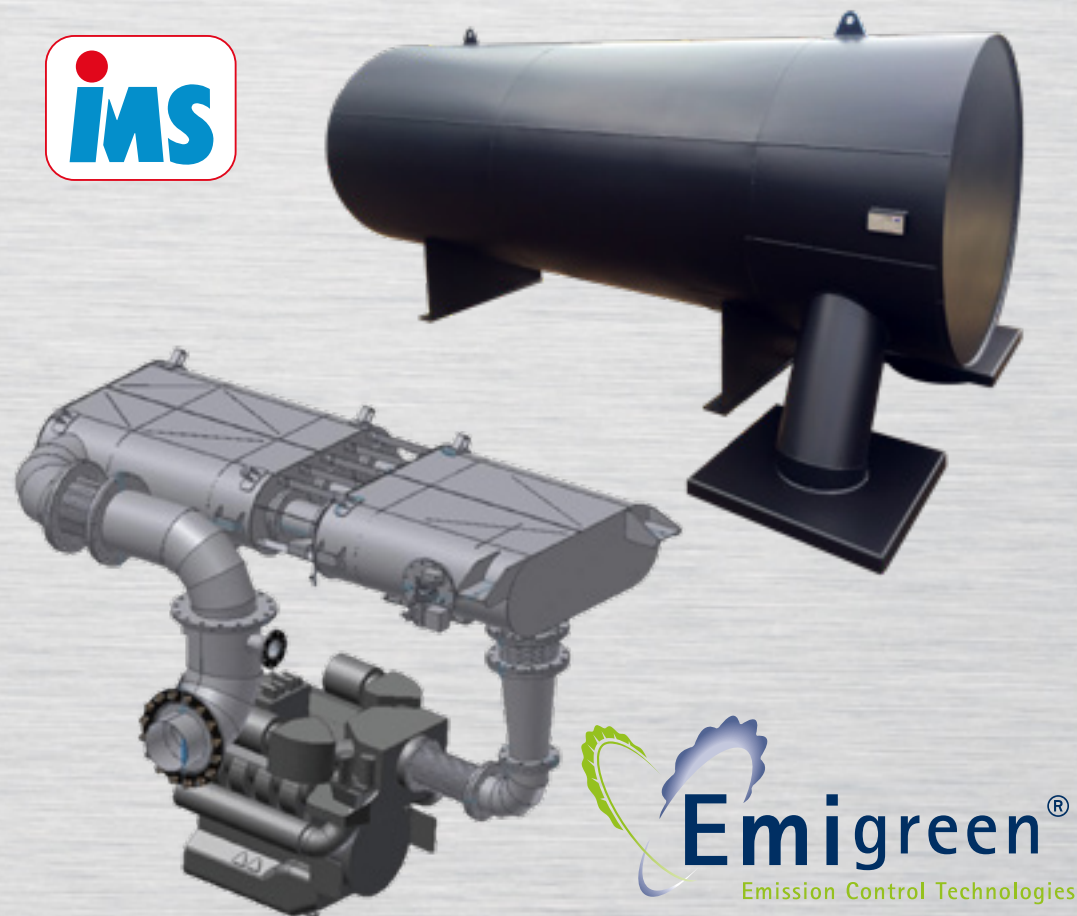
Heat reducing penetrations are fixed penetrations designed to insulate the high exhaust temperature to bulkheads or decks. The complete assembled penetrations are made of carbon steel flanges and special asbestos free insulation material, ready for installation. Alternative materials for the carbon steel flanges can be supplied on request.

Flexible deck and bulkhead penetrations are also available, contact Halyard for details.

The penetrations are available as standard with the following dimensions.

Heat Reducing Bulkhead Penetration						
Reference	ØA	ØB	ØC	ØD	E	Bolts
	mm	mm	mm	mm	mm	
50	25	72	130	-30/+20	±20	35
65	32	72	130	-30/+20	±20	35
80	40	79	130	-30/+20	±20	50
100	50	89	130	-30/+20	±20	74
125	65	104	130	-30/+20	±20	87
150	80	120	130	-30/+20	±20	120
175	100	139	130	-30/+20	±20	143
200	125	164	130	-30/+20	±20	210
250	150	189	130	-30/+20	±20	283
300	200	237	130	-30/+20	±20	525
350	250	289	130	-30/+20	±20	636
400	300	338	130	-30/+20	±20	897
450	350	390	200	-30/+20	±20	1290
Standard flange range made of carbon steel S235JR, drilled according to DIN PN10/16, electrolytic galvanised						
Other dimensions available on request						





## Dry Silencers, SCR & DPF Aftertreatment

### SCR & DPF Systems:

- Customer's requirements dictate the solution
- Dedicated design team provides installation solutions for awkward spaces
- Global leaders in noise reduction and DPF & SCR
- Reactive & absorptive exhaust silencers
- Critical grade exhaust silencers

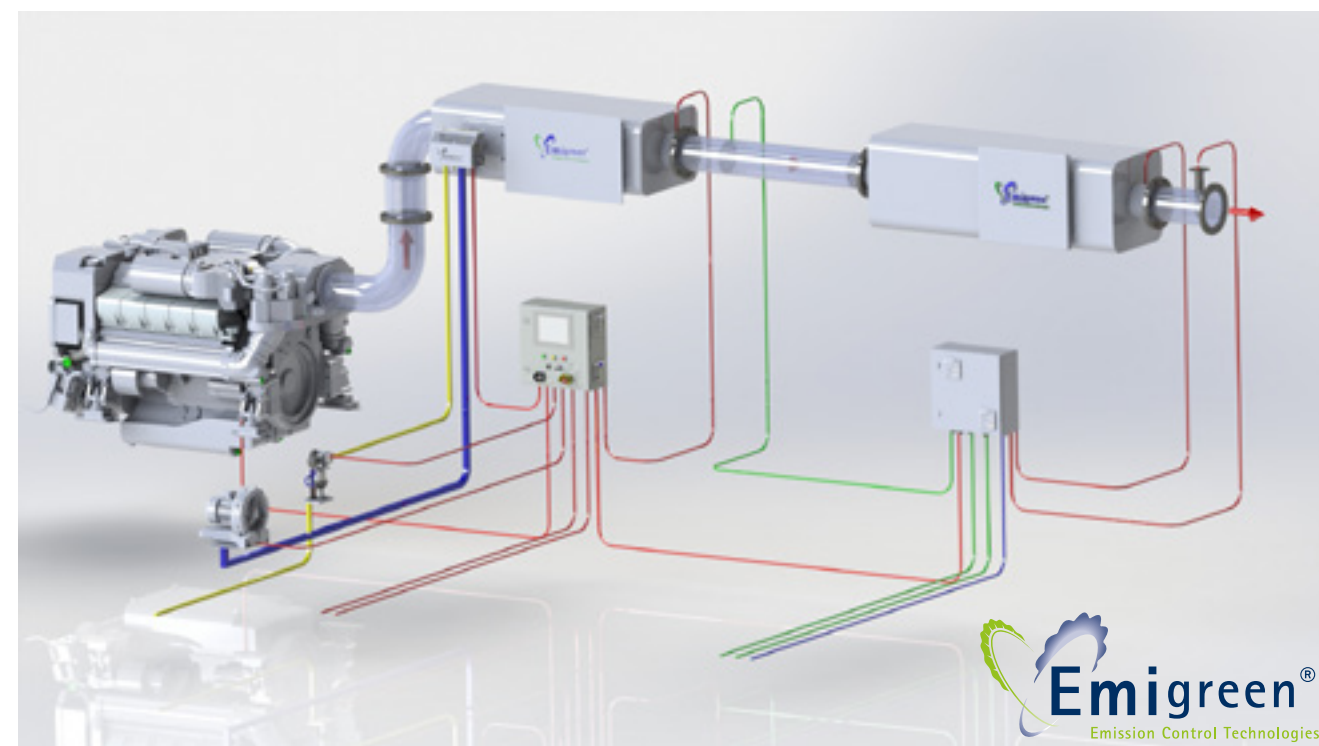
**Halyard is the Distributor  
for IMS and Emigreen in  
UK, Europe & Scandinavia**



## SCR & DPF Aftertreatment



### Emigreen SCR and DPF Aftertreatment Systems



### SCR and DPF Systems

- Designed to meet and exceed statutory emissions regulations
- Elimination of soot contamination
- Bespoke solutions to optimise available engine room space
- Integrated in a high-performance exhaust silencer

Emigreen is the leading innovator in the field of Selective Catalytic Reduction (SCR) and Diesel Particle Filters (DPF) producing integrated emission control solutions driven by the customer's requirements. This is where Emigreen stands out from the crowd; it is the customer's requirements that dictate the solution, not the products from any particular supplier.

Customer requirements are many and varied, ranging from the need to meet statutory regulations, through the need to stop soot blemishing the deck of a luxury yacht to the need to fit the solution into an awkward space. Whether for a commercial vessel or superyacht, new build or retrofit Emigreen has the solution optimised for reliability, control and efficiency.

Please contact Halyard for further information and to discuss your specific requirements.



**Halyard are main Emigreen distributors**

# IMS Exhaust Systems

Dry Silencers, SCR and DPF Aftertreatment Products



UK based IMS are global leaders in noise reduction and particulate filtering, manufacturing absorptive and reactive exhaust gas silencers, SCR and DPF emission control technology, acoustic enclosures, air inlet & extract attenuators, and acoustic doors.

## Reactive Exhaust Gas Silencer

This range of reactive silencers are designed primarily for use with internal combustion engine exhausts. The units can be installed vertically, horizontally or inclined, without affecting performance. They are of fully welded design, sturdily constructed in carbon steel with a heat resisting aluminium or black paint finish to ensure a long service life. All units are fitted with drain points to remove exhaust condensate. The acoustically treated MA type silencer increases the higher frequency performance by up to 10dB(A), reducing casing breakout as well as lowering the surface temperature. The units can be used where good overall acoustic performance is required without a secondary or terminal silencer.



## Absorptive Exhaust Gas Silencer

This range of silencers are straight through absorption type, suitable for vertical, horizontal or inclined installations. The design gives good attenuation in the higher frequency octave bandwidths and is, therefore, versatile in its application as an exhaust silencer or intake silencer on internal combustion engines. When used as a secondary or terminal silencer in conjunction with a high-performance reactive silencer, stringent noise limitations can be achieved as a result of their complementary effect on the noise spectrum. They are of all welded design, sturdily constructed in carbon steel with a heat resisting aluminium or black paint finish to ensure a long service life.

### Options for both reactive and absorptive silencers:

- BS10 Table 'D' flanges fitted as standard
- Alternative flange patterns on request for example PN flanges
- B.S.P. connections available on smaller sizes
- Radial/axial Inlet & Outlet
- Heat resistant aluminium or black paint
- Shot blast and aluminium metal sprayed Stainless steel grades such as 304 / 316 available
- Corten steel
- Support feet and brackets
- Anti-vibration mounts
- Lifting lugs
- Spark arrestors
- Thermal Insulation Jackets / Stainless Steel Cladding
- Marine Classification Certification

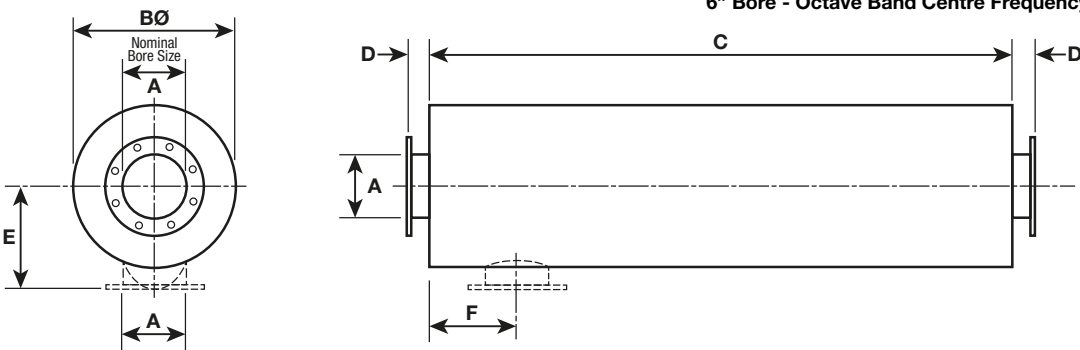
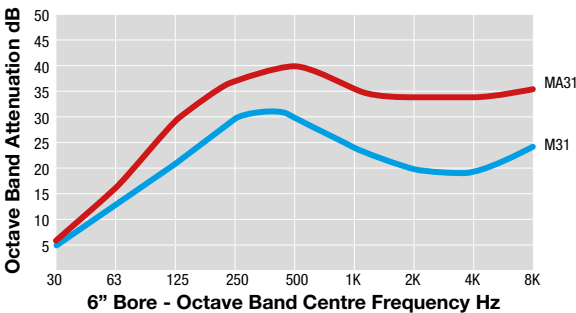
The most common silencers sold by Halyard into the marine industry are the M31/MA31, M51/MA51 and FP ranges. There are, however, also the M21/MA21, M41/MA41, MRA1/MAA1, MRA2/MAA2, MRA3/MAA3, MSA & BTS ranges with different configurations and specifications available on request.

## Semi-residential Reactive Silencers

### M31 Reactive Silencer Range

The M31 range of semi-residential reactive silencers are a medium attenuation design recommended for use where equipment must operate with a reduced noise level. Highly efficient and of advanced acoustical design, they are suitable for the exhausts or intakes of all two-stroke and four-stroke internal combustion engines, compressors and blowers. The units can be mounted vertically, horizontally or inclined, without affecting efficiency. The M31 'semi-residential grade' reactive exhaust silencer range are of all welded design, sturdily constructed in carbon steel with a heat resisting aluminium or black paint finish to ensure a long service life. All units are fitted with drain points to remove exhaust condensate.

MA31 Range is acoustically treated MA31 type silencer increases the higher frequency performance by up to 11dB(A), reducing casing breakout as well as lowering the surface temperature. The units can be used where good overall acoustic performance is required without a secondary or terminal silencer.



MA31 Series												
Silencer Ref.		All	M31	MA31	All	All	M31	MA31	All	All	Weight	Weight
		A	B	B	C	D	E	E	F Min.	F Max.	M31	MA31
		Inch	mm	mm	mm	mm	mm	mm	mm	mm	kg	kg
M31/MA31	038	1.5	160	260	600	50	155	205	60	250	3	4
M31/MA31	050	2	210	310	600	50	180	230	60	250	5	6
M31/MA31	063	2.5	260	360	700	50	205	255	70	380	8	10
M31/MA31	075	3	310	410	800	50	230	280	90	430	14	16
M31/MA31	090	3.5	360	460	900	75	255	305	150	480	32	36
M31/MA31	100	4	360	460	1000	75	255	305	160	490	45	50
M31/MA31	125	5	410	510	1200	75	280	330	180	530	54	62
M31/MA31	150	6	460	560	1400	75	305	355	190	590	78	95
M31/MA31	175	7	540	640	1400	75	350	400	200	590	100	135
M31/MA31	200	8	560	660	1800	75	355	405	220	810	130	170
M31/MA31	225	9	660	760	1800	75	420	470	235	810	190	230
M31/MA31	250	10	660	760	2100	75	420	470	250	1100	210	280
M31/MA31	300	12	760	860	2500	100	470	520	280	1150	340	390
M31/MA31	350	14	920	1020	2800	100	550	600	320	1350	440	500
M31/MA31	400	16	1020	1120	2900	100	600	650	340	1450	610	700
M31/MA31	450	18	1170	1270	3000	100	685	735	370	1500	840	940
M31/MA31	500	20	1270	1370	3400	100	735	785	400	1700	990	1050
M31/MA31	550	22	1370	1470	3700	100	785	835	430	1800	1200	1400
M31/MA31	600	24	1470	1570	4000	100	915	965	460	2000	1550	1800

Drawings and dimensions are for guidance. Halyard (M&I) Ltd should be contacted to verify correct silencer for the particular application. Alternative sizes and configurations available on request.

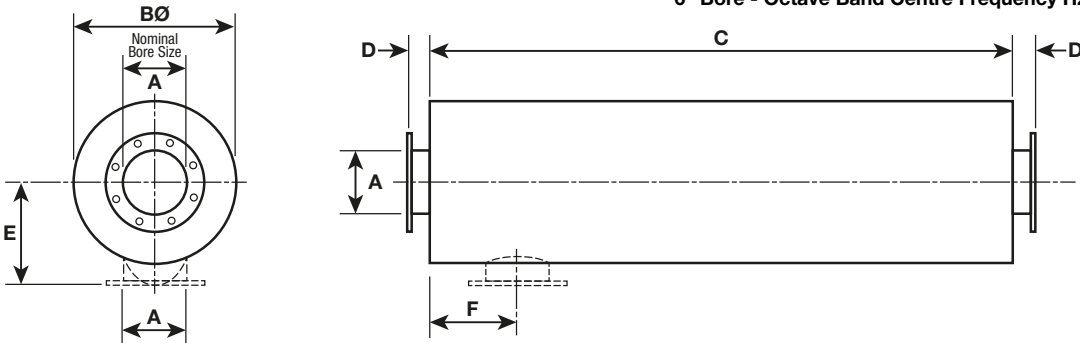
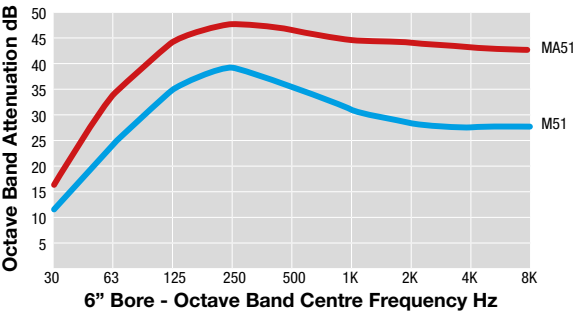




M51 Range

The M51 range of ‘critical grade’ exhaust silencers has been designed to meet the increasingly stringent noise criteria required in a pollution conscious environment. Generally specified for use on two stroke and four-stroke internal combustion engine exhausts, the units give good low frequency attenuation in the normal engine firing frequency ranges. The units can be installed horizontally, vertically or inclined, without affecting efficiency. The M51 ‘residential grade’ reactive exhaust silencer range are of all welded design, sturdily constructed in carbon steel with a heat resisting aluminium or black paint finish to ensure a long service life. All units are fitted with drain points to remove exhaust condensate.

The acoustically treated MA51 type silencer increases the higher frequency performance by up to 13dB(A), reducing casing breakout as well as lowering the surface temperature. The units can be used where good overall acoustic performance is required without a secondary or terminal silencer.



MA51 Series												
Silencer Ref.		All	M51	MA51	All	All	M51	MA51	All	All	Weight	Weight
		A	B	B	C	D	E	E	F Min.	F Max.	M51	MA51
		Inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
M51/MA51	038	1.5	160	260	800	50	155	205	60	400	9	10
M51/MA51	050	2	210	310	900	50	180	230	60	450	16	17
M51/MA51	063	2.5	260	360	1000	50	205	255	70	500	36	38
M51/MA51	075	3	310	410	1200	50	230	280	90	600	45	47
M51/MA51	090	3.5	360	460	1300	75	255	305	150	650	80	85
M51/MA51	100	4	360	460	1500	75	255	305	160	750	90	98
M51/MA51	125	5	410	510	1700	75	280	330	180	850	130	150
M51/MA51	150	6	460	560	2000	75	305	355	190	1000	168	200
M51/MA51	175	7	540	640	2000	75	350	400	200	1000	220	280
M51/MA51	200	8	560	660	2400	75	355	405	220	1200	265	300
M51/MA51	225	9	660	760	2400	75	420	470	235	1200	320	360
M51/MA51	250	10	660	760	2800	75	420	470	250	1400	390	480
M51/MA51	300	12	760	860	3500	100	470	520	280	1500	580	650
M51/MA51	350	14	920	1020	3600	100	550	600	320	1500	710	800
M51/MA51	400	16	1020	1120	4000	100	600	650	340	1600	920	1000
M51/MA51	450	18	1170	1270	4600	100	685	735	370	1800	1150	1250
M51/MA51	500	20	1270	1370	5300	100	735	785	400	2200	1400	1550
M51/MA51	550	22	1370	1470	5700	100	785	835	430	2300	1780	2000
M51/MA51	600	24	1470	1570	6000	100	915	965	460	2500	2070	2400

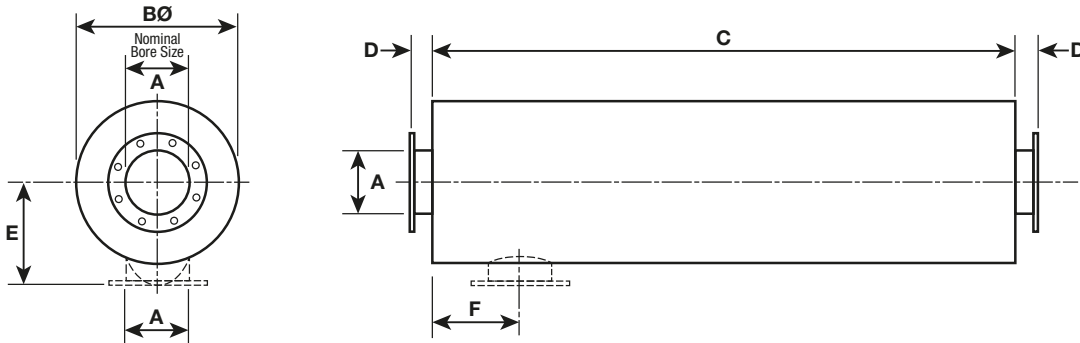
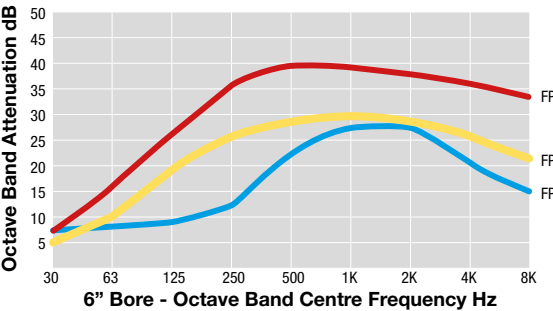
Drawings and dimensions are for guidance. Halyard (M&I) Ltd should be contacted to verify correct silencer for the particular application. Alternative sizes and configurations available on request.

Straight Through Absorption Silencers

FP Range

The FP series silencer is a straight through absorption type, suitable for vertical and horizontal installations. The design gives good attenuation in the higher frequency octave band widths and is, therefore, versatile in its application as an intake or exhaust silencer on fan blowers, centrifugal compressors, internal combustion engines, and small low-pressure gas vents and steam ejectors. When used as a secondary or terminal silencer in conjunction with a high performance reactive silencer, stringent noise limitations can be achieved as a result of their complementary effect on the noise spectrum. The FP ‘industrial grade’ absorptive

silencer series are of all welded design, sturdily constructed in carbon steel with a heat resisting aluminium or black paint finish to ensure a long service life.



FP 1/2 Series													
Silencer Ref.	All	FP	FP1/2	FP	FP1	FP2	All	FP	FP1/2	All	Weight	Weight	Weight
	A	B	B	C	C	C	D	E	E	F	FP	FP1	FP2
	Inch	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg	kg	kg
FP/1/2 038	1.5	115	178	600	800	1100	50	93	160	60	3	10	14
FP/1/2 050	2	115	210	700	850	1200	50	98	180	60	5	17	20
FP/1/2 063	2.5	140	210	700	850	1200	50	110	180	70	6	25	35
FP/1/2 075	3	152	230	700	900	1250	50	126	190	90	9	35	55
FP/1/2 090	3.5	178	310	850	950	1350	75	164	230	150	15	60	80
FP/1/2 100	4	230	360	850	1100	1600	75	190	255	160	20	85	125
FP/1/2 125	5	310	410	850	1200	1800	75	230	280	180	30	120	160
FP/1/2 150	6	360	460	1150	1400	1900	75	255	305	190	46	160	220
FP/1/2 175	7	360	460	1150	1500	2300	75	255	305	200	47	170	250
FP/1/2 200	8	410	610	1450	1650	2500	75	280	355	220	64	190	280
FP/1/2 225	9	410	610	1450	1800	2600	75	280	355	235	68	220	320
FP/1/2 250	10	460	660	1750	2000	2700	75	305	430	250	130	290	400
FP/1/2 300	12	560	760	2200	2200	3200	100	380	480	280	200	400	500
FP/1/2 350	14	560	760	2200	2400	3300	100	380	480	320	218	490	680
FP/1/2 400	16	660	920	2600	2700	3700	100	430	550	340	280	630	850
FP/1/2 450	18	660	920	2900	3000	4200	100	430	550	370	310	780	1000
FP/1/2 500	20	760	1070	2900	3300	4500	100	480	640	400	330	900	1200
FP/1/2 550	22	760	1270	3200	3600	4800	100	480	735	430	375	1100	1400
FP/1/2 600	24	810	1370	3500	3700	5000	100	505	835	460	430	1300	1800

Drawings and dimensions are for guidance. Halyard (M&I) Ltd should be contacted to verify correct silencer for the particular application. Alternative sizes and configurations available on request.

## Selective Catalytic Reduction (SCR) Technology

The **IMSeco** SCR Technology is a bespoke design to suit each installation and can also be retrofitted to existing Equipment.

The SCR system will reduce NOx emissions by up to 98% taking it well below the threshold of IMO Tier 3 regulations.

Installing the **IMSeco** SCR technology not only significantly reduces NOx emissions but dependent on the existing engine can also enable customers to meet IMO Tier 3 emission regulations.

### IMSeco SCR (Selective Catalytic Reduction) Technology

The SCR Catalysts are housed in a full Stainless-Steel Modular Reactor for either “SCR only” or SCRT (SCR plus DPF) configurations where the reactor is sectioned into two chambers, the lower chamber having an “In-built AdBlue Mixer Pipe” prior to either the DPF or SCR substrates and the Upper Chamber housing the SCR Catalysts.

The Inlet and Outlet Exhaust Pipework can be located on either side of the reactor to suit the specific installation requirements. A removable hatch is provided for access to remove the substrates for maintenance if required.

The modular SCR system can be scaled to suit the specific installation.

The engine speed and load are used to calculate the exhaust flow across the catalysts to determine the exact rate at which to inject the “AdBlue” agent.

AdBlue is a liquid reductant which consists of approximately 68% water and 32% Urea.

The SCR Technology from IMS components are shown in the illustration below.

IMSeco provides a small integral “AdBlue Tank” with level sensors and a control panel that controls the amount of AdBlue that is dosed via the “AdBlue Pump” and the “Airless AdBlue Injector”.

Once injected into the exhaust stream the water content of the AdBlue will evaporate, and the urea will decompose into an ammonia gas at temperatures above 180°C.

A temperature sensor is used at the point of injection to ensure that there is sufficient temperature for injection to take place to prevent the Liquid Urea crystallising and potentially blocking the face of the SCR.

