KEMEL

MARINE SEALING TECHNOLOGIES

www.kemel.com

KEMEL

The largest maker of seals for the marine market.

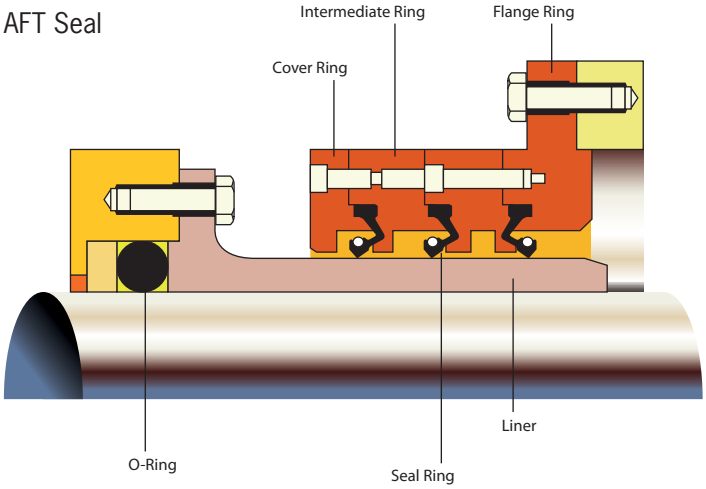
The focus on product quality and superior after service are the key elements of the company's future to serve the industry.

This focus has resulted in a 50% market share for mid to large size vessels and 70% share for the small vessel market in Japan. Also a significant increase of market share worldwide.

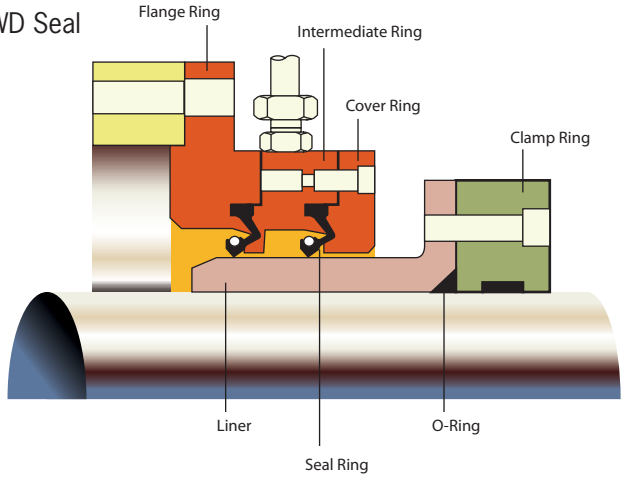
To meet the future requirements, we refocused from "stop leakage" to "no harm to the environment". This has led to lubricant products that return to nature. The technology compatible with these seals has also been developed by our Company.

The well known and highly reliable COMPACT SEAL (Type CX & DX)

AFT Seal



FWD Seal



The best seal ring designed through advanced technologies
The COMPACT SEAL provides excellent sealing performance, easy handling and stable quality over a long period of time, by utilizing the latest design technology and specially developed seal ring and material.

A seal ring of superb durability
The seal rings come in two kinds of material FKM (fluoric rubber) and NBR (nitrile-butadiene rubber) – for selection depending on operating conditions of stern tube seal. The FKM seal ring fitted on the COMPACT SEAL has superb heat resistance, with a special fabric vulcanized on it surface to assure high strength and durability. With its superior structure, the FKM seal ring features the important property of being free from the danger of crack generation under heavily loaded conditions.

A chrome Steel liner with superior abrasión and corrorion-resistance
A special grade of high-chomium stainless Steel newly developed by Kobe Steel is used for this liner. (Patent No. 5736974).
This new chrome Steel liner is far superior to conventional chrome liners in its abrasion and corrosion resistance, and is highly effective when used as the aft liner where pitting corrosion is liable to occur.

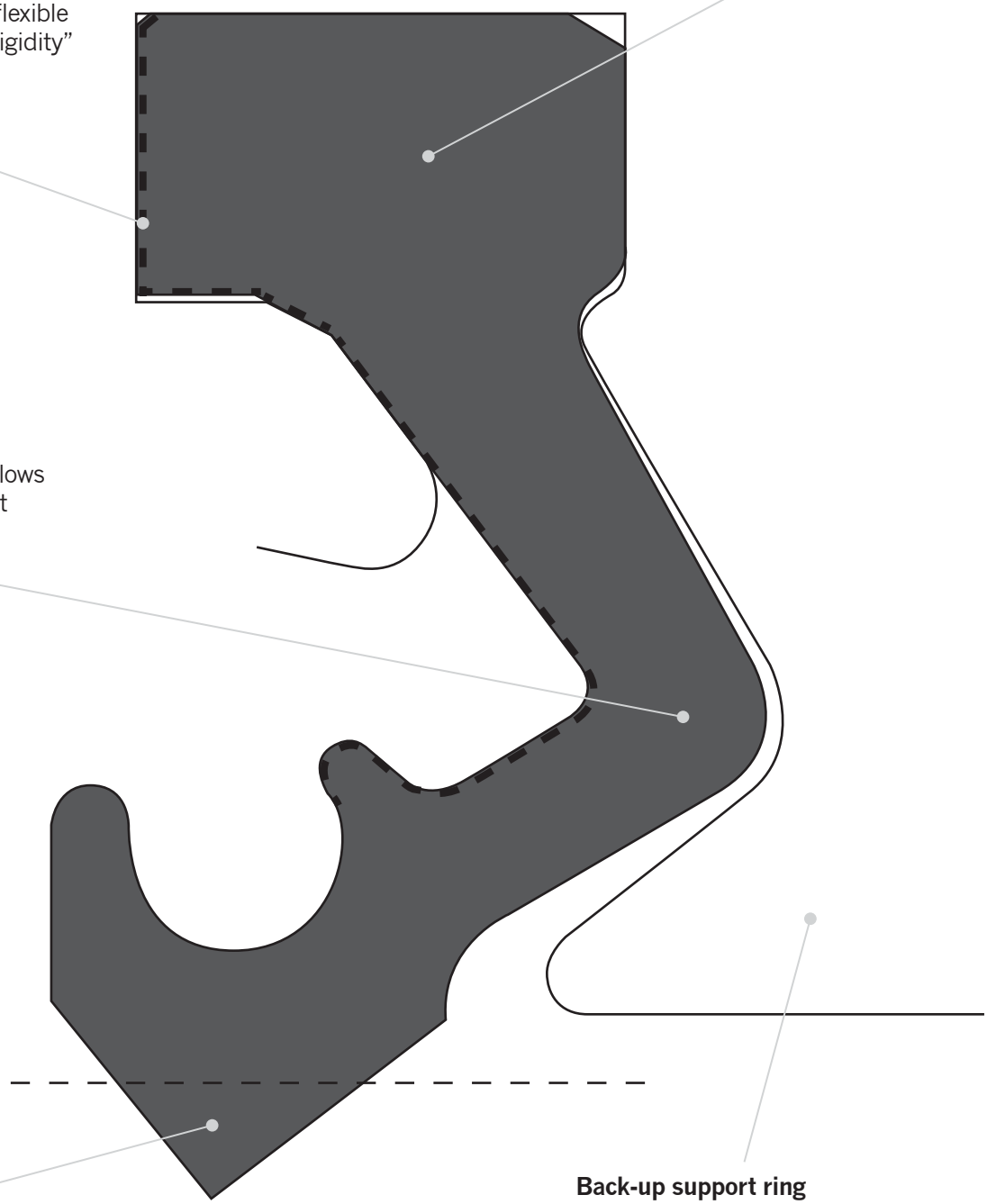
Repeatedly machinable liner
Our chrome Steel liners are provided with a sufficient machining allowance, so that the worn-out liner can be repeatedly reused after grinding.

Double security SEAL DX Type
In case of any oil leakage from #3 seal ring, the #3s seal ring is put into operation by closing two valves on the oil between the #3 and #3S chamber. The #3S seal ring is safely serviceable for a long period thereafter.

Excellent quality yields the highest reliability

Clamped Part
Designed for easy installation anywhere and always assembled accurately.

Special fabric affixed
A contradictory “extremely flexible and soft yet with sufficient rigidity” rubber is created through vulcanizing a special fabric.



Knuckle Part
The flexible dog-leg shape follows any propeller shaft movement smoothly.

Back-up support ring
The sealing ring is supported by the back-up support ring, and the contact area is always kept constant.

Sealing Ring Material
A KEMEL developed material (FKM) has high abrasion and blister resistance.

DOUBLE SECURITY Seal (Type DX)

To fully prevent oil leakage from the stern tube, two sealing ring (#3 and #3S) are installed. Normally, the #3S sealing ring is maintained in an unloaded state by making the oil pressure in the chamber between sealing ring #3 and #3S the same as the stern tube pressure. (Refer to fig. A.).

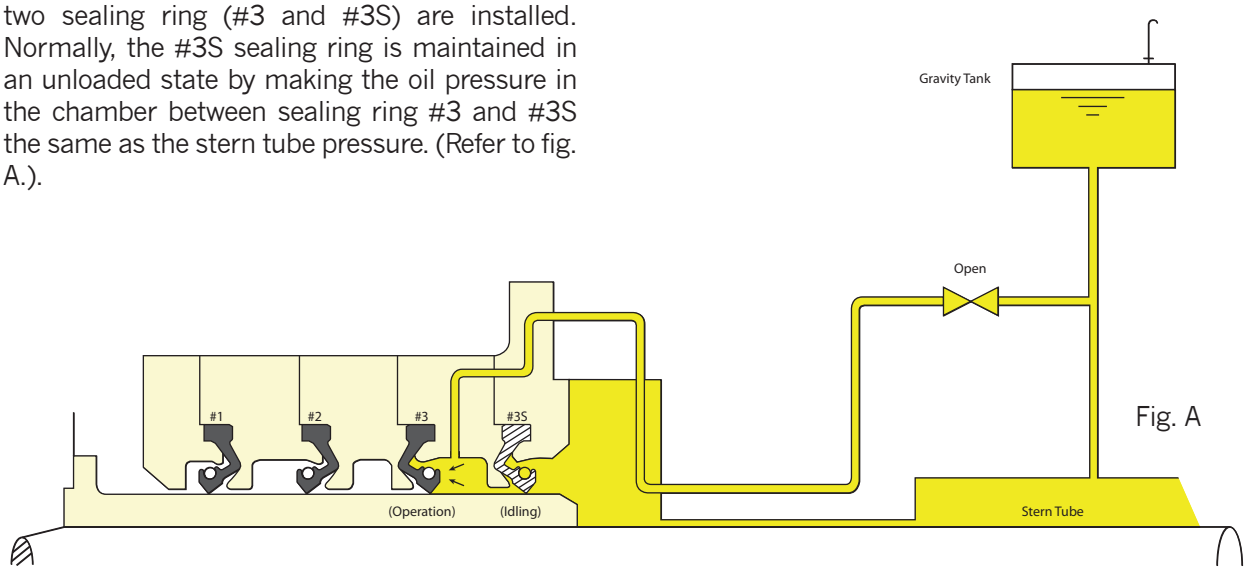


Fig. A

In case on any oil leakage from the #3 sealing ring, the #3S sealing ring is put into operation by closing two valves on the oil line between the #3 and #3S chambers. The #3 sealing ring is safely serviceable for a long period thereafter. (Refer to Fig. B).

