



CSM®



ASTRO FIRE & SAFETY

We constantly challenge ourselves to provide professional and ethical safety services to comply with the latest SOLAS/IMO regulations.

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Ensuring The Safety of Lives At Sea Since 1998

ASTRO FIRE is a leading marine and offshore safety solutions provider for the marine and offshore markets.

Incorporated in Singapore in 1998, we have expanded our worldwide service footprint to cover key ports in Asia Pacific, Americas, Europe, Africa, Middle East and The Black Seas. We constantly challenge ourselves to provide the most professional and ethical safety services without compromise on regulatory safety standards. We endeavour to help keep our clients' vessels compliant to the latest SOLAS & IMO regulations all year round.

Fixed Firefighting and Fire Suppression Systems



SERVICES OFFERED:

- CO2 high / low pressure systems
- Deck foam and helideck foam systems
- Dry chemical powder system
- Inergen system
- Novec 1230 system
- FM200 system
- Dual agent system
- High / low pressure water mist system
- Galley wet chemical system
- Smoke sampling system
- Fire detection system (conventional / addressable type)
- LAFF system
- AC/OX gas distribution system
- Halon system



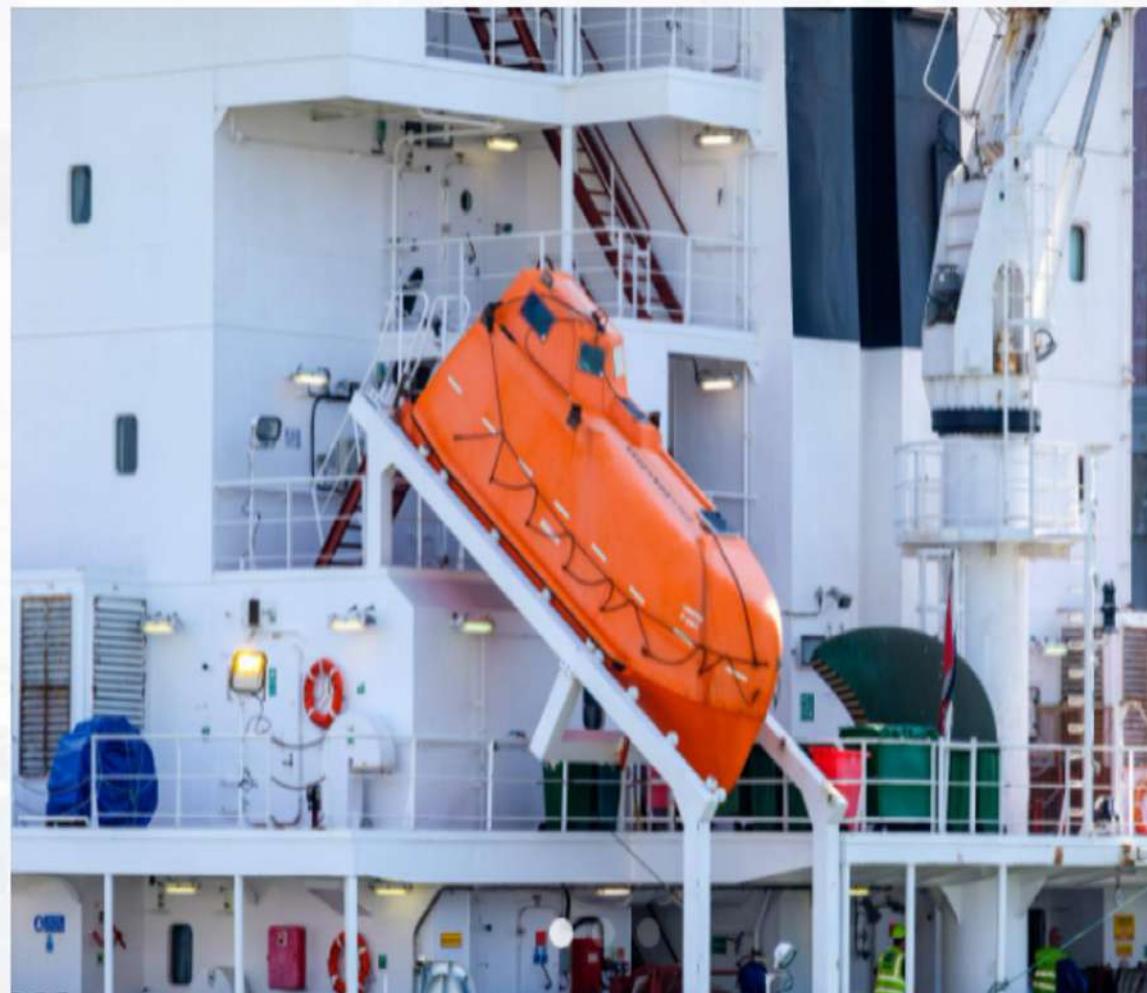
Lifesaving Appliances



SERVICES OFFERED:

- Portable & trolley fire extinguishers
- SCBA & EEBD
- Medical hospital system (inside and outside systems) and portable resuscitator units
- Lifeboat air breathing system
- Immersion / gas-tight / chemical / fireman protection suits
- Portable gas detector (multi brand)
- Inflatable lifejackets
- BA compressor and air quality test
- Foam concentrate analysis (high/low expansion foams), including PBAR foams (small scale fire test)
- Produced foam test
- Dry powder moisture test

LifeBoat & Davit / Winch Systems



SERVICES OFFERED:

- Inspection Work: Annual & Five Yearly Inspections
- Load Testing Work: Lifeboat & Lifeboat Release & Retrieval System (LRRS)
- Replacement Work: Lifeboat Release & Retrieval System (LRRS)
- Maintenance and Repairs: Lifeboat & Fast Rescue Craft, Davit & Winch Systems & Fibre Reinforced Plastics (FRP)

Our Lifeboat /Davit Certificates

MAKER

- [CSSC Luzhou Zhenjiang Marine Auxiliary Machinery Co Ltd](#)
- [Qingdao Beihai](#)
- [Wuxi Xingsheng](#)
- [Jiangsu Jiaoyan Marine Equipment Co Ltd](#)
- [Oriental Inspection & Service Co Ltd](#)

FLAG

- [Bahamas](#)
- [Panama](#)
- [Liberia](#)

CLASS

- [American Bureau of Shipping \(ABS\)](#)
- [China Classification Society \(CCS\)](#)
- [Det Norske Veritas - Germanischer Lloyd \(DNV-GL\)](#)
- [Lloyd's Register \(LR\)](#)
- [Registro Italiano Navale \(RINA\)](#)
- [Bureau Veritas \(BV\)](#)
- [CR Classification Society \(CR\)](#)
- [Korean Register of Shipping \(KR\)](#)
- [Nippon Kaiji Kyokai \(NK\)](#)

Lifeboat/Davit Job Reference List (Year 2024)



NO	JOB #	ATTENDENCE DATE	VESSEL NAME	IMO #	CLASS	FLAG	LIFEBOAT MAKER	RELEASE GEAR MAKER	DAVIT WINCH MAKER	WORK SCOPE
1	A020/24	03.01.24	JAG AARATI	9478200	DNV	INDIA		QINGDAO BEIHAI		ANNUAL, FF+RB
2	A031/24	09.01.24	COUGAR	9578048	BV	SINGAPORE		JIANGSU JIAOYAN		ANNUAL, FF+RB
3	A055/24	11.01.24	HIGH ADVENTURER	9788435	RINA	LIBERIA		JIANGSU JIAOYAN & MANSEI		ANNUAL, LR
4	A042/24	12.01.24	PAC DUBHE	9304021	DNV-GL	SINGAPORE		NANJING DONGSHENG	ZHENJIANG JUST MARINE	ANNUAL, FF+RB
5	A058/24	13.01.24	WILLIAM OLDENDORFF	9623570	ABS	LIBERIA		JIANGSU JIAOYAN	WUXI XINGSHENG	ANNUAL, LR+RB
6	A059/24	24.01.24	GAS TESSA	9160487	BV	MALAYSIA		FASSMER	FASSMER & DONGNAM MARINE	ANNUAL & 5 YEARLY FF LOAD TEST
7	A007/24	28.01.24	SEA GEMINI	9598218	ABS	MARSHALL ISLANDS		QINGDAO BEIHAI		ANNUAL, LR
8	B015/24	02.02.24	CAPELLA	9379818	BV	HONG KONG, CHINA		JIANGSU JIAOYAN	ZHENJIANG MARINE	ANNUAL, PS+SB
9	B059/24	13.02.24	CAPRICORN TRADER	9708540	NK	PANAMA		NORSAFE		ANNUAL, FF+RB
10	B074/24	16.02.24	GREEN LINE	9261841	BV	PANAMA		GEPA FIBER GLASS SANAVI VE		ANNUAL, FF+RB
11	B069/24	23.02.24	MH PHOENIX BEAUTY	9455894	KR	LIBERIA		HYUNDAI		ANNUAL & 5 YEARLY FF LOAD TEST
12	B076/24	27.02.24	FITZ ROY	9516739	DNV	LIBERIA		HATECKE		ANNUAL, FF+RB
13	C032/24	06.03.24	ROTTERDAM	9398450	KR	LIBERIA		ORIENTAL/ SCHAT HARDING		ANNUAL, PS
14	L007/23	14.03.24	UNI-ACTIVE	9130547	CR	TAIWAN		UMOE-SCHAT-HARDING		ANNUAL, FF+RB
15	C063/24	10.03.24	GOLDEN STAR	9950703	ABS	MARSHALL ISLANDS		ZHENJIANG MARINE		ANNUAL, FF+RB

Lifeboat/Davit Job Reference List (Year 2024)



NO	JOB #	ATTENDENCE DATE	VESSEL NAME	IMO #	CLASS	FLAG	LIFEBOAT MAKER	RELEASE GEAR MAKER	DAVIT WINCH MAKER	WORK SCOPE
16	C097/24	26.03.24	MSC LANGSAR	9439735	LR	LIBERIA		QINGDAO BEIHAI		ANNUAL, PS
17	C126/24	30.03.24	IMARI	9567773	NK	PANAMA		QINGDAO BEIHAI	ORIENTAL PRECISION	ANNUAL, PS
18	D008/24	01.04.24	EVA	9845271	LR	SINGAPORE		ZHENJIANG MARINE		ANNUAL, FF+RB
19	D003/24	13.04.24	OOCL HONG KONG	9776171	ABS	HONG KONG, CHINA		JIANGSU JIAOYAN	ORIENTAL PRECISION	ANNUAL, PS
20	D089/24	18.04.24	AUZONIA	9253670	BV	LIBERIA		JIANGYIN WOLONG	NED-DECK MARINE	ANNUAL, FF+RB
21	D011/24	21.04.24	YM HARMONY	9299329	CR	TAIWAN		JIANGSU JIAOYAN	DONGWOO MACHINERY	ANNUAL STARBOARD ONLY
22	D094/24	22.04.24	ABILENE	9723057	LR	LIBERIA		JIANGYINSHI BEHAI		ANNUAL, FF+RB
23	D119/24	28.04.24	LANDBRIDGE WISDOM	9828780	BV	HONG KONG, CHINA		QINGDAO BEIHAI		5 YEARLY PORT+SB LOAD TEST
24	D040/24	06.04.24	NEPTUNE	9640413	BV	TUVALU		ZHENJIANG HENGXIN		ANNUAL, FF+RB
25	D108/24	30.04.24	HIGH SEAS	945573	ABS	LIBERIA		HYUNDAI	DONGNAM MARINE	ANNUAL, PS
26	E013/24	04.05.24	SALLY	9841213	NK	SINGAPORE		JIANGYINSHI BEHAI		ANNUAL, FF+RB
27	E032/24	07.05.24	GOLDEN SOUL	9950715	ABS	Marshall Islands		ZHENJIANG HENGXIN		ANNUAL, FF+RB
28	E063/24	15.05.24	PICTOR	9254563	NK	LIBERIA		ISHIHARA/NISHI		ANNUAL, PORT+SB
29	D116/24	20.05.24	BRITISH SPONSOR	9766580	LR	Isle of Man		JIANGSU JIAOYAN		5 YEARLY PORT+SB LOAD TEST
30	E107/24	21.05.24	ATLANTIC CONQUEROR	9380219	ABS	MALAYSIA		NORSAFE AS		5 YEARLY RB+PS LOAD TEST