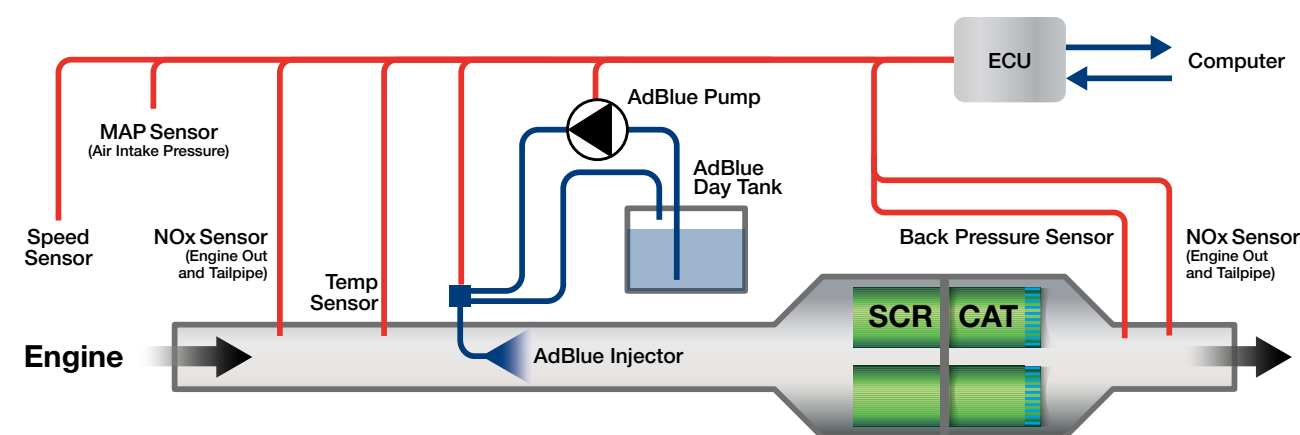
Once converted into an ammonia gas and passed across the SCR Catalyst a chemical reaction takes place that converts NOx (NO + NO2) into nitrogen (N2) and water vapour, natural components of the air we breathe, which is then expelled through the exhaust outlet.

NOx sensors are used to measure the “Engine Out” and “Tailpipe” NOx to validate NOx reductions that are taking place across the SCR Catalysts.

An ammonia slip catalyst is also used after the SCR Catalysts to prevent any ammonia gas being emitted from the tailpipe in the unlikely event that there is an overdosing of the AdBlue.

The ECU is fitted with a memory chip which stores “Real-Time” NOx emissions data can be downloaded via the Windows Friendly Software to enable reporting of reductions being achieved.

Downloads can be done manually via a laptop or through a Telematics Package.



## Diesel Particulate Filter (DPF) with ‘Active’ Regeneration Technology

To capture the soot particles, present within the exhaust stream of any Diesel Engine, **IMSeco** uses a “Wall-Flow” DPF (Diesel Particulate Filter) where every alternate cell in the porous ceramic substrate is capped to form a “Checker Board” pattern on the front and rear face of the substrate.

Particulate Matter (Soot) in the exhaust stream enters the DPF through an open cell but cannot exit at the opposite end due to the cell being capped.

The exhaust gases pass through the porous walls of the substrate and out through an adjacent cell.

To prevent the DPF from becoming blocked by the soot particles captured within the DPF it needs to be regenerated, which can be done “passively or actively” dependent on exhaust gas temperatures present.

Exhaust gas temperatures of more than 350°C for extended periods of time are required to regenerate a DPF, which is often not present in some diesel engines (especially at low loads), which means you either need to:

A) Lower the point of combustion by adding a “Diesel Oxidation Catalyst – DOC” up front of the DPF to assist with passive regeneration, or:

B) Artificially raise the exhaust gas temperatures by some form of “Active Regeneration” such as Electrical Heating, use of a Burner System or Hydrocarbon (Fuel) Injection

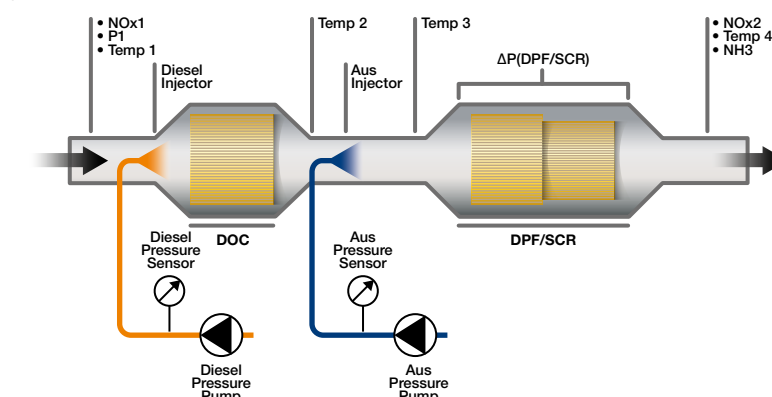
The **IMSeco** DPF system would in many cases use a DOC (Diesel Oxidation Catalyst) which is manufactured from a Corrugated Metallic Substrate coated in a precious metal solution that draws oxygen molecules and NO2 to its surface that travels into the DPF to passively reduce up to 99% of the particulates (PM10/PM2.5) captured within the DPF.

The DOC will also dramatically reduce the Carbon Monoxides (CO) and Hydrocarbons (HC) present within the exhaust stream and can also be used together with the Hydrocarbon Injection System to vaporise the fuel across the DOC elevating the exhaust gas temperatures when active regeneration is required.

Once combusted the soot particles turn to ash which migrate to the ends of the cells within the DPF. The ash would need to be removed periodically by cleaning of the DPF, generally on an annual basis.

The system shown below is an example of the **IMSeco** Active regeneration system using “Hydrocarbon Injection” to vaporise the fuel across a DOC upstream of the DPF, elevating the exhaust gas temperatures to keep the DPF Clean.

The system shown below also incorporates the **IMSeco** SCR Technology that also reduces NOx.



## IMSeco Electrical Regeneration Technology

**IMSeco** are also able to offer its patented “Electrical Regeneration Technology” where an electrical current taken from the generating set is applied directly to the filter media electrically powered heat that elevates the exhaust gas temperatures to between 600-700°C to oxidize any accumulated soot in the self-regenerating “Active DPF Filters” in a controlled manner within 3 minutes while typically using less than 1% of the generator output.

The **IMSeco** “Electrical Regeneration Technology” has built in microprocessors that monitor back pressure, temperature and elapsed time between re-generators to control the regeneration cycles efficiently and safely, so your stand-by power is available when you need it most.





# High Performance Yacht Cranes

*Raising the bar on Yacht Crane Performance*

## Yacht Cranes:

- High performance
- Efficient lightweight versions
- Heavy duty versions
- Advanced easy operation
- 2 Year warranty

**Halyard is the Distributor for UK & Ireland**



# High Performance Yacht Cranes



## High Performance Yacht Lifting Equipment

Steelhead Marine's elegantly designed, high-tech cranes are renowned across the yachting industry, but their ambitions stretch even higher. Through persistence, innovation, and hard work they are aiming to become the leader in advancing hydraulic solutions for the yachting world.

With strong leadership and a dynamic workforce, Steelhead is working to take their innovative products to the next level of sophistication. A diligent sales, engineering, design and build process combined with a close working relationship with their clients ensures Steelhead products will be at the forefront of innovation in the global yacht market.

### Benefits of Steelhead Marine

- Engineered for Performance
- Greater lift capacity with reduced crane weight
- Superior engineering and advanced materials
- Durability, strength and reliability
- Compact and attractive design that puts less space and weight demands on your yacht
- Easy to use



### 2 year industry leading warranty

An optional 3rd year limited warranty with approved commissioning by certified AdvanTec technician



Whisper Davits

Whisper-quiet, low lift requirements, compact, sleek and dual function davits.



E Series

Lightweight aluminium crane with standard two function (luffing & lifting) operation. Optional upgrades for wireless controller with three or a full four function operation.



ES Series

Lightweight, super efficient, low profile European design with four-function hydraulics.



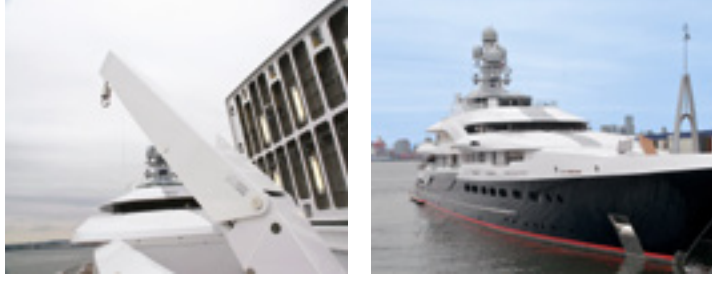
CT Series

Heavy duty four function hydraulic cranes with live telescoping boom extension and proportional controls.



LDC Series

Lay-down five function hydraulic cranes with live telescoping boom extension and second luffing function. This series is completely custom built to meet individual customer requirements.



High Performance Yacht Crane Product Specifications

Yacht Crane Product Specifications															
Series	Hydraulic Functions	Options	Model	Capacity		Reach		Hoist		Retracted Length		Weight		Ideally suited for vessels	
				lbs	kg	ft	m	ft	m	ft	m	lbs	kg	ft	m
Whisper Davits	Hoisting Power Luffing	Pedestal Base Standpipe Mount 12 or 24V dc power	WD600	600	363	8	2.4	17	5.2	NA	NA	215	98	< 50	< 15
			WD800	800	363	8	2.4	17	5.2	NA	NA	215	98	< 50	< 15
			WD1000	1000	454	8	2.4	17	5.2	NA	NA	235	107	< 50	< 15
E	Hoisting Luffing	Power Rotation Power Extension Pedestal Base Standpipe Mount	E1000	1000	454	10	3.0	16	4.9	6	1.8	384	174	< 55	< 17
			E1100	1100	500	10	3.0	16	4.9	6	1.8	369	167	< 55	< 17
			E1500	1500	680	12	3.7	20	6.1	7	2.1	582	263	55–70	17–21
			E1750	1750	794	12	3.6	20	6	7	2.1	610	276	> 70	> 21.3
ES	Hoisting Luffing Rotation Extension	Radio Controlled Pedestal Base Standpipe Mount	ES1000	1000	454	10	3.0	16	4.9	6	1.8	384	174	< 55	< 17
			ES1100	1100	500	10	3.0	16	4.9	6	1.8	384	174	< 55	< 17
			ES1500	1500	680	12	3.7	20	6.1	7	2.1	602	273	55–70	17–21
			ES1750	1750	794	12	3.6	20	6	7	2.1	630	285	> 70	> 21.3
			ES2200/ES2500	2200/2500	1000/1131	14	4.3	22	6.7	8	2.4	1150	521	> 70	20
CT	Hoisting Luffing Rotation Extension	Radio Controlled Fixed Boom 230V ac Power or Ship's Hydraulics Pedestal Base Standpipe Mount Custom Reach Available	CT2000	2000	907	18	5.5	24	7.3	12	3.7	1050	476	> 70	> 21
			CT2500	2500	1134	18	5.5	24	7.3	12	3.7	1150	522	> 70	> 21
			CT3000	3000	1361	16	4.9	24	7.3	11	3.4	1150	522	> 70	> 21
			CT3500	3500	1588	20	6.1	24	7.3	13	4.0	1700	771	> 70	> 21
			CT4000	4000	1814	20	6.1	30	9.1	12.5	3.8	2100	953	> 70	> 21
			CT5000	5000	2268	20	6.1	30	9.1	12.5	3.8	2400	1089	> 70	> 21
			CT6000	6000	2722	20	6.1	30	9.1	12.5	3.8	2600	1179	> 70	> 21



Cranes are proof tested to minimum 110% capacity



All cranes above 1500lbs (680kg) come with wired and wireless proportional controls

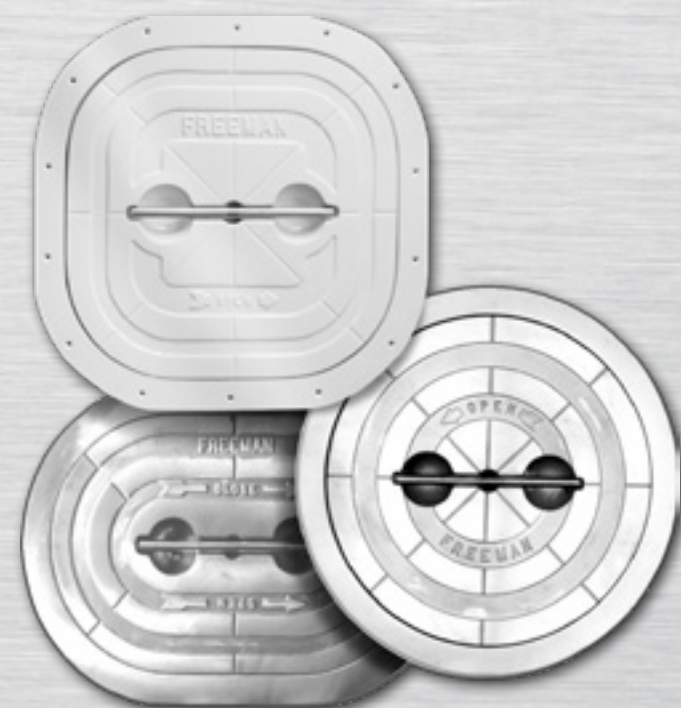


Compact design uses less deck space



Whisper quiet linear winches use composite rope which is quieter and stronger than steel cable





## Cast Hatches & Watertight Doors

*Freeman Hatches, Doors & Portlights deliver reliability, safety and more features than any other manufacturer*

### Cast Hatches:

- High quality range of cast Aluminium and Ductile Iron hatches
- Handle is always attached and fits flush with the deck
- Quick-acting dogs eliminates over or under tightening
- Versatile installation, hatches can be installed in steel, aluminium, wood, or fibreglass decks

### Quick Availability Doors:

- Selection of watertight and weathertight doors
- Stock items, ready to ship
- Guaranteed quality products
- Hinged and sliding

**Halyard is the Distributor for Advantec and Freeman for UK & Ireland**

## Series 2400 Cast Hatches

Approvals & Certificates

ISO 9001:2015

### Halyard Quality Policy Statement

- Consistently meet or exceed our customer's expectation for product quality and performance.
- Consistently meet or exceed our customer's expectation for product and service delivery.
- Continuously improve our processes and systems.
- Provide employee training to better serve our customers and to support personal growth.

### Certificates and Acceptances

AdvanTec's Freeman cast hatch line has various approvals and certifications. The hatches have been granted American Bureau of Shipping (ABS) Product Design Assessment Certification for 109 different models. Each of these models can be used on a number of ABS classed vessels in locations specified in the design assessment.

AdvanTec Marine constantly monitors maritime regulations, standards and classification society activities related to closure approvals.

AdvanTec Marine closures have received specific intended use acceptance by:

- ABS - American Bureau of Shipping
- DNV - Det Norske Veritas
- LR - Lloyds Register of Shipping
- GL - Germanischer Lloyd
- BV - Bureau Veritas
- MCA - Maritime Coastguard Agency
- RS - Russian Maritime Register of shipping
- RINA - RINA S.P.A., Italy
- CRS - Croatian Registry of Shipping
- USCG - US Coast Guard
- CCG - Canadian Coast Guard (Transport Canada)
- ABYC - American Boat & Yacht Council

For the full range of available products and specifications please visit:  
[www.advantecglobal.com/marine](http://www.advantecglobal.com/marine)



### Approvals at a glance

- **ABS - type approval, certificate no.13-HS1082451-PDA**
- **Lloyd's Register - type approval certificate no. 03/00088(E3) & 9/60003(E1)**
- **U.S. Coast Guard, CE, ISO-12216 compliant**

Approvals have been awarded and may be obtained for specific intended uses.

AdvanTec Cast Hatches are currently in use on Coast Guard vessels and Naval craft of all types.

AdvanTec Marine can assist with specific intended use applications.



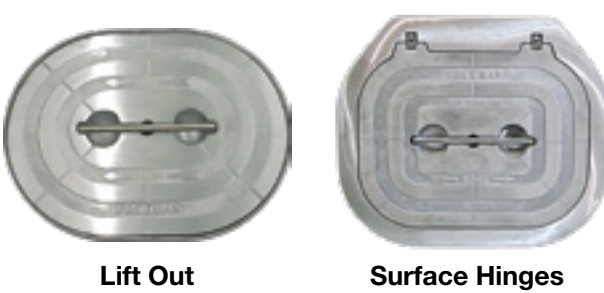
**Over 350 self righting vessels 100% completely outfitted with AdvanTec hatches, doors, windows & portlights. The people you trust, trust AdvanTec Marine.**



# Series 2400 Cast Hatches



## Service, Value and Experience



### Freeman Cast Hatches Attributes

- Evenly spaced dog arms exert uniform force on the cover plate.
- Handle position shows when dog arms are engaged or disengaged.
- Handle is always attached. Hatch and handle fit flush with the deck with the handle in a recessed locked position.
- Watertight hatches, designed to seal up to 30' intermittent head, the double-sealing gasket seals tighter under pressure.
- Versatile installation, hatches can be installed in steel, aluminium, wood, or fibreglass decks.
- Complete units include aluminium or steel mounting rings for bolt-in or weld-in installations.
- Dog mechanism assures smooth consistent action; no binding or jamming.
- Quick-acting dog eliminates over or under tightening; hatch operates the same each time.

### Freeman Hatches have more quick-acting flush hatch experience, models and features than any manufacturer.

AdvanTec Marine's Freeman hatches are used on a wide variety of fishing boats, tugs, barges, research vessels, offshore tenders, rescue craft and other workboats. The Freeman hatch is designed for new boats, or replacing other hatches in standard openings, or for improving existing craft.

The hatches are fast acting and easy to use. Simply grasp the handle and pull, the shaft slides into place, and with less than a quarter turn, completely disengages the locking mechanism. The dogs and linked handle do the work smoothly in just a second.

Our easy lift system allows simple removal. With the locking mechanism disengaged, the hatch is resting on the deck ring and can be lifted out with one hand.

### Hinged Hatches

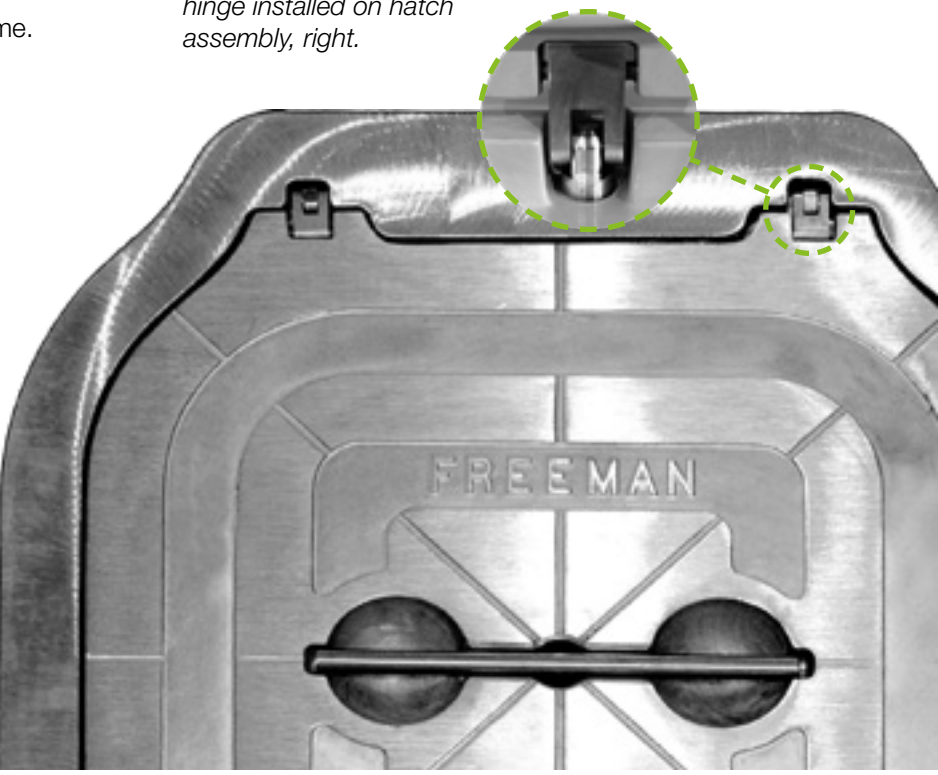
For hinged models the unique hinging device allows the hatch to be opened more than 180° and "floats" when the hatch is closed to facilitate a tighter seal. Round hatches 18" and larger, and all oval and square hatches with aluminium covers are available hinged from the factory.

Close-up view of standard Freeman "floating" hinge installed on hatch assembly, right.



• **Concealed Yoke Hinge**  
(Optional, selected models)

- **Great Value**
- **Versatile**
- **Fast Acting**
- **Reliable**
- **Easy Lift**
- **Low Maintenance**



## Quality and Capability

### Two Important Features Distinguish the Freeman Cast Hatch from Other Designs

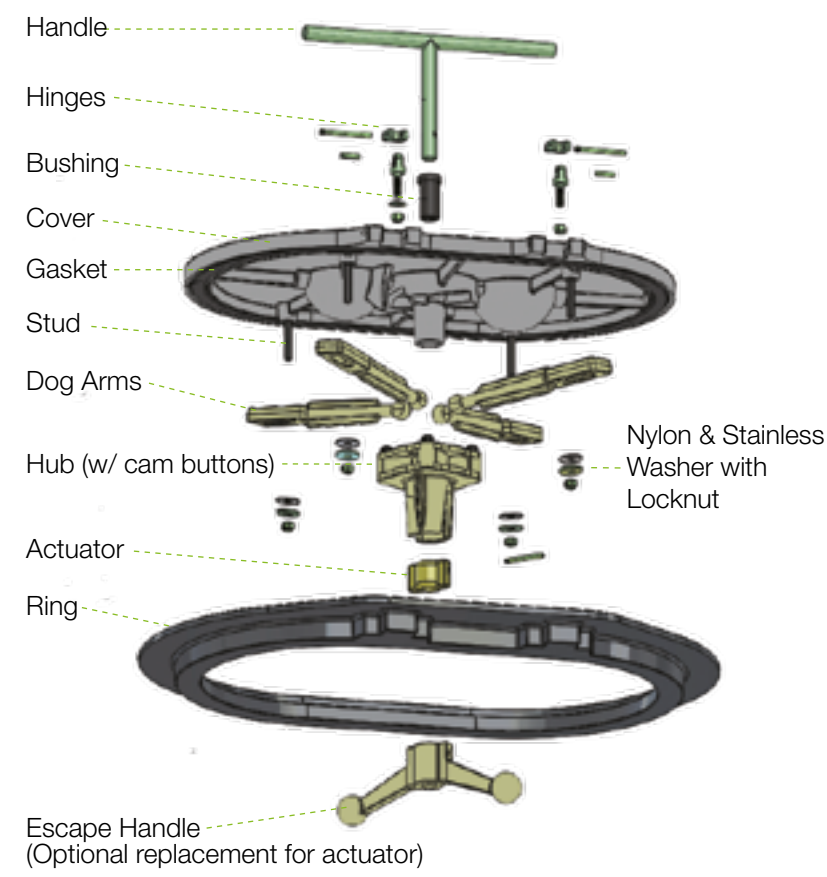
- **Built in T-Handle**
- **Easy Operating Dogging Mechanism**

The standard pocketed, stainless steel T-handle is built in, permanently part of the hatch. Grasp the handle and pull, the shaft slides up into place, and with less than a quarter of a turn the locking mechanism completely disengages. The alignment of the handle shows when dog arms are engaged or disengaged.

Evenly spaced dog arms (either 3, 4 or 8 depending on size of hatch) exert uniform sealing pressure on the cover plate. The unique design, fit, and adjustability of Freeman's dog mechanism assure smooth, consistent action; no binding or jamming of parts.

- **As hub rotates a cam exponentially increases force at the opposite end of the dog arm**
- **Each dog is adjustable to insure equal tension on the gasket sealing surface**

### Typical Hatch Cover Assembly



## Knife Edge or Compression Sealing

### Compression Seal 2400 Series Hatches

These hatches have easy-to-clean spigots, feature long gasket life, and are economical to purchase.

- Aluminium Deck Rings are intended to be weld installed into aluminium decks and bolt installed into other deck materials.
- Steel Deck Rings are to be weld installed into steel decks only.
- Watertight seal to 30 foot intermittent head, continuous 10 foot head top-loaded pressure (on properly installed and adjusted hatch assemblies).

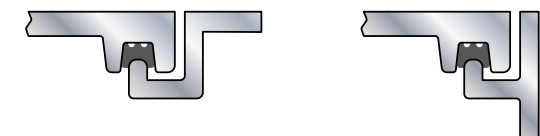


**A-C** Aluminium Deck Ring with Compression Seal      **S-C** Steel Deck Ring with Compression Seal

### Knife-edge Seal 2400 Series Hatches

These hatches feature a coaming with drain gutter and an aggressive sealing rim edge. A drain fitting can be installed to minimize water from entering enclosure when hatch is initially opened.

- Aluminium Deck Rings are intended to be weld installed into aluminium decks and bolt installed into other deck materials.
- Steel Deck Rings are to be weld installed into steel decks only.