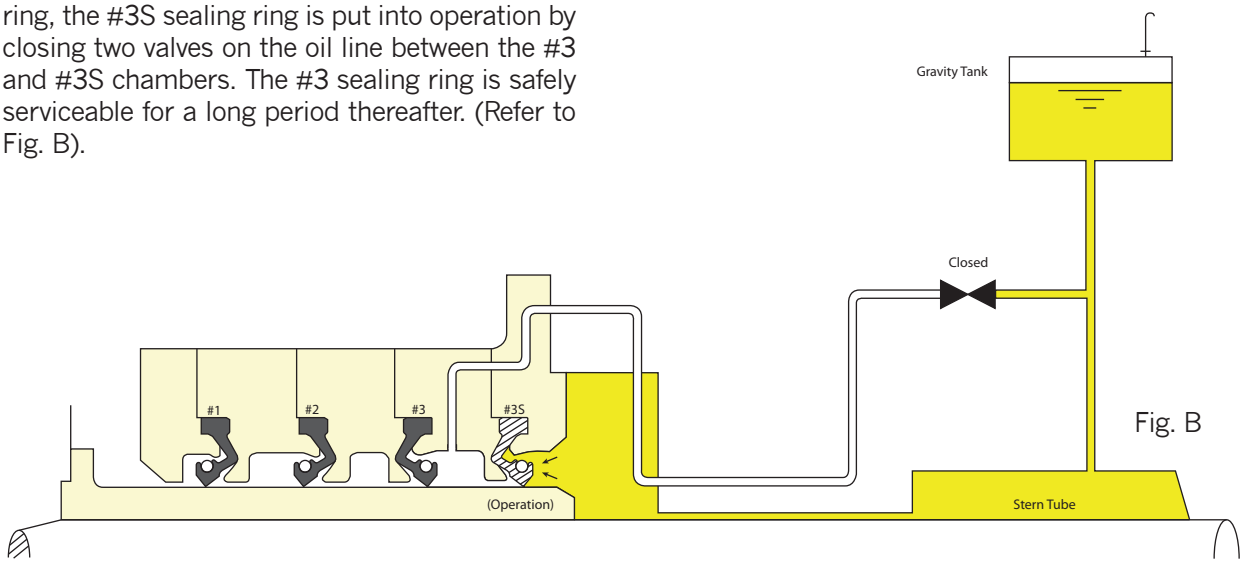
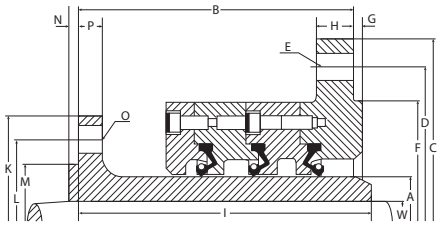
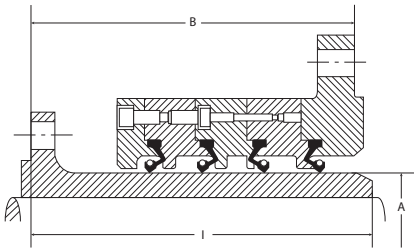


Fig. B

AFT Seal

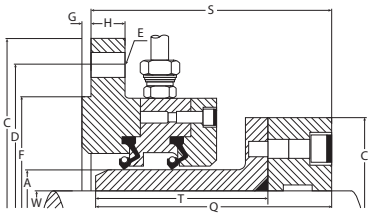


Type CX



Type DX

FWD Seal



Standard CX Dimensions

(If a distance ring is used, length "B" and "I" of the seals smaller in size than A size, 380 will be larger than those in the following table.)

(mm)

Size A	*125	140	160	180	200	220	240	260	280	300	330	355	380	400	420	450	480
W-min.	80	111	126	146	166	186	206	226	246	266	286	316	340	363	382	401	429
W-max.	110	125	145	165	185	205	225	245	265	285	315	339	362	381	400	428	457
B	160	160	160	160	160	160	175	175	175	175	175	195	195	200	200	225	225
C	275	290	310	330	350	370	425	445	465	485	515	565	590	610	630	675	705
D	245	260	280	300	320	340	390	410	430	450	480	525	550	570	590	630	660
E	8xM12	8xM12	8xM12	8xM12	8xM12	8xM12	12xM16	12xM16	12xM16	12xM16	12xM16	12xM20	12xM20	12xM20	12xM20	12xM20	12xM20
F	210	225	245	265	285	305	345	365	385	405	435	475	500	520	540	575	605
G	6	6	6	6	6	6	6	6	6	6	6	7	7	7	7	8	8
H	15	15	15	15	15	15	20	20	20	20	20	25	25	25	25	30	30
I	180	180	180	180	180	180	191	191	191	191	191	212	212	217	217	241	241
K	184	200	230	260	280	300	320	340	360	375	425	450	480	500	520	550	590
L	164	180	210	230	250	270	290	310	330	346	390	416	440	460	486	510	550
M	145	160	190	204	224	240	260	284	300	320	360	384	406	424	450	476	510
N	6	6	6	6	6	6	6	6	6	6	7	7	7	7	8	8	8
O	8xM8	8xM8	8xM8	8xM12	8xM12	8xM12	8xM12	8xM12	12xM12	12xM12	12xM12	12xM16	12xM16	12xM16	12xM16	12xM16	12xM20
P	12	12	12	12	12	12	15	15	15	15	15	15	15	20	20	20	20
Q	149	149	149	149	149	149	159	159	164	164	164	185	185	185	190	205	205
R	190	195	220	240	260	280	300	320	350	370	400	430	460	480	500	530	560
S	140	140	140	140	140	140	153	153	158	158	158	184	184	184	189	205	205
T	109	109	109	109	109	109	119	119	119	119	119	135	135	135	135	150	150
Weight kg. FWD Seal	14	26	27	31	33	37	52	55	62	70	84	109	119	120	131	170	180
Weight kg. AFT Seal	26	29	30	34	37	42	59	64	69	76	92	122	130	135	144	203	215

* Sectional shape of the seal ring in 125 size is different from illustrations in this brochure.

Size A	500	530	560	600	630	670	710	750	800	850	900	950	1000	1060	1120	1180	
W-min.	458	477	505	533	571	599	636	673	711	757	804	851	897	943	999	1054	
W-max.	476	504	532	570	598	635	672	710	756	803	850	896	942	998	1053	1130	
B	225	225	240	240	245	245	280	280	310	310	330	330	330	350	350	350	
C	725	755	820	860	890	930	990	1030	1090	1140	1200	1250	1300	1400	1460	1520	
D	680	710	765	805	835	875	930	970	1030	1080	1135	1185	1235	1325	1385	1445	
E	12xM20	12xM20	12xM24	12xM24	12xM24	12xM24	16xM24	16xM24	20xM24	20xM24	20xM24	20xM24	20xM24	24xM30	24xM30	24xM30	
F	625	655	700	740	770	810	865	905	960	1010	1065	1115	1165	1245	1305	1365	
G	8	8	9	9	9	9	10	10	10	10	11	11	11	11	11	11	
H	30	30	35	35	35	35	40	40	40	40	45	45	45	50	50	50	
I	241	241	253	253	258	258	301	301	338	338	362	362	362	381	381	386	
K	600	630	675	700	760	820	840	885	945	1000	1070	1130	1170	1230	1300	1360	
L	560	590	630	660	710	750	790	836	890	950	1010	1070	1110	1170	1230	1290	
M	526	550	588	620	670	710	740	780	825	870	920	970	1040	1100	1160	1220	
N	8	8	9	9	9	10	10	10	10	10	11	11	11	11	11	12	
O	12xM20	12xM20	12xM20	12xM20	12xM24	12xM24	12xM24	16xM14	16xM14	16xM14	16xM14	16xM14	20xM24	20xM24	20xM30	24xM30	
P	20	20	20	20	22	22	25	25	30	30	35	35	35	35	40	40	
Q	205	205	221	221	238	238	268	318	337	337	349	349	349	389	399	399	
R	580	620	650	690	720	760	830	870	915	974	1027	1076	1130	1200	1260	1340	
S	205	205	223	223	240	240	268	318	336	336	352	352	352	395	405	405	
T	150	150	166	166	168	168	198	198	217	217	229	229	229	244	249	249	
Weight kg. FWD Seal	189	212	262	290	331	371	477	580	668	736	825	890	998	1222	1380	1495	
Weight kg. AFT Seal	220	230	294	325	392	417	504	529	655	735	858	933	1000	1205	1374	1477	

Standard DX Dimensions

(If a distance ring is used, length "B" and "I" of the seals smaller in size than A size, 380 will be larger than those in the following table.)