Lifeboat/Davit Job Reference List (Year 2024)



NO	JOB #	ATTENDENCE DATE	VESSEL NAME	IMO #	CLASS	FLAG	LIFEBOAT MAKER	RELEASE GEAR MAKER	DAVIT WINCH MAKER	WORK SCOPE
31	E113/24	24.05.24	PACIFIC JULIA	9772046	KR	Marshall Islands		JIANGSU JIAOYAN		ANNUAL, PS
32	E120/24	26.05.24	BEAR MOUNTAIN BRIDGE	9463293	NK	PANAMA		ORIENTAL PRECISION		ANNUAL, PS
33	F024/24	11.06.24	MILLIE	9492103	LR	SINGAPORE		QINGDAO BEIHAI		ANNUAL, RB
34	F064/24	14.06.24	MSC ASTRID III	9263344	DNV	PANAMA	JIANGYIN NORSAFE	ZHENJIANG MARINE		ANNUAL, PS
35	F040/24	18.06.24	CIELO DI CAGLIARI	9781281	ABS	LUXEMBOURG		JIANGYINSHI BEIHAI		ANNUAL PS & SB
36	F095/24	20.06.24	LONGROW	9812432	ABS	LIBERIA	ZHEJIANG HENGXIN	ZHEJIANG HENGXIN		ANNUAL, PS
37	F103/24	29.06.24	LIMA TRADER	9500821	DNV	LIBERIA	JIANGSU JIAOYAN	ZHENJIANG MARINE		ANNUAL, RB
38	F019/24	29.06.24	OOCL PIRAEUS	9908097	ABS	HONG KONG, CHINA		JIANGSU JIAOYAN		ANNUAL, PS
39	G046/24	07.07.24	ACRA	9693410	CCS	LIBERIA		JIANGYINSHI BEIHAI LSA Co.,LTD		5YEARLY, FF & RB
40	G054/24	08.07.24	ORACLE	9490648	DNV/BV	LIBERIA		JIANGSU JIAOYAN		ANNUAL, RB
41	G091/24	23.07.24	GCL MAHI	9939955	ABS	SINGAPORE		JIANGYINSHI BEIHAI LSA Co.,LTD		ANNUAL, FF & RB
42	G084/24	24.07.24	SDM CHONGQING	9949235	NK	LIBERIA		ZHEJIANG NORSIER		ANNUAL, FF & RB
43	G097/24	24.07.24	HIGH FIDELITY	9689146	RINA	LIBERIA		JIANGYING NORSAFE		ANNUAL, FF & RB
44	G103/24	31.07.24	BBC HONG KONG	9372925	DNV-GL	ANTIGUA AND BARBUDA	ERNST HATECKE	HAEAN MACHINERY		ANNUAL, RB
45	H034/24	02.08.24	DENE	9209520	NK	LIBERIA	ISHIHARA	SEKIGAHARA		ANNUAL, PS

Lifeboat/Davit Job Reference List (Year 2024)



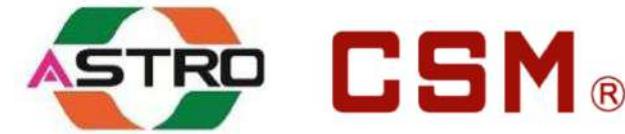
NO	JOB #	ATTENDENCE DATE	VESSEL NAME	IMO #	CLASS	FLAG	LIFEBOAT MAKER	RELEASE GEAR MAKER	DAVIT WINCH MAKER	WORK SCOPE
46	H063/24	08.08.24	NORD AGANO	9893266	NK	MALTA		QINGDAO BEIHAI		ANNUAL FF & RB
47	H002/24	20.08.24	YM HEIGHTS	9301275	ABS	TAIWAN		JIANGSU JIAOYAN	DONGWOO MACHINERY	ANNUAL PS
48	H099/24	22.08.24	GOLDEN EMERALD	9884631	DNV	MARSHALL ISLANDS		JIANGYINSHI BEIHAI LSA Co.,LTD		ANNUAL, FF & RB
49	H080/24	26.08.24	EPSILON GAS	9202039	DNV	ANTIGUA AND BARBUDA		HATECKE		ANNUAL, FF & RB
50	H056/24	06.09.24	GAS CRUSADER	9133549	BV	MALAYSIA		FASSMER GMBH	DAVIT INTERNATIONAL	ANNUAL, FF & RB
51	I079/24	26.09.24	GIANT " (ex "GRACE")	9238868	ABS	HONG KONG CHINA		WATERCRAFT HELLAS	ORIENTAL PRECISION	ANNUAL, PS
52	I077/24	27.09.24	MELPOMENI	9486025	NK	MALTA		JIANGSU JIAOYAN		5 YEARLY PORT+SB LOAD TEST
53	I090/24	04.10.24	ANGLO SAXON	9448059	ABS	UNITED KINGDOM		ZHENJIANG MARINE	GLOBAL DAVIT	ANNUAL, FF & RB
54	J093/24	17.10.24	ILE DE RE	8200278	BV	INDONESIA		SCHAT-HARDING AS	GLOBAL DAVIT	ANNUAL WORKBOAT
55	J031/24	14.10.24	HIGH VOYAGER	9681845	RINA	LIBERIA		DONGNAM MARINE CRANE CO.,LTD.		5YEARLY, FFLB & RB + DR
56	J090/24	17.10.24	INCE ANADOLU	9527271	NK	PANAMA		JIANGSU JIAOYAN	SEKIGAHARA	ANNUAL, RB
57	J117/24	26.10.24	AMPHITRITE	9455973	DNV	MALTA		ORIENTAL PRECISION		ANNUAL PS
58	J076/24	29.10.24	OGBA	9724001	LR	SINGAPORE		JIANGYINSHI BEIHAI		5YEARLY, LB & RB
59	J016.24	31.10.24	POSH ENDEAVOUR	9722209	ABS	SINGAPORE		JIANGYINSHI BEIHAI		5YEARLY, LB & RB
60	K025/24	02.11.24	MYGAS	9694397	DNV	ANTIGUA AND BARBUDA		Jiangsu Jiaoyan	Oriental Precision	ANNUAL, LB & RB

Lifeboat/Davit Job Reference List (Year 2024)



NO	JOB #	ATTENDENCE DATE	VESSEL NAME	IMO #	CLASS	FLAG	LIFEBOAT MAKER	RELEASE GEAR MAKER	DAVIT WINCH MAKER	WORK SCOPE
61	J016/24	30.11.24	POSH ENDEAVOUR	9722209	ABS	SINGAPORE		JIANGYINSHI BEIHAI		ANNUAL, LB & RB
62	K060/24	22.11.24	RED ORCHID	9757890	NK	PANAMA		JIANGSU JIAOYAN		ANNUAL, LB & RB
63	K069/24	26.11.24	KOTA CEPAT	9638977	LR	SINGAPORE		QINGDAO BEIHAI		ANNUAL, PS
64	K088/24	26.11.24	HIGH LOYALTY	9681857	RINA	LIBERIA		JIANGYIN NORSAFE		ANNUAL, LB & RB
65	K096/24	30.11.24	UNI-ACTIVE	9130547	NK	TAIWAN		UMOE - SCHAT - HARDING		ANNUAL, LB & RB
66	L033/24	09.12.24	TENEO	9019602	BV	INDONESIA		JIANGYIN WOLONG, SCHAT-HARDING & FERRI		ANNUAL, LB & RB
67	L060/24	12.12.24	MSC RICCARDA II	9449869	ABS	PORTUGAL		QINGDAO BEIHAI	NMF	ANNUAL, LB & RB
68	L057/24	13.12.24	KOTA NABIL	9356830	LR	SINGAPORE		QINGDAO BEIHAI		ANNUAL, PS
69	L064/24	16.12.24	ZHONG CHI	9342097	CCS	HONG KONG, CHINA		ZHENJIANG MARINE		ANNUAL, PS

Lifeboat/Davit Job Reference List (Year 2025)



NO	JOB #	ATTENDENCE DATE	VESSEL NAME	IMO #	CLASS	FLAG	LIFEBOAT MAKER	RELEASE GEAR MAKER	DAVIT WINCH MAKER	WORK SCOPE
1	A024/25	07.01.25	KOTA NASRAT	9494620	LR	SINGAPORE		QINGDAO BEIHAI		ANNUAL - LB & PS
2	A061/25	17.01.25	KUNLUN	9915911	LR	HONG KONG CHINA		JIANGSU JIAOYAN		ANNUAL - LB & PS
3	A088/25	24.01.25	KRITI VERANO	9346861	ABS	GREECE	SHIGI SHIPBUILDING		MANSEI INDUSTRY	ANNUAL - PS
4	A077/25	31.01.25	GOLDEN SURABAYA	9723526	ABS	HONG KONG CHINA	WUXI HAIHING BOAT MAKING		ZHENJIANG MARINE	ANNUAL - LB & PS
5	B052/25	11.02.25	HIGH NAVIGATOR	9814143	RINA	LIBERIA	NISHI		MNNSEI	ANNUAL - LB & PS
6	B048/25	28.02.25	STAR AQUARIUS	9715828	BV	LIBERIA		JIANGSU JIAOYAN		ANNUAL - SINGLE ARM DAVIT
7	C018/25	07.03.25	OOCL HONG KONG	9776171	ABS	HONG KONG CHINA	JIANGSU JIAOYAN		ORIENTAL PRECISION	ANNUAL - LB & PS
8	C038/25	10.03.25	YUAN PENG YANG	9847633	LR	HONG KONG CHINA		JIANGSU JIAOYAN		ANNUAL - PS
9	C051/25	12.03.25	KSL SINGAPORE	9719903	ABS	HONG KONG CHINA	WUXI HAI HONG		ZHENJIANG MARINE	ANNUAL, FF+RB
10	C095/25	25.03.25	SLOMAN THEMIS	9306677	DNV-GL	ANTIGUA AND BARBUDA		QINGDAO BEIHAI		ANNUAL, FF+RB
11	C076/25	29.03.25	MSC MICHEL CAPPELLINI	9929431	DNV	LIBERIA	JIANGSU JIAOYAN		ORIENTAL PRECISION	ANNUAL - PS
12	C007/25	30.03.25	YM WONDERLAND	9820910	ABS	LIBERIA	SHIGI		SEKIGAHARA	ANNUAL - PS
13	D021/25	04.04.25	HIGH LEADER	9814155	LR	LIBERIA		NISHI-F CO LTD		5YEARLY LB & DV
14	D050/25	14.04.25	PAC ALNATH	9565926	ABS	SINGAPORE	JIANGSU JIAOYAN		ZHENJIANG MARINE	ANNUAL - LB & RB
15	D049/25	15.04.25	LANDBRIDGE WISDOM	9828780	BV	HONG KONG CHINA		QINGDAO BEIHAI		ANNUAL - PS