**A-K** Aluminium Deck Ring with Knife Edge Seal      **S-K** Steel Deck Ring with Knife Edge Seal



Series 2400 Cast Hatches



Oval Cast Hatches



15"x 24" Oval lift-out, Aluminium ring



15" x 24" Oval hinged, Steel ring, Inside view



15"x 24" Oval lift-out, Steel ring



15"x 24" Oval hinged, Steel ring

Cast Aluminium Hatches - Oval																					
Part No.	Size Inch	Style	Ring	Hatch Dimensions										Cover Dimensions				Mechanism		Assembly Weight	
				Clear Opening		Rough Opening*		Overall (Cover + Ring)						Material		Overall					
				A (inch)	A (mm)	B (inch)	B (mm)	C (inch)	C (mm)	D	E	F	Metal	Thick	Inch	mm	Metal	Dog Qty.	lbs	kg	
2431-0002	12x18	Lift-Out	A-C	12.0x18.0	305x457	15.0x21.0	381x533	18.8x24.8	478x630	1.5	0.31	NA	A	0.28	14.1x20.3	358x516	AA	4	29	13.2	
2431-0003	12x18	Lift-Out	S-C	12.0x18.0	305x457	14.8x19.8	376x503	14.8x19.8	376x503	1.3	0.25	NA	A	0.29	14.1x20.3	358x516	AA	4	30	13.6	
2471-0002	12x18	Hinged	A-C	12.0x18.0	305x457	15.0x21.0	381x533	18.8x24.8	478x630	1.5	0.31	NA	A	0.28	14.1x20.3	358x516	AA	4	31	14.1	
2471-0003	12x18	Hinged	S-C	12.0x18.0	305x457	14.8x20.8	376x503	17.2x20.8	437x529	1.3	0.25	NA	A	0.29	14.1x20.3	358x516	AA	4	31	14.1	
2433-0002	15x24	Lift-Out	A-C	14. 8x23.7	376x603	17.7x26.7	450x677	21.3x30.3	541x770	1.5	0.25	NA	A	0.22	16.3x25.9	414x658	AA	4	35	15.9	
2433-0003	15x24	Lift-Out	S-C	14. 8x23.7	376x603	17.5x26.5	445x673	17.5x26.5	445x673	1.3	0.25	NA	A	0.22	16.3x25.9	414x658	AA	4	37	16.8	
2434-0002	15x24	Lift-Out	A-K	15.2x24.2	386x615	17.9x26.9	455x684	21.0x30.0	533x762	1.6	0.31	0.6	A	0.21	17.7x26.7	450x678	AA	4	35	15.9	
2434-0003	15x24	Lift-Out	S-K	15.2x24.2	386x615	17.9x26.7	454x678	17.9x26.7	454x678	2.5	0.31	0.25	A	0.21	17.6x26.4	447x671	AA	4	54	24.5	
2473-0002	15x24	Hinged	A-C	14.6x23.5	371x597	17.6x26.5	447x673	21.6x30.5	549x775	1.5	0.31	NA	A	0.2	16.1x25.7	409x653	AA	4	37	16.8	
2473-0003	15x24	Hinged	S-C	14.6x23.5	371x597	17.6x26.5	440x670	19.7x26.5	500x673	1.3	0.31	0.25	A	0.2	16.1x25.7	409x653	AA	4	38	17.2	
2474-0002	15x24	Hinged	A-K	15.2x24.2	388x615	17.2x26.2	437x665	21.0x30.0	533x762	1.6	0.31	0.6	A	0.21	17.4x26.3	442x668	AA	4	35	15.9	
2474-0003	15x24	Hinged	S-K	15.2x24.2	388x615	20.1x26.7	454x678	20.1x26.7	510x678	2.5	0.31	0.25	A	0.21	17.0x26.1	432x668	AA	4	60	27.2	
2483-0107	15x24	Lift-Out	S-C	15.1x24.1	384x613	16.8x25.6	427x650	16.8x25.6	427x650	1.5	0.25	NA	D I	0.38	17.0x26.1	432x668	AA	4	85	28.6	
2435-0002	19x26	Lift-Out	A-K	19.2x26.2	488x665	21.2x28.2	538x716	25.0x32.0	635x813	1.6	0.31	0.6	A	0.29	21.5x28.4	546x721	AA	4	43	19.5	
2435-0003	19x26	Lift-Out	S-K	19.2x26.2	488x665	21.7x28.7	551x729	21.7x28.7	551x729	2.5	0.31	0.25	A	0.29	21.3x28.4	546x721	AA	4	61	27.7	
2475-0002	19x26	Hinged	A-K	19.2x26.2	488x665	21.2x28.2	538x716	27.2x32.4	691x823	1.6	0.31	0.6	A	0.29	21.3x28.4	546x721	AA	4	44	20	
2475-0003	19x26	Hinged	S-K	19.2x26.2	488x665	24.0x28.8	610x732	24.0x28.8	610x732	2.5	0.31	0.25	A	0.29	21.3x28.4	546x721	AA	4	67	30	

AA - Aluminium Alloy SS - Stainless Steel DI - Ductile Iron (see loading limits page) \*Rough opening dimensions do not include hinge pockets

A-K Aluminium Deck Ring with Knife Edge Seal

A-C Aluminium Deck Ring with Compression Seal

S-K Steel Deck Ring with Knife Edge Seal

S-C Steel Deck Ring with Compression Seal

Round Cast Hatches



30" Round lift-out, steel ring



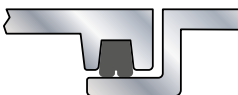
8" Round lift-out, aluminium ring



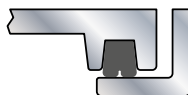
18" Round lift-out, steel ring



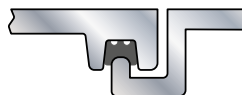
20" Round hinged, aluminium ring



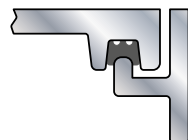
A-C Aluminium deck ring with compression seal



S-C Steel deck ring with compression seal



A-K Aluminium deck ring with knife edge seal



S-K Steel deck ring with knife edge seal

Cast Aluminium Hatches - Round																					
Part No.	Size Inch	Style	Ring	Hatch Dimensions									Cover Dimensions				Mechanism		Assembly Weight		
				Clear Opening		Rough Opening*		Overall (Cover + Ring)					Material		Overall						
				A (inch)	A (mm)	B (inch)	B (mm)	C (inch)	C (mm)	D	E	F	Metal	Thick	Inch	mm	Metal	Dog Qty.	lbs	kg	
2401-0002	8"	Lift-Out	A-C	7.9	201	10.3	262	12.2	310	1.1	0.31	NA	AA	0.23	9.8	249	AA	3	8	3.6	
2402-0002	12"	Lift-Out	A-C	11.9	302	14.8	376	17.4	442	1.3	0.31	NA	AA	0.19	13.9	353	AA	3	13	5.9	
2402-0003	12"	Lift-Out	S-C	11.9	302	14.5	368	14.7	373	1.3	0.25	NA	AA	0.19	13.9	353	AA	3	16	7.3	
2403-0002	15"	Lift-Out	A-C	15	381	17.8	452	12.5	546	1.3	0.31	NA	AA	0.29	17	432	AA	3	23	10.4	
2403-0003	15"	Lift-Out	S-C	15	381	17.6	447	17.8	452	1.3	0.25	NA	AA	0.29	17	432	AA	3	26	11.8	
2404-0002	18"	Lift-Out	A-C	18	457	20.9	530	24.5	622	1.4	0.31	NA	AA	0.26	20	508	AA	3	30	13.6	
2404-0003	18"	Lift-Out	S-C	18	457	20.5	521	20.7	526	1.3	0.25	NA	AA	0.26	20	508	AA	3	32	14.5	
2405-0002	18"	Lift-Out	A-K	18	457	20	508	24	607	1.5	0.38	0.8	AA	0.24	20.4	518	AA	3	38	17.2	
2405-0003	18"	Lift-Out	S-K	18	457	20.6	523	21.1	536	2.5	0.31	1	AA	0.24	20.7	526	AA	3	36	16.3	
2441-0002	18"	Hinged	A-C	18	457	25.7	653	24.5	622	1.6	0.27	NA	AA	0.38	20	508	AA	3	35	15.9	
2441-0003	18"	Hinged	S-C	18	457	20.8	528	20.5	521	1.3	0.25	NA	AA	0.38	20	508	AA	3	38	17.2	
2442-0002	18"	Hinged	A-K	18	457	20.7	527	24.5	607	1.5	0.38	0.8	AA	0.24	20.7	526	AA	3	39	17.7	
2442-0003	18"	Hinged	S-K	18	457	20.6	523	22.9	580	2.5	0.31	1	AA	0.24	20.7	526	AA	3	42	19.1	
2481-0107	18"	Lift-Out	S-C	18	457	20.5	521	20.3	516	1.5	0.25	NA	DI	0.41	19.9	505	SS	3	75	34	
2406-0002	20"	Lift-Out	A-C	19.8	503	22.8	579	26.5	673	1.3	0.31	NA	AA	0.26	21.9	556	AA	4	36	16.3	
2406-0003	20"	Lift-Out	S-C	19.8	503	22.4	569	22.3	566	1.3	0.25	NA	AA	0.26	21.9	556	AA	4	37	16.8	
2407-0002	20"	Lift-Out	A-K	20	508	22	559	26	660	1.4	0.38	0.7	AA	0.35	21.9	556	AA	4	44	20	
2407-0003	20"	Lift-Out	S-K	20	508	22.6	574	22.3	566	2.5	0.31	1	AA	0.35	21.6	549	AA	4	41	18.6	
2443-0002	20"	Hinged	A-C	19.6	498	22.8	579	26.5	673	1.7	0.4	NA	AA	0.29	21.9	556	AA	4	44	20	
2443-0003	20"	Hinged	S-C	19.6	498	22.4	569	22.1	561	1.3	0.25	NA	AA	0.29	21.9	556	AA	4	47	21.3	
2444-0002	20"	Hinged	A-K	20	508	22	559	26	660	1.4	0.38	0.7	AA	0.35	22.4	569	AA	4	45	20.4	

AA - Aluminium Alloy SS - Stainless Steel DI - Ductile Iron (see loading limits page)  
\*Rough opening dimensions do not include hinge pockets

Continued >

Series 2400 Cast Hatches



Cast Aluminium Hatches - Round																				
Part No.	Size Inch	Style	Ring	Hatch Dimensions									Cover Dimensions				Mechanism		Assembly Weight	
				Clear Opening		Rough Opening*		Overall (Cover + Ring)					Material		Overall					
				A (inch)	A (mm)	B (inch)	B (mm)	C (inch)	C (mm)	D	E	F	Metal	Thick	Inch	mm	Metal	Dog Qty.	lbs	kg
2444-0003	20"	Hinged	S-K	20	508	22.6	579	22.9	582	2.5	0.31	1	AA	0.35	22.4	569	AA	4	48	21.8
2408-0002	22"	LIFT-OUT	A-C	22	559	24.8	630	28.5	724	1.6	0.31	NA	AA	0.31	24	610	AA	4	39	17.7
2408-0003	22"	LIFT-OUT	S-C	22	559	24.6	625	24.7	627	1.5	0.25	NA	AA	0.31	24	610	AA	4	40	18.1
2411-0002	24"	LIFT-OUT	A-C	23.3	592	26.6	676	30.5	775	1.4	0.31	NA	AA	0.37	25.8	665	AA	4	52	23.6
2411-0003	24"	LIFT-OUT	S-C	23.3	592	26.7	679	26.2	665	1.5	0.25	NA	AA	0.37	25.8	665	AA	4	54	24.5
2412-0002	24"	LIFT-OUT	A-K	24.1	612	27.1	689	30.6	778	1.6	0.38	0.6	AA	0.42	26.5	673	AA	4	65	29.5
2412-0003	24"	LIFT-OUT	S-K	24.1	612	26.7	678	26.5	673	2.5	0.31	1.0	AA	0.42	26.2	665	AA	4	59	28.8
2447-0002	24"	HINGED	A-C	23.4	594	26.4	671	30.5	775	1.7	0.4	NA	AA	0.41	25.8	665	AA	4	59	28.8
2447-0003	24"	HINGED	S-C	23.4	594	26.5	673	29.3	743	1.5	0.25	NA	AA	0.41	25.8	665	AA	4	62	28.1
2448-0002	24"	HINGED	A-K	24.1	612	26.1	663	30.6	777	1.6	0.38	0.6	AA	0.42	25.8	665	AA	4	66	29.9
2448-0003	24"	HINGED	S-K	24.1	612	26.7	678	26.3	668	2.5	0.31	1.0	AA	0.42	25.8	655	AA	4	65	29.5
2482-0107	24"	LIFT-OUT	S-C	23.3	592	26.5	673	26.3	668	1.5	0.25	NA	DI	0.36	25.8	655	AA	4	110	49.9
2415-0006	30"	LIFT-OUT	A-C	30	762	33.5	851	37.3	947	1.4	0.31	NA	AA	0.41	32.5	826	SS	4	81	36.7
2415-0007	30"	LIFT-OUT	S-C	30	762	33.3	846	33.1	841	1.3	0.25	NA	AA	0.39	32.5	826	SS	4	87	39.5
2452-0006	30"	HINGED	A-C	30	762	33.5	851	37.3	947	1.7	0.4	NA	AA	0.46	32.5	826	SS	4	82	37.2
2452-0007	30"	HINGED	S-C	30	762	33.3	846	33.1	841	1.5	0.25	NA	AA	0.49	32.5	826	SS	4	118	53.5

AA - Aluminium Alloy SS - Stainless Steel DI - Ductile Iron (see loading limits page) \*Rough opening dimensions do not include hinge pockets

A-K Aluminium Deck Ring with Knife Edge Seal

A-C Aluminium Deck Ring with Compression Seal

S-K Steel Deck Ring with Knife Edge Seal

S-C Steel Deck Ring with Compression Seal

Rectangular/Square Cast Hatches

22" Square hinged, inside view      27" Square hinged, steel ring      18 x 24" Rectangular hinged, aluminium ring      22" Square hinged, aluminium ring

A-C Aluminium deck ring with compression seal      S-C Steel deck ring with compression seal      A-K Aluminium deck ring with knife edge seal      S-K Steel deck ring with knife edge seal

Cast Aluminium Hatches - Round																				
Part No.	Size (inch)	Shape	Style	Ring	Hatch Dimensions									Cover Dimensions		Mechanism		Assembly Weight		
					Clear Opening		Rough Opening*		Overall (Cover + Ring)					Material						
					A (inch)	A (mm)	B (inch)	B (mm)	C (inch)	C (mm)	D	E	F	Metal	Thick	Metal	Dog Qty.	lbs	kg	
2421-0002	18x24	R	Lift-Out	A-K	18.0x24.0	457x610	20.5x26.5	521x673	24.5x30.5	622x775	1.6	0.38	0.7	ALUM	0.2	AA	4	36	16.3	
2421-0003	18x24	R	Lift-Out	S-K	18.0x24.0	457x610	20.5x26.5	521x673	20.4x26.4	518x671	2.5	0.31	0.9	ALUM	0.2	AA	4	61	27.7	
2461-0002	18x24	R	Hinged	A-K	18.0x24.0	457x610	20.5x26.5	521x673	24.5x30.5	622x775	1.6	0.38	0.7	ALUM	0.2	AA	4	36	16.3	
2461-0003	18x24	R	Hinged	S-K	18.0x24.0	457x610	20.5x26.4	521x673	22.8x26.3	579x668	2.5	0.31	0.9	ALUM	0.2	AA	4	61	27.7	
2436-0002	24x28	R	Lift-Out	A-K	24.6x28.6	625x727	27.5x31.5	699x799	31.2x35.2	793x894	1.6	0.38	0.7	ALUM	0.2	AA	4	61	27	
2436-0003	24x28	R	Lift-Out	S-K	24.6x28.6	625x727	27.5x31.5	699x799	27.1x31.1	688x790	2.5	0.31	0.9	ALUM	0.3	AA	4	83	37.4	
2476-0002	24x28	R	Hinged	A-K	24.6x28.4	629x724	29.6x31.4	752x797	33.1x34.9	840x887	1.6	0.38	0.7	ALUM	0.3	AA	4	62	28.1	
2476-0003	24x28	R	Hinged	S-K	24.6x28.4	629x724	29.6x31.4	752x797	29.6x33.1	752x841	2.5	0.31	0.9	ALUM	0.3	AA	4	84	37.9	
2429-0002 0001**	30x36	R	Lift-Out	A-K	30.5x36.5	775x927	32.8x38.8	834x987	36.3x42.3	923x1075	2.5	0.31	0.9	ALUM	0.3	AA	8	102	46.3	
2429-0003 0001**	30x36	R	Lift-Out	S-K	30.5x36.5	775x927	33.5x39.5	850x1003	33.5x39.5	850x1003	2.5	0.31	0.9	ALUM	0.3	AA	8	119	54	
2469-0002 0001**	30x36	R	Hinged	A-K	30.6x36.6	776x930	32.8x38.8	834x987	38.1x42.3	967x1075	1.6	0.38	0.7	ALUM	0.3	AA	8	93	42.4	
2469-0003 0001**	30x36	R	Hinged	S-K	30.0x36.0	762x914	33.5x39.5	850x1003	37.5x39.3	952x998	2.5	0.31	0.9	ALUM	0.3	AA	8	130	59	
2422-0002	20x20	SQ	Lift-Out	A-K	20.3x20.3	517x517	22.8x22.8	579x579	26.8x26.8	681x681	1.6	0.38	0.7	ALUM	0.5	AA	4	43	19.5	
2422-0003	20x20	SQ	Lift-Out	S-K	20.3x20.3	517x517	22.8x22.8	579x579	22.5x22.5	572x572	2.5	0.31	0.9	ALUM	0.5	AA	4	74	33.6	
2462-0002	20x20	SQ	Hinged	A-K	20.3x20.3	517x517	22.8x22.8	579x579	28.2x26.4	715x672	1.6	0.38	0.7	ALUM	0.3	AA	4	45	20.4	
2462-0003	20x20	SQ	Hinged	S-K	20.3x20.3	517x517	22.8x22.8	579x579	25.2x22.8	640x579	2.5	0.31	0.9	ALUM	0.3	AA	4	76	34.5	
2423-0002	22x22	SQ	Lift-Out	A-K	22.0x22.0	559x559	24.5x24.5	622x622	28.5x28.5	724x724	1.6	0.38	0.7	ALUM	0.3	AA	4	45	20.4	
2423-0003	22x22	SQ	Lift-Out	S-K	22.0x22.0	559x559	24.5x24.5	622x622	24.7x24.7	627x627	2.5	0.31	0.9	ALUM	0.3	AA	4	92	41.7	
2463-0002	22x22	SQ	Hinged	A-K	22.0x22.0	559x559	24.5x24.5	622x622	28.5x28.5	724x724	1.6	0.38	0.7	ALUM	0.3	AA	4	46	20.9	

AA - Aluminium Alloy DI - Ductile Iron (see loading limits page) \*Rough opening dimensions do not include hinge pockets  
\*\*Requires escape handle as standard

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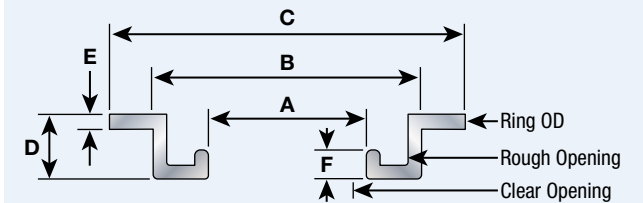
Series 2400 Cast Hatches



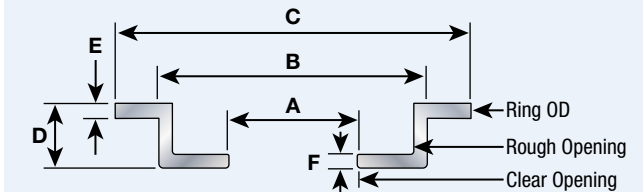
Cast Aluminium Hatches - Round																			
Part No.	Size (inch)	Shape	Style	Ring	Hatch Dimensions									Cover Dimensions		Mechanism		Assembly Weight	
					Clear Opening		Rough Opening*		Overall (Cover + Ring)					Material		Metal	Dog Qty.	lbs	kg
					A (inch)	A (mm)	B (inch)	B (mm)	C (inch)	C (mm)	D	E	F	Metal	Thick				
2463-0003	22x22	SQ	Hinged	S-K	22.0x22.0	559x559	24.5x24.5	622x622	26.8x24.3	681x617	2.5	0.31	0.9	ALUM	0.3	AA	4	92	41.7
2423-0002	22x22	SQ	Lift-Out	A-K	22.0x22.0	559x559	24.5x24.5	622x622	28.5x28.5	724x724	1.6	0.38	0.7	ALUM	0.3	AA	4	45	20.4
2423-0003	22x22	SQ	Lift-Out	S-K	22.0x22.0	559x559	24.5x24.5	622x622	24.6x24.9	625x625	2.5	0.31	0.9	ALUM	0.3	AA	4	92	41.7
2424-0002	24x24	SQ	Lift-Out	A-K	24.6x24.6	625x625	27.5x27.5	697x697	31.2x31.2	792x792	1.6	0.38	0.7	ALUM	0.3	AA	4	63	28.6
2424-0003	24x24	SQ	Lift-Out	S-K	24.0x24.0	610x610	27.4x27.4	695x695	27.4x27.4	695x695	2.5	0.31	0.9	ALUM	0.3	AA	4	82	37.2
2480-0106	24x24	SQ	Hinged	A-K	24.8x24.8	630x630	27.3x29.2	693x742	31.2x35.2	793x894	1.6	0.38	0.7	DI	0.3	DI	4	133	60.3
2480-0107	24x24	SQ	Hinged	S-K	24.7x24.7	629x629	27.4x29.5	695x748	29.6x27.4	752x695	2.5	0.31	0.9	DI	0.3	DI	4	155	70.3
2464-0002	24x24	SQ	Hinged	A-K	24.0x24.0	610x610	27.5x27.5	698x698	33.1x31.2	840x792	1.6	0.38	0.7	ALUM	0.3	AA	4	59	26.7
2464-0003	24x24	SQ	Hinged	S-K	24.0x24.0	610x610	27.4x27.4	695x695	29.6x27.4	695x695	2.5	0.31	0.9	ALUM	0.3	AA	4	87	39.5
2427-0002	27x27	SQ	Lift-Out	A-K	27.2x27.2	690x690	29.6x29.6	752x752	33.6x33.6	854x854	1.6	0.32	0.8	ALUM	0.3	AA	4	63	28.6
2427-0003	27x27	SQ	Lift-Out	S-K	27.2x27.2	690x690	29.6x29.6	750x750	29.6x29.6	752x752	2.5	0.31	1.9	ALUM	0.3	AA	4	85	38.6
2426-0006	30x30	SQ	Lift-Out	A-K	30.0x30.0	762x762	32.5x32.5	826x826	36.5x36.5	927x927	1.6	0.25	0.7	ALUM	0.3	AA	4	75	31
2426-0007	30x30	SQ	Lift-Out	S-K	30.0x30.0	762x762	32.5x32.5	826x826	32.6x32.6	828x828	2.5	0.31	0.9	ALUM	0.3	AA	4	113	51.3
2466-0006	30x30	SQ	Hinged	A-K	30.0x30.0	762x762	32.5x32.5	826x826	36.5x36.5	927x927	1.6	0.25	0.7	ALUM	0.2	AA	4	78	35.4
2466-0007	30x30	SQ	Hinged	S-K	30.0x30.0	762x762	32.5x32.5	826x826	34.8x32.6	884x829	2.5	0.31	0.9	ALUM	0.2	AA	4	114	51.7
2428-0002 0001**	36x36	SQ	Lift-Out	A-K	36.0x36.0	914x914	39.3x39.3	998x998	42.5x42.5	1080x1080	2.5	0.31	0.9	ALUM	0.4	AA	8	104	48
2428-0003 0001**	36x36	SQ	Lift-Out	S-K	36.0x36.0	914x914	39.3x39.3	998x998	39.2x39.0	996x991	2.5	0.31	0.9	ALUM	0.4	AA	8	134	60.8
2468-0002 0001**	36x36	SQ	Hinged	A-K	36.0x36.0	914x914	39.3x39.3	998x998	44.2x42.2	1067x1067	2.5	0.31	0.9	ALUM	0.3	AA	8	119	54
2468-0003 0001**	36x36	SQ	Hinged	S-K	36.0x36.0	914x914	39.3x39.3	998x998	43.6x39.3	1106x997	2.5	0.31	0.9	ALUM	0.3	AA	8	149	67.6

AA - Aluminium Alloy DI - Ductile Iron (see loading limits page) \*Rough opening dimensions do not include hinge pockets  
\*\*Requires escape handle as standard

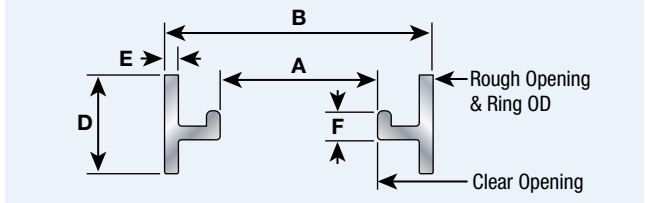
A-K Aluminium Deck Ring with Knife Edge Seal



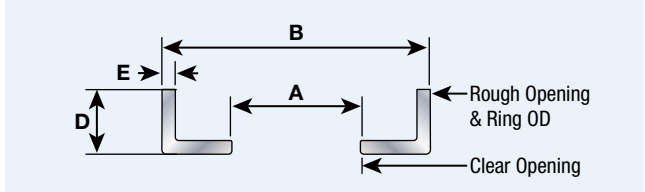
A-C Aluminium Deck Ring with Compression Seal



S-K Steel Deck Ring with Knife Edge Seal



S-C Steel Deck Ring with Compression Seal



Handle Options

Inside Escape Handle Options

0001 0031-2064  
[AL] w/ Pin. 18" Hatches and larger

0002 0031-2065  
7.5" O. D. [AL] w/ Pin 20"  
Hatch and larger

0003 0031-2087  
12.5" O.D. [AL] w/ Pin 20"  
Hatches and larger

0004 0031-2119  
[SS mill finish] w/ Pin. Use  
with hatches that have SS  
dogging mechanism

Topside Handle Options

0031-2158  
[SS] Standard Integral  
Handle Includes o-ring  
and pin

Optional Removable Handles

0435-2012  
Winch Handle  
Use with Flat Top  
Bi-square Spindle

0031-2264  
Interlocking T-Wrench  
Use with Interlocking  
Spindle

0021-2008  
T-Style Wrench Handle  
Use with T-Style  
Slot Spindle

# Series 2400 Cast Hatches



## Hinge Options

**0461-2205 [SS]  
Standard hinge Assembly  
Double Acting**  
Allows cover to lay flat

**0461-2202 [SS]  
Standard Hinge Assembly  
Single Pivot**  
Use with hold open or gas shocks

**0461-2077 Yoke Hinge**  
Concealed, includes hold open

**0461-2171 Yoke Hinge**  
Raised flush with Teak

**0462-2021 Blade Hinge**  
Use with raised coaming & vertical mount hatches

## Hold Open Options

**0031-2007 Hold Open**  
Use with 18", 20", 24",  
18"x24", 15"x24", 20"x20",  
22"x22", 24"x24", 19"x26"

**0423-1023  
Hold Open Slide Rod**  
Hold open , slide rod  
Use with 24"x24" or larger

**Gas Shocks [2]/Hatch**  
20"x20" up to 36"x36"  
square or rectangular  
hatches only

## Miscellaneous Options

**Coaming Drain**  
Use with knife edge

**Drill & Countersink**  
Aluminium rings with flange. Hatch shown with Inside escape handle, drain hold open ring drilled and countersunk

**Sensor Assembly**  
Magnetic contact senses if hatch isn't dogged completely



# Quick Ship

Quick Availability Doors



## 250 Series Weathertight doors

### 250 Hinged door & 250 Dutch door

- Marine Grade .090" Aluminium Captured Panel Skins Mill Finish
- Welded 6063 Flanged Aluminium Frame
- 4" Radius Corners
- Gasket on Frame
- Insulation Korolite Rigid Foam Core
- Bolt-in or Weld-in Frames
- (2) Individual Nylon Dogs
- Stainless Steel Hinges and Fasteners
- Trioving Lockset with 3 keys



250 Hinged



250 Dutch

## 1212 Series Watertight doors

### Hinged Watertight Door

- Marine Grade Interprime 198 Red Oxide Primer Finish
- Welded Mild Steel, Radius Formed Corners
- Gasket on Door Panel for Long Life and Positive Sealing
- 250" Thick, Outside Mild Steel Panel
- (4) Individual Steel Dogs
- (3) Welded Steel Panel Hinges
- Inside and Outside Steel Pull Handles



1212 Watertight

## 300X Series Sliding Doors

### Single Panel Sliding Door

- Commercial Duty Closure Designed for Offshore Use
- Marine Grade 6063 Aluminium
- Mill Finish
- Insulation Korolite Rigid Foam Core
- Tempered Window
- Trioving Lockset with 3 keys



300X Sliding

# Premium Yacht & Commercial Vessel

## World-class Superyacht Sliding & Hinged Doors

Whether it's aluminium, steel, stainless steel, or light weight carbon fibre composite marine doors, Halyard are your first source for sales, support and supply of AdvanTec marine doors.