Size A	B	I
140	200	220
160	200	220
180	200	220
200	200	220
220	200	220
240	215	233
260	220	236
280	220	236
300	220	236
330	220	236
355	235	252

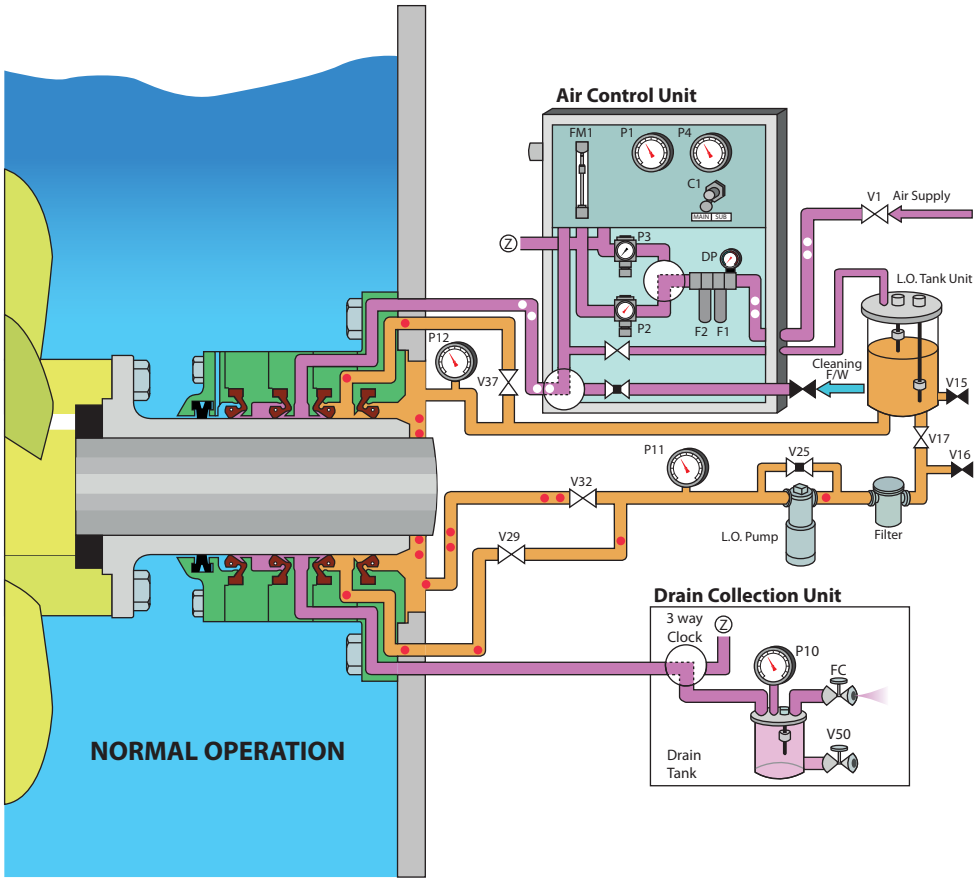
Size A	B	I
380	235	252
400	240	257
420	240	257
450	270	286
480	270	286
500	270	286
530	270	286
560	285	298
600	285	298
630	290	303
670	290	303

Size A	B	I
710	330	351
750	330	351
800	365	393
850	365	393
900	385	417
950	385	417
1000	385	417
1060	405	436
1120	410	441
1180	410	441

Non-Pollution Air Sealing System (Type AX)

The AX type Air Seal has a simplified structure.

Air supplied from the air source within the ship passes through #2/3 chamber and is spouted in the sea water. Any change of draft is automatically detected by the air control unit and pressure is adjusted to maintain the optimum pressure on each part.



FEATURES

High reliability

High reliability is realized with the following two measures:

· Small pressure difference on all seal rings.

· The provision of two seal rings on sea water side and stern tube oil side. Even if the oil seal rings are damaged, the leaked oil is completely collected in an air chamber between seal rings.

Easy Maintenance

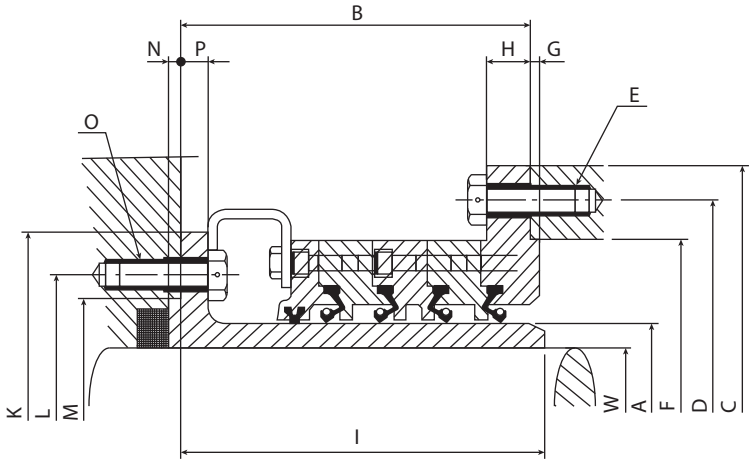
Any draft change is automatically detected and the stern tube pressure changes in accordance with draft changes even on vessels with numerous draft changes due to loading conditions.

Low Air Consumption

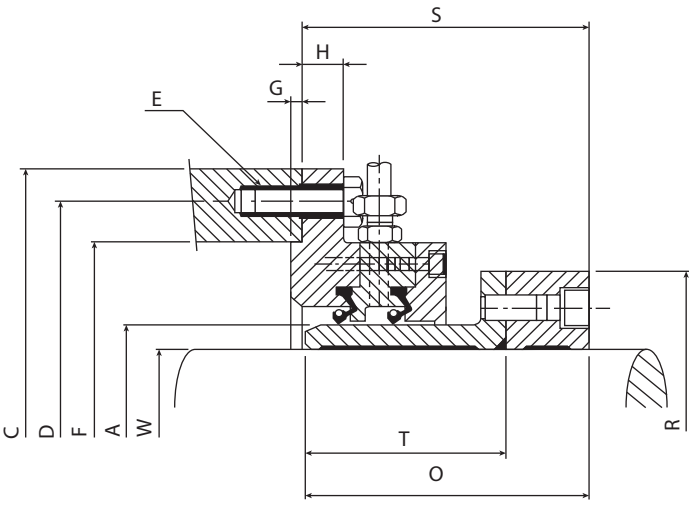
Air is supplied to the #2/3 chamber controlling the chamber pressure with a small amount of air constantly flowing out the drain tank to avoid air deposition in the line. Total air consumption is less than 40 Nl/min.

Various Emergency Measures

Emergency measures include spare seal rings and air control devices. It is possible to convert from air seal systems to Double Security Type COMPACT Seals with simple valve operations, provided that an emergency stern tube gravity tank is prepared.



AFT Air Seal



FWD Air Seal

Size A	140	160	180	200	220	240	260	280	300	330	355	380	400	420	450	480
W-min.	111	126	146	166	186	206	226	246	266	286	316	340	363	382	401	429
W-max.	125	145	165	185	205	225	245	265	285	315	339	362	381	400	428	457
B	200	200	200	200	200	215	220	220	220	220	235	235	240	240	270	270
C	290	310	330	350	370	425	445	465	485	515	565	590	610	630	675	705
D	260	280	300	320	340	390	410	430	450	480	525	550	570	590	630	660
E	8xM12	8xM12	8xM12	8xM12	8xM12	12xM16	12xM16	12xM16	12xM16	12xM16	12xM20	12xM20	12xM20	12xM20	12xM20	12xM20
F	225	245	265	285	305	345	365	385	405	435	475	500	520	540	575	605
G	6	6	6	6	6	6	6	6	6	6	7	7	7	7	8	8
H	15	15	15	15	15	20	20	20	20	20	25	25	25	25	30	30
I	220	220	220	220	220	233	236	236	236	236	252	252	257	257	286	286
K	200	230	260	280	300	320	340	360	375	425	450	480	500	520	550	590
L	180	210	230	250	270	290	310	330	346	390	416	440	460	486	510	550
M	160	190	204	224	240	260	284	300	320	360	384	406	424	450	476	510
N	6	6	6	6	6	6	6	6	6	7	7	7	7	8	8	8
O	8xM8	8xM8	8xM12	8xM12	8xM12	8xM12	8xM12	12xM12	12xM12	12xM12	12xM16	12xM16	12xM16	12xM16	12xM16	12xM20
P	12	12	12	12	12	15	15	15	15	15	15	15	20	20	20	20
Q	149	149	149	149	149	159	159	164	164	164	185	185	185	190	205	205
R	195	220	240	260	280	300	320	350	370	400	430	460	480	500	530	560
S	140	140	140	140	140	153	153	158	158	158	184	184	184	189	205	205
T	109	109	109	109	109	119	119	119	119	119	135	135	135	135	150	150
Weight kg FWD Seal	26	27	31	33	37	52	55	62	70	84	109	119	120	131	170	180
AFT Seal	29	30	34	37	42	59	64	69	76	92	122	130	135	144	203	215

Size A	500	530	560	600	630	670	710	750	800	850	900	950	1000	1060	1120	1180
W-min.	458	477	505	533	571	599	636	673	711	757	804	851	897	943	999	1054
W-max.	476	504	532	570	598	635	672	710	756	803	850	896	942	998	1053	1130
B	270	270	285	285	290	290	330	330	365	365	385	385	385	405	410	410
C	725	755	820	860	890	930	990	1030	1090	1140	1200	1250	1300	1400	1460	1520
D	680	710	765	805	835	875	930	970	1030	1080	1135	1185	1235	1325	1385	1445
E	12xM20	12xM20	12xM24	12xM24	12xM24	12xM24	16xM24	16xM24	20xM24	20xM24	20xM24	20xM24	20xM24	24xM30	24xM30	24xM30
F	625	655	700	740	770	810	865	905	960	1010	1065	1115	1165	1245	1305	1365
G	8	8	9	9	9	9	10	10	10	10	11	11	11	11	11	11
H	30	30	35	35	35	35	40	40	40	40	45	45	45	50	50	50
I	286	286	298	298	303	303	351	351	393	393	417	417	417	436	441	441
K	600	630	675	700	760	820	840	885	945	1000	1070	1130	1170	1230	1300	1360
L	560	590	630	660	710	750	790	836	890	950	1010	1070	1110	1170	1230	1290
M	526	550	588	620	670	710	740	780	825	870	920	970	1040	1100	1160	1220
N	8	8	9	9	9	10	10	10	10	10	11	11	11	11	11	12
O	12xM20	12xM20	12xM20	12xM20	12xM24	12xM24	12xM24	16xM24	16xM24	16xM24	16xM24	16xM24	20xM24	20xM24	20xM30	20xM30
P	20	20	20	20	22	22	25	25	30	30	35	35	35	35	40	40
Q	205	205	221	221	238	238	268	318	337	337	349	349	349	389	399	399
R	580	620	650	690	720	760	830	870	915	974	1027	1076	1130	1200	1260	1340
S	205	205	223	223	240	240	268	318	336	336	352	352	352	395	405	405
T	150	150	166	166	168	168	198	198	217	217	229	229	229	244	249	249
Weight kg FWD Seal	189	212	262	290	331	371	477	580	668	736	825	890	998	1222	1380	1495
AFT Seal	220	230	294	325	392	417	504	529	655	735	858	933	1000	1205	1374	1477

Environmentaly Preferable Lubricants for Stern Tubes, Thrusters and Marine Hydraulic Systems.