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16	D006/25	22.04.25	UM UNIFORMITY	9462691	ABS/CR	TAIWAN	JIANGYIN NEPTUNE		ORIENTAL PRECISION	ANNUAL - PS
17	E004/25	02.05.25	OOCL YOKOHAMA	9329538	ABS	Hong Kong, China	QINGDAO BEIHAI		ORIENTAL	ANNUAL - PS
18	E015/25	05.05.25	ANNEGRI	9512630	NK	LIBERIA		JIAOYAN & MANSEI		ANNUAL, FF+RB
19	D001/25	06.05.25	MSC MARIELLA	9934747	DNV	LIBERIA	JIANGSU JIAOYAN		ORIENTAL	ANNUAL - PS
20	E020/25	09.05.25	CSCL MARS	9467287	CCS/DNV	HONG KONG CHINA	SCHAT-HARDING		ORIENTAL	5 YEARLY PORT+SB LOAD TEST
21	E042/25	18.05.25	OOCL FELIXSTOWE	9922512	ABS	HONG KONG CHINA		JIANGSU JIAOYAN		ANNUAL - PS
22	E058/25	19.05.25	MILLIE	9492103	LR	SINGAPORE	QINGDAO BEIHAI			ANNUAL - LB & RB
23	E047/25	21.05.25	TITAN UNIKUM	9468437	DNV	CYPRUS		JIANGSU JIAOYAN		ANNUAL, FF+RB
24	E082/25	22.05.25	MSC SPARKLE III	9472567	NK	CYPRUS	JIANGSU JIAOYAN			ANNUAL - PS
25	F036/25	08.06.25	X PRESS CAPELLA	9967419	ABS	SINGAPORE	JIANGSU JIAOYAN			ANNUAL - DV
26	F002/25	06.06.25	OOCL PIRAEUS	9908097	ABS	HONG KONG CHINA	JIANGSU JIAOYAN			ANNUAL - PS
27	F025/25	05.06.25	ANGLO SAXON	9448059	ABS	UNITED KINGDOM	JIANGSU JIAOYAN	ZHENJIANG MARINE		5 YEARLY PORT+SB LOAD TEST
28	F008/25	06.06.25	XIANG AN KOU	9888089	CCS	LIBERIA	JIANGSU JIAOYAN			ANNUAL - PS
29	E073/25	11.06.25	CIELO DI CAGLIARI	9781281	ABS	LIBERIA	JIANGYINSHI BEIHAI			ANNUAL - PS
30	F044/25	19.06.25	TAI STRENGTH	9881885	ABS	LIBERIA	SHIGI	MANSEI		ANNUAL, FF+RB

Lifeboat/Davit Job Reference List (Year 2025)



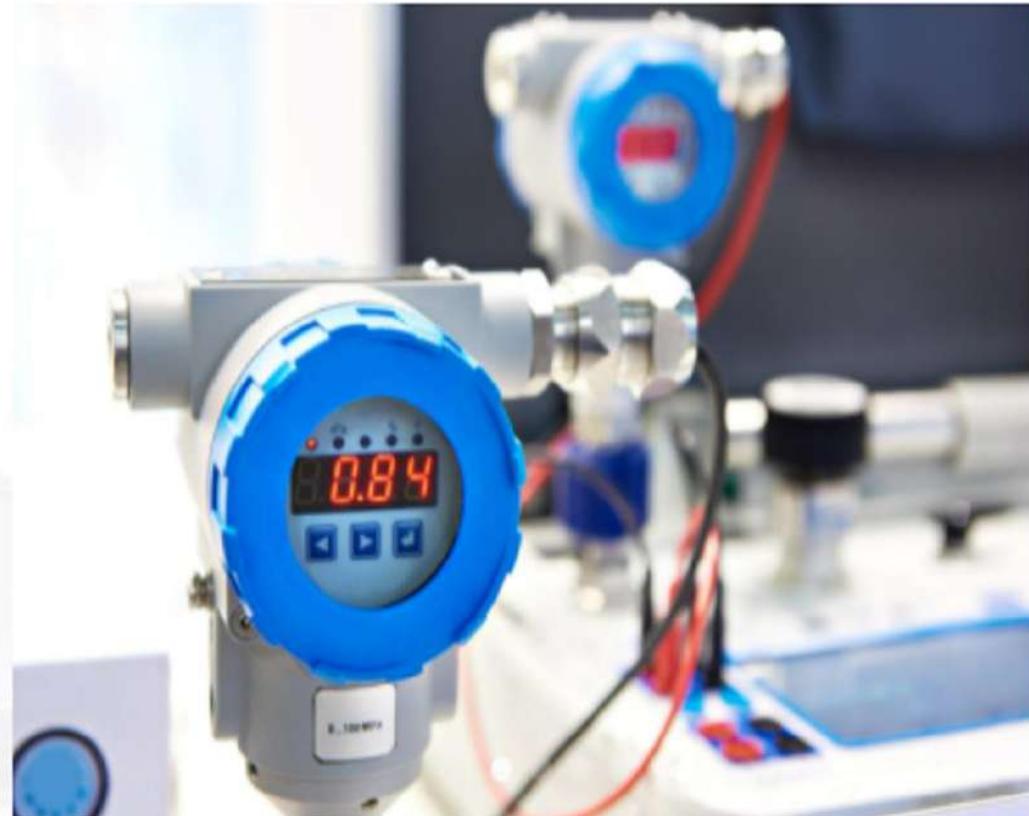
NO	JOB #	ATTENDENCE DATE	VESSEL NAME	IMO #	CLASS	FLAG	LIFEBOAT MAKER	RELEASE GEAR MAKER	DAVIT WINCH MAKER	WORK SCOPE
31	F022/25	21.06.25	MSC GIANNINA II	9289051	LR	PANAMA	QINGDAO BEIHAI		WUXI MINGZI	ANNUAL, FF+RB
32	F071/25	24.06.25	BRIGHT PEGASUS	9599080	NK	PANAMA	QINGDAO BEIHAI			ANNUAL, FF+RB
33	F049/25	27.06.25	KIRAN ASYA	9040895	LR	TURKEY	GEBA			5 YEARLY LB & DV LOAD TEST
34	F086/25	30.06.25	YUAN DONG HAI	9843338	CCS	CHINA PEOPLE'S REPUBLIC	JIANGSU JIAOYAN			5 YEARLY LB & DV LOAD TEST
35	G019/25	07.07.25	EVA	9845271	LR	SINGAPORE	ZHENJIANG MARINE			ANNUAL, FF+RB
36	G038/25	18.07.25	EMERALD SPIRIT	9422005	ABS	BAHAMAS	ZHENJIANG MARINE			ANNUAL, FF+RB
37	G051/25	21.07.25	X PRESS ANTARE	9875367	DNV	SINGAPORE	ZHENJIANG MARINE			ANNUAL, FF+RB
38	G070/25	31.07.25	FRANCESCO	9841196	NK	SINGAPORE	JIANGYINSHI BEIHAI			ANNUAL, FF+RB
39	H034/25	04.08.25	KOTA LARIS	9351048	LR	SINGAPORE	QINGDAO BEIHAI			ANNUAL - PS
40	H036/25	08.08.25	X PRESS LHOTSE	9678642	DNV	LIBERIA	QINGDAO BEIHAI			ANNUAL, FF+RB
41	H018/25	11.08.25	MAERSK PANGANI	9783097	LR	LIBERIA	QINGDAO BEIHAI			ANNUAL - PS
42	H023/25	12.08.25	OOCL ATLANTA	9285005	ABS	HONG KONG CHINA	ORIENTAL	QINGDAO BEIHAI		ANNUAL PS
43	H008/25	13.08.25	YM MILESTONE	9484998	ABS	LIBERIA	ORIENTAL	JIANGYIN NEPTUNE		ANNUAL PS
44	H067/25	16.08.25	LONDON STAR	9330343	LR/KR	LIBERIA	JIANGYIN XINJIANG	JIANGSU JIAOYAN		ANNUAL, FF+RB
45	H035/25	19.08.25	EA CENTAURUS	9967469	ABS	SINGAPORE	JIANGYIN NEPTUNE	JIANGSU JIAOYAN		ANNUAL PS

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46	H068/25	26.08.25	X-PRESS AQUARIUS	9936991	DNV	SINGAPORE	ZHENJIANG MARINE			ANNUAL, FF+RB
47	I009/25	02.09.25	X-PRESS ANGLESEY	9623843	LR	LIBERIA	Jiangyin Neptune		ZHENJIANG MARINE	ANNUAL PS
48	I023/25	07.09.25	OOCL HOUSTON	9355757	ABS	HONG KONG, CHINA	QINGDAO BEIHAI		ORIENTAL PRECISION	ANNUAL PS
49	I038/25	06.09.25	POLAR STAR	9193599	NK	PANAMA	JIANGYIN XINJIANG		MIURA	ANNUAL PS
50	I015/25	08.09.25	MSC ZAINA III	9334519	BV	CYPRUS	JIANGYIN NEPTUNE			ANNUAL PS
51	I033/25	12.09.25	AL JMELIYAH	9732357	DNV	GERMANY	HYUNDAI		ORIENTAL PRECISION	ANNUAL, LB
52	J036/25	11.10.25	X-PRESS PISCES	9967524	ABS	SINGAPORE	JIANGYIN NEPTUNE		JIANGSU JIAOYAN	ANNUAL - LB
53	J071/25	23.10.25	HIGH VOYAGER	9681845	RINA	LIBERIA	JIANGYIN NORSAFE		FASSMER MARLAND	ANNUAL, FF+RB
54	J070/25	30.10.25	MSC REN V	9252230	CCS	LIBERIA	FASSMER GmbH		ORIENTAL PRECISION	ANNUAL PS
55	J075/25	06.11.25	POAVOSA WISDOM VI	9589724	NKK	PANAMA	QINGDAO BEIHAI			ANNUAL - LB
56	K034/25	05.11.25	MILESTONE	9469003	LR	SINGAPORE	WUXI HAIHONG		ZHENJIANG MARINE	ANNUAL, FF+RB
57	K024/25	08.11.25	PAN LILY	9136022	DNV	PANAMA	SCHAT-HARDING			5 YEARLY LB & DV LOAD TEST
58	K042/25	13.11.25	YUAN BEI HAI	9843352	CCS	China Peoples's Republic	JIANGSU JIAOYAN			5 YEARLY LB & DV LOAD TEST
59	K053/25	11.11.25	SLOMAN THETIS	9306653	DNV	ANTIGUA AND BARBUDA	QINGDAO BEIHAI			ANNUAL, FF+RB
60	K077/25	22.11.25	KOTA PELANGI	9786748	NK	SINGAPORE	JIANGYINSHI BEIHAI			ANNUAL PS
61	K003/25	26.11.25	GOLDEN FROST	9849899	LR	Belgium	ZHENJIANG MARINE			ANNUAL, RB

Calibration Services : Fixed and Portable Equipment



SERVICES OFFERED:

- Fixed gas sampling system
- Fixed gas detection system
- Fire detection system
- Cargo hold smoke detection system
- 15ppm bilge alarm monitor (OWS)
- Oil discharge monitoring system (ODME)
- O2 analyzer for IG system (IGS)
- Vapour emission control system (VECS O2 system)
- Transmitters
- UTI/MMC meter
- Multi gas detector
- Gas sampling pump
- Pressure gauge
- Pressure calibrator with handpump
- Temperature calibrator
- Thermometer
- RTD
- Thermocouple
- 4-20mA loop calibrator
- Alcohol tester
- Barometer
- Torque wrench

Tank Level Gauge System Services:

- Expertise in systems for Cargo, Ballast, and Draft Gauge, notably in Nakakita, Musasino, and Scanjet PSM systems (Authorization)

Monitoring Systems:

- Advanced solutions for Tank Pressure and Temperature Monitoring

Range of System Services:

- Specializations in ODME, OMD, OWS
- Fire Alarm System troubleshooting
- Repairs and modifications in PCB, ACB, PLC, Screen Monitors
- Services for Main Engine Control and Pneumatic Systems
- ME-C Type Engine expertise
- Solutions for MSBD and ESB, Power Management Systems



Astro Fire is a competent service provider for the inspection and maintenance of lifeboats and davits. We use water bolsters, water bags, and calibrated load cells for our load testing work. Our trained and qualified engineers carry out load testing in accordance to Class and equipment manufacturers' requirements.