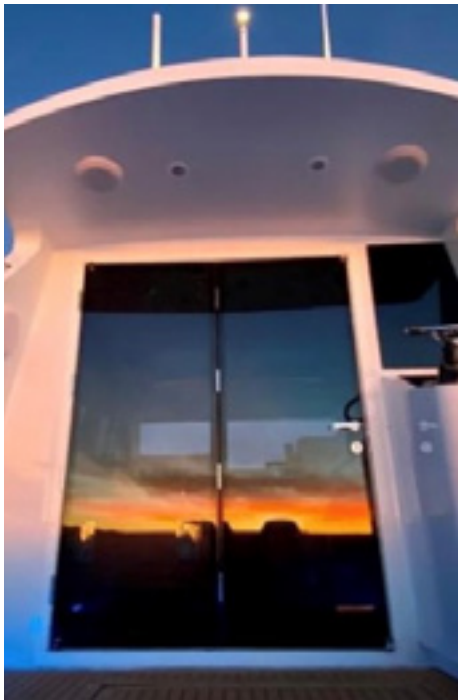
- Classed Superyachts



PACIFIC COAST  
MARINE

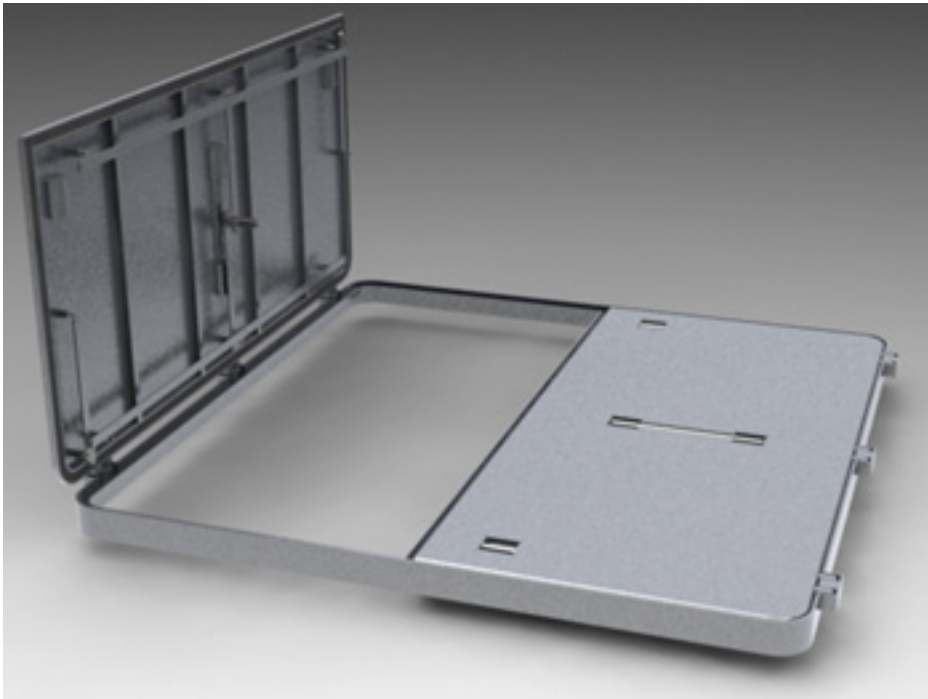


Directbond Glass, Hinged/Sliding Doors & Hatches



- Patrol boats, fishing vessels, tugs & pleasure craft

Premium Quality Defence & Commercial/Workboat Doors & Hatches



- Classed vessels
- Rollover rescue, navies, specialized commercial boats



Cast Hatch Loading Limits

Maximum allowable loading for cast iron covers listed and their aluminium equivalents. The following values CANNOT be used to extrapolate loading limits on other models or cover/ring combinations.				
Hatch Part Number, Description	Max Load kN (lbf)	Max Load-Fatigue kN (lbf)	Max Watertight Pressure kPa (psi)	Comment
<b>2483-1101 (0136-4001)</b> Oval 15"x24" Cast Iron	13 (2900)	-	28 (4)	All rings excluding aluminium
<b>2433-1001 (2433-3001)</b> Oval 15"x24" Aluminium	2.5 (550)	1.5 (350)	28 (4)	All rings, as cast
<b>2482-1101 (0136-4003)</b> Round 24" Cast Iron	17 (3800)	-	43 (6.2)	All rings excluding aluminium
<b>2411-1001 (2411-3001)</b> Round 24" Aluminium	4.5 (1000)	3 (650)	43 (6.2)	All rings, as cast
<b>2481-1101 (0136-4002)</b> Round 18" Cast Iron	16 (3600)	-	38 (5.5)	All rings excluding aluminium
<b>2404-1001 (0111-4106)</b> Round 18" Aluminium	3 (650)	2 (450)	38 (5.5)	All rings, as cast
<b>2480-1101 (0136-4006)</b> Hinged Square 24"x24" Cast Iron	*3.5 (800)	-	*55 (8)	All rings excluding aluminium
<b>2464-1001 (2464-3001)</b> Hinged Square 24"x24" Aluminium	1.5 (350)	1 (200)	55 (8)	All rings, as cast
				* Failure mode is non-typical and found at hinge pin

Definitions

- **Max load:** maximum point load acceptable on any point on top of the cover.
- **Max load-fatigue:** maximum cyclic point load acceptable on any point on top of the cover. Higher loads will result in non-infinite fatigue life which may be acceptable in certain applications.
- **Max watertightness pressure:** Maximum tank test pressure (inside direction).

Analysis

The load results are based on finite element analysis of hatch/ring combinations. In the case of aluminium castings, the fatigue limit is also included as it is lower than the yield limit. A 2x safety factor was assumed in all instances.

The watertightness pressures listed are based on Type Approvals and previous sealing results. Note that only the aluminium models hold TA certificates.

**Higher loading results may be acceptable based on the application and other requirements. Please contact Engineering if additional clarity is required.**

For the full range of available products and specifications please visit:  
[www.advantecglobal.com/marine](http://www.advantecglobal.com/marine)





## Custom Generator Enclosure



**Halyard are now able to offer a range of generator enclosures designed and manufactured to suit the particular engine / generator model and installation requirements.**

The standard specification for these acoustic enclosures includes the following but other options are available on request:

- Modular Aluminium frame
- Removable and fixed panels to suit and allow for service access
- All panels internally lined with Halyard noise insulation materials
- Base frame skid with optional integrated fuel tank
- Cut outs to facilitate service connections
- Cooling fans
- Mounting to accommodate generator manufacturers control panel

Please contact Halyard for further information.

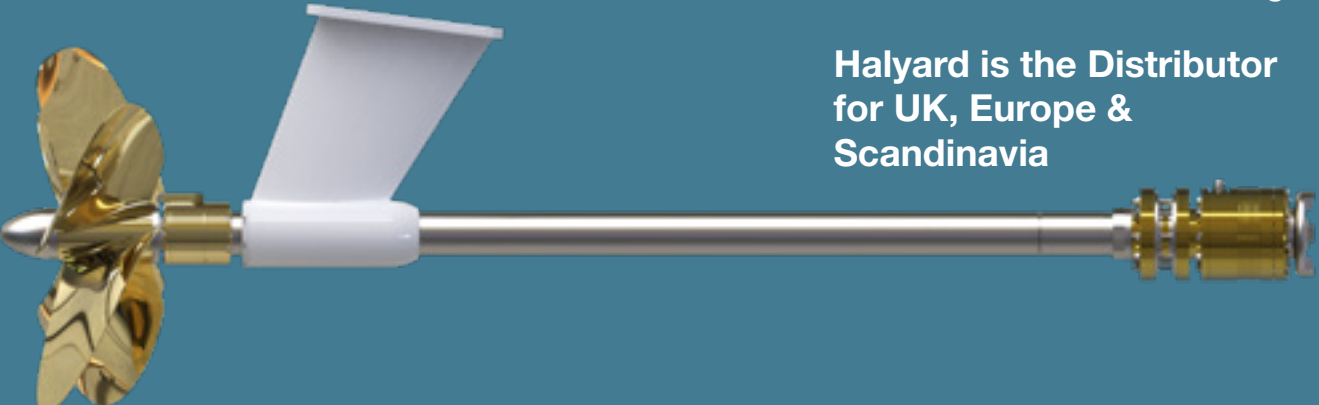


## Seatorque Shaft Systems

*The BOSS™ system is the internationally acclaimed Bolt On Shaft System by Seatorque Control Systems*

- Significant reduction of noise and vibration from engines, shafts and propellers
- Alignment issues eradicated
- Reduced installation times
- Mechanical losses reduced to 2% total
- Up to 8% reduction in fuel consumption and increased delivered horse power
- Reduced underwater drag

**Halyard is the Distributor for UK, Europe & Scandinavia**





# Seatorque Shaft Systems

## 'BOSS' - Bolt-on Shaft System

Developed over twenty-five years and fitted as standard equipment to a growing number of globally recognised boat manufacturers, Seatorque Shaft Systems offer a multitude of noise and vibration, fuel consumption and delivered power benefits.

- The 'BOSS' is a self-contained shaft and thrust bearing assembly supplied as a complete unit from the transmission output coupling to the propeller shaft end
- An oil-filled stainless-steel tube, in which the propeller shaft rotates supported by roller bearings, hydrodynamic journal bearings, and thrust bearings reduces drag to an absolute minimum
- The thrust bearing housing, at the inboard end of the tube, bolts to the hull transferring thrust from the propellers to the vessel structure and not through the transmission and engine
- Flexible isolators located between the 'BOSS' system, the vessel's hull, and the strut absorb thrust loads as well as significantly reducing noise and vibration



### Features & Benefits

The enclosed shaft arrangement eliminates turbulence and drag, referred to as the 'Magnus Effect', so the water flow to the propeller is far less disturbed compared to a shaft spinning in open water. Inefficiency and drag created by cutlass bearings and shaft misalignment are also eliminated.

The system is completed with a Cardan shaft connecting the 'BOSS' system to the transmission reducing the need for very accurate and time-consuming engine alignment. An oil reservoir located in the engine room allows easy monitoring of the oil level.

Conventional shaft installations rely on anti-vibration mounts to absorb engine and transmission vibration as well as propeller thrust. The 'BOSS' system removes the thrust from the mounts so they can then be optimised for absorption of engine vibration and torque, reducing the transmission of vibration into engine beds and the vessels structure.

The combination of taper and needle roller bearings, the non-rotating full-length shaft casing, the resiliently mounted thrust bearing and strut, and the optimised engine mounts all contribute to the very significant reduction of noise and vibration, typically over 50%

In addition, the reduction of mechanical losses to only 2%, thus providing valuable extra power for propulsion, and fuel consumption reductions of circa 8%, as verified across a number of in-service case studies, are very valuable considerations when specifying your shaft system.

### System Maintenance

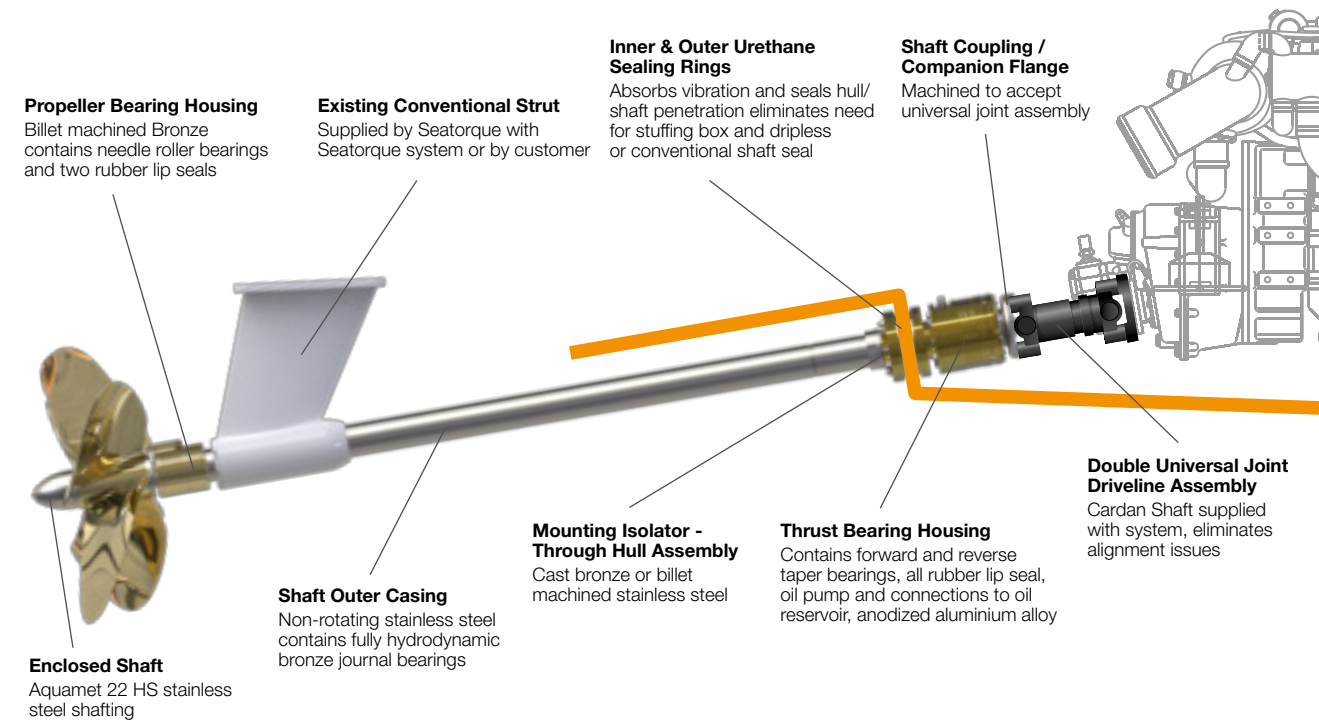
Recommended service intervals on the 'BOSS' are very realistic for the commercial operator as well as for recreational use. Cost effective oil and seal changes are not required until 3,000 hours while a major inspection is only necessary every 10,000 hours or ten years.



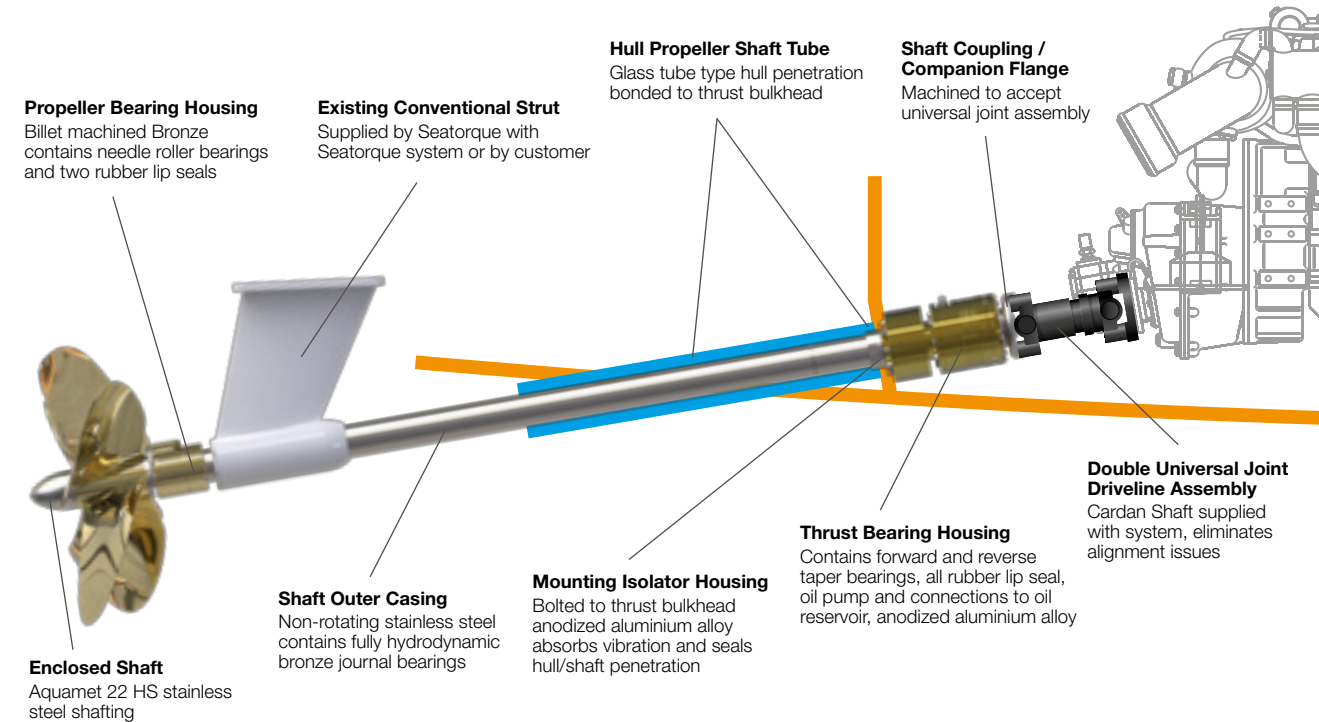
Seal and oil changes are carried out when the vessel is out of the water, a job that takes approximately 1-2 hours per system (excluding removal and refitting of the propeller) comparing very favourably with conventional shaft systems, including those with a thrust bearing, which require: gland/stuffing box maintenance or replacement, cutlass bearing replacement, shaft/ strut alignment, and even shaft replacement in very silty/sandy waters. It is therefore very clear to see the maintenance advantages with the 'BOSS' system.

## ST Series Typical Installations

### STM3 Enclosed Bolt-on-Shaft System 'BOSS' - Typical Installation



### ST Series Tube Style System - Typical Installation





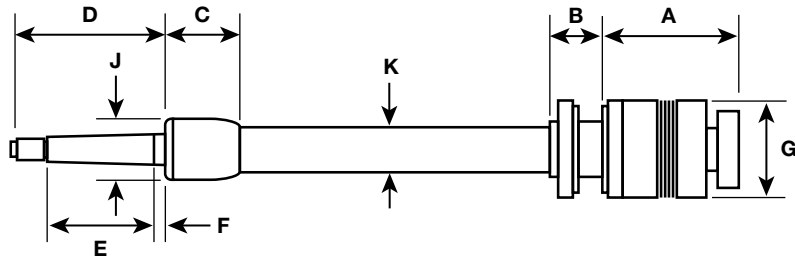
# Seatorque Shaft Systems

## ST Series Typical Installations



**Test Boat Specifications:** LOA - 64ft Displacement - 109,000lbs Engines: MTU 16V2000M91 2000hp

### Seatorque 'BOSS' Standard Range Dimensions



STM3 SERIES											
		A	B	C	D	E	F	G	H	J	K
	Thrust Assembly	Mounting Length	Propeller Housing	Exposed Shaft	SAE Taper Length	Housing Clearance to Taper	Housing Diameter	Shaft Diameter	Propeller Housing Dia.	Shaft Casing O.D.	
100	inch	5.5	3	3	4.5	2.75	1	3.75	1	2.25	1.9
	mm	139.70	76.20	76.20	114.30	69.85	25.40	95.25	25.40	57.15	48.26
175	inch	6.75	3.5	4.5	7.75	5	1	5	1.75	3.5	2.375
	mm	171.45	88.90	114.30	196.85	127.00	25.40	127.00	44.45	88.90	60.33
200	inch	8	4	5	8.875	5.75	1	6.125	2	4.25	3
	mm	203.20	101.60	127.00	225.43	146.05	25.40	155.58	50.80	107.95	76.20
250	inch	10.54	4.15	5.5	10.75	7.25	1	7.37	2.5	4.75	3.5
	mm	267.72	105.41	139.70	273.05	184.15	25.40	187.20	63.50	139.70	101.60
300	inch	12.5	5.125	5.9	13	8.625	1	9	3	5.75	4
	mm	317.50	130.18	149.86	330.20	219.08	25.40	228.60	76.20	146.05	101.60
350	inch	12.5	6	7.07	15.25	10.125	1	9.5	3.5	6.25	4.5
	mm	317.50	152.40	179.58	387.35	257.18	25.40	241.30	88.90	158.75	114.30
400	inch	12.75	6	7.98	17.5	11.625	1	10	4	6.5	5.5
	mm	323.85	152.40	202.69	444.50	295.28	25.40	254.00	101.60	165.10	139.70

In summary, the Seatorque 'BOSS' is a premium engineered, proven system that offers significantly reduced levels of noise and vibration, improved onboard comfort, increased delivered propeller power and reduced fuel consumption with very low maintenance requirements. The 'BOSS' further delivers unrivalled ruggedness in operation coupled

with the lowest underbody drag of any system currently available.

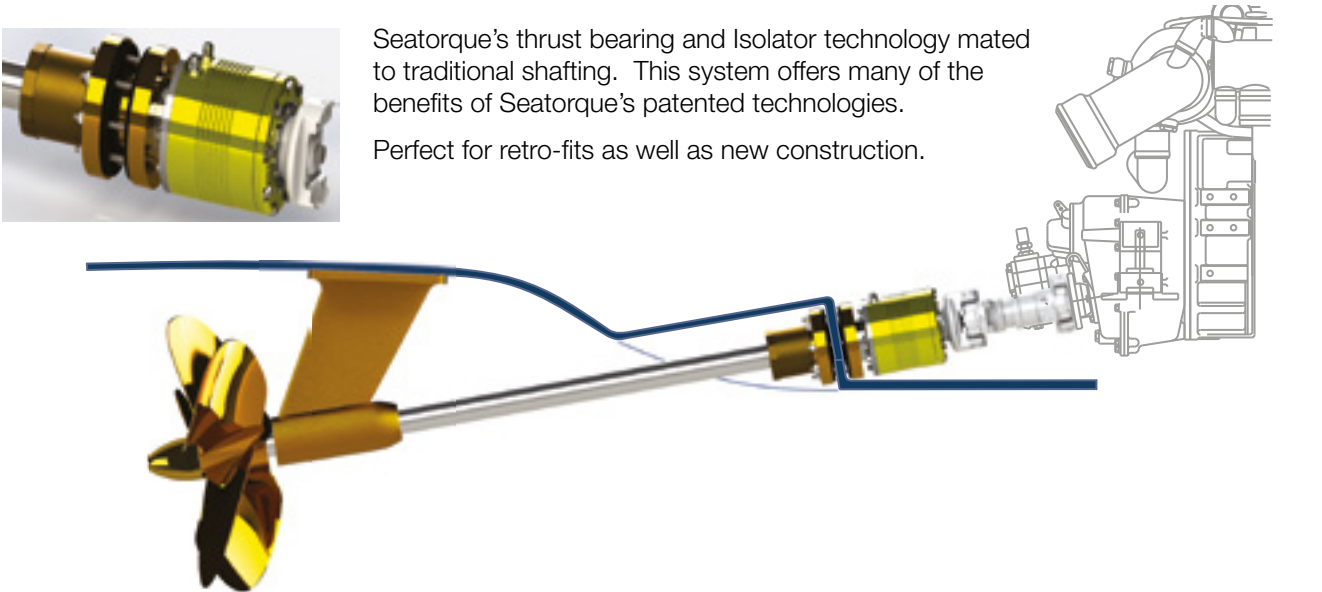
With systems available for commercial and recreational power and sailing vessels from circa 30 to 200 feet, there is a system to suit your needs.

## MX Series Typical Installations

### Additional Benefits of all Seatorque Propulsion Systems

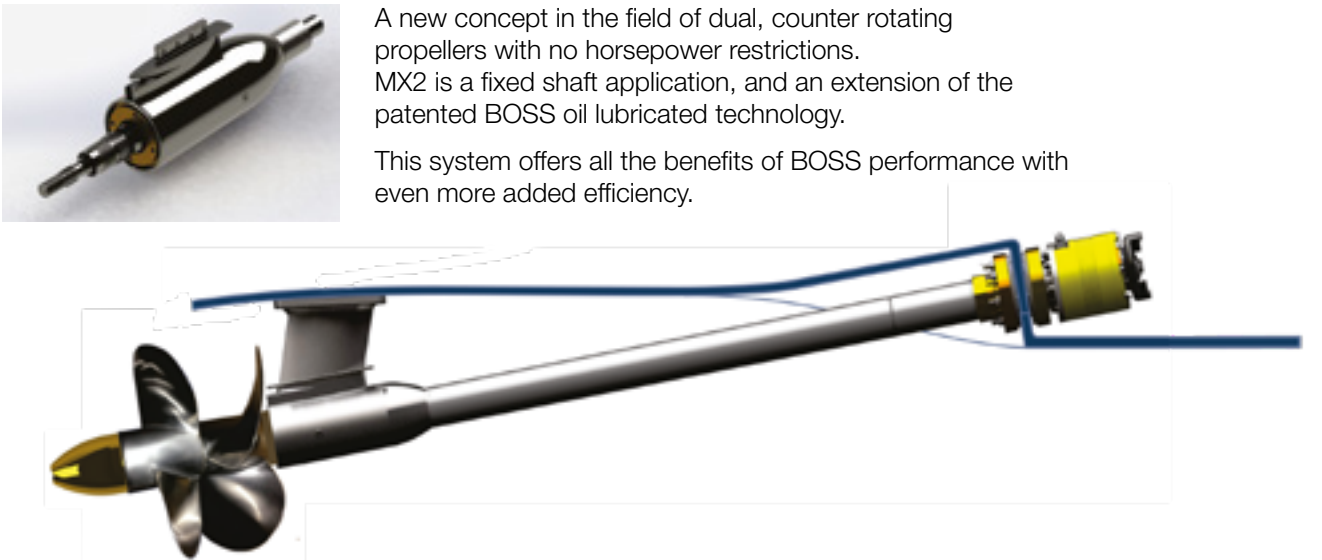
- Designed to handle power suitable for vessels from 30 Feet to 200 Feet, with no need for high cost of ownership, and often complex, multi-engine and drive packages.
- All BOSS propulsion systems are always Joy Stick compatible.
- Builders enjoy simplified and dramatically reduced installation times.
- End users enjoy a silky smooth, whisper quiet ride, improved operating efficiency and range, plus easy maintenance cycles; with rugged reliable operation.
- Popular options include Seatorque's Bio-Mar fully biodegradable Oil; QuickKutter line cutters, extended warranty packages and more.
- All equipment is fully supported by our worldwide network of sales and service professionals, and backed by Seatorque's
- International 2-year Limited Warranty.

### MX1 BOSS-Lite



Seatorque's thrust bearing and Isolator technology mated to traditional shafting. This system offers many of the benefits of Seatorque's patented technologies. Perfect for retro-fits as well as new construction.

### MX2 Duo-BOSS



A new concept in the field of dual, counter rotating propellers with no horsepower restrictions. MX2 is a fixed shaft application, and an extension of the patented BOSS oil lubricated technology. This system offers all the benefits of BOSS performance with even more added efficiency.



# Aquadrive Antivibration System

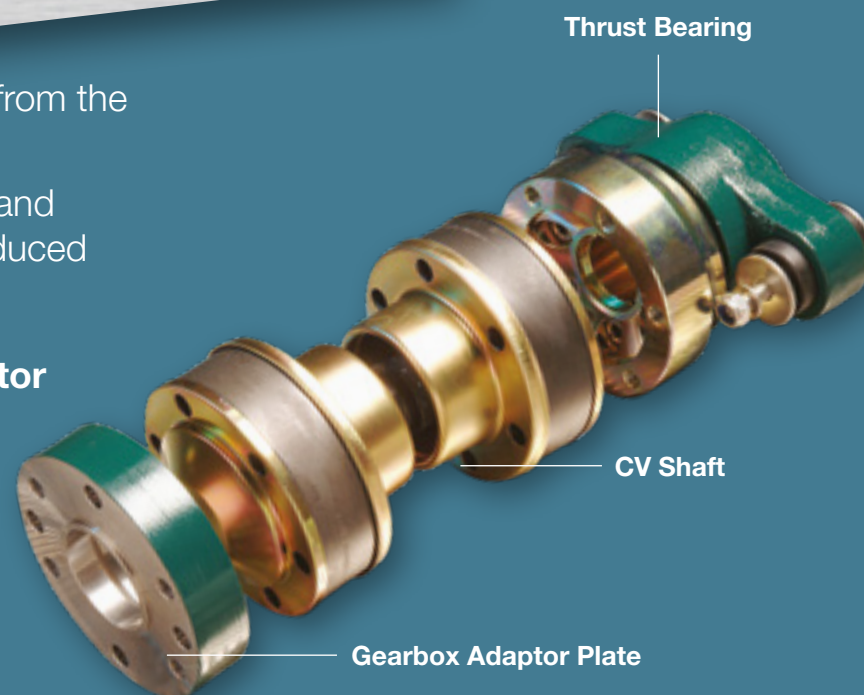
40 years' experience of installations  
and aftersales service

- Isolation of the engine from the hull structure
- Cabin & cockpit noise and vibration are greatly reduced by 50% or more

Halyard is the Distributor  
for UK & Ireland



**aquadrive**  
antivibration system



## Aquadrive Antivibration System

### Model Range

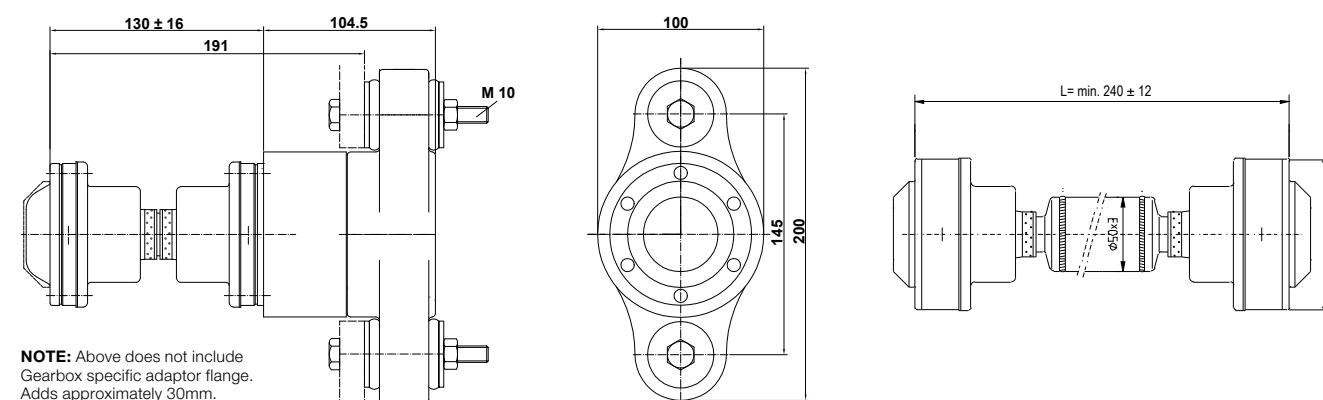
#### CVB 05.10 Aquadrive Moduline B10

Application Examples	Rated Power kW / hp	Crankshaft rpm	Gearbox Ratio
Sailing	35 / 45	3800	2.6:1
Displacement	26 / 35	2600	3.0:1

**Note:** Above rating examples are based on optimum conditions with 2° for each CV joints. In case a CV joint will run at an angle greater than 2°, the max permitted power must be reduced (normally by 8-9% for each degree over 2°).  
The maximum allowable joint angle is 4-8° depending on shaft rpm.