KEMEL ST-77 for Stern Tubes
KEMEL TH-100 for Azimuthal Thrusters

Polyethylen-glycol-based lubricant for marine application.

Base Fluid
Polyethylene glycol, a type of polyalkylene glycol, is a well-known non-toxic material. It is generally applied in cosmetics and medicines.

Biodegradable
The OECD 301C test method found KEMEL ST-77 and TH-100 readily biodegradable.

Practically Non-Toxic
KEMEL ST-77 and TH-100 have ben classified as practically non-toxic to fish under the OECD 203 test.

No Sheen / No Sludge
KEMEL ST-77 and TH-100 are water-soluble and from no sheen or discoloration on water surface. Also produces no sludge or emulsion under water surface.

High Seawater Tolerance
KEMEL ST-77 and TH-100 provide excellent lubrication and corrosion prevention even when the seawater content is 10%.

Class Certificate
Certificated by ABS in March 2008.

Application to Marine Hydraulic Systems
KEMEL ST-77 has been applied to controllable pitch propeller system. Application to marine hydraulic systems is another promising area.

AX Seal and ST-77

Combination of Air Seal (AX) and ST-77 is the best solution for oil leakage issue.

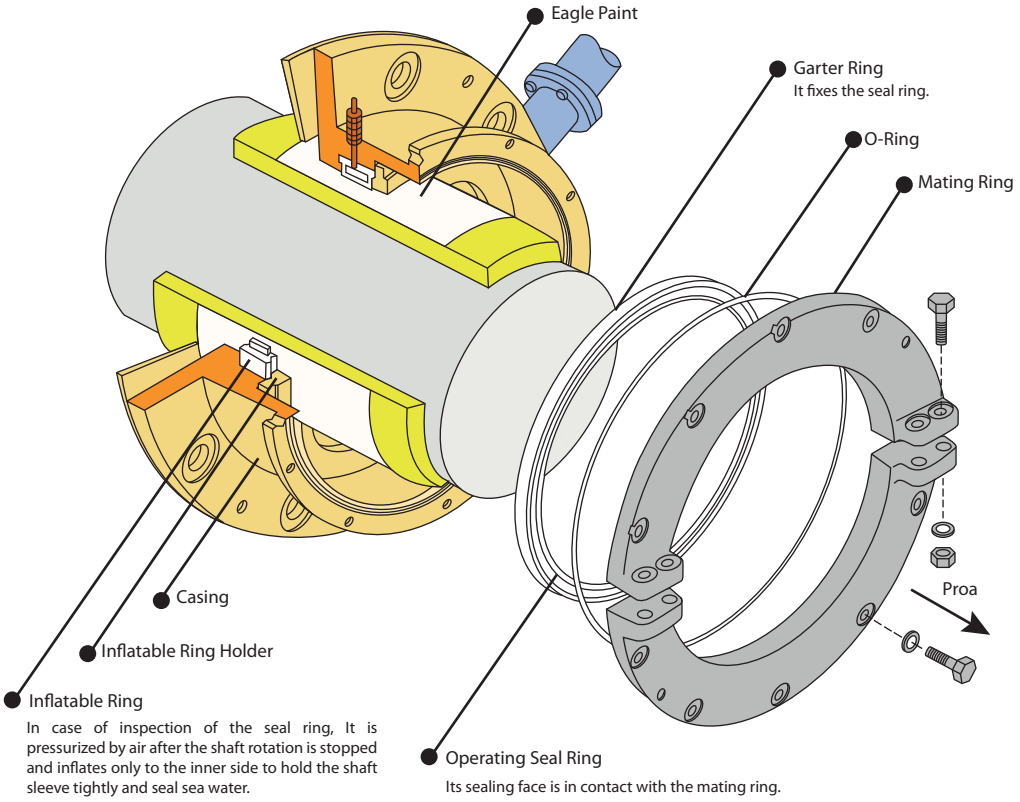
The Air Seal avoids oil leakage to the seawater and the entering of seawater into the stern tube, but if during an emergency lubricant leaked into the sea, it would not be contaminant.

CX Seal and ST-77

The combination of the COMPACT SEAL (CX) and ST-77 is and effective solution for oil leakage.

This combination is recommendable for small vessels that cannot equip aft seal tank.

Water Lubricated Seal (EVK)

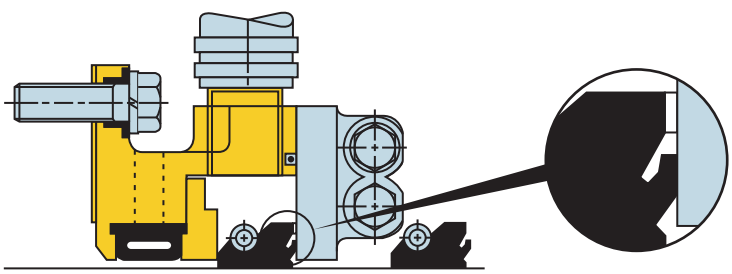


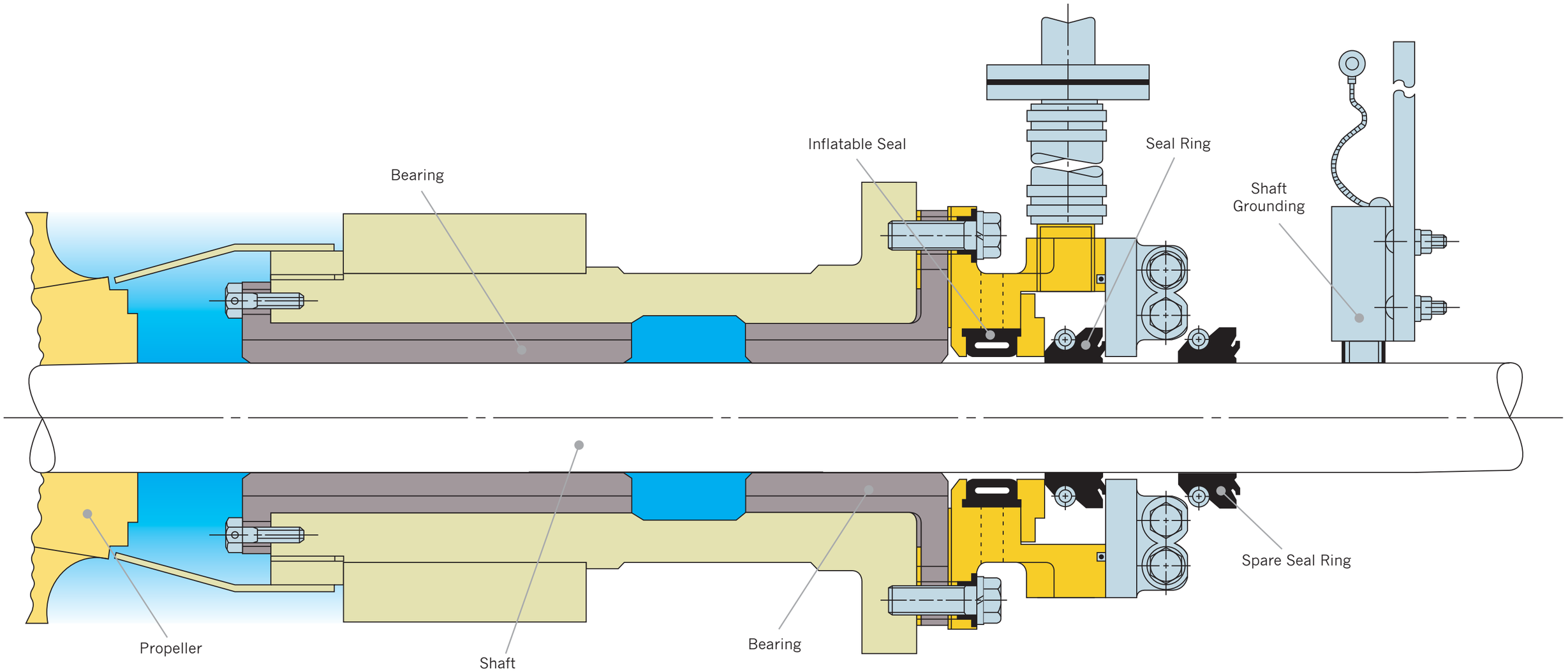
Excellent Sealing Performance with Shaft Vibration Resistance
Since it is an end face type seal consisting of the seal ring and the mating ring, it flexibly copes with complicated vibration and shaft deflection and shows excellent sealing performance.

No wear of shaft sleeve
The seal ring rotates together with the shaft sleeve and therefore, there is no wear of the shaft sleeve.
“Eagle Paint” is provided on the surface of the shaft sleeve to prevent corrosion.