Water bags are utilized for applications in which a suspended load is preferred or required. We offer an inventory of water bags and load cells up to test loads of 50 ton capacity and lifeboat davit testing up to 20 ton.

Water bags offer safe working conditions and are economical to use. Weighing approximately 2% of their rated capacity, transportation cost is greatly minimized as compared to conventional weights. Its light weight allows ease of handling and control, resulting in minimum downtime for the equipment being tested. As such, we are able to carry out similar load testing of cargo gears and gangway ladders as a complete package for our valued clients.

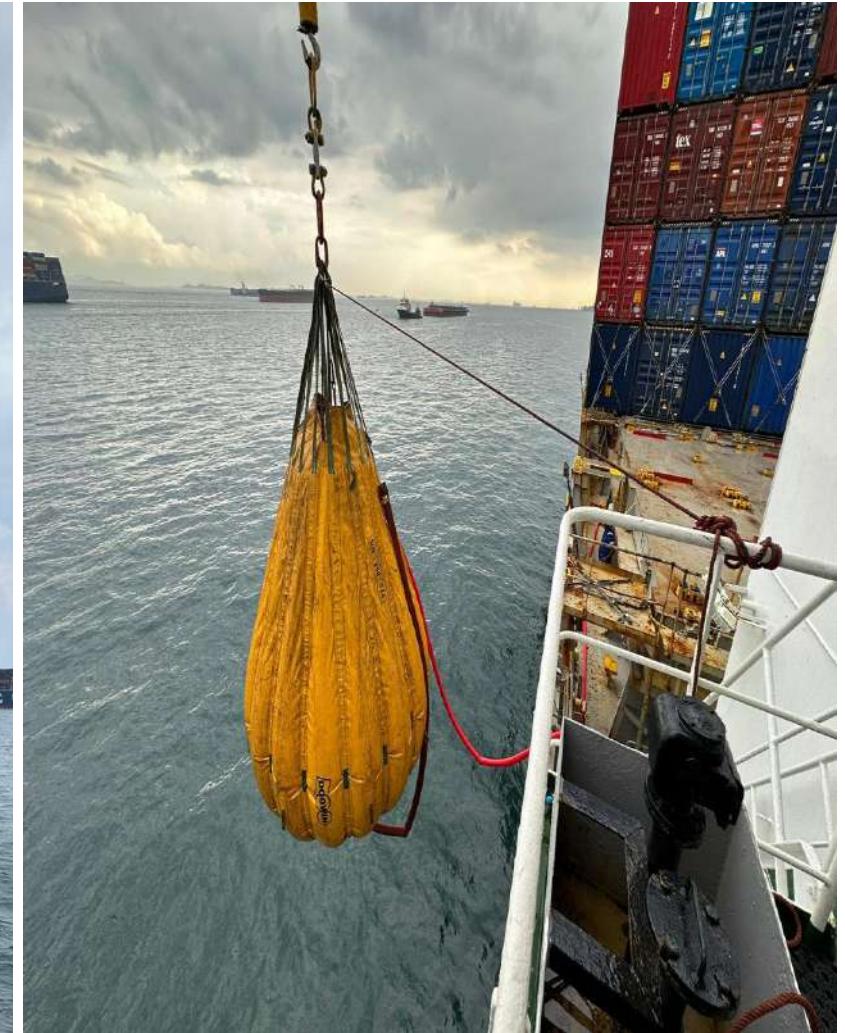
Load Testing Services: Cranes

- Deck Crane
- Gantry Crane
- Provision Crane
- Bunker Davits/Hose handling Crane
- Engine Room Overhead Crane

Load Testing Services: Others

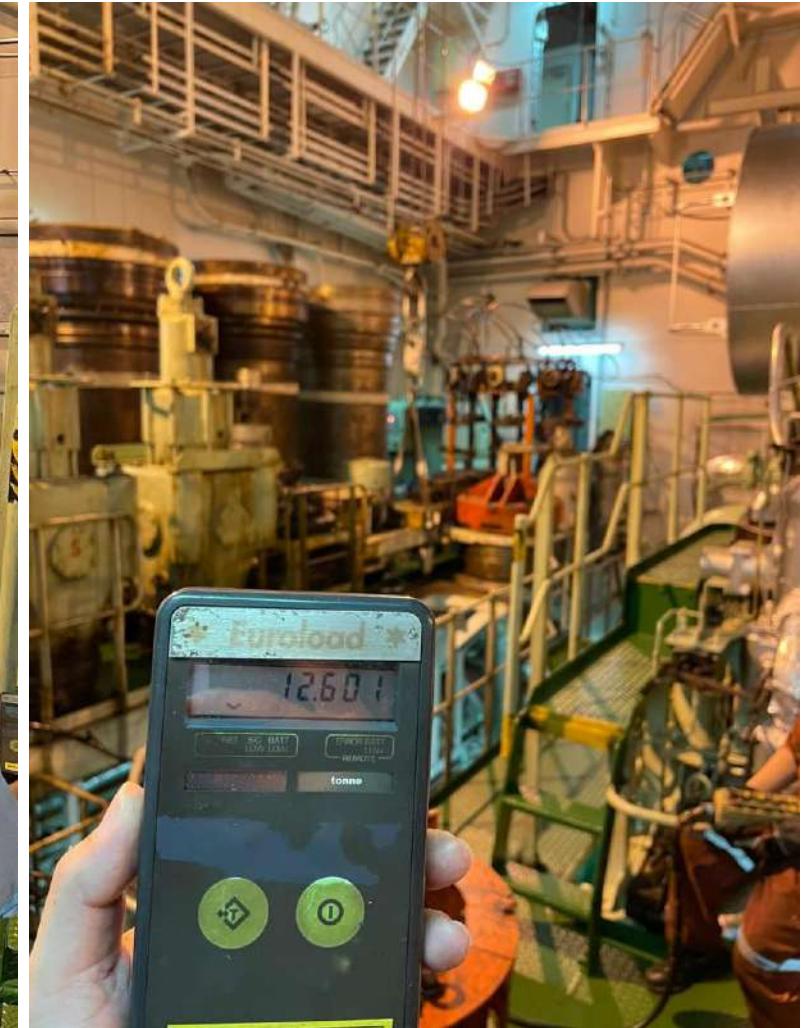
- Workshop Davit Arms
- Trolley Beams
- A Frames
- Gangway/Accommodation Ladders
- Personal Transfer Baskets or PTB

Load Testing Services



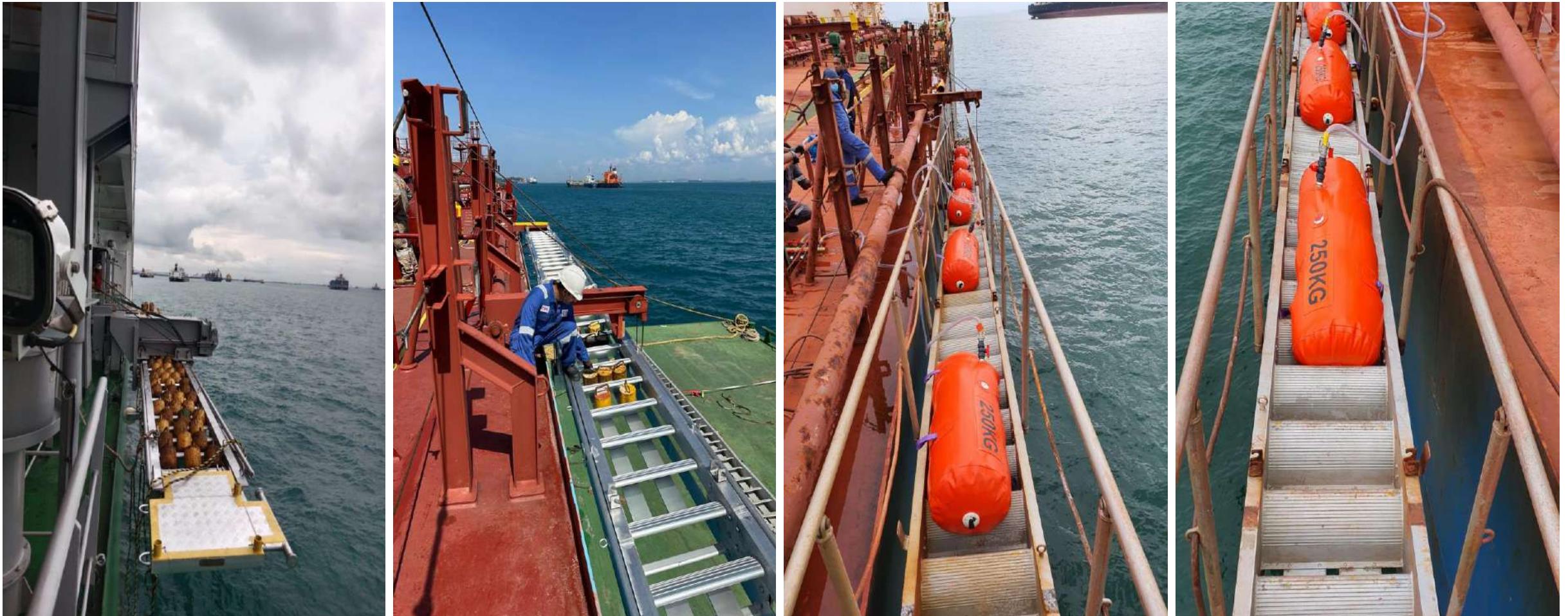
Monorail Crane Load Test

Load Testing Services



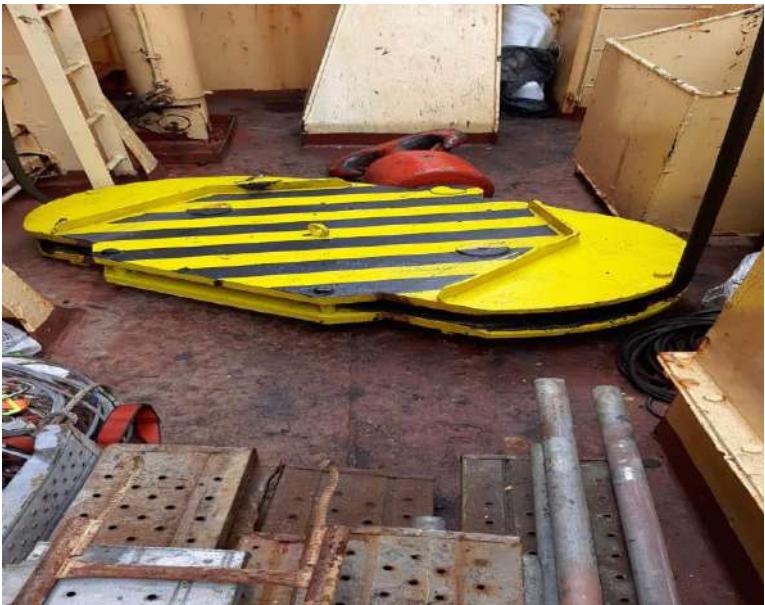
Engine room crane static pull test

Load Testing Services



Accommodation ladder and winch load test

Load Testing Services

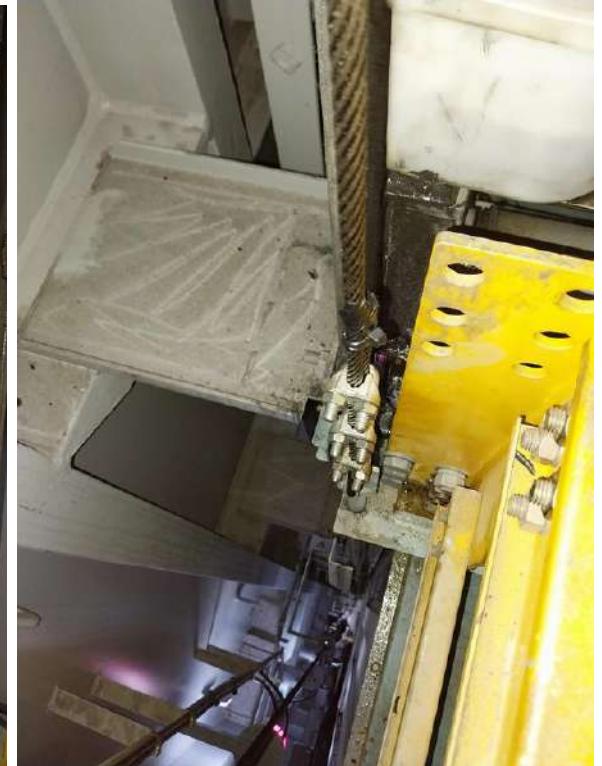


Marine Elevator Services



Since our Incorporation in 1998, we are a leading technical services provider trusted by major international companies.