Maximum Static Torque (ØA=20mm)	1034 Nm / 763 lbft
Maximum Propeller Shaft Revolutions	4000 rpm
Maximum Continuous Propeller Thrust	11 kN / 2475 lbft

**Drive Shafts**  
Custom-length CV 05 driveshaft is available in lengths from 150 mm (from 240 mm with tubeshaft design). Maximum length depends on shaft rpm.



**NOTE:** Above does not include Gearbox specific adaptor flange. Adds approximately 30mm.

#### Propeller Shaft Options

B10 Standard version accepts propeller shaft ØA from 20mm (3/4") to 40mm (1 1/2"). Oversize version with external clamp mechanism available. All B10 systems are also available with flange coupling to suit standard BW 5" propeller flange. Contact your local Halyard representative to assist you in selecting a suitable Aquadrive system for your application.

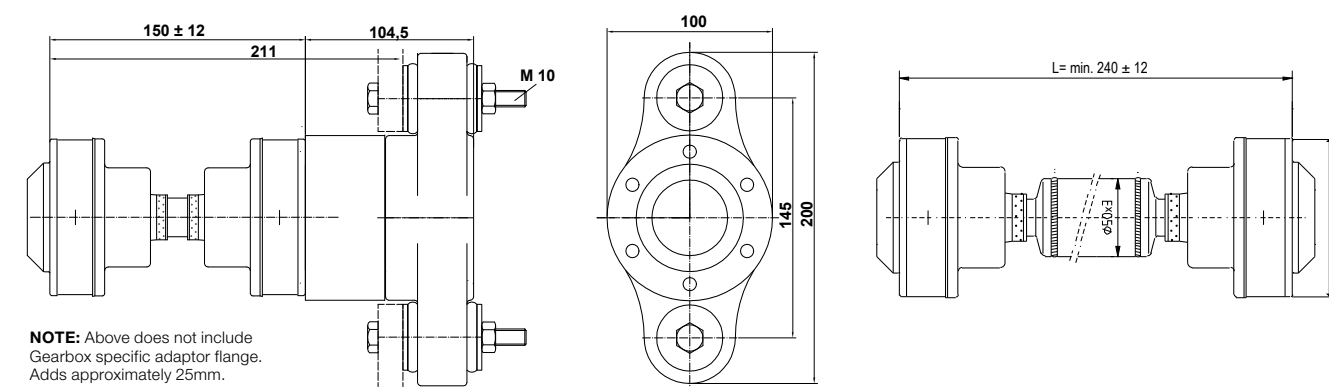
#### CVB 10.10 Aquadrive Moduline B10

Application Examples	Rated Power kW / hp	Crankshaft rpm	Gearbox Ratio
Planing	62 / 85	3800	2.0:1
Sailing	55 / 75	3800	2.6:1
Displacement	40 / 55	2600	3.0:1

**Note:** Above rating examples are based on optimum conditions with 2° for each CV joints. In case a CV joint will run at an angle greater than 2°, the max permitted power must be reduced (normally by 8-9% for each degree over 2°).  
The maximum allowable joint angle is 4-8° depending on shaft rpm.

Maximum Static Torque (ØA=1")	1300 Nm / 969 lbft
Maximum Propeller Shaft Revolutions	4000 rpm
Maximum Continuous Propeller Thrust	11 kN / 2475 lbft

**Drive Shafts**  
Custom-length CV 10 driveshaft is available in lengths from 150 mm (from 240 mm with tubeshaft design). Maximum length depends on shaft rpm.



**NOTE:** Above does not include Gearbox specific adaptor flange. Adds approximately 25mm.

#### Propeller Shaft Options

B10 Standard version accepts propeller shaft ØA from 20mm (3/4") to 40mm (1 1/2"). Oversize version with external clamp mechanism available. All B10 systems are also available with flange coupling to suit standard BW 5" propeller flange. Contact your local Halyard representative to assist you in selecting a suitable Aquadrive system for your application.



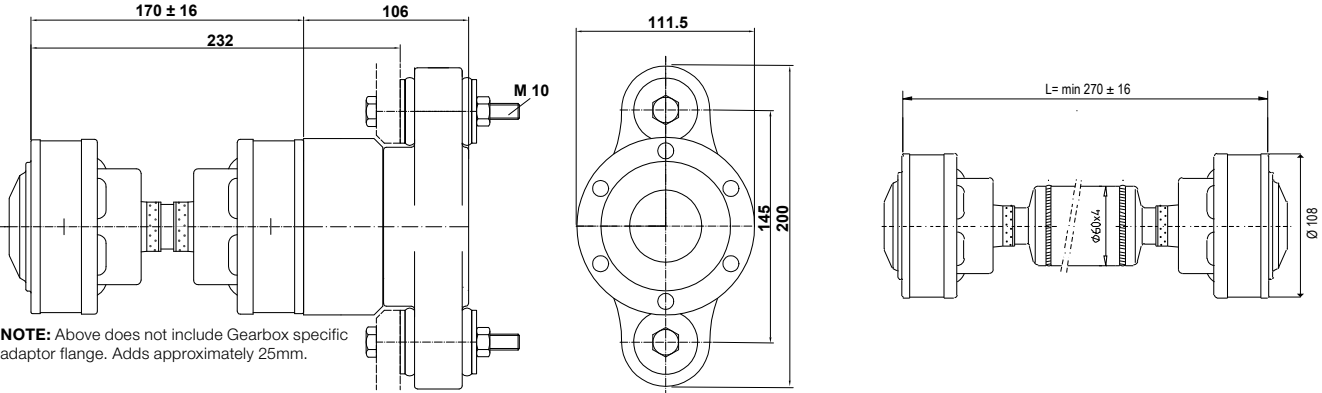
# Aquadrive Antivibration System

## Model Range

### CVB 15.10 Aquadrive Moduline B10

Application Examples	Rated Power kW / hp	Crankshaft rpm	Gearbox Ratio
Planing	114 / 155	3800	2.0:1
Semi-displacement	96 / 130	3300	2.2:1
Sailing	85 / 115	3300	2.6:1
Displacement	66 / 90	2600	3.0:1

**Note:** Above rating examples are based on optimum conditions with 2° for each CV joints. In case a CV joint will run at an angle greater than 2°, the max permitted power must be reduced (normally by 8-9% for each degree over 2°).  
The maximum allowable joint angle is 4-8° depending on shaft rpm.

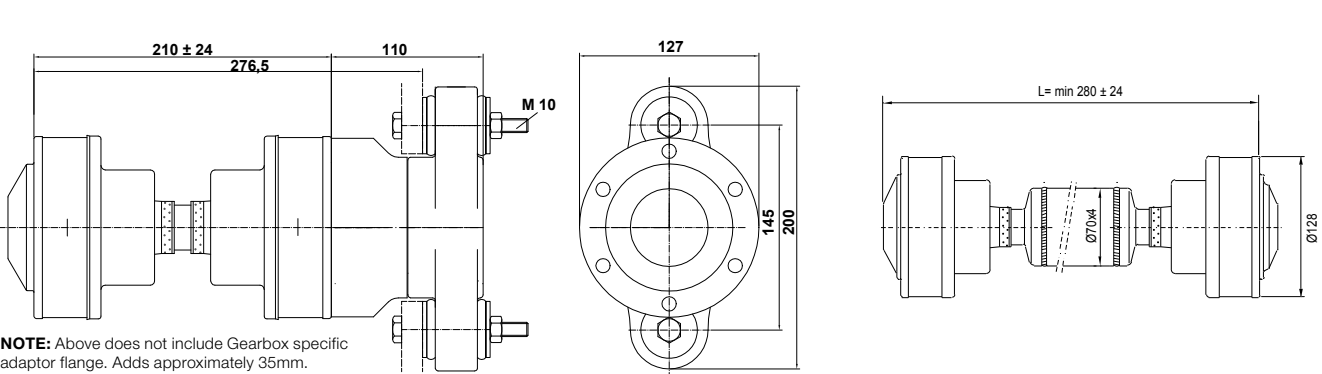


**Propeller Shaft Options**  
B10 Standard version accepts propeller shaft ØA from 20mm (3/4") to 40mm (1 1/2"). Oversize version with external clamp mechanism available.  
All B10 systems are also available with flange coupling to suit standard BW 5" propeller flange. Contact your local Halyard representative to assist you in selecting a suitable Aquadrive system for your application.

### CVB 21.10 Aquadrive Moduline B10

Application Examples	Rated Power kW / hp	Crankshaft rpm	Gearbox Ratio
Planing Boat	173 / 235	3800	2.0:1
Semi-displacement Motorboat	147 / 200	3300	2.2:1
Displacement Motorboat	96 / 130	2500	3.1:1

**Note:** Above rating examples are based on optimum conditions with 2° for each CV joints. In case a CV joint will run at an angle greater than 2°, the max permitted power must be reduced (normally by 8-9% for each degree over 2°).  
The maximum allowable joint angle is 4-8° depending on shaft rpm.

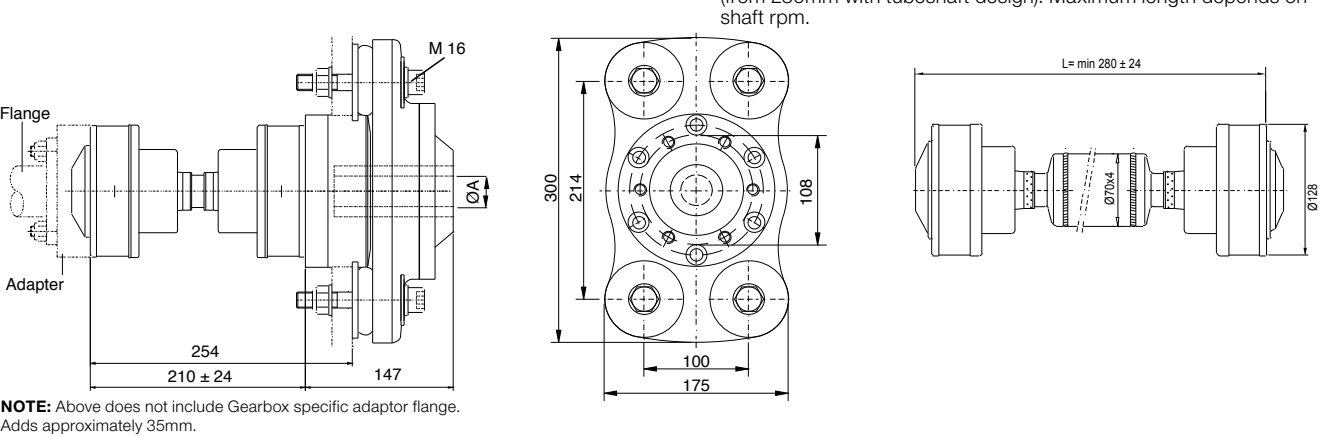


**Propeller Shaft Options**  
B10 Standard version accepts propeller shaft ØA from 20mm (3/4") to 40mm (1 1/2"). Oversize version with external clamp mechanism available.  
All B10 systems are also available with flange coupling to suit standard BW 5" propeller flange. Contact your local Halyard representative to assist you in selecting a suitable Aquadrive system for your application.

### CVB 21.20 Aquadrive Moduline B20

Application Examples	Rated Power kW / hp	Crankshaft rpm	Gearbox Ratio
Displacement	100 / 135	2600	3.0:1
Planing	165 / 225	3900	2.0:1

**Note:** Above rating examples are based on optimum conditions with 2° for each CV joints. In case a CV joint will run at an angle greater than 2°, the max permitted power must be reduced (normally by 8-9% for each degree over 2°).  
The maximum allowable joint angle is 4-8° depending on shaft rpm.

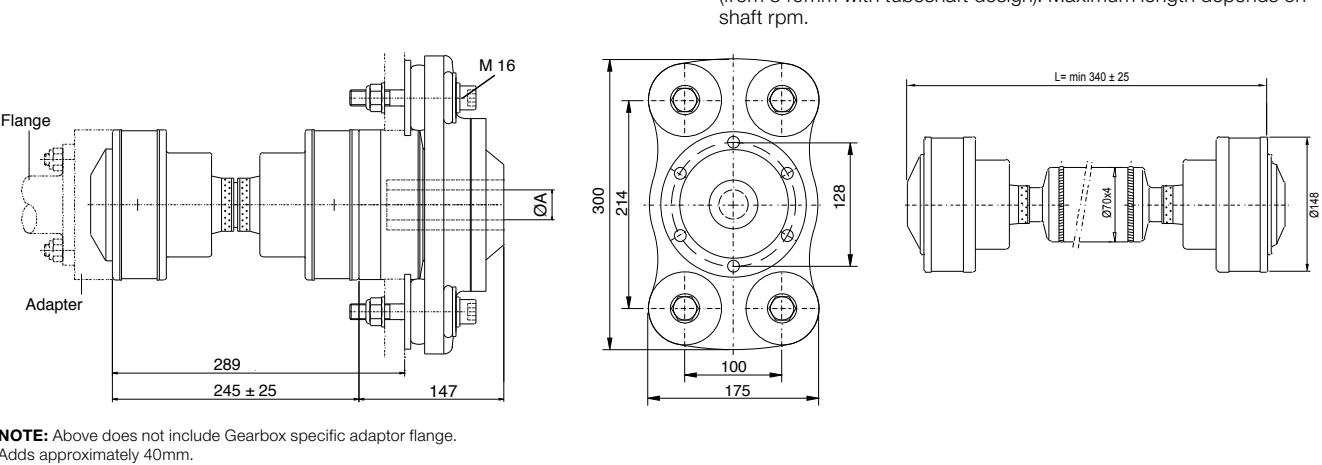


**Propeller Shaft Options**  
B20 Standard version accepts propeller shaft ØA from 35mm (1 1/2") to 50mm (2"). Oversize version with external clamp mechanism available.  
All B20 systems are also available with flange coupling. Contact your local Halyard representative to assist you in selecting a suitable Aquadrive system for your application.

### CVB 30.20 Aquadrive Moduline B20

Application Examples	Rated Power kW / hp	Crankshaft rpm	Gearbox Ratio
Displacement	130 / 175	2600	3.0:1
Planing	200 / 270	3300	2.0:1

**Note:** Above rating examples are based on optimum conditions with 2° for each CV joints. In case a CV joint will run at an angle greater than 2°, the max permitted power must be reduced (normally by 8-9% for each degree over 2°).  
The maximum allowable joint angle is 4-8° depending on shaft rpm.



**Propeller Shaft Options**  
B20 Standard version accepts propeller shaft ØA from 35mm (1 1/2") to 50mm (2"). Contact your local Halyard representative to assist you in selecting a suitable Aquadrive system for your application.

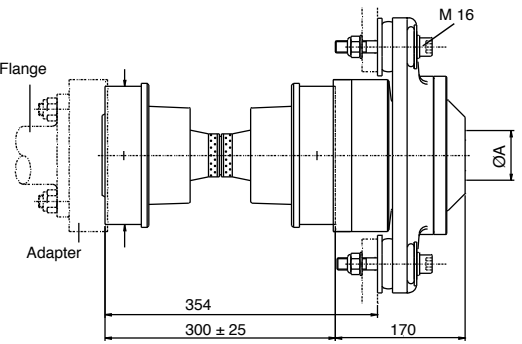
# Aquadrive Antivibration System

## Model Range

### CVB 32.30 Aquadrive Moduline B30

Application Examples	Rated Power kW / hp	Crankshaft rpm	Gearbox Ratio
Displacement	195 / 265	2600	3.0:1
Planing	270 / 365	3000	2.0:1

**Note:** Above rating examples are based on optimum conditions with 2° for each CV joints. In case a CV joint will run at an angle greater than 2°, the max permitted power must be reduced (normally by 8-9% for each degree over 2°).  
The maximum allowable joint angle is 4-8° depending on shaft rpm.



**NOTE:** Above does not include Gearbox specific adaptor flange. Adds approximately 45mm.

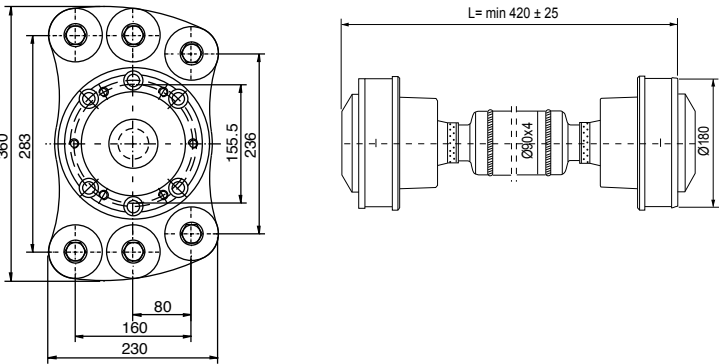
#### Propeller Shaft Options

B30 Standard version accepts propeller shaft ØA from 40mm (1½") to 70mm (2½"). All B30 systems are also available with flange coupling. Contact your local Halyard representative to assist you in selecting a suitable Aquadrive system for your application.

Maximum Static Torque (ØA=65mm)	3000 Nm / 2215 lbft
Maximum Propeller Shaft Revolutions	1700 rpm
Maximum Continuous Propeller Thrust	21 kN / 4725 lbft

#### Drive Shafts

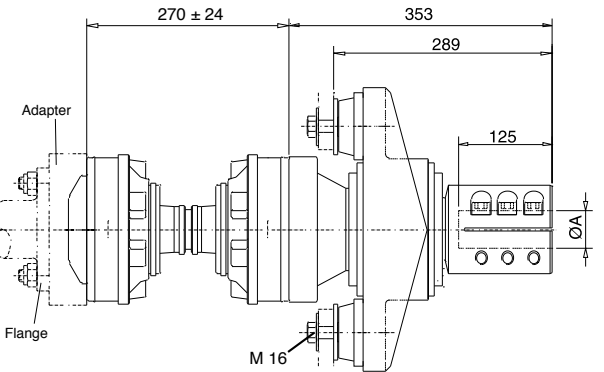
Custom-length CV 32 driveshaft is available in lengths from 300mm (from 420mm with tubeshaft design). Maximum length depends on shaft rpm.



### CVB 42.680 Aquadrive Heavy Duty HDL

Application Examples	Rated Power kW / hp	Crankshaft rpm	Gearbox Ratio
Displacement	220 / 300	2100	3.0:1
Planing	420 / 570	2600	2.0:1

**Note:** Above rating examples are based on optimum conditions with 2° for each CV joints. In case a CV joint will run at an angle greater than 2°, the max permitted power must be reduced (normally by 8-9% for each degree over 2°).  
The maximum allowable joint angle is 5-8° depending on shaft rpm.



**NOTE:** Above does not include Gearbox specific adaptor flange. Adds approximately 50mm.

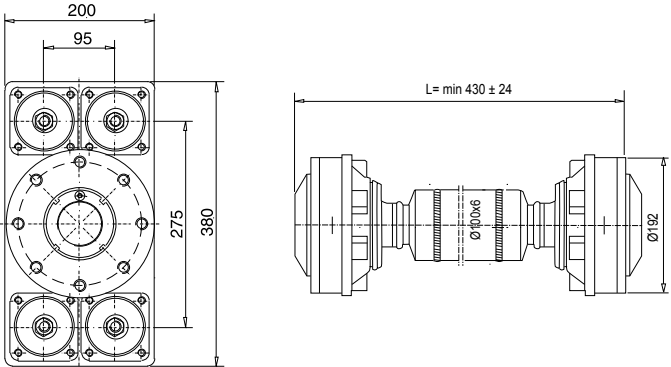
#### Propeller Shaft Options

HDL 680 Standard version accepts propeller shaft ØA from 50mm (2") to 70mm (2½"). Contact your local Halyard representative to assist you in selecting a suitable Aquadrive system for your application.

Maximum Static Torque	10500 Nm / 7750 lbft
Maximum Propeller Shaft Revolutions	1700 rpm
Maximum Continuous Propeller Thrust	40 kN / 9000 lbft

#### Drive Shafts

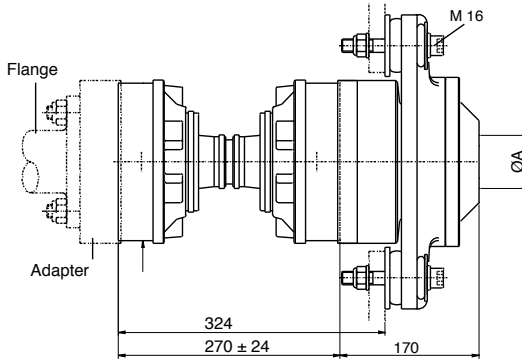
Custom-length CV 42 driveshaft is available in lengths from 270mm (from 430mm with tubeshaft design). Maximum length depends on shaft rpm.



### CVB 42.30 Aquadrive Moduline B30

Application Examples	Rated Power kW / hp	Crankshaft rpm	Gearbox Ratio
Displacement	240 / 325	2800	3.0:1
Planing	310 / 420	2600	2.5:1

**Note:** Above rating examples are based on optimum conditions with 2° for each CV joints. In case a CV joint will run at an angle greater than 2°, the max permitted power must be reduced (normally by 8-9% for each degree over 2°).  
The maximum allowable joint angle is 4-8° depending on shaft rpm.



**NOTE:** Above does not include Gearbox specific adaptor flange. Adds approximately 50mm.

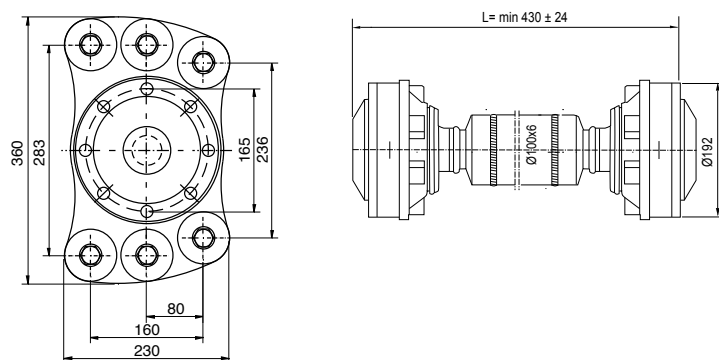
#### Propeller Shaft Options

B30 Standard version accepts propeller shaft ØA from 40mm (1½") to 70mm (2½"). All B10 systems are also available with flange coupling. Contact your local Halyard representative to assist you in selecting a suitable Aquadrive system for your application.

Maximum Static Torque (ØA=40mm)	3000 Nm / 2215 lbft
Maximum Propeller Shaft Revolutions	1700 rpm
Maximum Continuous Propeller Thrust	21 kN / 4725 lbft

#### Drive Shafts

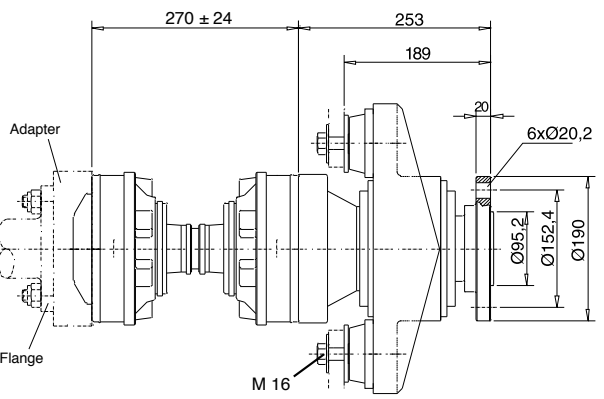
Custom-length CV 42 driveshaft is available in lengths from 270mm (from 430mm with tubeshaft design). Maximum length depends on shaft rpm.



### CVB 42.680 Aquadrive Heavy Duty HDL Flanged

Application Examples	Rated Power kW / hp	Crankshaft rpm	Gearbox Ratio
Displacement	220 / 300	2600	3.0:1
Planing	420 / 570	2600	2.0:1

**Note:** Above rating examples are based on optimum conditions with 2° for each CV joints. In case a CV joint will run at an angle greater than 2°, the max permitted power must be reduced (normally by 8-9% for each degree over 2°).  
The maximum allowable joint angle is 5-8° depending on shaft rpm.



**NOTE:** Above does not include Gearbox specific adaptor flange. Adds approximately 50mm.

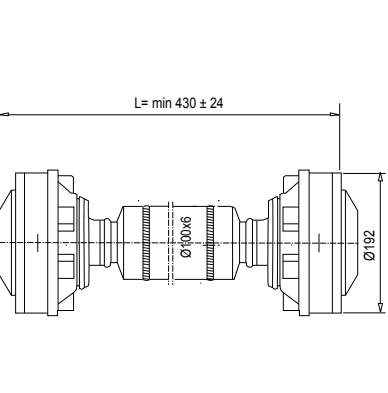
#### Propeller Shaft Options

HDL 680 Standard version accepts propeller shaft ØA from 50mm (2") to 70mm (2½"). Contact your local Halyard representative to assist you in selecting a suitable Aquadrive system for your application.

Maximum Static Torque	10500 Nm / 7750 lbft
Maximum Propeller Shaft Revolutions	1700 rpm
Maximum Continuous Propeller Thrust	40 kN / 9000 lbft

#### Drive Shafts

Custom-length CV 42 driveshaft is available in lengths from 270mm (from 430mm with tubeshaft design). Maximum length depends on shaft rpm.





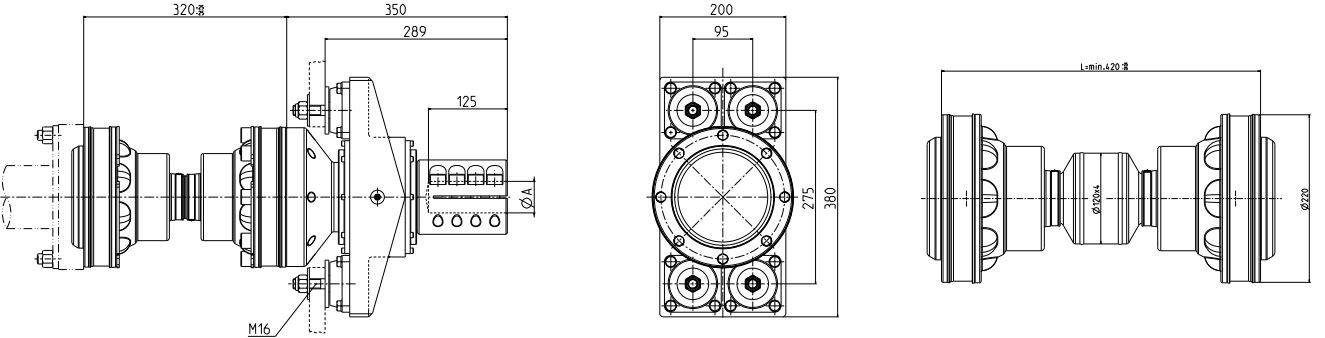
# Aquadrive Antivibration System

## Model Range

### HDL 48.690 Aquadrive Heavy Duty - Flanged Option Available

Application Examples	Rated Power kW / hp	Crankshaft rpm	Gearbox Ratio
Displacement	410 / 550	2100	3.0:1
Planing	670 / 900	2800	2.0:1

**Note:** Above rating examples are based on optimum conditions with 2° for each CV joints. In case a CV joint will run at an angle greater than 2°, the max permitted power must be reduced (normally by 8-9% for each degree over 2°).  
The maximum allowable joint angle is 5-8° depending on shaft rpm.