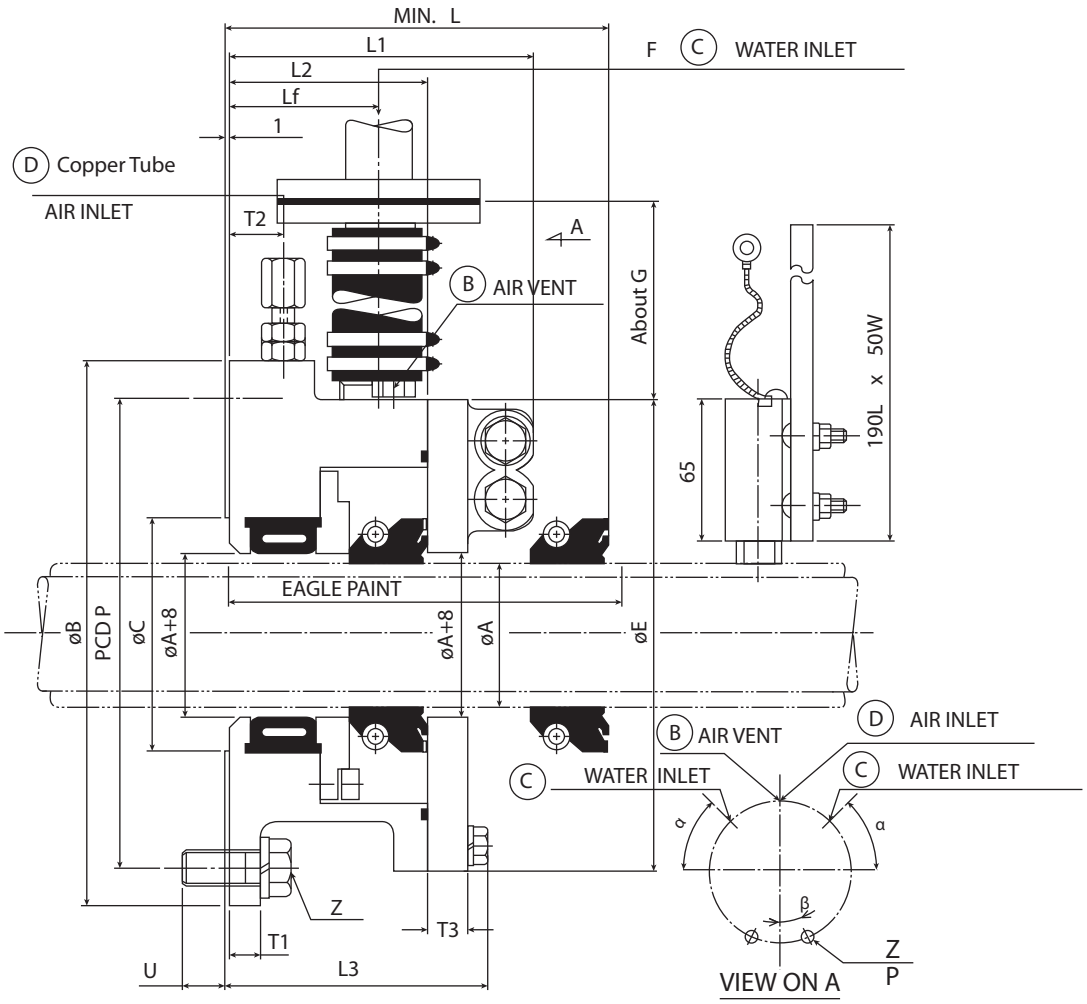
Easy Replacement of Parts
The seal ring and the inflatable ring can be easily bonded over the shaft by the vulcanizer. By working the inflatable ring, inspection and replacement of the seal ring on the sea can be easily done.

Maintenance Saving
The sealing faces of the seal ring and the mating ring are lubricated by sea water coming through the notches of the seal ring, and therefore daily maintenance will not be required.




Bearing
Inflatable Seal
Seal Ring
Shaft
Grounding
Propeller
Shaft
Bearing
Spare Seal Ring

WATER LUBRICATED SEAL (EVK)



(mm)

Size	Shaft Sleeve Dia. A	B	P	C	E	F	G	L1	L2	L3	Lf	L	T1	T2	T3	Z	U	α	β	Weight (kg)
110	101 ~ 120	270	240	148	240	1-20A	220	122	74	103	54	170	15	19	18	6-M12x35	16	30	30	20
130	121 ~ 140	290	260	168	260	1-20A	220	122	74	103	54	170	15	19	18	6-M12x35	16	30	30	22
150	141 ~ 160	310	280	188	280	1-20A	220	122	74	103	54	170	15	19	18	8-M12x35	16	45	22.5	25
170	161 ~ 180	330	300	208	300	1-20A	220	122	74	103	54	170	15	19	18	8-M12x35	16	45	22.5	27
190	181 ~ 200	350	320	228	320	1-20A	220	122	74	103	54	170	15	19	18	8-M12x35	16	45	22.5	29
210	201 ~ 220	385	350	248	345	1-25A	320	122	74	104	51	170	15	19	18	6-M16x40	20	40	30	34
230	221 ~ 240	405	370	271	375	1-25A	320	139	91	121	68	190	15	25	18	6-M16x40	20	40	30	42
250	241 ~ 260	425	390	291	395	1-25A	320	139	91	121	68	190	15	25	18	6-M16x40	20	40	30	45
270	261 ~ 270	445	410	311	415	1-25A	320	139	91	121	68	190	15	25	18	8-M16x40	20	45	22.5	49
..	271 ~ 280	..	..	..	..	2-25A	..	..	..	..	..	..	..	..	..	..	..	..	..	..
290	281 ~ 300	465	430	331	435	2-25A	320	139	91	121	68	190	15	25	18	8-M16x40	20	45	22.5	52
310	301 ~ 320	485	450	351	455	2-25A	320	139	91	121	68	190	15	25	18	8-M16x40	20	45	22.5	54
330	321 ~ 340	520	480	371	475	2-25A	320	141	93	123	70	190	18	26	18	8-M20x50	26	45	22.5	63
350	341 ~ 360	540	500	391	495	2-25A	320	141	93	123	70	190	18	26	18	8-M20x50	26	45	22.5	65
370	361 ~ 380	560	520	411	515	2-25A	320	141	93	123	70	190	18	26	18	8-M20x50	26	45	22.5	68
390	381 ~ 400	580	540	431	535	2-25A	320	141	93	123	70	190	18	26	18	8-M20x50	26	45	22.5	71
410	401 ~ 420	640	580	515	580	2-32A	135	167	106	145	72	215	20	29	25	8-M24x60	33	45	22.5	101
430	421 ~ 440	660	600	535	600	2-32A	135	167	106	145	72	215	20	29	25	8-M24x60	33	45	22.5	110
450	441 ~ 460	680	620	555	620	2-32A	135	167	106	145	72	215	20	29	25	8-M24x60	33	45	22.5	118
470	461 ~ 480	700	640	575	640	2-32A	135	167	106	145	72	215	20	29	25	8-M24x60	33	45	22.5	126
490	481 ~ 500	720	660	595	660	2-40A	135	167	106	145	72	215	20	29	25	8-M24x60	33	45	22.5	132

* Please note that the plit type and opther non standard size can be manufactured upon request.
* Longer bolts can be supplied upon request when the bearing flange is fixed between the stern tube and the EVK seal.

Friction Free Bearings (F.F.B.)

As a result of investigating a heavy duty bearing material with superior low friction properties, the F.F.B. was developed in 1982 combining technologies from bearings made of P.T.F.E. and synthetic rubber. With over 30 years of actual operational experience for F.F.B. on naval vessels and high speed, long-distance cruising ferries, F.F.B. has proven the most effective bearing when conformity to the strict demands of vessels are considered. Heavy duty, low vibration, low noise levels, maximum fuel economy and long life with less maintenance cost.

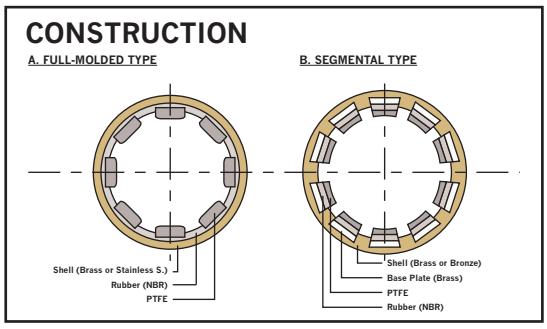
Advantages of F.F.B.

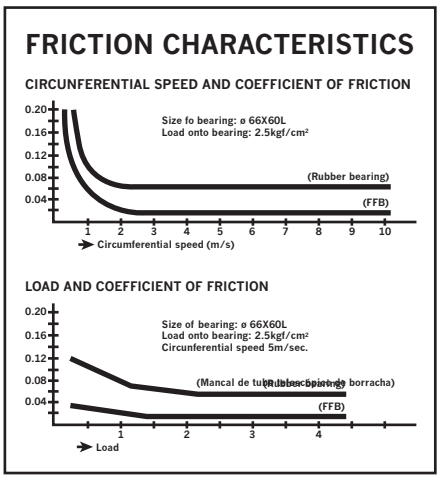
1.- Three layer structure
A special compound elastic rubber is sandwiched between Poly-tetra Fluor Ethylene and the outer metal shell. The three layer structure solves and issue that the bearing must be flexible against a poor alignment and yet be excellent against wear which are incompatible with each other.

2.- Long Life
The superior frictional characteristics of F.F.B. minimizes both shaft sleeve and bearing wear. Many F.F.B. are still working over 10 years or more in good condition without any replacement.

3.- Easy Maintenance
In case of segmental type, only worn segment are replacement with a spare one.

4.- Manufactured according to requirement
The Friction Free Bearings are manufactures by KEMEL according to each requirement and in all necessary dimensions.





Sterntube Bush

Oil lubricating sterntube bushes have been manufactured in conjunction with KEMEL COMPACT Seals for decades. Our standard bush is cast iron lined with White metal and the excellent reliability and performance have gained a high reputation.

Material

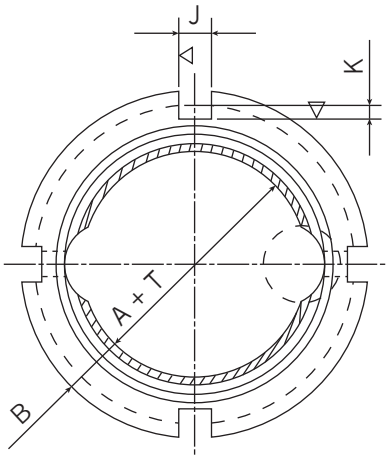
The standard materials of back metal are cast iron (FC250). The standard lining material is WJ2.