We specialize in elevator services, technical consultancy, servicing/repairs and sales of elevator equipment and spares.



Marine Elevator Services



*Elevator wire
rope replacement

Marine Elevator Services



*Elevator load test



Marine Elevator Brands



Our service team is trained and specializes in marine elevators and dumbwaiters service (servicing / maintenance, repairs, upgrading and installation) for the following major makers:

- USHIO REINITSU
- USHIO Korea
- HANS LUTZ
- Dan
- Schindler
- Schindler K.K
- Shanghai Sanei
- Nippon
- MORIYA
- HYUNDAI



Marine Elevator Spare Parts



- Varies types of contactors and Timers
- Inverter HYUNDAI 700 GS, 900G
- All types of Safety switch and Retiring cam for all brand elevators (Lift).



Engineering and Steel Works



- Pipe Fabrication



- In-situ piping works



- **Engineering and Fabrication**

- * Fabrication of cross deck with gratings

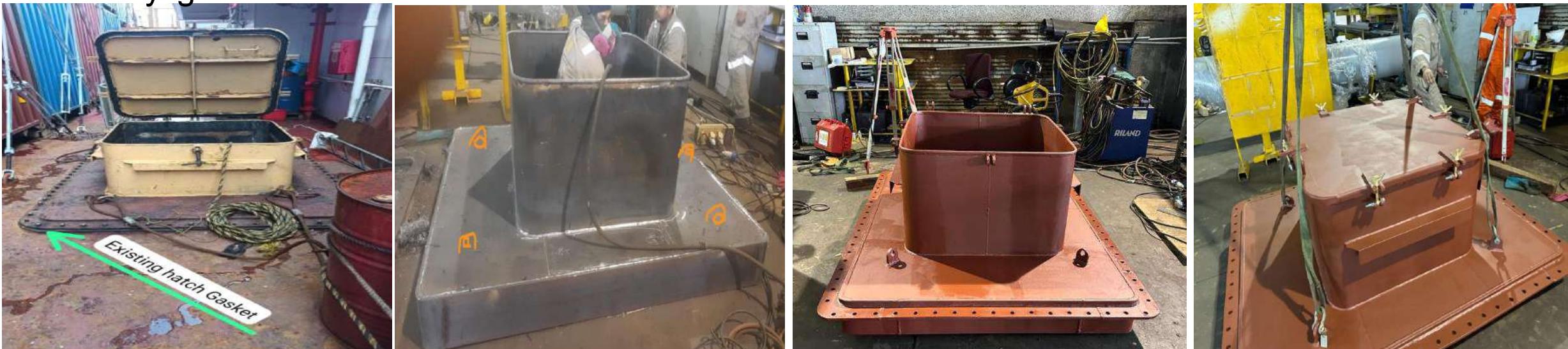


- **Engineering and Fabrication**

- * Calorifier tank fabrication

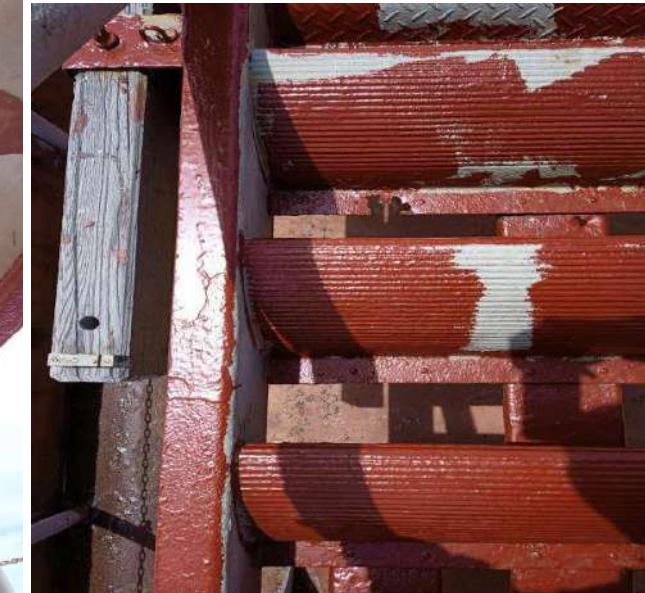
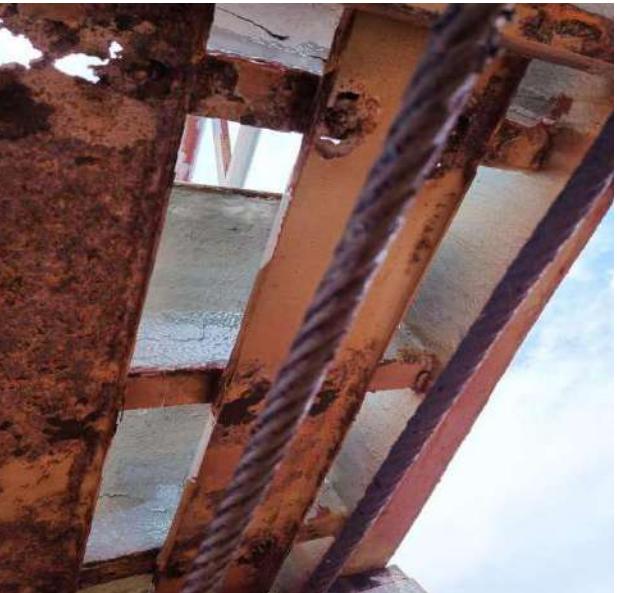


- * Skylight hatch cover fabrication



- **Repairs**

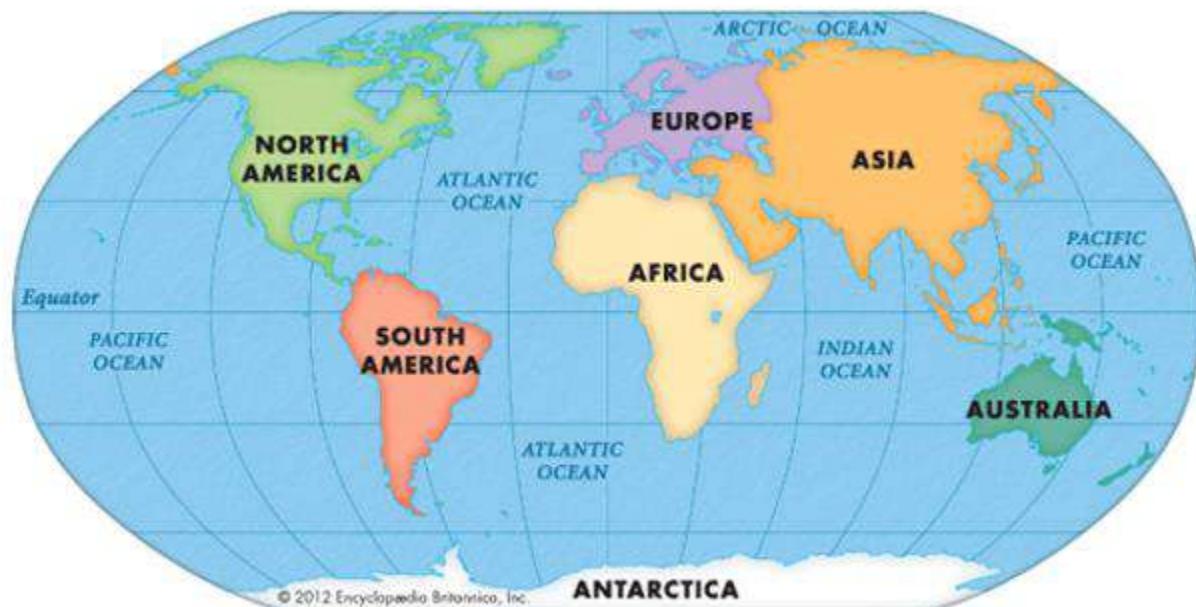
- * Accommodation ladder repair



- * Hatch hinge and roller replacement



Our Global Servicing Network



Globally divided into:

- Europe - 42 sites
- South America - 36 sites
- North America - 4 sites
- Asia Ports - 98 sites

With:

- (1) More than 500 ports in more than 70 countries, including New Zealand and Africa
- (2) Other non-key ports are available on request (logistic solution)

Our Role



- Regional Office for S.E.A.
- Liferaft Training Centre for S.E.A.
- Exclusive Sales and Service Station for Singapore
- We Appoint our CSM Authorised Service Partners for S.E.A.

Our CSM Approvals – CSM Maker / MPA



上海星星橡胶制品有限公司
SHANGHAI STAR RUBBER PRODUCTS CO., LTD.

No.4968, Sichen Highway (Sheshan Industrial Zone), Songjiang District,
Shanghai, China, Post Code:201602

Tel: 0086-21-57797028 E-mail: csm@csmliferaft.com Fax: 0086-21-57797008

Feb. 11, 2020

Statement

To Whom it may concern

We, SHANGHAI STAR RUBBER PRODUCTS CO., LTD (CSM) hereby confirm that CSM LIFESAVING PTE. LTD. (31A BENOI ROAD, SINGAPORE 627779), the joint company between Astro Fire & Safety Pte. Ltd and CSM, to be our exclusive sales and services agent in Singapore & S.E.A.

The contact information of CSM LIFESAVING PTE. LTD:

Attn.: Mr. Rodney Sim / rodney.sim@csm-lifesaving.com /+65 8113 7868.

Best regards.

Kun HUANG/Chairman
Shanghai Star Rubber Products Co., Ltd.

Certificate No. LRSS-1-2021

CERTIFICATE OF APPROVAL SERVICING STATION FOR INFLATABLE LIFERAFTS

This is to certify that:

CSM LIFESAVING PTE LTD
31A Benoi Road, Singapore 627779

is approved by this Administration as "approved servicing station" to service the following inflatable liferafts:

Manufacturer	Type / Model
CSM	(See next page for details)

This Certificate is valid¹ until: 20 November 2025

Date of issue: 04 February 2021



ANG BOON YEN
for DIRECTOR OF MARINE
MARITIME & PORT AUTHORITY OF SINGAPORE

¹ This certificate remains valid subject to the following conditions:
(a) the servicing station remains at the specified premise;
(b) the servicing station remains authorised by the manufacturer(s) to service their liferafts;
(c) the servicing station uses only qualified personnel who have been adequately trained and certificated by the liferaft manufacturer to carry out servicing and repair of their liferafts;
(d) the servicing station ensures that the servicing of liferafts is effectively carried out in accordance with the "Recommendation on Conditions for the Approval of Servicing Stations for Inflatable Liferafts" contained in IMO Resolution A.751(18) as amended by Resolution MSC.55(66) and
(e) the servicing station is subject to periodic inspection and quality assurance checks by this Administration to determine compliance with the above IMO Recommendation.

EC Type Examination Cert for SMLR-A



DNV

**TYPE EXAMINATION CERTIFICATE –
EC MODULE B**

Certificate no.:
MEDB00003FF
Revision No.:
4

Application of: Directive 2014/90/EU of 23 July 2014 on marine equipment (MED). This Certificate is issued by DNV SE based on the notification of the Federal Maritime and Hydrographic Agency of Germany.