**NOTE:** Above does not include Gearbox specific adaptor flange. Adds approximately 50mm.

#### Propeller Shaft Options

HDL 680 Standard version accepts propeller shaft ØA from 50mm (2") to 70mm (2 1/2").  
Contact your local Halyard representative to assist you in selecting a suitable Aquadrive system for your application.

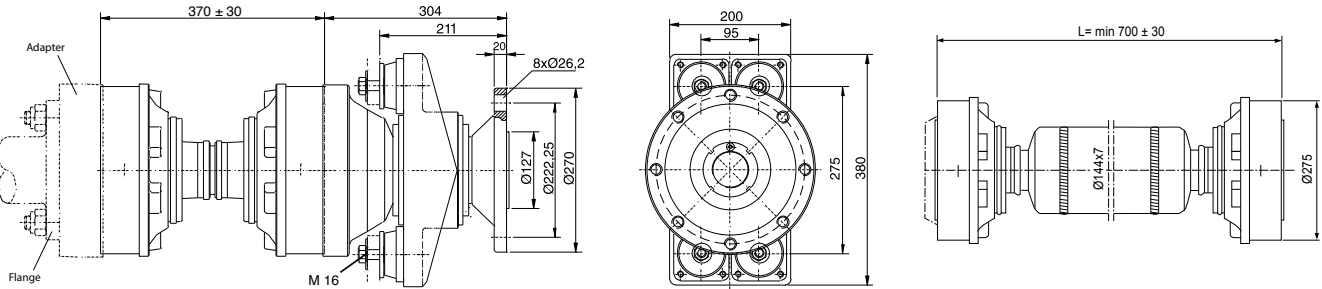
Maximum Static Torque	12240 Nm / 9060 lbft
Maximum Propeller Shaft Revolutions	1700 rpm
Maximum Continuous Propeller Thrust	40 kN / 9000 lbft

**Drive Shafts**  
Custom-length CV 48 driveshaft is available in lengths from 320mm (from 420mm with tubeshaft design). Maximum length depends on shaft rpm.

### HDL 60.700 Aquadrive Heavy Duty HT - High Tensile Steel

Application Examples	Rated Power kW / hp	Crankshaft rpm	Gearbox Ratio
Displacement	515 / 700	1900	3.0:1
Planing	735 / 1000	2300	2.5:1

**Note:** Above rating examples are based on optimum conditions with 2° for each CV joints. In case a CV joint will run at an angle greater than 2°, the max permitted power must be reduced (normally by 8-9% for each degree over 2°).  
The maximum allowable joint angle is 3° depending on shaft rpm. For higher benching angles please consult Halyard.



**NOTE:** Above does not include Gearbox specific adaptor flange. Adds approximately 60mm.

#### Propeller Shaft Options

HDL 700 Standard version accepts propeller shaft ØA from 50mm (2") to 70mm (2 1/2").  
Contact your local Halyard representative to assist you in selecting a suitable Aquadrive system for your application.

Maximum Static Torque	22000 Nm / 16280 lbft
Maximum Propeller Shaft Revolutions	1700 rpm
Maximum Continuous Propeller Thrust	40 kN / 9000 lbft

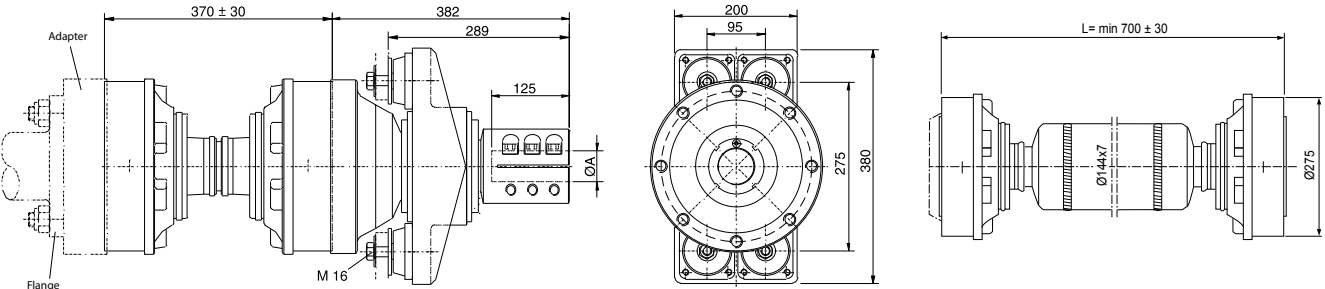
#### Also available with 10 1/2" diameter flange

**Drive Shafts**  
Custom-length CV 60 driveshaft is available in lengths from 370mm (from 700mm with tubeshaft design). Maximum length depends on shaft rpm.

### HDL 60.700 Aquadrive Heavy Duty - Flanged Option Available

Application Examples	Rated Power kW / hp	Crankshaft rpm	Gearbox Ratio
Displacement	370 / 500	1900	2.7:1
Planing	660 / 900	2300	1.75:1

**Note:** Above rating examples are based on optimum conditions with 2° for each CV joints. In case a CV joint will run at an angle greater than 2°, the max permitted power must be reduced (normally by 8-9% for each degree over 2°).  
The maximum allowable joint angle is 3° depending on shaft rpm. For higher benching angles please consult Halyard.



**NOTE:** Above does not include Gearbox specific adaptor flange. Adds approximately 60mm.

#### Propeller Shaft Options

HDL 700 Standard version accepts propeller shaft ØA from 50mm (2") to 70mm (2 1/2").  
Contact your local Halyard representative to assist you in selecting a suitable Aquadrive system for your application.

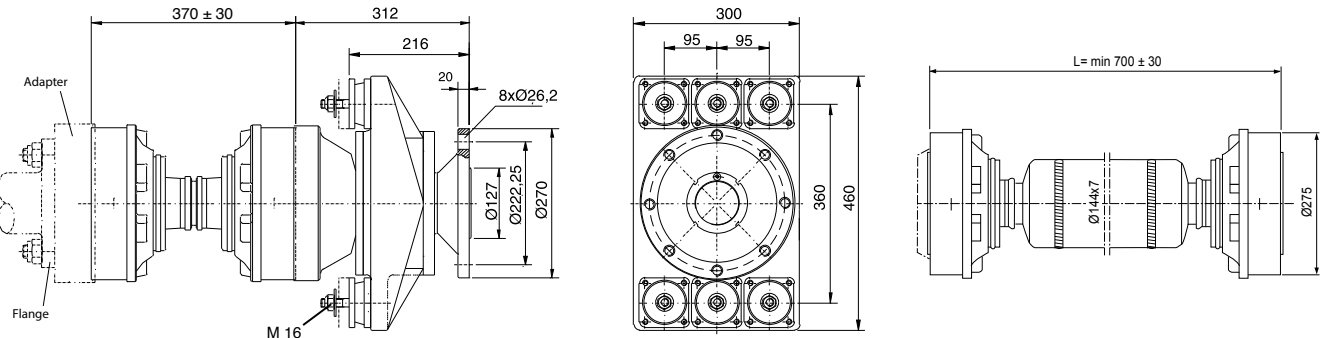
Maximum Static Torque	12240 Nm / 9060 lbft
Maximum Propeller Shaft Revolutions	1700 rpm
Maximum Continuous Propeller Thrust	40 kN / 9000 lbft

**Drive Shafts**  
Custom-length CV 60 driveshaft is available in lengths from 370mm (from 700mm with tubeshaft design). Maximum length depends on shaft rpm.

### HDL 60.780 Aquadrive Heavy Duty Flanged

Application Examples	Rated Power kW / hp	Crankshaft rpm	Gearbox Ratio
Displacement	590 / 800	2100	3.0:1
Planing	1100 / 1500	2300	1.75:1

**Note:** Above rating examples are based on optimum conditions with 2° for each CV joints. In case a CV joint will run at an angle greater than 2°, the max permitted power must be reduced (normally by 8-9% for each degree over 2°).  
The maximum allowable joint angle is 3° depending on shaft rpm. For higher benching angles please consult Halyard.



**NOTE:** Above does not include Gearbox specific adaptor flange. Adds approximately 60mm.

#### Propeller Shaft Options

HDL 780 Standard version accepts propeller shaft ØA from 50mm (2") to 70mm (2 1/2").  
Contact your local Halyard representative to assist you in selecting a suitable Aquadrive system for your application.

Maximum Static Torque	25000 Nm / 18500 lbft
Maximum Propeller Shaft Revolutions	1400 rpm
Maximum Continuous Propeller Thrust	60 kN / 13500 lbft

#### Also available with 10 1/2" diameter flange

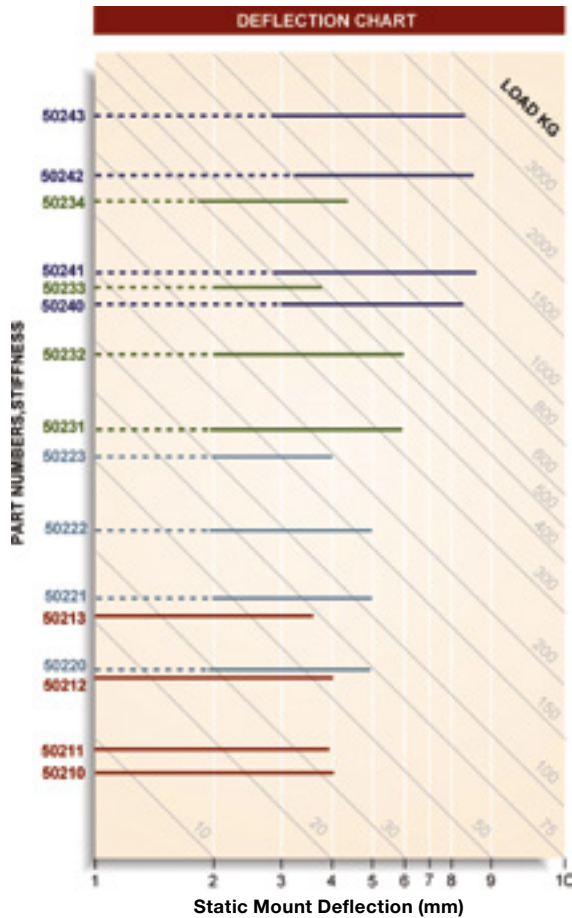
**Drive Shafts**  
Custom-length CV 60 driveshaft is available in lengths from 370mm (from 700mm with tubeshaft design). Maximum length depends on shaft rpm.



# Aquadrive Mounts

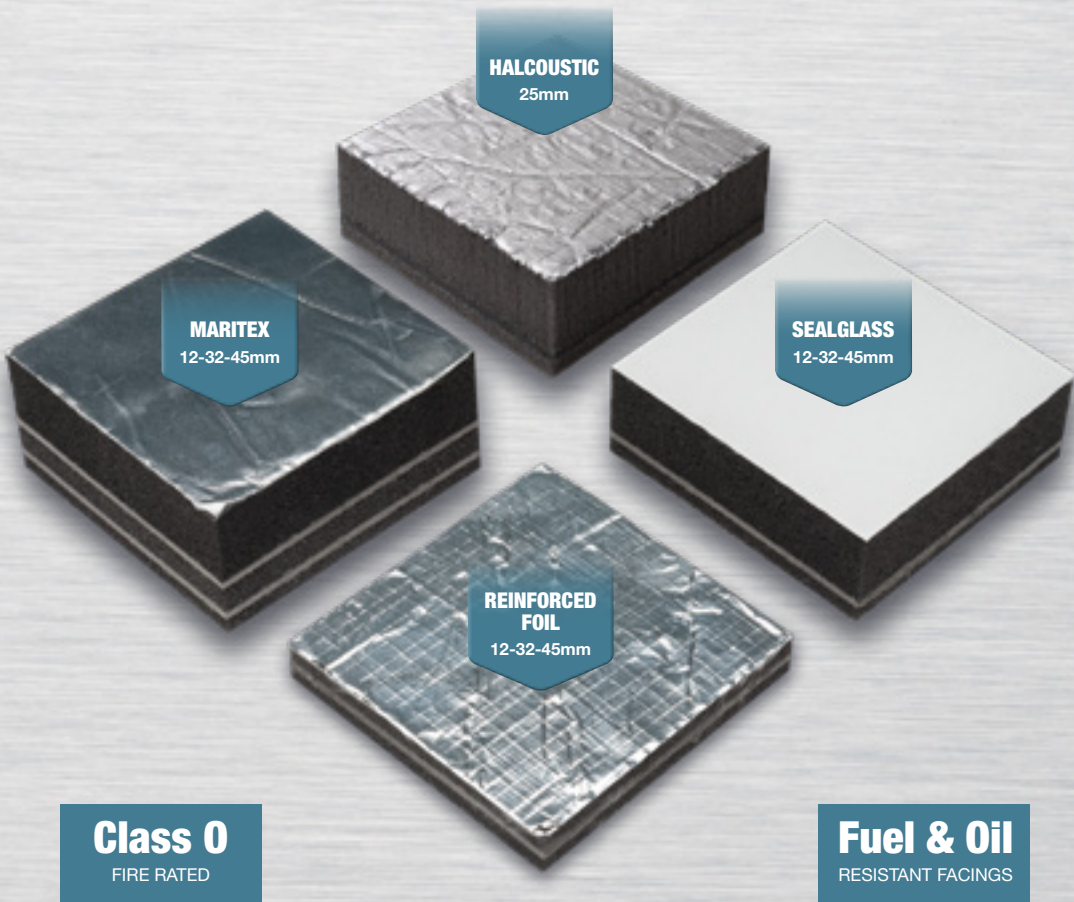
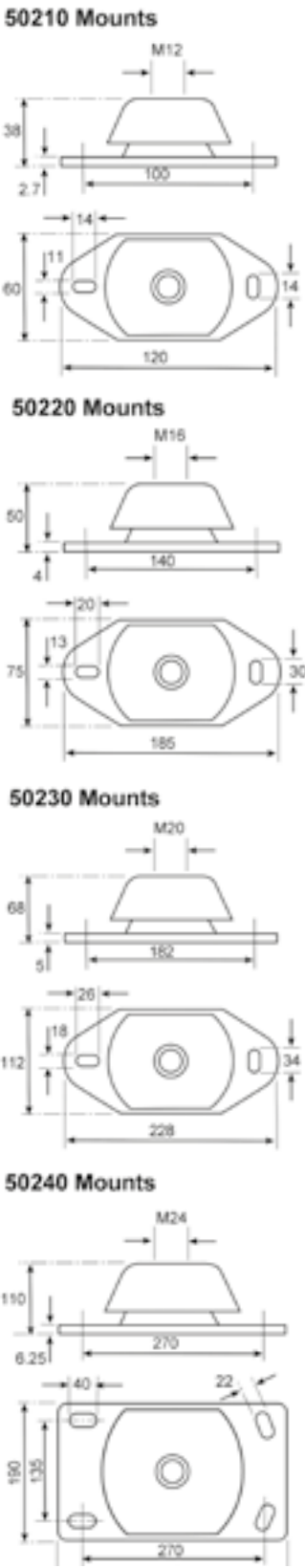
## Aquadrive System Engine Mounts

Engine Mounts	Weight
50210 Series engine mounts complete with stud and any stiffness grade	0.5kg
50220 Series engine mounts complete with stud and any stiffness grade	1.1kg
50230 Series engine mounts complete with stud and any stiffness grade	2.6kg
50240 Series engine mounts complete with stud and any stiffness grade	9.5kg



It is essential to select the correct rubber grade and mount for the engine or generator in question. For reference, the chart above shows the level of deflection (or squash) that will occur on each model of mount for a given loading.

In general you should aim for 3mm on the 50210, 4mm on the 50220, 5mm on the 50230 and 6mm on the 50240. The numbering system is simple: A 50223 mount is the 50220 model with number three rubber hardness and so on. Some engines, particularly those with less than four cylinders, require particular care and your distributor will help with these.



**Class 0**  
FIRE RATED

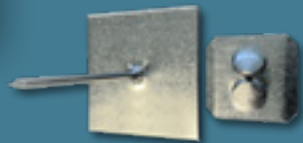
**Fuel & Oil**  
RESISTANT FACINGS

## Noise Insulation Materials and Accessories

*A proven range of high quality  
UK manufactured noise insulation materials*

### A range of technically advanced noise insulation materials:

- Compliant with the European Recreational Craft Directive
- Available in standard thicknesses of 12, 25, 32, and 45mm
- Three tough fuel and oil resistant facings: Maritex, Sealglass and Reinforced Foil
- Range of tapes & accessories



Self-adhesive mechanical mounting pin to assist with the installation of the materials.

Halyard self-adhesive joining tape.





# Noise Insulation Materials and Accessories

## Noise Insulation Materials, Tapes and Accessories

Part No.	Reference	Description
<b>12mm (1/2") Materials (2.4 sq metre packs)</b>		
H000535	S3002	Maritex
H000537	S3004	Sealglass
H000536	S3003	Re-inforced Silver
<b>12mm (1/2") Self Adhesive Materials (2.4sq metre packs)</b>		
H000554	S5002	Maritex
H000556	S5004	Sealglass
H000555	S5003	Re-inforced Silver
<b>25mm (1") Value Materials (2.4sq metre packs)</b>		
H024545	Halcoustic 25	Non-adhesive backing
H024546	Halcoustic 25SA	Self-adhesive backing
<b>32mm (1 1/2") Materials (2.4 sq metre packs)</b>		
H000540	S3017	Maritex
H000538	S3015	Sealglass
H000539	S3016	Re-inforced Silver
<b>32mm (1 1/2") Self Adhesive Materials (2.4sq metre packs)</b>		
H000559	S5017	Maritex
H000557	S5015	Sealglass
H000558	S5016	Re-inforced Silver
<b>45mm (1 3/4") Materials (1.2sq metre packs)</b>		
H000543	S3039	Maritex
H000541	S3037	Sealglass
H000542	S3038	Re-inforced Silver
<b>45mm (1 3/4") Self Adhesive Materials (1.2sq metre packs)</b> Physical fixing required when hanging from the underside		
H000562	S5039	Maritex
H000560	S5037	Sealglass
H000561	S5038	Re-inforced Silver
<b>60mm SilentWave (1.2sq metre packs)</b>		
H020841	S3018	Foil Faced
<b>Joining Tapes</b>		
H020666	S4021	20m x 50mm Sealglass
H020311	S4025	5m x 50mm Maritex
H020158	S4026	20m x 50mm Maritex
H000552	S4036	50m x 50mm Silver Polyester
<b>Accessories</b>		
H000544	S4000	10m x 25mm Hatch Noise Tape
H000545	S4010	3m x 19mm Hatch Noise Tape
H000553	S4041	1.2m x 1m x 2.4mm Barrier Layer
H000533		Stick Pin & Backing Washer

Halyard noise insulation uses high performance barrier materials to achieve excellent acoustic results with low frequency noise associated with diesel engines and other onboard noise generating equipment.

### Technical Specification

- Fire Safety - Compliant with European Recreational Craft Directive (RCD)
- Class 0 fire rated (BS476-7) on selected products
- Lowest possible weight
- All materials tested to ISO 4589-3 (oxygen index – elevated temperature)
- Compliant to ISO 9094-2 Fire Protection for craft with a hull over 15m
- Bulkhead performance up to Rw 54dB (EN ISO 717-1)
- Fuel & oil resistant facing

### Packing (12, 25 and 32mm materials):

Halcoustic only: 25mm supplied in packs of 4 sheets 990mm x 590mm (2.3m²)

12 & 32mm supplied in packs of 4 sheets 1000mm x 600mm (2.4m²)

Box weight is approximately 14kg for 12mm, 16kg for 25mm and 19kg for 32mm.

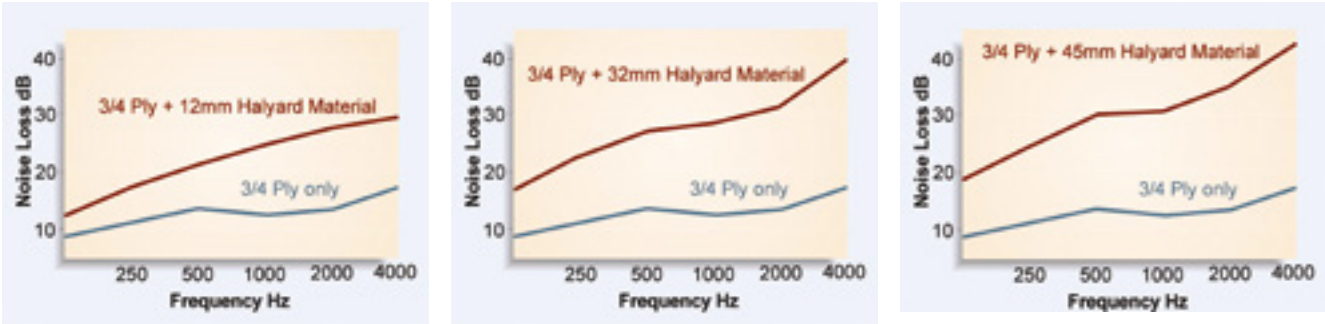
### Packing (45mm materials):

45mm supplied in packs of 2 sheets 1000mm x 600mm (1.2m²).

Box weight is approximately 16kg.

Actual noise attenuation achievable with the products is dependant on many factors relating to the specific installation. Please note the above graphs are indicative only.

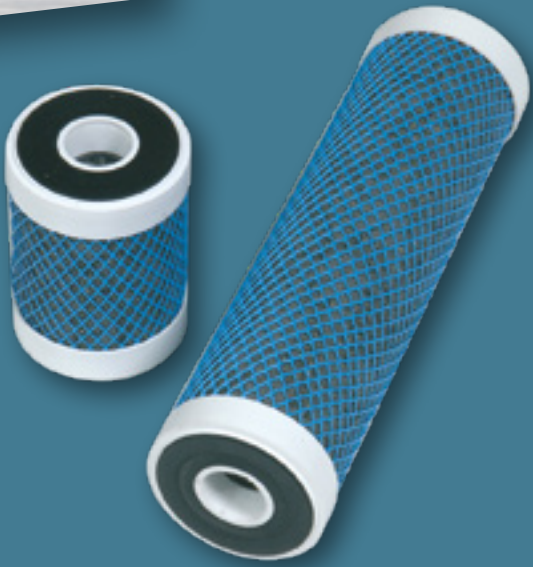
Please contact Halyard for further information and detailed product specifications to suit your particular installation requirements.



## Wave International Ltd Filtration Systems

Main distributors for Wave International technically advanced marine filtration systems

- **Wavestream** bilge filter systems
- **Wavebrite** waste water filter system
- **Flostream** drinking water filter system
- **Prostream** watermaker filter protection system
- **Waveair** holding tank vent filter system
- **Waveshine** wash & rinse system





# Wave Filtration Systems

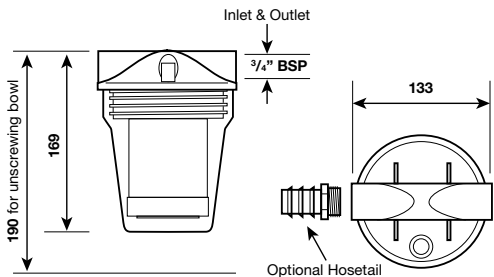
## Product Range

Effective control and prevention of oily contaminated bilge water. The Wavestream bilge filters are Lloyd's Register of shipping Type Approved and Boat Safety Scheme compliant. Wavestream provides an efficient way of managing bilge water removal without the need for holding tanks whilst still protecting the environment.