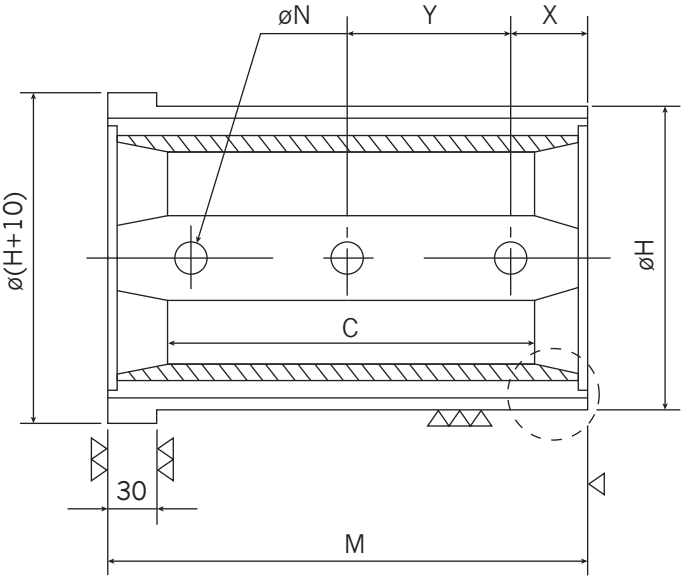
Machining

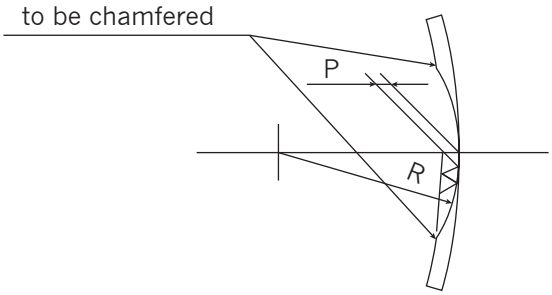
The sterntube bushes are supplied rough turned (margin 3mm) on the outside and finish machined on the others.

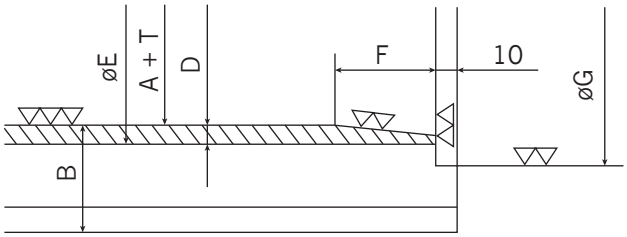
Insepction

In general, the following inspections are carried out; material test of back metal, water pressure test (0.2MPa), dimension inspection, surface inspection and coherence test of lined material.









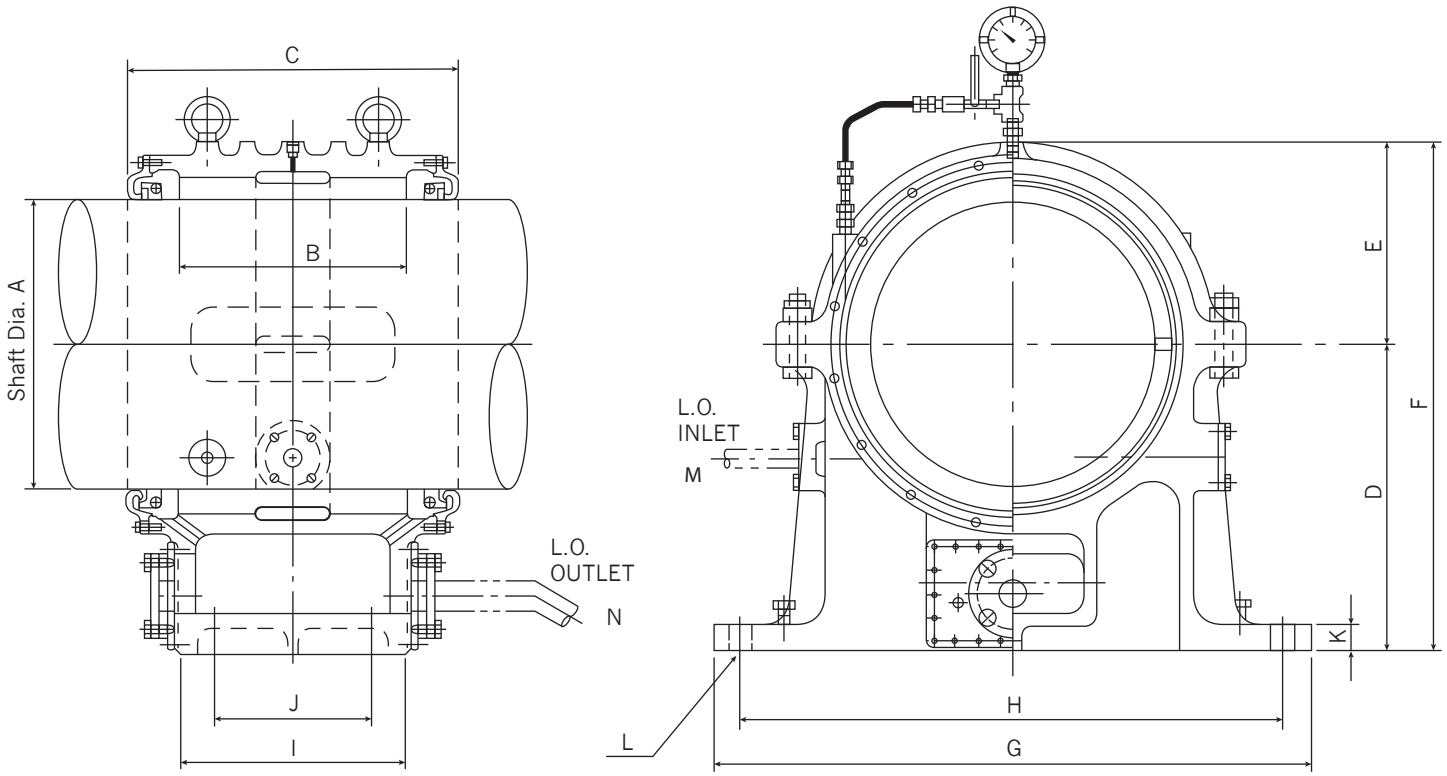
(mm)

A	101~160	161~208	209~284	285~337	338~400	401~500	501~600	601~700	701~800	801~900	901~1000
B	25	30	35	35	40	45	50	55	60	65	70
C	AFT≥2xA(LR.AB.NV) FORE C≥0.7xA										
D	2	2	2	2	3	3	4	4	4	4	4
F	10	10	15	15	20	20	20	20	20	20	20
G	E+10										
J	30	30	35	35	40	50	60	60	65	65	70
K	8	8	8	10	10	10	15	15	15	15	15
M	C+2F+20										
N	20	20	20	30	30	30	40	40	40	40	40
P	3	3	3	3	4.5	4.5	6	6	6	6	6
R	0.35xA(Min, R45)										
T	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.3	1.4
X	50	50	50	60	80	80	110	110	140	140	170
Y	120~210	120~210	120~210	190~280	190~280	190~280	260~350	260~350	330~420	330~420	400~490

A Shaft diameter

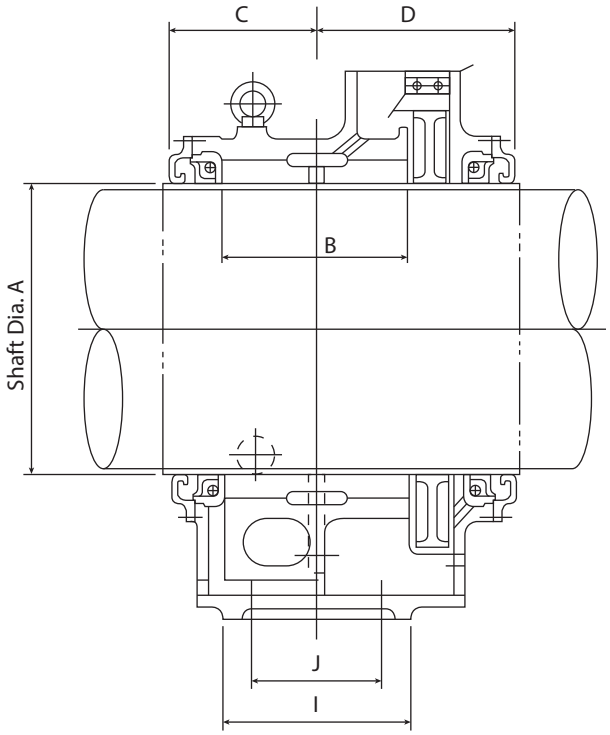
B~Y Standard dimentions

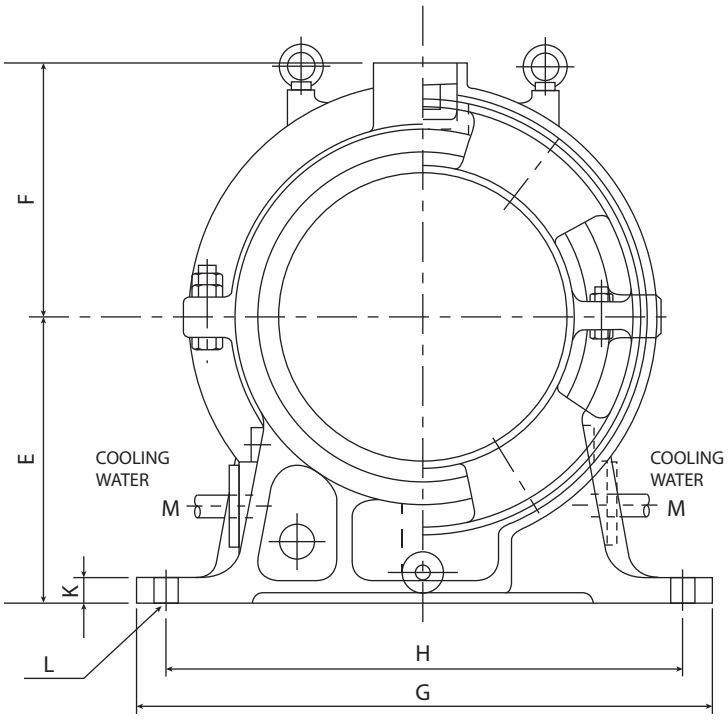
INTERMEDIATE SHAFT BEARING (KMF)