This is to certify:
that the Inflatable liferafts
with type designation(s)
SMLR-A-6/-8/-10/-12/-15/-16/-20/-25 Trade names: CSM

issued to
Shanghai Star Rubber Products Co., Ltd.
Shanghai, China

is found to comply with the requirements in the following Regulations/Standards:
Regulation (EU) 2024/1975,
item No. MED/1.12. SOLAS 74 as amended, Regulation III/4, III/13, III/21, III/26, III/31, III/34 & X/3, LSA Code I, V, IMO Res. MSC.481(102), IMO MSC/Circ.811, IMO MSC.1/Circ.1328, IMO MSC.1/Circ.1630 Rev.2 and 2000 HSC Code 8

Further details of the equipment and conditions for certification are given overleaf.

This Certificate is valid until 2030-01-06.

Issued at Hamburg on 2025-01-07

DNV local unit:
Shanghai

Approval Engineer:
Tessa Blever

Notified Body No.: 0098

for DNV SE

Digitally Signed By:
Christine Mydlak-Röder
Location: DNV Hamburg, Germany

Mydlak-Röder, Christine
Head of Notified Body

The mark of conformity may only be affixed to the above type approved equipment and a Manufacturer's Declaration of Conformity issued when the production surveillance module (D, E or F) of Annex II of the MED is fully complied with and controlled by a written inspection agreement with a Notified Body. The product liability rests with the manufacturer or his representative in accordance with Directive 2014/90/EU.
This certificate is valid for equipment, which is conform to the approved type. The manufacturer shall inform DNV SE of any changes to the approved equipment. This certificate remains valid unless suspended, withdrawn, recalled or cancelled.
Should specified regulations or standards be amended during the validity of this certificate, the product is to be re-approved before being placed on board a vessel to which the amended regulations or standards apply.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to USD 300,000.

DNV

**QS - CERTIFICATE OF
ASSESSMENT - EC (MODULE D)**

Certificate No:
MEDD00000B8
Revision No:
13

Application of: Directive 2014/90/EU of 23 July 2014 on marine equipment (MED). This Certificate is issued by DNV GL SE based on the notification of the Federal Maritime and Hydrographic Agency of Germany.

This is to certify:
that the Quality System for the products
with type designation(s) as specified in the Appendix to this Certificate

Issued to
Shanghai Star Rubber Products Co., Ltd.
Shanghai, China

is found to comply with the applicable requirements.
The quality system has been assessed with respect to the procedure of conformity assessment described in Annex II, Module D in the directive 2014/90/EU and regulation (EU) 2023/1667.

This Certificate is valid until 2028-04-19.

Issued at Hamburg on 2023-12-21

DNV local unit:
Shanghai

Approval Engineer:
Michael Oberländer

Notified Body No.: 0098

for DNV GL SE

Digitally Signed By: Permoda, Jovita
Location: DNV Gdańsk, Poland
on behalf of

Mydlak-Röder, Christine
Head of Notified Body

0098/xxxx 0098: Notified Body number undertaking quality surveillance
xxxx: The year in which the mark is affixed

The product liability rests with the manufacturer or his representative in accordance with Directive 2014/90/EU.
This certificate authorizes the manufacturer in conjunction with the valid EC Type Examination (Module B) Certificate(s) of the equipment listed before to affix the Mark of Conformity (wheelmark) to the product described herein.
This certificate loses its validity if the manufacturer makes any changes to the approved quality system, which have not been notified to, and agreed with the notified body named on this certificate. This certificate remains valid unless suspended, withdrawn, recalled or cancelled.
The Manufacturer has to apply for periodic audits to verify the maintenance and application of the quality system every 12 months.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.

EC Type Examination Cert for SMLR-D



DNV

TYPE EXAMINATION CERTIFICATE – EC MODULE B

Certificate no.: MEDB00000YS
Revision No: 4

Application of: Directive 2014/90/EU of 23 July 2014 on marine equipment (MED). This Certificate is issued by DNV SE based on the notification of the Federal Maritime and Hydrographic Agency of Germany.

This is to certify:
that the Inflatable liferafts
with type designation(s)
SMLR-D-12, -16, -20 & -25. Trade names: CSM

issued to
Shanghai Star Rubber Products Co., Ltd.
Shanghai, China

is found to comply with the requirements in the following Regulations/Standards:
Regulation (EU) 2024/1975,
item No. MED/1.12. SOLAS 74 as amended, Regulation III/4, III/13, III/21, III/26, III/31, III/34 & XI/3, LSA Code I, V, IMO Res. MSC.481(102), IMO MSC/Circ.811, IMO MSC.1/Circ.1328, IMO MSC.1/Circ.1630 Rev.2 and 2000 HSC Code 8

Further details of the equipment and conditions for certification are given overleaf.

This Certificate is valid until 2030-01-06.

Issued at Hamburg on 2025-01-07

DNV local unit:
Shanghai

Approval Engineer:
Tessa Blever

Notified Body No.: 0098

for DNV SE

Digitally Signed By:
Christine Mydlak-Röder
Location: DNV Hamburg, Germany

Mydlak-Röder, Christine
Head of Notified Body

The mark of Conformity may only be affixed to the equipment by a notified body. Manufacturer's Declaration of Conformity issued when the production-approval module (D, E or F) of the MED is fully complied with and confirmed by a written inspection agreement with a Notified Body. The product liability rests with the manufacturer or his representatives in accordance with Directive 2014/90/EU.

This certificate is valid for equipment, which is conform to the approved type. The manufacturer shall inform DNV SE of any changes to the approved equipment. This certificate remains valid unless suspended, withdrawn, recalled or cancelled.

Should the specified regulations or standards be amended during the validity of this certificate, the product is to be re-approved before being placed on board a vessel to which the amended regulations or standards apply.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to USD 300,000.

Form code: MED 201 DEU Revision: 2024-10 www.dnv.com Page 1 of 2

DNV

QS - CERTIFICATE OF ASSESSMENT - EC (MODULE D)

Certificate No: MEDD00000B8
Revision No: 13

Application of: Directive 2014/90/EU of 23 July 2014 on marine equipment (MED). This Certificate is issued by DNV GL SE based on the notification of the Federal Maritime and Hydrographic Agency of Germany.

This is to certify:
That the Quality System for the products
with type designation(s) as specified in the Appendix to this Certificate

Issued to
Shanghai Star Rubber Products Co., Ltd.
Shanghai, China

is found to comply with the applicable requirements.
The quality system has been assessed with respect to the procedure of conformity assessment described in Annex II, Module D in the directive 2014/90/EU and regulation (EU) 2023/1667.

This Certificate is valid until 2028-04-19.

Issued at Hamburg on 2023-12-21

DNV local unit:
Shanghai

Approval Engineer:
Michael Oberländer

Notified Body No.: 0098

for DNV GL SE
Digitally Signed By: Permoda, Jowita
Location: DNV Gdańsk, Poland
on behalf of

Mydlak-Röder, Christine
Head of Notified Body

The mark of Conformity may only be affixed to the equipment by a notified body. Manufacturer's Declaration of Conformity issued when the production-approval module (D, E or F) of the MED is fully complied with and confirmed by a written inspection agreement with a Notified Body. The product liability rests with the manufacturer or his representatives in accordance with Directive 2014/90/EU.

This certificate authorizes the manufacturer in conjunction with the valid EC Type Examination (Module B) Certificate(s) of the equipment listed before to affix the Mark of Conformity (wheelmark) to the product described herein.

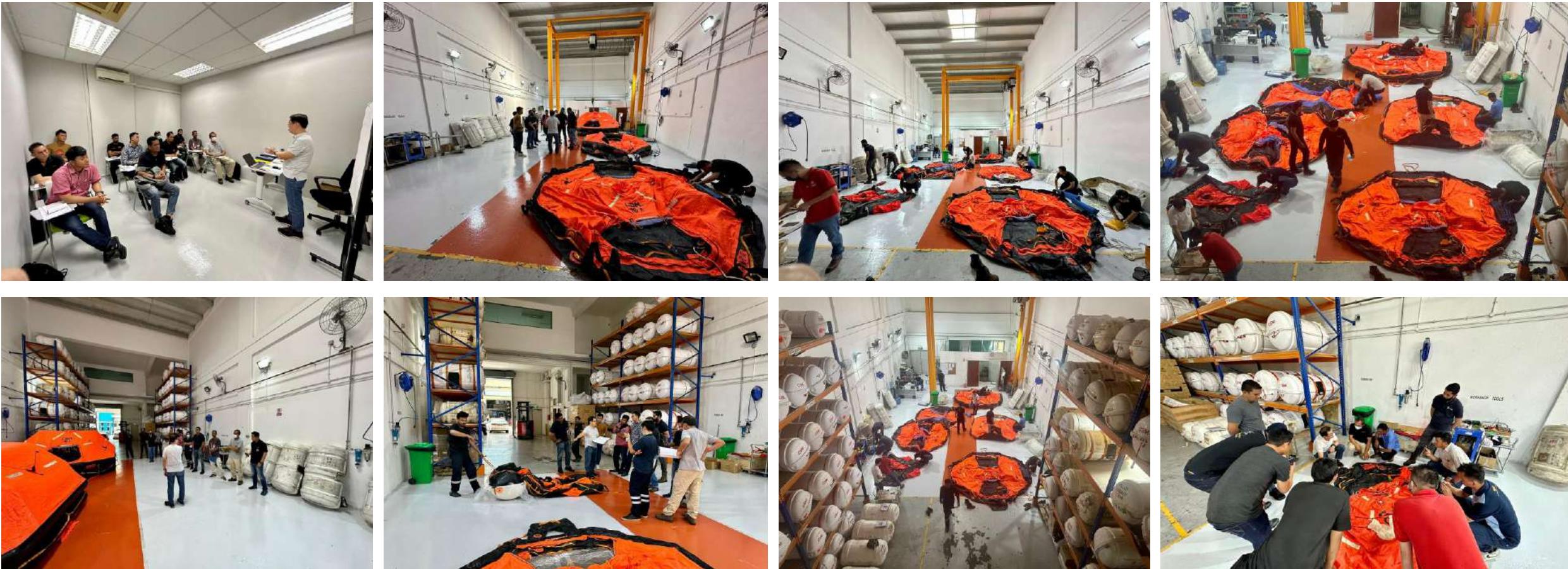
This certificate loses its validity if the manufacturer makes any changes to the approved quality system, which have not been notified to, and agreed with the notified body named on this certificate. This certificate remains valid unless suspended, withdrawn, recalled or cancelled.

The manufacturer has to apply for periodical audits to verify the maintenance and application of the quality system every 12 months.

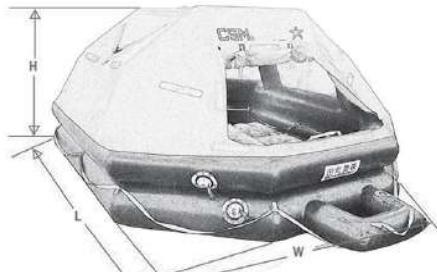
LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.