### Wavestream Micro Bilge Filter



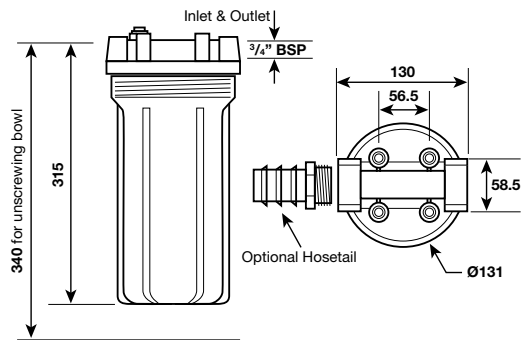
Ref: WMS - Part No. H000610	
Flow Rate	1 - 40 litres per minute
Maximum Pressure	8 bar
Maximum Temperature	40°C
Minimum Temperature	1 °C
Connection	3/4" BSP (3/4 NPT available)
Cartridge	WC-CM H000611
With Whale Orca 12V Pump	WMSFP H020978



### Wavestream System 1 Bilge Filter



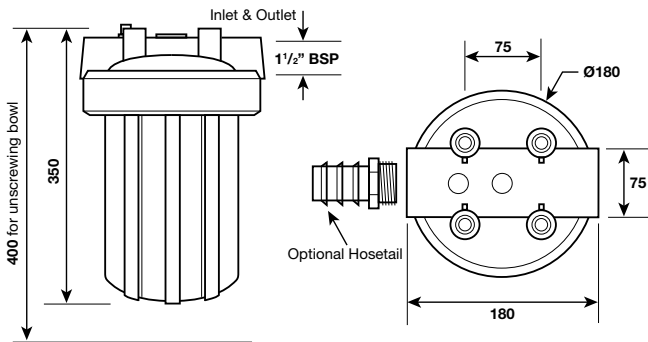
Ref: WSS1 - Part No. H000596	
Flow Rate	1 - 40 litres per minute
Maximum Pressure	6.2 bar
Maximum Temperature	40°C
Minimum Temperature	1 °C
Connection	3/4" BSP
Cartridge	WS-C1 H000597
With Whale Orca 12V Pump	WSS1FP H020982



### Wavestream System 2 Bilge Filter



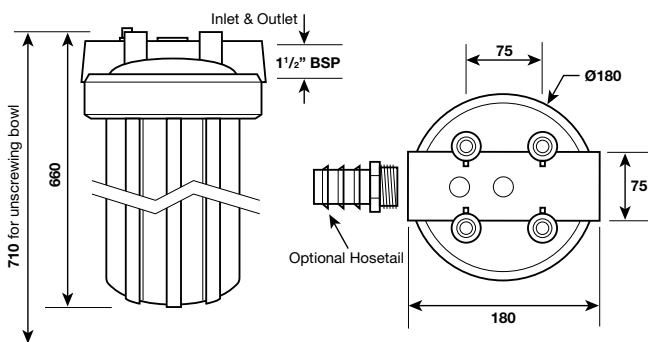
Ref: WSS2 - Part No. H000601	
Flow Rate	1 - 265 litres per minute
Maximum Pressure	6.8 bar
Maximum Temperature	37°C
Minimum Temperature	1 °C
Connection	1 1/2" BSP
Cartridge	WS-C2 H000602
With Whale Orca 12V Pump	WSS2FP H020983



### Wavestream System 3 Bilge Filter



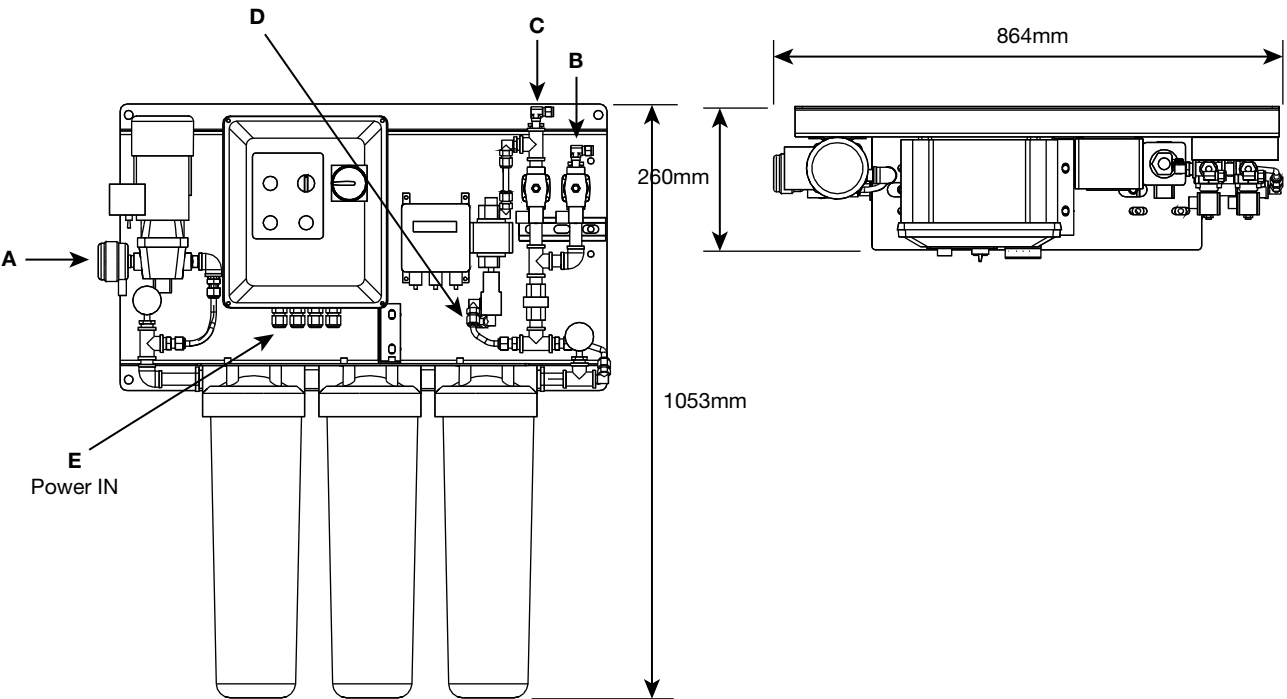
Ref: WSS3 - Part No. H007262	
Flow Rate	1 - 265 litres per minute
Maximum Pressure	6.2 bar
Maximum Temperature	37°C
Minimum Temperature	1 °C
Connection	1 1/2" BSP
Cartridge	WS-C3 H000608
With Whale Orca 12V Pump	WSS3FP H020985



### Wavestream MiniBOSS IMO Bilge Filter System

**MPEC 107(49) Certified bilge filter system giving effective control and prevention of oily bilge water discharge using Wavestream System 3 filters.**

- MiniBOSS from Recovered Energy Inc., with Wavestream removes trace oils to less than 5 ppm, keeping within the IMO required 15 or 5 ppm levels
- IMO Certified Oil in Water Monitor with 18 month data logging, 2 models available
- Wave MiniBOSS 24V dc maximum flow rate 0.50m<sup>3</sup>/hr
- Wave MiniBOSS 110V ac, 240V ac maximum flow rate 0.50m<sup>3</sup>/hr
- Compact, light and easy to maintain with Wavestream high capacity cartridges





# Wave Filtration Systems

## Product Range

### Wavebrite Waste Water Filter System

#### Wavebrite discharge meets EU Council Directive concerning waste water treatment (91/271/EEC).

- Wavebrite has five main components with four stage waste water filtration; main Wavebrite module, pre-filters, pump, pump strainer and control
- Pump with automatic control, no holding tanks or pump out required
- The components are modular and can be located separately, connected by flexible hose for ease of installation
- Basic models have 15l/min maximum flow rate with an option to increase available on request

Flostream HiFlo 10		
Reference	Part No.	Description
WBS	H020996	Wavebrite System 12 / 24V dc - complete with pump, filters, guages, control pump, fittings and pipe
WBLite	H020997	Wavebrite Lite Syatem 12 / 24V dc - complete as WBS for smaller boats
WB2010	H019882	Wavebrite 2010 Syatem 12 / 24V dc - complete for boats with multiple showers and basins
WB2020	H020998	Wavebrite 2020 Syatem 12 / 24V dc - complete as 2010 but larger capacity
WB100	H020999	Wavebrite 100 Syatem 12 / 24V dc or ac - complete for S/Y and boats requiring larger capacity, processes up to 100 cubic metres
WB300	H02100	Wavebrite 100 Syatem 12 / 24V dc or ac - complete for S/Y and boats requiring larger capacity, processes up to 300 cubic metres

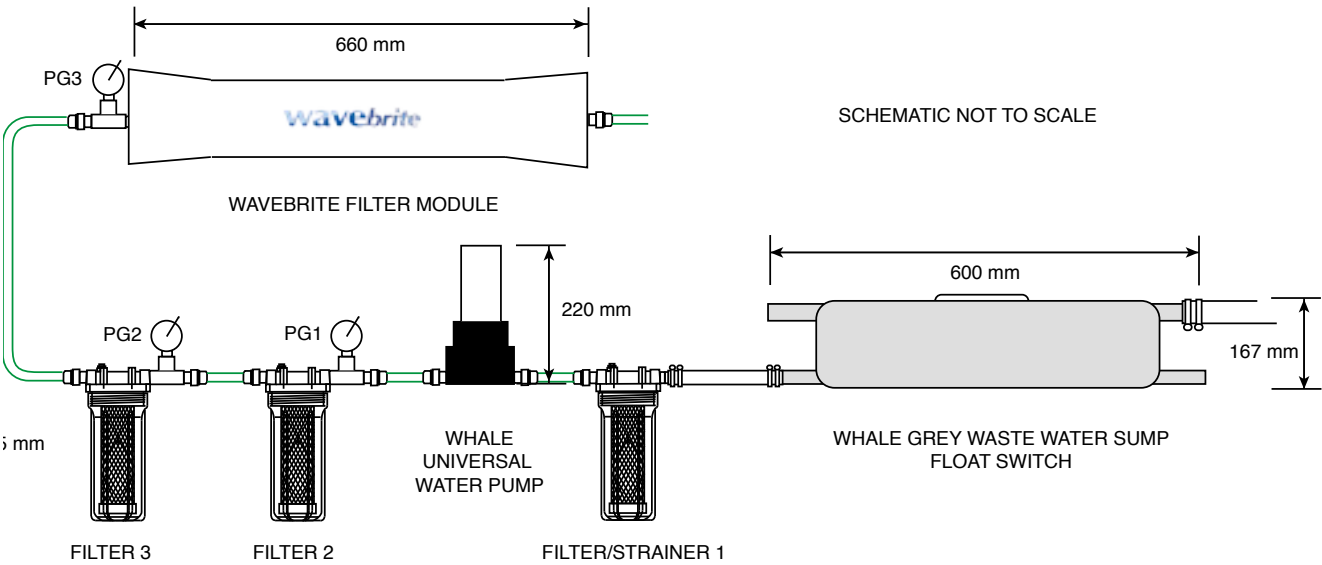


WB100 / 300

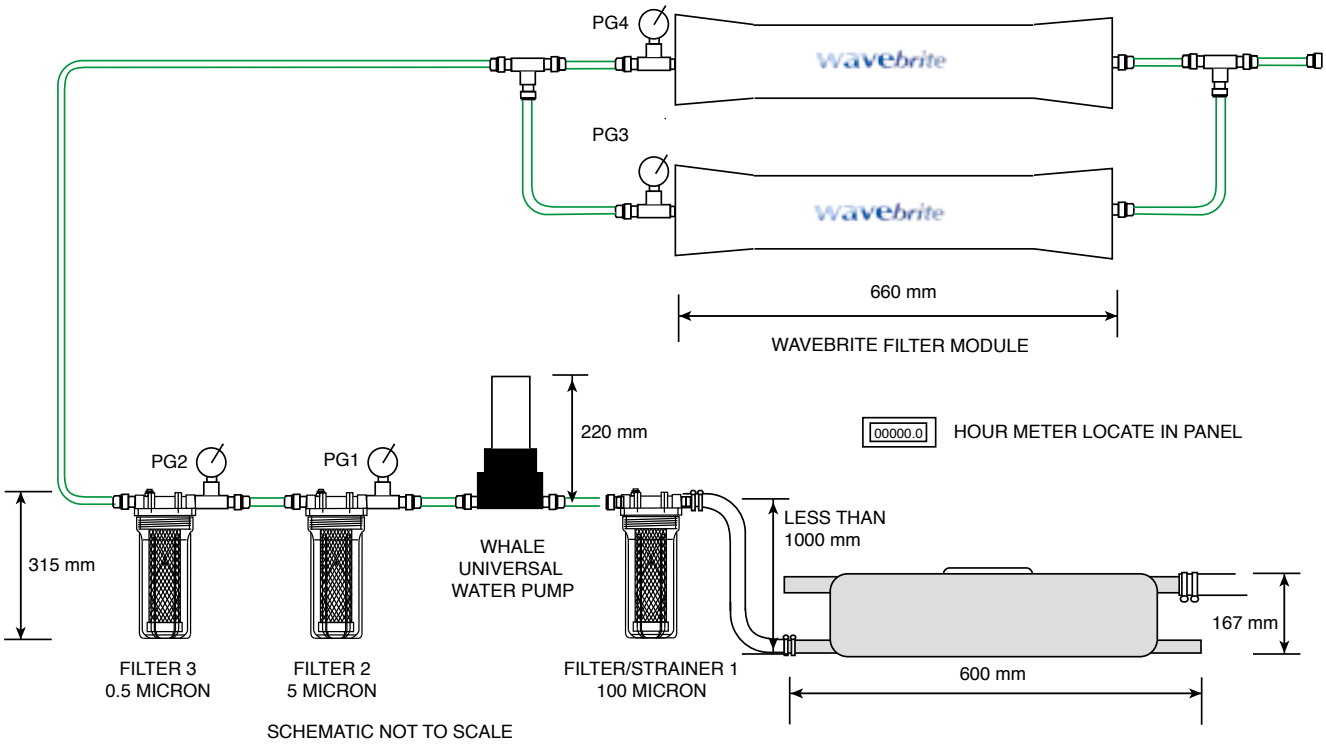


WBS / WBLite

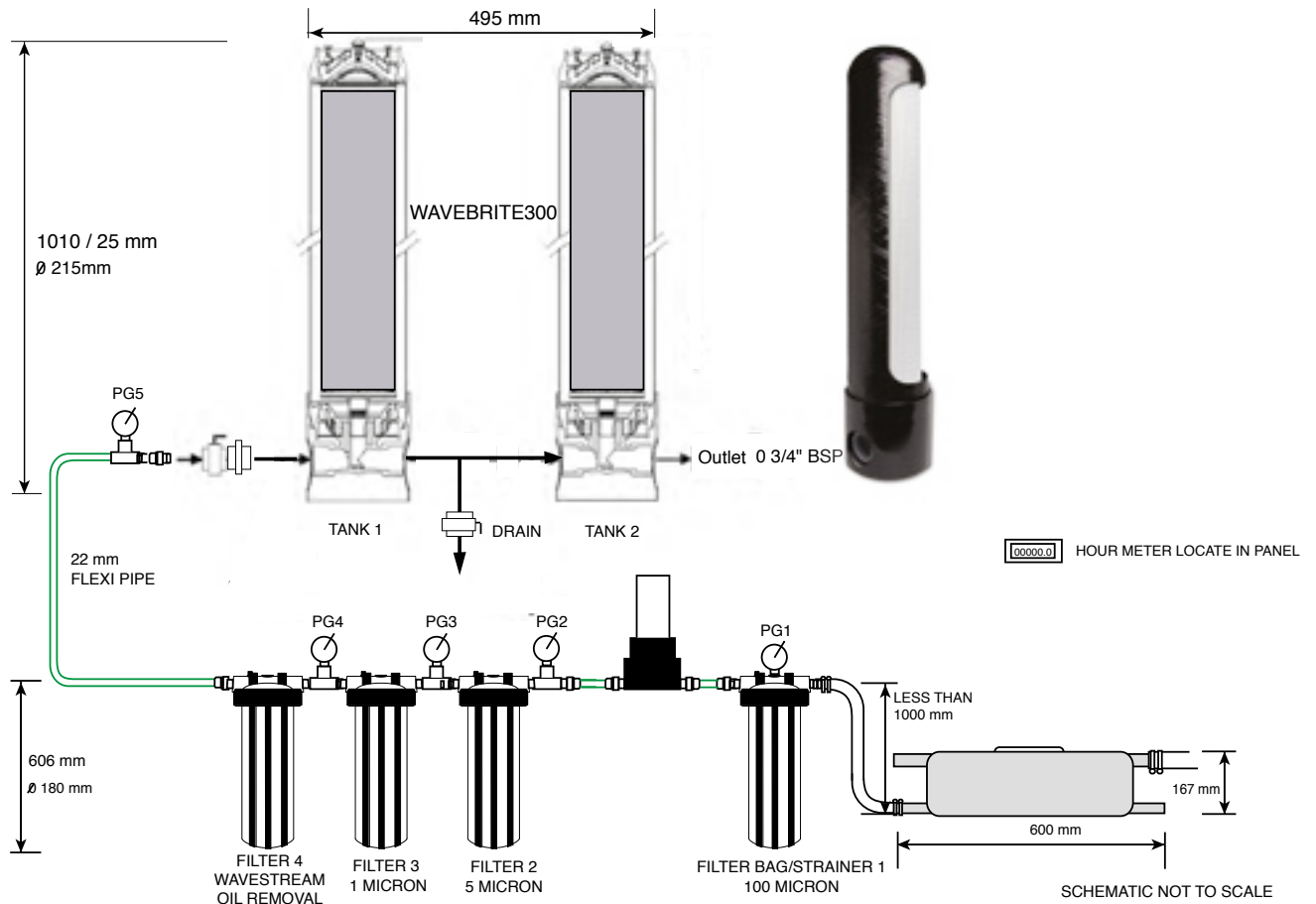
### Wavebrite WBS Schematic



### Wavebrite WB2010 Schematic



### Wavebrite WB300 Schematic



# Wave Filtration Systems

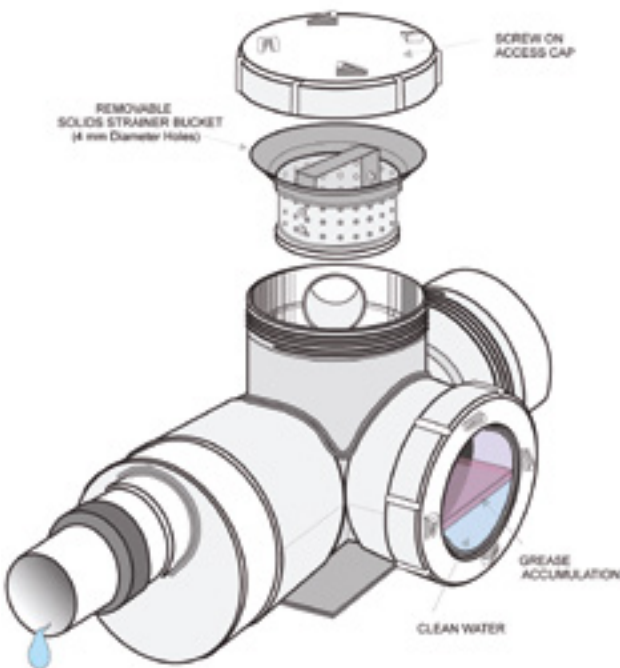
Product Range

## Wavebrite Grease Trap

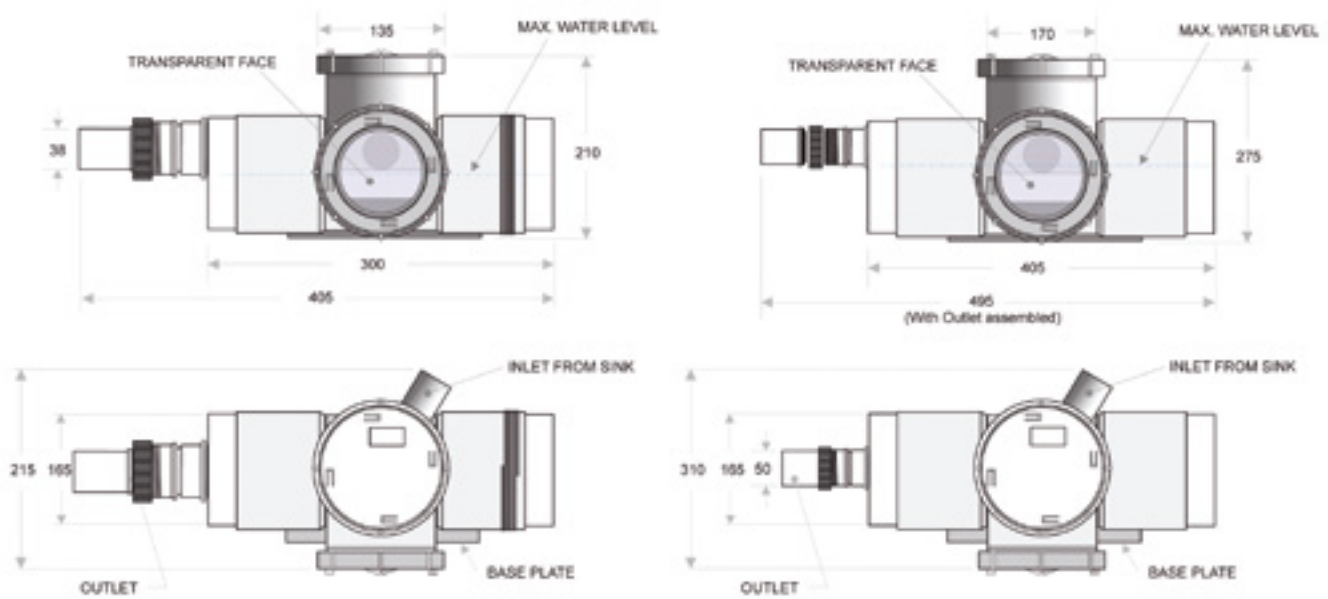
The Wavebrite Grease Trap is a useful addition to any Wavebrite system when processing galley waste water. It removes food waste, fat and grease which helps prevent solids forming in the system and extends the life of the Wavebrite module and filter cartridges.

- Simply installed in the drain from the galley sink or dishwasher
- Removes food debris, fat and grease retaining them in a food basket and grease trap reservoir
- Extends the life of the Wavebrite module and filter cartridges and improves pump efficiency
- The fat / grease level is visible through the inspection glass which indicates when the trap needs servicing
- Two sizes are available - 1.75 and 4.50 litre

Wavebrite		
Reference	Part No.	Description
WBG/1.75	H021005	Wavebrite Grease Trap 1.75l capacity
WBG/4.5	H021006	Wavebrite Grease Trap 4.50l capacity



Wavebrite 1.75l Dimensions



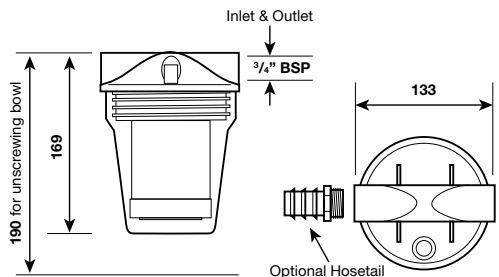
## Flostream HiFlo Drinking Water Filters

The Flostream HiFlo 10 and HiFlo 10 Micro are designed for higher flow rate drinking/wash applications providing premier quality, safe healthy water and eliminating the need for plastic water bottles.

- WRAS and NSF Certified components and filter cartridge
- Chlorine, taste and odour reduction
- Limescale inhibition and reduces heavy metals
- Bacteriostatic control to inhibit microbial growth in the water system
- Filter body easily removed with spanner provided. Replace cartridge after 6 months or if it has passed stated capacity of 6000 litres or 3000 litres for HiFlo 10 Micro.
- Pressure range 0.7 - 8 bar. Temperature range 4 - 45°C. Recommended maximum flow rate 10 litres per minute
- Simple installation with 15mm push-fits for flexi-pipe connectors or standard 3/4" BSP

Flostream HiFlo 10		
Reference	Part No.	Description
FLOHF10	H021011	Flostream HiFlo housing, cartridge and spanner. 3/4" BSP or 15mm push-fit connectors (Part No. FLOMHF10-15). Maximum recommended flow rate 10l/min
FLOHF10-15	H020049	Flostream HiFlo housing, cartridge and spanner with 15mm quick connectors
FLOHF10C	H021012	Flostream HiFlo replacement cartridge, capacity 6,000 litres
FLOMHF10	H021011	Flostream HiFlo 10 Micro housing with bracket, cartridge and spanner. 3/4" BSP or 15mm push-fit connectors (Part No. FLOMHF10-15). Maximum recommended flow rate 10l/min
FLOHF10C	H021012	Flostream HiFlo 10 Micro replacement cartridge, capacity 3,000 litres

HiFlo 10 Micro Dimensions





# Wave Filtration Systems

## Product Range

### Flostream Drinking Water Cartridge and Head

Designed to provide premium quality drinking water and for all food service applications. Available in two sizes giving a practical, cost effective point of use solution for safe, healthy water.

- NSF 42 & 53 Certified to meet health and aesthetic standards
- Chlorine, taste and odour reduction
- Limescale and KDF inhibition, anti-bacterial and reduces heavy metals
- Cyst reduction, removes contaminants that cause health issues
- Bacteriostatic control to inhibit microbial growth in the water system
- Cartridge easy connect / release with a quarter turn
- Pressure range 0.7 - 8.5 bar. Temperature range 2 - 38°C. Recommended flow rate 1.9l/min
- Simple installation with push-fit connectors for standard 10mm flexi-pipe. Install in vertical position with cartridge hanging down for easy replacement

Flostream		
Reference	Part No.	Description
FLOW2	H019878	Flostream Cartridge 2 replacement cartridge,length plus head 264mm. Capacity 3,800l
FLOW4	H021009	Flostream Cartridge 4 replacement cartridge, length plus head 372mm. Capacity 7,600 litres
FLOWPHD	H021008	Flostream Universal Head with 10mm quick connect ports
FLOWPHD15	H019877	Flowstream Universal Head with 15mm quick connect ports



### Flostream Dock Water Filter, Cartridge and Hose

The Flostream Dock Water Filter is installed in the water supply to pre-filter water when filling onboard tanks. Removing most impurities in three stages, further purification at the point of use can then be applied if required.

- Removes particulates and chlorine improving the taste and smell as a pre-filter
- STAGE 1 - Removes large particulates
- STAGE 2 - Removes sediments down to one micron
- STAGE 3 - Effectively reduces Chlorines, smell and odours, improving taste and colour with bacteriostatic control
- Maximum pressure 6.20 bar. Temperature range 1 - 45°C. Recommended maximum flow rate 20l/min
- Simple installation, hose supplied with 3/4" BSP connectors. The filter is installed between the supply tap and the onboard tanks

**Note:** Bracket is not included.

Flostream HiFlo 10		
Reference	Part No.	Description
FDF	H021023	Flostream dock water filter and housing, cartridge, connections and supply hose
FDF-C1	H021024	Flostream dock water filter replacement cartridge, length plus head 315mm. Capacity 20,000 litres
WSS1SSMB	H024439	Flostream Wavestream1/Dock Filter Mounting Bracket



### Waveair Holding Tank Vent Filter

Eliminates foul smells in and around your boat from holding tank vents. Waveair is simply installed in the vent line after the tank and before the outlet. Removes the organic compounds that cause bad odours

- Wavair uses a highly effective filter media, available in two sizes, 430mm and 200mm long, both for 16,19 and 25mm hose connections
- Single module supplied with brackets and connections
- Easy filter replacement. Simply remove the complete filter after one year, retaining bracket and connections and insert replacement filter
- Not suitable for treated sewage with significant amounts of chemicals, chlorine or other oxidising agents within the tank

Waveair		
Reference	Part No.	Description
WAM16	H021025	Waveair Micro tank vent filter - 16mm
WAM19	H021026	Waveair Micro tank vent filter - 19mm
WAM25	H021027	Waveair Micro tank vent filter - 25mm
WAMC	H021028	Waveair Micro replacement filter - 16 & 19mm
WAMC25	H021030	Waveair Micro replacement filter - 25mm
WA16	H021013	Waveair tank vent filter - 16mm
WA19	H021014	Waveair tank vent filter - 19mm
WA25	H021015	Waveair tank vent filter - 25mm
WAC	H021016	Waveair replacement filter - 16 & 19mm
WAC25	H021031	Waveair replacement filter - 25mm



### PROstream Watermaker Duo Cartridge

Unique pre-RO watermaker protection removes both sediment and trace oils. Combined string wound or melt blown cartridge with Wavestream oil removal technology. The PROstream cartridge replaces an existing pre-filter and offers additional oil protection phase

- Protects main RO by efficient oil removal with high dirt holding properties
- Wide range of sizes, micron ratings and end cap configurations available
- Consistent filtration over the life of the cartridge
- Marine, domestic and industrial applications

PROstream		
Reference	Part No.	Description
PRO-C1	H021017	PROstream wound outer 5 micron oil removal cartridge fits standard 10" housings
PRO-C1 / 20	H021018	PROstream wound outer 5 micron oil removal cartridge fits standard 20" housings
PRO-C2	H021019	PROstream wound outer 5 micron oil removal cartridge fits large diameter Big Blue 10" housings
PRO-C2 / 20	H021020	PROstream wound outer 5 micron oil removal cartridge fits large diameter Big Blue 20" housings



# Wave Filtration Systems

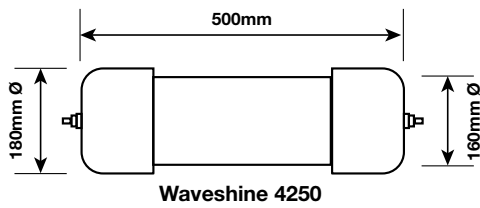
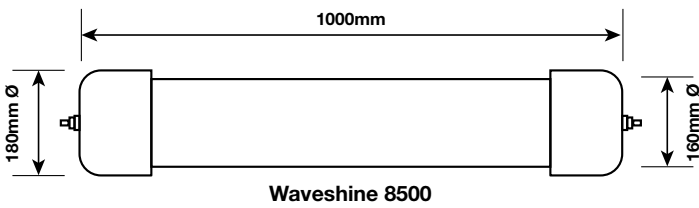
Product Range

## Waveshine Inline Wash and Rinse System

**Waveshine is a washdown filter system that removes the minerals from water that causes spotting and smears when washing and rinsing your boat. When also used to filter water going onboard it removes hardness softening the water for regular use, protecting appliances, taps, sinks, showers, pumps and systems.**

- Waveshine 4250 and 8500 use a highly effective resin media with 4250 and 8500 litre capacities, depending on water hardness
- Replacement salt cartridges and hardness test kits available
- Waveshine can be used free standing on the dock or installed onboard. Saddle clamps work as a stand on the dock or as installation brackets
- Softened water dramatically reduces scaling in appliances, pumps and systems and improves the effectiveness of soaps and detergents reducing the impact on the environment

Waveshine		
Reference	Part No.	Description
WSN4250	H022157	Waveshine system with 4250 litre capacity, regeneration filter, salt cartridge, hose and hardness kit
WSN8500	H021021	Waveshine system with 8500 litre capacity, regeneration filter, salt cartridge, hose and hardness kit
WSN-CS1	H021022	Waveshine 4250 & 8500 regeneration cartridge
WSN-HK	H021029	Waveshine hardness test kit



## Waveshine Clear Cartridge Wash and Rinse System

**The Waveshine Clear range of washdown filter systems remove the minerals from water that cause spotting and smears when washing and rinsing your boat, leaving a clear, shiny finish.**

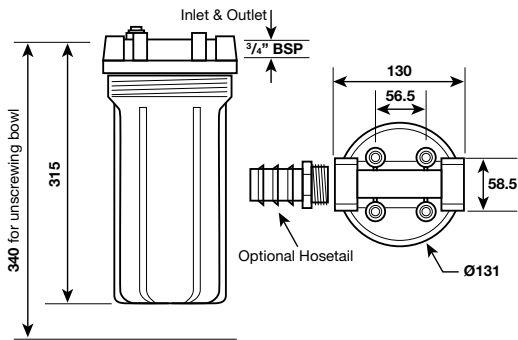
Three models available, Clear 300, 1000 and 2000, reflecting the approximate capacity of the cartridge in the filter in litres. A replaceable cartridge in each filter system removes and retains the minerals from the rinse water. **Note:** Must not be used as drinking water filter.