(mm)

TYPE (KMF)	A		B	C	D	E	F	G	H	I	J	K	L	M	N
	MIN.	MAX.													
		310	Dimensions are availabe on request												
340	311	340	260	392	380	245	625	740	660	260	180	35	M30	25A	40A
370	341	370	280	412	400	263	633	780	700	280	200	35	M30	25A	40A
400	371	400	300	442	430	280	710	830	750	300	220	35	M30	25A	40A
430	401	430	320	462	455	297	752	870	790	320	240	40	M30	25A	40A
460	431	460	340	482	485	314	799	960	860	340	240	40	M36	25A	50A
490	461	490	370	512	510	332	842	990	890	370	270	40	M36	25A	50A
520	491	520	400	542	540	350	890	1040	940	400	290	40	M36	25A	50A
550	521	550	420	572	565	365	930	1100	990	420	310	45	M42	25A	50A
580	551	580	440	592	590	382	972	1130	1020	440	330	45	M42	25A	65A
620	581	620	465	617	630	405	1035	1190	1080	465	360	45	M42	25A	65A
660	621	660	500	672	660	426	1086	1260	1140	500	380	50	M48	25A	65A
700	661	700	580	752	700	450	1150	1320	1200	580	460	50	M48	25A	80A
750	701	750	640	812	745	475	1220	1380	1260	640	520	55	M48	25A	80A
800	751	800	760	932	790	502	1292	1440	1320	760	640	55	M48	25A	80A
	801	Dimensions are availabe on request													





(mm)

TYPE (KMS)	A		B	C	D	E	F	G	H	I	J	K	L	M
	MIN.	MAX.												
		160	Dimensions are available on request.											
190	161	190	120	121	181	210	200	440	390	120	70	25	M16	15A
220	191	220	140	131	201	235	215	480	420	140	80	30	M20	15A
250	221	250	160	141	211	260	235	530	470	160	100	30	M20	15A
280	251	280	180	151	226	290	255	600	520	180	100	30	M24	20A
310	281	310	200	161	236	320	275	640	560	200	120	30	M24	20A
340	311	340	220	176	256	340	300	710	620	220	130	35	M30	25A
370	341	370	240	186	266	370	320	750	660	240	150	35	M30	25A
400	371	400	260	201	281	400	350	800	710	260	170	35	M30	32A
430	401	430	280	211	296	420	365	840	750	280	190	40	M30	32A
460	431	460	300	221	306	450	380	900	800	300	200	40	M36	32A
490	461	490	320	231	316	480	405	930	830	320	220	40	M36	32A
520	491	520	340	241	336	500	415	970	870	340	240	40	M36	32A
550	521	550	360	256	351	530	435	1040	930	360	250	45	M42	32A
580	551	580	380	266	366	560	455	1070	960	380	270	45	M42	32A
620	581	620	450	301	401	590	485	1120	1010	450	340	45	M42	40A
660	621	660	480	326	426	620	515	1200	1080	480	360	50	M48	40A
700	661	700	580	376	476	660	540	1250	1130	580	460	50	M48	40A
750	701	750	640	406	506	700	575	1300	1180	640	520	55	M48	40A
800	751	800	760	466	576	745	610	1360	1240	760	640	55	M48	40A
	801	Dimensions are available on request.												

All KEMEL seals (CX, DX, AX and EVK) can be installed through bonding, without removing the shaft and with the vessel on the water.

KEMEL bonding tools allow cutting the ring, pass it around the shaft and bond it through a system similar to vulcanizing. The bonding is of excellent quality, almost imperceptible to the eye and does not alter the seal's performance.

Main Features

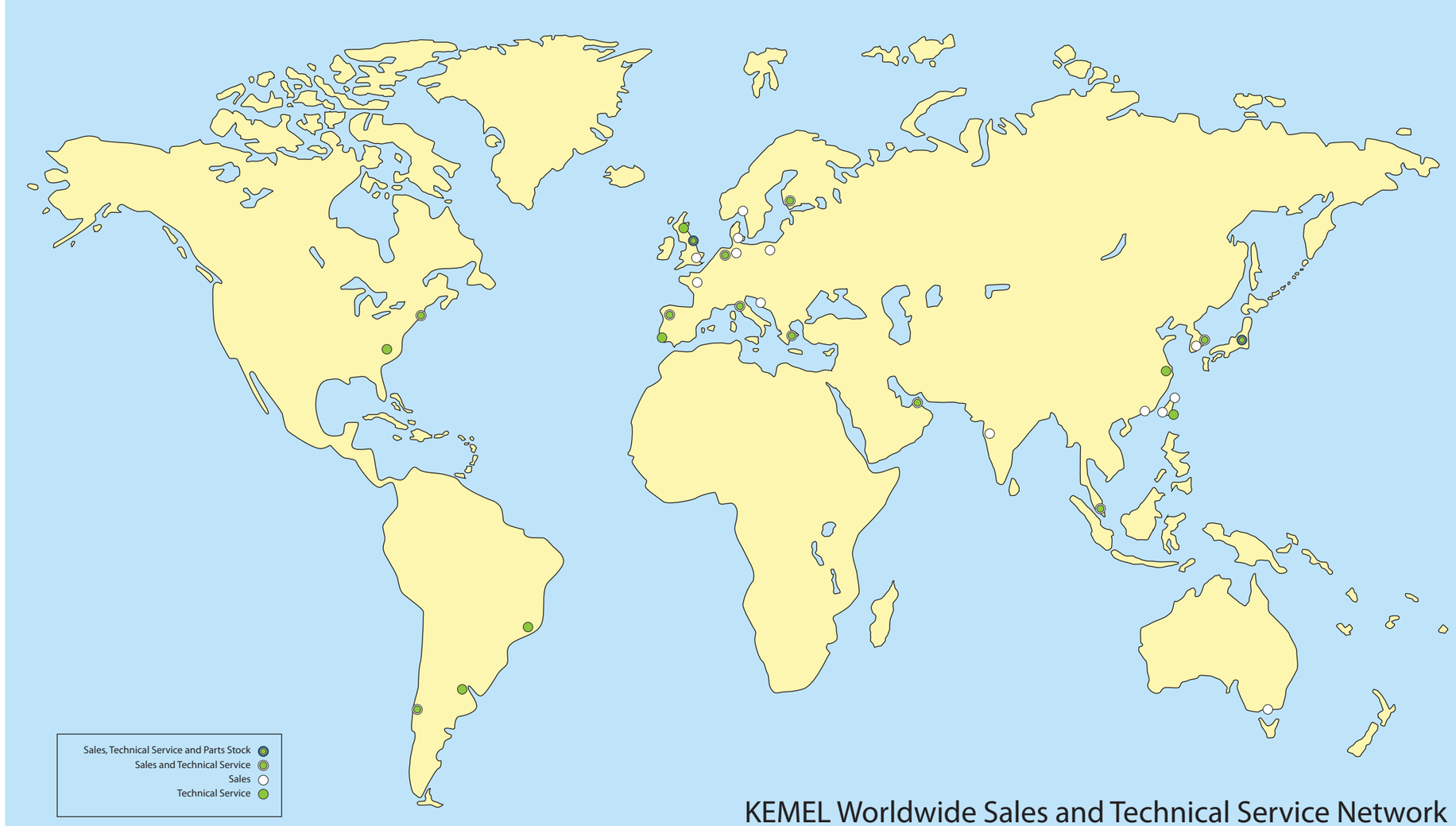
Saving
It is not necessary to dry dock the vessel for seal ring replacement. If the vessel is already in dry dock, the seal rings can be installed without removing the shaft.

Quick Service
Since it doesn't require shaft removal, the service engineer only has to open the housing and replace the necessary rings.

Our worldwide technical service network assures you can count with a service engineer, qualified by the Japan factory, within few hours.

Quality
The chemicals developed for bonding and KEMEL tools that contain the profile of every measure and every seal ring model, ensure that performance and durability of seals installed through this method is equivalent to those installed using the traditional method.

NOTES



KEMEL Worldwide Sales and Technical Service Network

JAPAN

TOKYO
KEMEL CO., LTD.
NBF Tower 13F, 1-1-30, Shiba-Daimon, Mintao-ku, Tokyo 105-0012 JAPAN
TEL: +81-3-3436-4840 FAX: +81-3-3436-4890
E-mail: kiyoshi.fujii@kemel.com
Mr. K. Fujii/ Mr. T. Nakamura/ Mr. S. Hayashi/ Mr. Y. Nakanishi

KOBE
KEMEL CO., LTD
1-3-32, Hyogo-cho, Hyogo-ku, Kobe, Hyogo 652-0813 JAPAN
TEL: +81-78-652-8857 FAX: +81-78-652-8867
E-mail: shunsuke.hikita@kemel.com
Mr. S. Hikita/ Mr. K. Nishizawa

TAKASAGO
KEMEL CO., LTD.
2-3-1 Shinhama, Arai-cho, Takasago, Hyogo 676-8670 JAPAN
(Kobe Steel Takasago Works)
TEL: +81-79-445-7109 FAX: +81-79-445-7246
E-mail: soichi.maeda@kemel.com
Mr. S. Maeda/ Mr. T. Okamoto

KURE
KEMEL CO., LTD.
8-1, Showa-cho, Kure, Hiroshima, 737-0027 JAPAN
TEL: +81-823-25-7121～5 FAX: +81-823-25-7120
E-mail: toshinari.kawajiri@kemel.com
Mr. N. Takaishi/ Mr. T. Kawajiri

SINGAPUR

KEMEL ASIA PACIFIC PTE LTD.
26 Pandan Loop Singapore 128244 SINGAPORE
TEL: +65-6779-1300 FAX: +65-6777-9224
E-mail: s.fujii@kemelsg.com, wksin@kemelsg.com, terry@kemelsg.com
Mr. S. Fujii/ Sr. W. K. Sin/ Mr. Terry Loo