0098/yyy 0098: Notified Body number undertaking quality surveillance
yyy: The year in which the mark is affixed

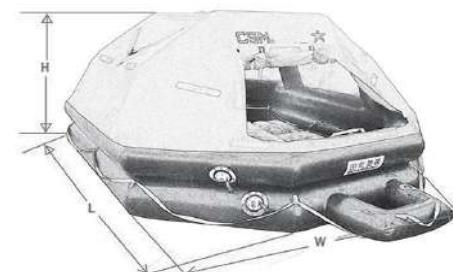
Liferaft training conducted in Singapore for our S.E.A. agents from Malaysia (East & West), Indonesia and Thailand
Date: July 10 to 11, 2023 and July 21 to 23, 2025



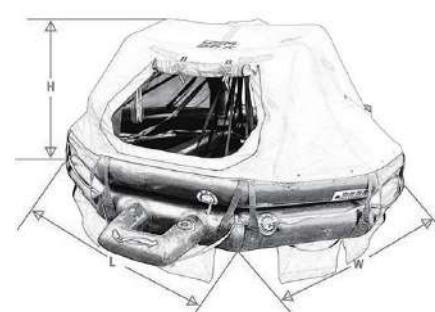
Liferafts and MES (All data sheets are available on request)



SMLR-A



SMLR-A(I)



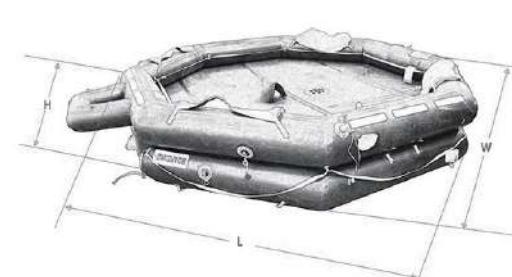
SMLR-D



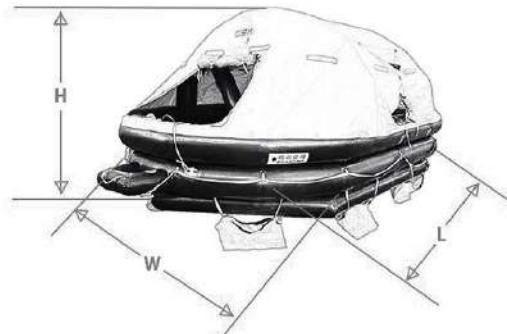
SMLR-L(I)



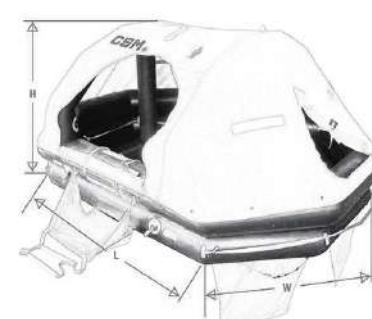
SMLR-L(II)



RAFT-R



RAFT-RS



SMLR-SL



MES

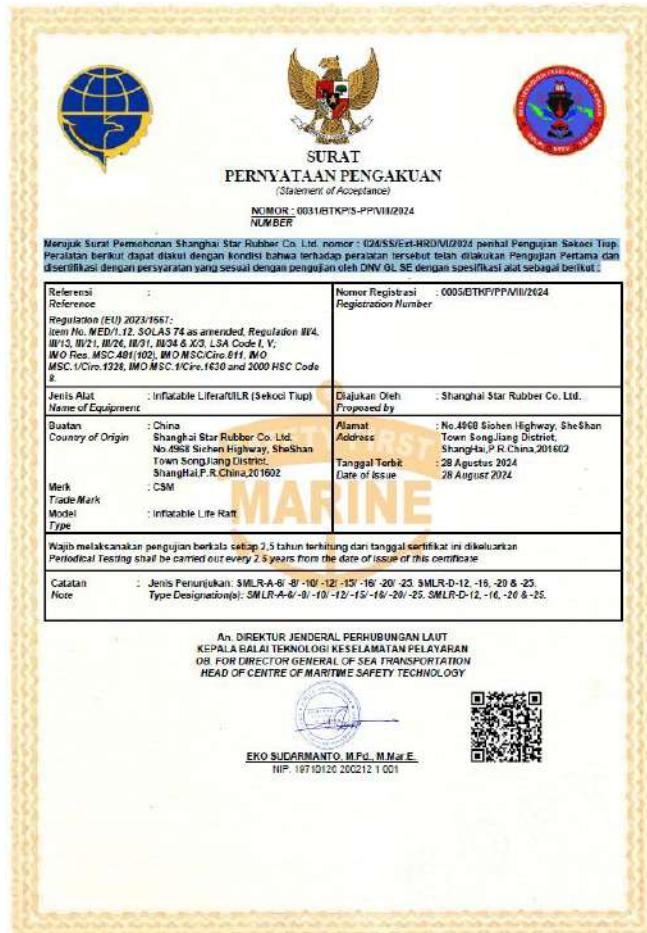


MES

Indonesian Marine Transport – CSM Liferafts



The Indonesian Marine Transport has endorsed CSM Liferafts for mandatory use on new builds starting 28th August 2024



Inflatable liferafts



Reversible Inflatable liferafts

Indonesian Marine Transport – CSM MES



The Indonesian Marine Transport has endorsed CSM MES for mandatory use on new builds starting 28th August 2024



MES Vertical Single Passage



MES Inclined Single Passage

Worldwide Servicing Network



COUNTRY	TERRITORY
AUSTRALIA	FREMANTLE, AUSTRALIA
AUSTRALIA	MELBOURNE, AUSTRALIA
AUSTRALIA	SYDNEY, AUSTRALIA
ANGOLA	LUANDA, ANGOLA
ARGENTINA	ROSARIO, ARGENTINA
ARGENTINA	PUNTA ALTA, ARGENTINA
ARGENTINA	PUERTO MADRYN, ARGENTINA
BANGLADESH	BANGLADESH
BRAZIL	BRAZIL
BRAZIL	ITAJAI, BRAZIL
BRAZIL	VITORIA, BRAZIL
BRAZIL	RIO DE JANEIRO, BRAZIL
BULGARIA	BULGARIA
CANADA	BURNABY, B.C.
CANADA	QUEBEC, CANADA
CANADA	DARTMOUTH, CANADA
CANADA	NEWFOUNDLAND, CANADA
CHILE	VALPARAISO
CONGO	CONGO
CAMEROON	CAMEROON
ECUADOR	ECUADOR

COUNTRY	TERRITORY
ECUADOR	GUAYAQUIL, ECUADOR
EGYPT	EGYPT, JORDAN, SUDAN
EGYPT	EGYPT
EGYPT	SUEZ, EGYPT
GERMANY	GERMANY
GREECE	GREECE
GREECE	PIRAEUS, GREECE
GHANA	TEMA, GHANA
HONG KONG	HONG KONG
INDIA	KOLKATA, INDIA
INDIA	KANDLA & MUNDRA, INDIA
INDIA	MUMBAI,JNPT,NHAVA,INDIA
INDIA	CHENNAI,TUTIKORIN, INDIA
INDIA	COCHIN, INDIA
INDIA	PORT BLAIR, INDIA
INDIA	MANGALORE, INDIA
INDIA	MUMBAI, INDIA
INDIA	CHENNAI,INDIA
INDIA	VISAKHAPATNAM
INDONESIA	SURAYBAYA
INDONESIA	JAKARTA, INDONESIA
INDONESIA	BATAM, ISLAND

COUNTRY	TERRITORY
ITALY	ITALY
ITALY	AUGUATA, ITALY
ISRAEL	ISRAEL
JAPAN	KITAKYUSHU
JAPAN	OSAKA, JAPAN
JAPAN	HIROSHIMA, JAPAN
KOREA	PUSAN
KOREA	INCHEONG, KOREA
KOREA	YEOSU, KOREA
KOREA	BUSAN, KOREA
KOREA	ULSAN, KOREA
KENYA	MOMBASA, KENYA
KINGDOM OF SAUDI ARABIA	JUBAIL, SAUDI ARABIA
KINGDOM OF SAUDI ARABIA	JEDDAH,K.S.A.
LATVIA	LATVIA
LIBYA	TRIPOLI, LIBYA
MAURITIUS	MAURITIUS
MOZAMBIQUE	BEIRA, MOZAMBIQUE
MALAYSIA	KEMAMAN, MALAYSIA
MALAYSIA	LABUAN, MALAYSIA
MALAYSIA	PORT KLANG, MALAYSIA

Worldwide Servicing Network



COUNTRY	TERRITORY	COUNTRY	TERRITORY	COUNTRY	TERRITORY
MALAYSIA	LABUAN FT, MALAYSIA	RUSSIA	NOVOROSSIYSK, RUSSIA	TAIWAN	KEE LUNG
MEXICO	TABASCO, MEXICO	RUSSIA	VLADIVOSTOK, RUSSIA	TAIWAN	KAOHSIUNG
MOROCCO	CASABLANCA, MOROCCO	RUSSIA	NAKHODKA, RUSSIA	TURKEY	TURKEY
NAMIBIA	WALVIS BAY, NAMIBIA	RUSSIA	ARKHANGELSK, RUSSIA	TURKMENISTAN	TURKMENISTAN
NETHERLANDS	NETHERLANDS	RUSSIA	ASTRAKHAN, RUSSIA	U.A.E	SHARJAH, U.A.E.
NEW ZEALAND	NEW ZEALAND	ROMANIA	ROMANIA	U.A.E.	DUBAI, U.A.E.
NIGERIA	NIGERIA	SLOVENJIA	SLOVENJIA	U.A.E.	SHARJAH, U.A.E.
NIGERIA	LAGOS, NIGERIA	SINGAPORE	SINGAPORE	U.A.E.	ABU DHABI, U.A.E
PAKISTAN	PAKISTAN	SOUTH AFRICA	DURBAN, SOUTH AFRICA	U.A.E.	AJMAN, U.A.E.
PANAMA	PANAMA	SOUTH AFRICA	CAPE TOWN, SOUTH AFRICA	UKRAINE	LLIYICHEVSK, UKRAINE
PARAGUAY	PARAGUAY	SPAIN	SPAIN	UKRAINE	MARIUPOL, UKRAINE
PHILIPPINES	PHILIPPINES	SPAIN	GANARIA, ESPANA	URUGUAY	URUGUAY
PORTUGAL	PORTUGAL	SPAIN	TENERIFE, SPAIN	U.S.A.	SAINT ROSE/NEW ORLEANS, U.S.A
POLAND	POLAND	SPAIN	CANARIAS, SPAIN	U.S.A.	HOUSTON/TEXAS, U.S.A
	PUPUA NEW GUINEA RABAUL/P	SAUDI ARABIA	JEDDAH, K.S.A.	U.S.A.	BALTIMORE, U.S.A.
PAPUA NEW GUINEA	MORESBY/LAE/MADANG	SAUDI ARABIA	JEDDAH, SAUDI ARABIA	U.S.A.	NORFOLK, U.S.A.
QATAR	QATAR	SRI LANKA	COLOMBO, SRI LANKA	U.S.A.	NEW ORLEANS, LOUISIANA
RUSSIA	RUSSIA	SRI LANKA	SRI LANKA	U.S.A.	PORTLAND, U.S.A.
RUSSIA	PETROPAVLOVSK KAMCHATSKIY	SOLOMON		U.S.A.	HOUSTON, U.S.A.
RUSSIA	SAINT-PETERSBURG, RUSSIA	ISLANDS	SOLOMON ISLANDS	U.K.	SCOTLAND, U.K.
RUSSIA	ROSTOV-ON-DON, RUSSIA	THAILAND	BANGKOK, THAILAND	U.K.	GODSTONE, U.K.
RUSSIA	SAKHALINSKAYA, RUSSIA	THAILAND	THAILAND	VIETNAM	VIETNAM
RUSSIA	MURMANSK, RUSSIA	TAIWAN	KAOHSIUNG	VANUATU	VANUATU

LOCAL CONTRACTS:

- 1) China Merchants Group
- 2) COSCO Lines
- 3) Evergreen Marine (Asia) Pte Ltd
- 4) Yang Ming Marine Transport Group
- 5) Bintan Ferries
- 6) Majestic Ferries
- 7) Lita Ocean
- 8) Penguin International
- 9) Hong Lam Marine Pte Ltd
- 10) Raffles Shipmanagement Services Pte Ltd
- 11) Raffles Technical Services Pte Ltd
- 12) Raffles Bulk Shipmanagement Pte Ltd
- 13) Oldendorff Carriers GmbH & Co. KG
- 14) Spring Valley Shipping
- 15) Bright Star Shipmanagement (formerly known as Sinogas)



PROJECTS:

Yinson Production Pte Ltd

1) Year 2020 : **Petrobras FPSO Anna Nery (Brazil)**
Supplied 13 units x SMLR-D-32

2) Year 2022 : **Petrobras FPSO Maria Quitéria**
Supplied 13 units x SMLR-D-32

3) Year 2023 : **1923 Enauta FPSO Atlanta**
Supplied 6 units x DSR-37 + 1 unit x SMLR-D-25



Fixed CO₂ High Pressure System

Governed by MSC.1/Circ.1318



E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1318/Rev.1
25 May 2021

REVISED GUIDELINES FOR THE MAINTENANCE AND INSPECTIONS OF FIXED CARBON DIOXIDE FIRE-EXTINGUISHING SYSTEMS

1 The Maritime Safety Committee, at its eighty-sixth session (27 May to 5 June 2009), having considered the proposal by the Sub-Committee on Fire Protection, at its fifty-third session, approved *Guidelines for the maintenance and inspections of fixed carbon dioxide fire-extinguishing systems* (MSC.1/Circ.1318).