- Waveshine Clear Systems use a highly effective resin media with an approximate 300, 1000 and 2000 litre capacity, depending on model and water hardness

- The cartridges are non-regenerable and replacements are available
- Waveshine Clear can be used free standing on the deck or installed onboard. Stainless brackets are supplied for internal fitting
- Maximum performance is ensured with no need for wipe or leather off after rinsing reducing the overall time for washdown leaving a clear, shiny finish all over the vessel

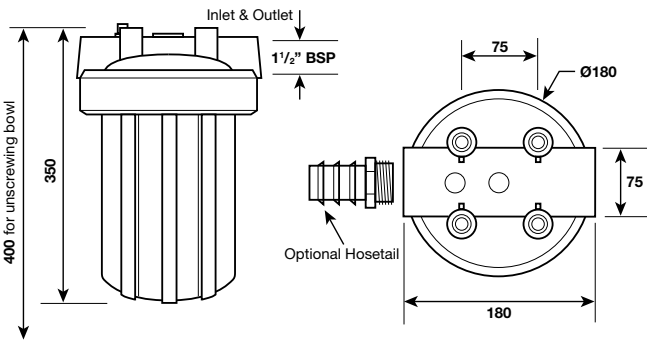
### Waveshine Clear 300

Ref: WSNC300 - H23020	
Flow Rate	1 - 40 litres per minute
Maximum Pressure	6.2 bar
Maximum Temperature	40°C
Minimum Temperature	1 °C
Connection	3/4" BSP
Cartridge	H023023



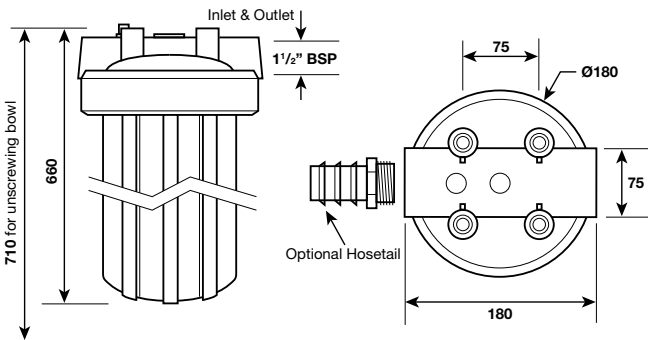
### Waveshine Clear 1000

Ref: WSN1000 - H023021	
Flow Rate	1 - 265 litres per minute
Maximum Pressure	6.8 bar
Maximum Temperature	37°C
Minimum Temperature	1 °C
Connection	1 1/2" BSP
Cartridge	H023024



### Waveshine Clear 2000

Ref: WSN1000 - H023022	
Flow Rate	1 - 265 litres per minute
Maximum Pressure	6.2 bar
Maximum Temperature	37°C
Minimum Temperature	1 °C
Connection	1 1/2" BSP
Cartridge	H023025

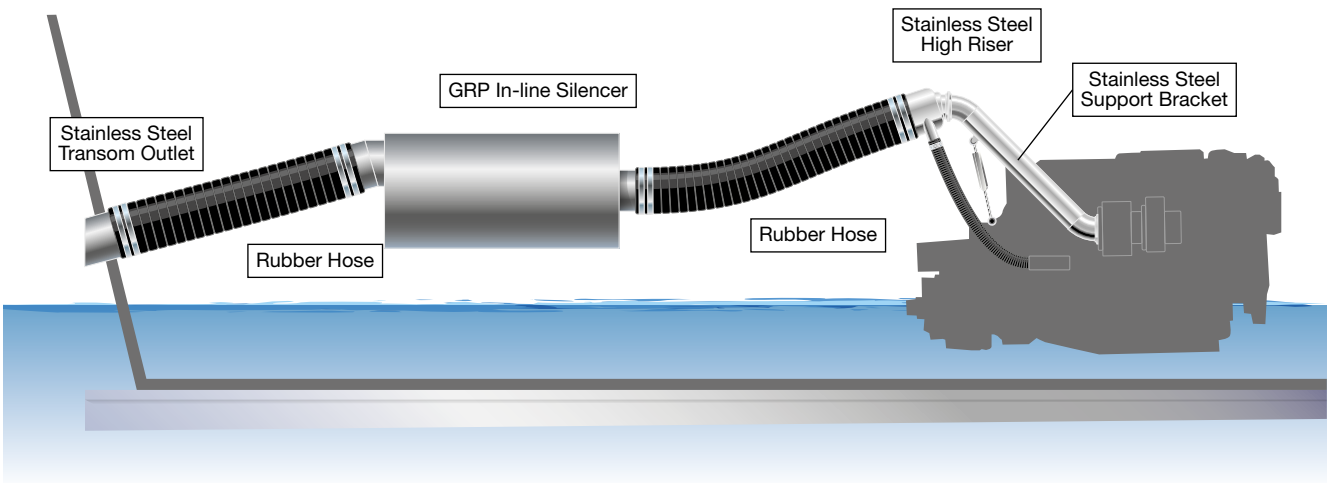




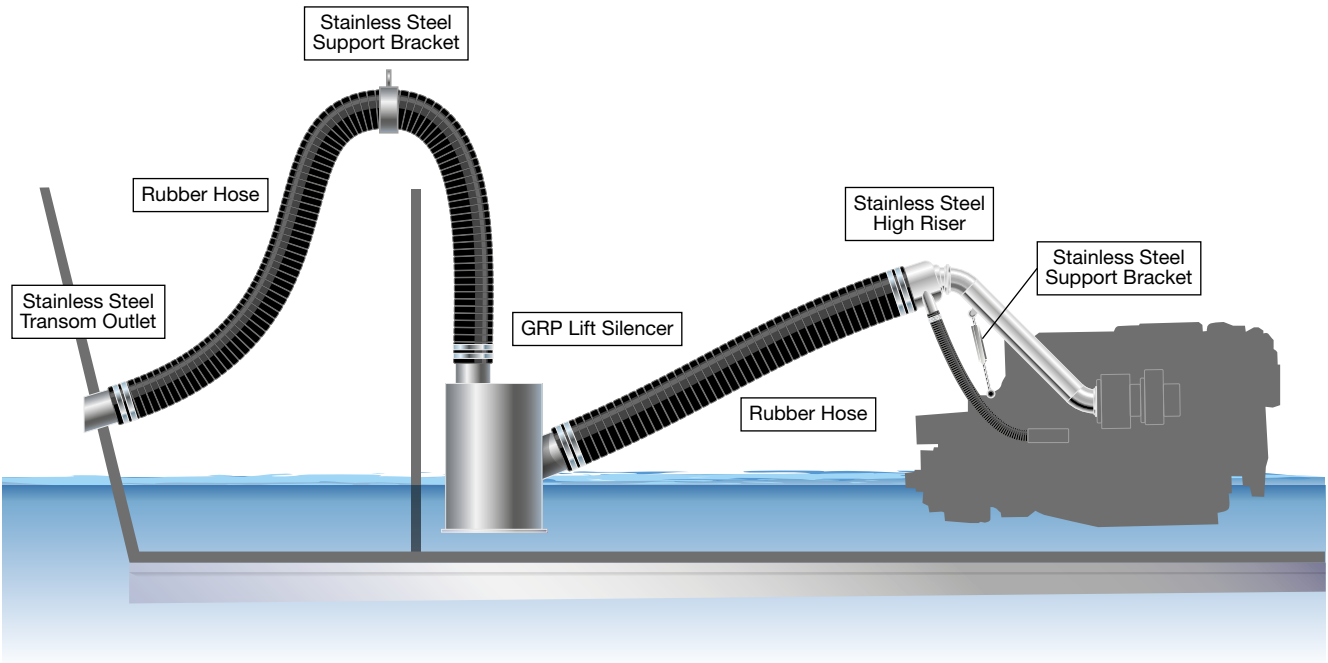
# System Drawings

Typical Exhaust System Layout Diagrams

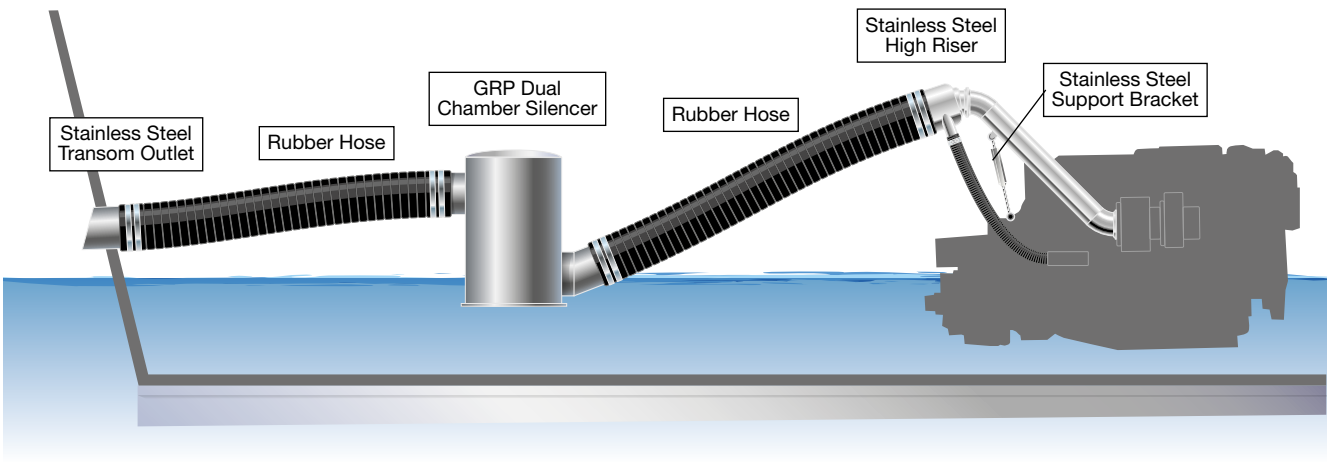
Standard In-line Silencer with Discharge Above Waterline



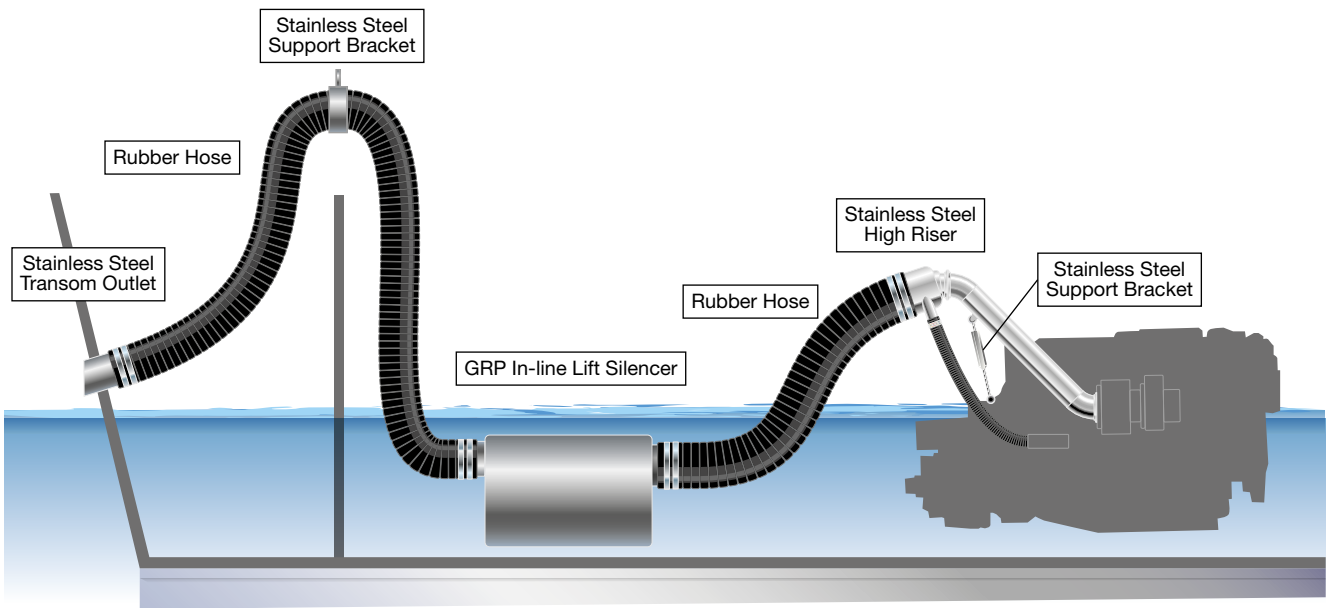
Single Chamber Lift Silencer with Discharge Above Waterline



Dual Chamber Silencer with Above Water Discharge



Standard In-line Lift Silencer with Discharge Above Waterline



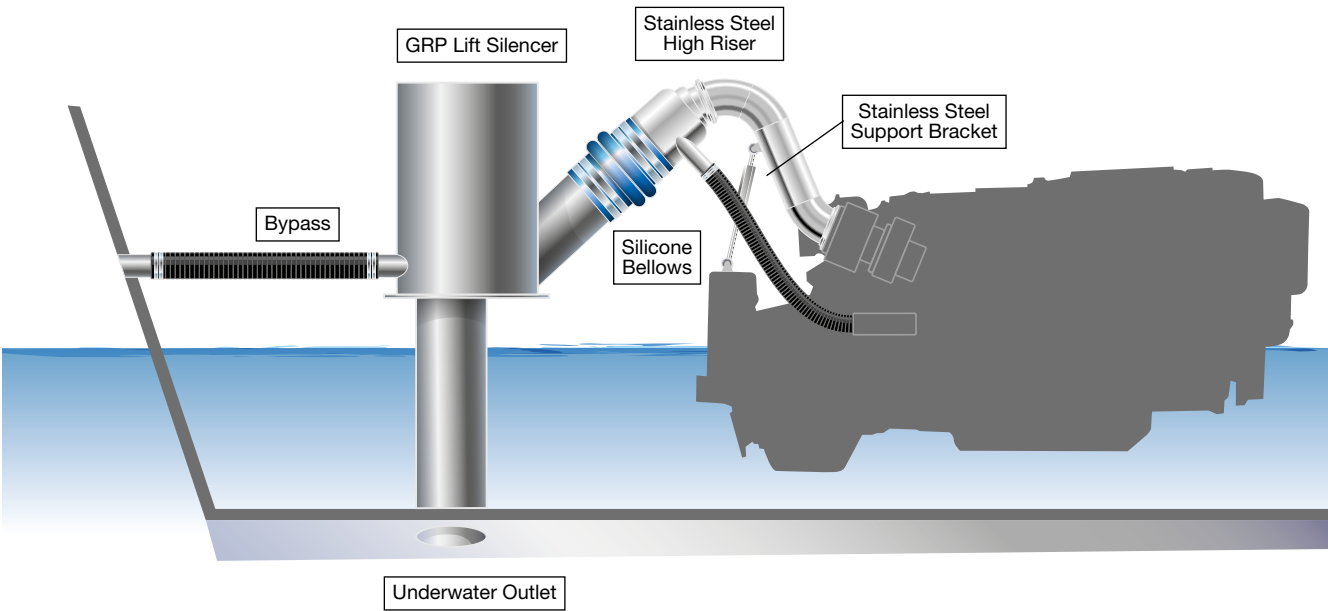
The information published by Halyard indicates the general suitability of our products for the types of applications for which they are designed. We cannot accept design responsibility for any specific installation unless we have confirmed in writing that the overall installation design is correct following our approval of detailed drawings or our physical survey of the vessel or equipment in which it will be used.

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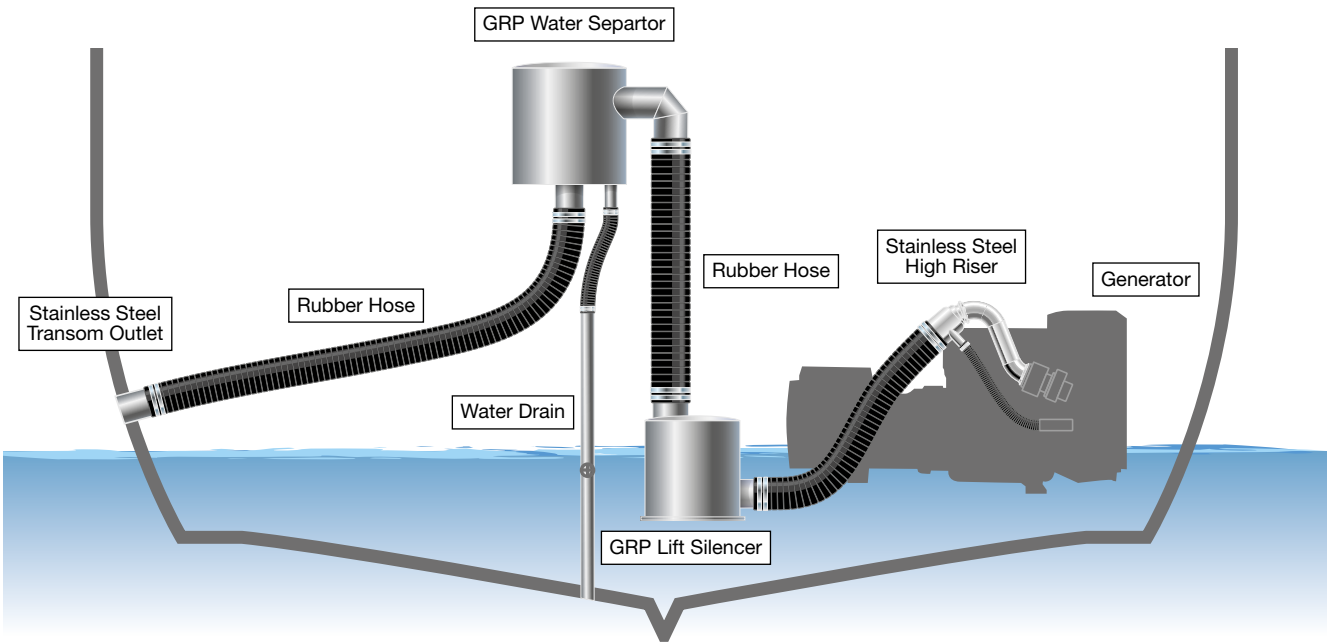
# System Drawings

Typical Exhaust System Layout Diagrams

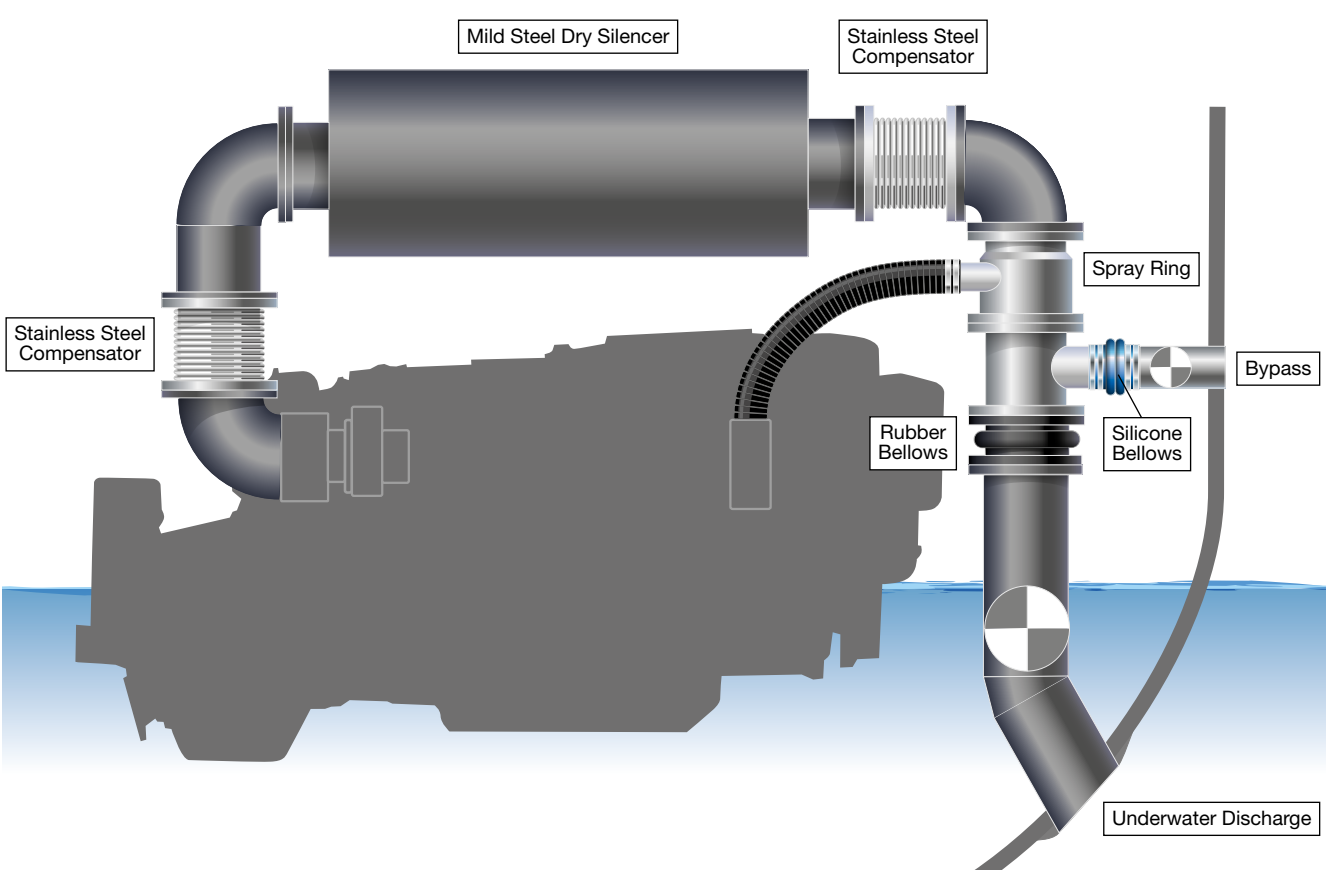
Single Chamber Lift Silencer with Bypass and Underwater Discharge



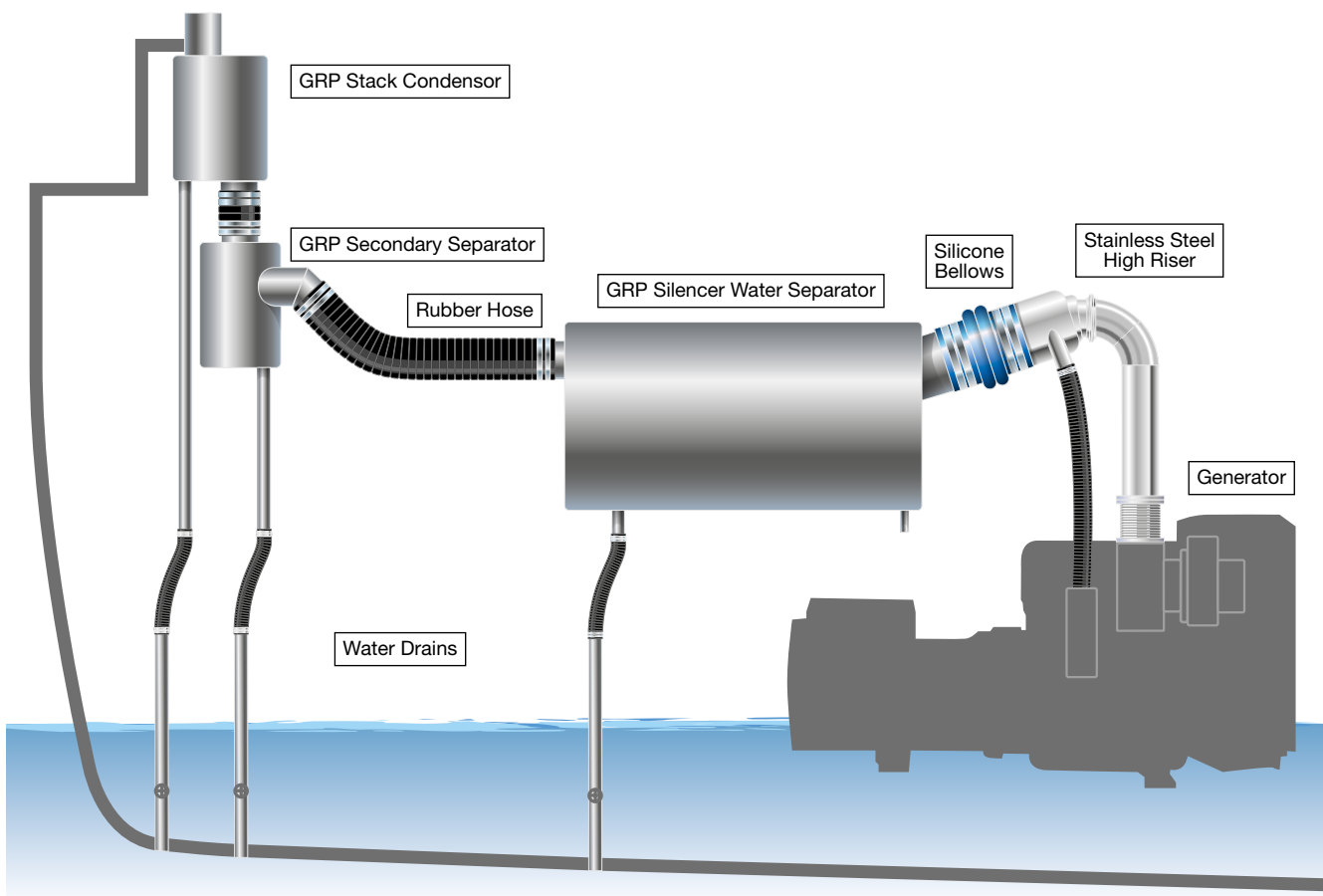
Single Chamber Lift Silencer and Separator with Discharge Above Waterline



Dry Silencer to Spray Ring with Bypass and Underwater Discharge



Combined Silencer and Separator with Gas Discharge up the Stack



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# Halyard Service Support

To ensure reliable operation and long service life of onboard equipment, it is critical that regular inspection and maintenance is carried out. To support this Halyard is able to provide its customers with the high level of support required with our service operation providing both field based and workshop support.

This service is available both in the UK and overseas from our own support engineers and also through our network of distributors and dealers.

We offer: Health Checks, Maintenance, Repair, Overhaul, Equipment Replacement, and Sea trial services for all Halyard supplied products but also for other selected onboard equipment. Service support includes but is not limited to the following:

- Exhaust systems & components
- Steelhead cranes
- Freeman hatches & doors
- Aquadrive antivibration systems
- Seatorque shaft systems
- Conventional shaft systems
- Steering gear
- Diesel engines & generators

If you have the requirement for any of the above services, please contact us to discuss your detailed requirements.



### Contacts:

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Roland McIlldowie:  
Email: rmcilldowie@halyard.eu.com  
Mobile: +44(0)7774-250765



# Halyard Network

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