EUROPA

U.K.
KEMEL EUROPE LIMITED
Unit 9 Tower Road, Glover Industrial Estate, Washington Tyne & Wear NE37 2SH U.K.
TEL: +44-191-416-0232 FAX: +44-191-415-5016
E-mail: k.tsukada@kemeleurope.com
Mr. K. Tsukada (Mobile: +44 786 752 8828)

KELLER BRYANT & CO., LTD.
Swan Centre, Fishers Lane, Chiswick London W4 1RX U.K.
TEL: +44-20-8996-9525
E-mail: mail@keller-bryant.co.uk
Mr. Edward Boyle (Mobile: +44 7775 741842)

JAMES ROBERTSON SEAL SERVICES LIMITED
East Ness, Preston Crescent, Inverkeithing, Fife KY11 1DS U.K.
TEL: +44-1383-418-264 FAX: +44-1383-616-127
E-mail: peter.white@smservices.uk.com
Mr. Peter White (Mobile: +44 7879 883611)

ALEMANIA
TURBO-TECHNIK REPARATUR-WERFT GmbH & CO.
Alstertwiete 5, 20099 Hamburgo, GERMANY
TEL: +49-40-280-1055 FAX: +49-40-280-3396
E-mail: hamburg@turbotechnik.com
Mr. Heinz Buchholz (Mobile: +49 172 439 3828)

TURBO-TECHNIK REPARATUR-WERFT GmbH & CO.
Hannoversche Strave 11, D-26384 Wilhelmshaven, GERMANY
TEL: +49-4421-3078-0 FAX: +49-4421-305086
E-mail: technical@turbotechnik.com
Mr. Sebastian Zeyen (Mobile: +49 160-90563491)

GRECIA
ROSS MARINE AND INDUSTRIAL SERVICES LTD.
1 Charilaou, Trikoupi Str 185 36 Piraeus, GREECE
TEL: +30-210-428-3741/ 452-3680 FAX: +30-210-451-1679
E-mail: rossmarine@rossmarine.gr ; info@rossmarine.gr ; technical@rossmarine.gr
Mrs.. Urania Hontzopoulou (Mobile: +30 6937 479 333)

NORUEGA / SUECIA
ULRIK QVALE & PARTNERS AS
Harbitzalleen 2A, P.O.Box 168 – Skoyen 0212 Oslo, NORWAY
TEL: +47-22-51-1623 FAX: +47-22-51-1624
E-mail:spareparts@uqp.no
Mrs. Kristin Johansen (Mobile: +47 9201 0544)

DINAMARCA
FALCK FORMCO A/S
Automatikvej 1, 3rd Floor DK-2860 Soeborg, DENMARK
TEL: +45-39-64-85-11 FAX: +45-39-63-28-40
E-mail: office@falckformco.dk
Mr. Thomas Falck (Mobile: +45 40 73 57 30)

FINLANDIA
MARINE DIESEL FINLAND OY
Etelakaari 10, FI-21420 Lieto, FINLAND
TEL: +358-20-711-8224 FAX: +358-2-253-9121
E-mail: markus.hjerppe@marinediesel.fi
Mr. Markus Hjerppe (Mobile: +358-40-544-1792)

ITALIA
MARINE DIESEL ITALY S.r.l. (MDI S.r.l)
Via G.B. Guarini 40, 57121 Livorno, ITALY
TEL: +39-0586-516237 FAX: +39-0586-406892
E-mail: a.bacci@mdisrl.it
Mr. Aleandro Bacci (Mobile: +39 0335 329172)

FRANCIA
WENEX EQUIPEMENTS
49 Rue de Billancourt 92100 Boulogne - FRANCE
TEL: +33-1-41-10-23-30 FAX:+33-1-41-10-23-45
E-mail: b.dalancon@wenex.fr
Mr. Benoit d'Alancon (Mobile: +33 6 10 17 17 97)

ESPAÑA
VIGO MARINE SERVICES S. L.
Garcia Barbon no.30 - 3 - oficina 8, 36201 Vigo, SPAIN
TEL: +34-986-120-116 FAX:+34-986-120-131
E-mail: pablo.villaverde@vigomarine.com
Mr. Pablo Villaverde Pena (Mobile: +34 620 074 740)

PORTUGAL
LISREP SHIP REPAIRERS AND MARINE CONSULTANTS
Aparatado 1131, 2780 Paco de Arcos, PORTUGAL
TEL: +351-21-362-05-22 FAX: +351-21-362-04-73
E-mail: amadeualves@lisrep.com
Mr. Amadeu Alves (Mobile: +351 96 405 7803)

POLONIA
TRENT
Leszczynowa 19A/6, 70-766 Szczecin, POLAND
TEL: +48-91-461-41-83/ 86 FAX: +48-91-461-24-58
E-mail: kk@trent.com.pl
Mr. Krzysztof Kaczmarzyk (Mobile: +48 691 74 30 40)

CROACIA
No Company Name
Setaliste 25, Travnja24, 51417 Moscenicka Draga, CROATIA
TEL: +385-51-737-657 FAX: +385-51-73-90-60
E-mail: nikola.cenic@ri.t-com.hr
Mr. Nikola Cenic (Mobile: +385 98 289 571)

ASIA

UAE & GOLFO
ALBWARDY MARINE ENGINEERING (L.L.C.)
Al Jadaf Ship dcoking Yard P.O. Box 6515 Dubai, U.A.E.
TEL: +971-4-324-1001 Ext:235 FAX: +971-4-324-1005
TEL: +971-4-324-1561 Ext: 207 FAX: +971-4-324-1252
E-mail: repairs@albwardymarine.com, sales@albwardymarine.com
Mr. Mohammad Beiranvand (Móvil: +971 50 6594158)

INDIA
D.P. ANTIA ASSOCIATES
Commissariat Building 1st Floor, 231, Dr.D.N.Road, Mumbai 400 001, INDIA
TEL: +91-22-2264-1935 FAX: +91-22-2265-5511
E-mail: maccdpaa@vsnl.net
Mr. A. K. Ginwalla

COREA
KOMARINE CORPORATION
RM. 914, Noblian2 Bldg. #23-1, 4-GA, Jungang-Dong, Jung-Gu, Pusan, 601839 KOREA
TEL: +82-51-462-8231/8233 FAX: +82-51-467-9770
E-mail : komarine8231@korea.com
Mr. K. S. Lee (Mobile: +82 11848 8237)

JONGHAP MARITIME ENGINEERING INC.
188-38, Dongsam-dong, Youngdo-ku, Pusan, KOREA
TEL: +82-51-403-2381 FAX: +82-51-403-2409
E-mail : thpark@jonghap-jme.co.kr
Mr. T. H. Park

CHINA (SHANGHAI)
SHANGHAI FENG CHANG SHIPPING ENGINEERING CO., LTD.
C/O Shanghai Li-Feng Shipyard
Shan Ling,Pu Dong, Shanghai, CHINA
TEL: +86-21-5841-0606 ex.801 FAX: +86-21-5841-0544E-mail: fengchangsh@163.com
Mr. S. H. Shen (Mobile: +86 1370 1735369)

HONG KONG
HASSEI TRADING (H.K.) LTD.
Unit 2809A, Wu Chung House, 213 Queen's Road East, Wanchai, HONG KONG
TEL: +852-2865-1055 FAX: +852-2529-8917
E-mail: stephen@hastra.com.hk
Mr. Stephen Chan (Mobile: +852 9453 2703)

TAIWAN
YEE FOO MARINE INDUSTRIAL CO. LTD.
6F-3, No.369 Fusing North Road, Taipei, TAIWAN
TEL: +886-2-8712-0848 FAX:+886-2-8712-0797
E-mail: yeefoo.tpe@msa.hinet.net
Mr. D. C. Chen/ Mr. S. R. Chen

KWANG-YOUN-GI ENGINEERING CO. LTD.
18 Gu-Po St., Kaohsiung, TAIWAN
TEL: +886-7-551-4651 FAX: +886-7-561-9711
E-mail: kygengr@ms37.hinet.net
Mr. Johnson C. H. Ou

EAGLE INDUSTRY TAIWAN CORPORATION
No.134, His lin Road, Yenchao, Kaohsiung, TAIWAN
TEL: +886-7-616-4401 FAX: +886-7-616-6486
E-mail: feng_yu@eit.com.tw
Mr. Feng Yu

AUSTRALIA
JAPAN MARINE ENGINEERING CO., LTD.
P.O. Box 30, Brighton, Victoria 3189, AUSTRALIA
TEL: +61-3-95555277 FAX: +61-3-95555344
E-mail: jmeaust@netlink.com.au
Mr. D. O'Connor

NORTE AMÉRICA

EE.UU, CANADA, MEXICO Y EL CARIBE
KEMEL USA INC.
366 Fifth Avenue, Suite 712, New York, NY 10001-2211, U.S.A
TEL: +1-212-967-5575 FAX: +1-212-967-6966
E-mail: hawkins@kemelusa.com
Mr. David Hawkins (Mobile: +1 201 665 2065)

COASTAL SEAL SERVICES LLC
1749 Jessica Ann Road
TEL: +1-630-267-7431 FAX: +1-704-736-1141
E-mail: silverbronco76@aol.com

SUD AMÉRICA

ARGENTINA
TANDANOR SACI Y N.
Av. Espana 3091, 1107 Buenos Aires, ARGENTINA
TEL: +54-11-5554-8352/8350/8349 FAX: +54-11-5554-8354
E-mail: mar@tandanor.com.ar / pre@tandanor.com.ar
Mr. Mario Toddere/ Sr. Julio Galle

CHILE
BELMAR INGENIERIA LTDA.
Ainavillo 633, Concepción, Chile
TEL: +56-41-2986417 FAX: +56-41-2986410
E-mail: cbc@belmar.cl
Mr. Cristian Belmar C.

BRASIL
NAPROSERVICE OFFSHORE ESTALERIOS DO BRASIL LTDA.
Rua Del. Waldir Guilherme, 32 - Ilha da Conceicao, Niteroi - RJ - Brazil 24050-170
TEL: +55-21-2109-1800 FAX: +55-21-2109-1812
E-mail: napro@naproservice.com.br
Mr. Vladimir Vidal (Mobile: +55-21-8802-0411)