2 In order to address the need to clarify the hydrostatic testing regime for high-pressure CO₂ cylinders and to align the relevant requirements in the Guidelines with those in the *Revised guidelines for the maintenance and inspection of fire protection systems and appliances* (MSC.1/Circ.1432), the Committee, at its 103rd session (5 to 14 May 2021), approved amendments to the above-mentioned Guidelines, prepared by the Sub-Committee on Ship Systems and Equipment, at its seventh session, with a view to dissemination as MSC.1/Circ.1318/Rev.1. The text of the *Revised guidelines for the maintenance and inspections of fixed carbon dioxide fire-extinguishing systems* is set out in the annex.

3 Member Governments are invited to apply the annexed Revised guidelines when inspecting fixed carbon dioxide fire-extinguishing systems on board all ships and bring them to the attention of ship designers, shipowners, equipment manufacturers, and other parties concerned.

4 This circular supersedes MSC.1/Circ.1318.

MSC.1/Circ.1318/Rev.1
Annex, page 3

6 Minimum recommended maintenance

6.1 At least biennially (intervals of 2 years ± 3 months) in passenger ships or at each intermediate, periodical or renewal survey¹ in cargo ships, the following maintenance should be carried out (to assist in carrying out the recommended maintenance, examples of service charts are set out in the appendix):

- .1 all high-pressure cylinders and pilot cylinders should be weighed or have their contents verified by other reliable means to confirm that the available charge in each is above 90% of the nominal charge. Cylinders containing less than 90% of the nominal charge should be refilled. The liquid level of low pressure storage tanks should be checked to verify that the required amount of carbon dioxide to protect the largest hazard is available;
- .2 the hydrostatic test date of all storage containers should be checked. High-pressure cylinders should be subjected to periodical tests at intervals not exceeding 10 years. At the 10-year inspection, at least 10% of the total number provided should be subjected to an internal inspection and hydrostatic test². If one or more cylinders fail, a total of 50% of the onboard cylinders should be tested. If further cylinders fail, all cylinders should be tested. Before the 20-year anniversary and every 10-year anniversary thereafter, all cylinders should be subjected to a hydrostatic test. Flexible hoses should be replaced at the intervals recommended by the manufacturer and not exceeding every 10 years. When cylinders are removed for testing, the cylinders should be replaced such that the quantity of fire-extinguishing medium continues to satisfy the requirements of 2.2.1 of chapter 5 of the FSS Code, subject to SOLAS regulation II-2/14.2; and
- .3 the discharge piping and nozzles should be tested to verify that they are not blocked. The test should be performed by isolating the discharge piping from the system and flowing dry air or nitrogen from test cylinders or suitable means through the piping.

Fixed CO₂ High Pressure System

Governed by MSC.1/Circ.1318/Rev.1 of 25 May 2021



MSC.1/Circ.1318/Rev.1
Annex, page 3

6 Minimum recommended maintenance

6.1 At least biennially (intervals of 2 years ± 3 months) in passenger ships or at each intermediate, periodical or renewal survey¹ in cargo ships, the following maintenance should be carried out (to assist in carrying out the recommended maintenance, examples of service charts are set out in the appendix):

- .1 all high-pressure cylinders and pilot cylinders should be weighed or have their contents verified by other reliable means to confirm that the available charge in each is above 90% of the nominal charge. Cylinders containing less than 90% of the nominal charge should be refilled. The liquid level of low pressure storage tanks should be checked to verify that the required amount of carbon dioxide to protect the largest hazard is available;
- .2 the hydrostatic test date of all storage containers should be checked. High-pressure cylinders should be subjected to periodical tests at intervals not exceeding 10 years. At the 10-year inspection, at least 10% of the total number provided should be subjected to an internal inspection and hydrostatic test². If one or more cylinders fail, a total of 50% of the onboard cylinders should be tested. If further cylinders fail, all cylinders should be tested. Before the 20-year anniversary and every 10-year anniversary thereafter, all cylinders should be subjected to a hydrostatic test. Flexible hoses should be replaced at the intervals recommended by the manufacturer and not exceeding every 10 years. When cylinders are removed for testing, the cylinders should be replaced such that the quantity of fire-extinguishing medium continues to satisfy the requirements of 2.2.1 of chapter 5 of the FSS Code, subject to SOLAS regulation II-2/14.2; and
- .3 the discharge piping and nozzles should be tested to verify that they are not blocked. The test should be performed by isolating the discharge piping from the system and flowing dry air or nitrogen from test cylinders or suitable means through the piping.

6.2 At least biennially (intervals of 2 years ± 3 months) in passenger ships or at each renewal survey¹ in cargo ships, the following maintenance should be carried out by service technicians/ specialists trained to standards accepted by the Administration:

- .1 where possible, all activating heads should be removed from the cylinder valves and tested for correct functioning by applying full working pressure through the pilot lines.

In cases where this is not possible, pilot lines should be disconnected from the cylinder valves and blanked off or connected together and tested with full working pressure from the release station and checked for leakage.

In both cases this should be carried out from one or more release stations when installed. If manual pull cables operate the remote release controls, they should be checked to verify the cables and corner pulleys are in good condition and freely move and do not require an excessive amount of travel to activate the system;

¹ Refer to the *Survey Guidelines under the Harmonized System of Survey and Certification (HSSC)*, 2019 (resolution A.1140(31)).

² Refer to standard ISO 18119:2018 – Gas cylinders – Seamless steel and seamless aluminium-alloy gas cylinders and tubes – Periodic inspection and testing.

Fixed CO2 High Pressure System

Governed by MSC.1/Circ.1318/Rev.1 of 25 May 2021



Service & Inspection Intervals

Year	Cargo Vessel	Passenger Vessel
1	A	A
2	A + P	A + P + R
3	A	A
4	A + P	A + P + R
5	A + P + R + IICV	A + IICV
6	A + P	A + P + R
7	A	A
8	A + P	A + P + R
9	A	A
10	A + P + R + IICV	A + P + R + IICV

A = Annual Inspection & Service Requirements
Visual inspection of entire system and all mandatory components

P = Periodic Inspection & Service Requirements
Check content of main CO2 & pilot cylinders
+ blow through distribution lines
+ check HT date of cylinders
+ check age of flexible hoses

R = Renewal Inspection & Service Requirements
Carry out function tests of release heads, valves and pilot lines at full working pressure
+ internal control valves inspection

Note: Some flag states / classification societies or other authorities have stricter service requirements than those shown above, example DNV-GL.

DNV-GL : + Blow through distribution lines at service interval "A"
+ Internal control valves inspection (IICV) at 5 yearly interval (now included in Rev.1)

Foam Matters...



Low Expansion Foam – Tested to MSC.1/Circ.1312

High Expansion Foam – Tested to MSC.1/Circ.670

Some competitors are offering Hi-Ex foam testing at a much lower price, but in most cases the foam is tested as a Low-Ex foam (MSC.1312). Take note that MSC.1432 specify that MSC.670 should be used. ASTRO FIRE is therefore testing to the correct standard.

MSC.1/Circ.1432
Annex, page 6

- .6 examine all filters/strainers to verify they are free of debris and contamination;
- .7 verify all control/section valves are in the correct position;
- .8 blow dry compressed air or nitrogen through the discharge piping or otherwise confirm the pipework and nozzles of high expansion foam systems are clear of any obstructions, debris and contamination. This may require the removal of nozzles, if applicable;
- .9 take samples from all foam concentrates carried on board and subject them to the periodical control tests in **MSC.1/Circ.1312, for low expansion foam, or MSC/Circ.670 for high expansion foam.**
(Note: Except for non-alcohol resistant foam, the first test need not be conducted until 3 years after being supplied to the ship.); and
- .10 test all fuel shut-off controls connected to fire-protection systems for proper operation.

Overview On Periodic Foam Tests – Types and Quantities Needed for Testing

Foam types	Test	At foam delivery	Year 1	Year 2	Year 3	Year 4	Year 5	Onwards
Low Exp.	Foam Conc test				1 x 2 ltr	1 x 2 ltr	1 x 2 ltr	1 x 2 ltr
Low Exp. (PB AR foam only)	Chemical stability test	2 ltr	2 ltr	2 ltr	<u>(included in above samples sent)</u>			
Low Exp. (PB AR foam only)	Small scale fire test				2x2 ltr (a)	2x2 ltr(a)	2x2 ltr(a)	2x2 ltr(a)
Hi Exp.	Foam Conc test				1 x 2 ltr	1 x 2 ltr	1 x 2 ltr	1 x 2 ltr
Low and Hi Exp.	Produced foam test	(b)	(b)	(b)	(b)	(b)	(b)	(b)

- a) 2x2 ltr must be sent in addition to standard 1x 2 ltr bottle.
- b) Min 1 x 2 ltr of foam concentrate + 1 x 2 ltr produced foam + 1 x 2 ltr of water used during production of foam onboard
 - For Helideck annual test of produced foam, for ships/others (per MCS 1432) every 5 years.

Foam (the importance) Sampling Method



FOAM CONCENTRATE - REQUEST FOR INFORMATION

ASTRO

Name and type of vessel : _____

Vessels E-mail address : _____

IMO No : _____ Date of sampling : _____

Sample delivered to : _____

TECHNICAL DESCRIPTION - FOAM CONCENTRATE

Foam Concentrate Manufacturer / Foam Brand Name : _____ / _____

Type : Protein Fluoroprotein AFFF
 Synthetic FFFF MeteorP(HotFoam)

Alcohol Resistant : Yes No

Mixing Ratio(%) : 2% 3% 6% Others : _____ %

Date of Complete Tank Filling/ Supply (Month / Year) : _____ / _____

TECHNICAL DESCRIPTION - FOAM SYSTEM

Foam System Manufacturer : _____

Protected Areas : Deck Helideck Engine Room
 Others : _____

Material Of Tank : Steel/Coated Fibre Glass Steel/Uncoated
 Stainless Steel Others : _____

Tank Capacity in litres : _____ Litres Tank Of Foam Location : _____

DESCRIPTION OF SAMPLING

Sample taken / drawn by : Astro Others: _____

Location of Sample taken/drawn : Top Middle Bottom

Volume Of sample in litres : _____ Litres

Note : All particulars must always be completed.

IMPORTANT :

To take sample properly you must follow the below instruction.

- Specify name and brand of foam - without this information you could risk an incorrect evaluation of the foam sample to be tested.
- 2 liters basis sample require for all foams.
- 4 litres extra sample (total 6 litres) required for protein-based alcohol resistant (PB AR) foam concentrate.
- Take sample from the middle of the tank thought the manhole/filling hole or use the drain valve, but then make sure you drain at least 5 litres before fill the sample bottle. This is to avoid sediments.

- Always use a clean bottle to avoid contamination of the foam sample
- Contaminants (even) in small quantities can destroy the foam within minutes
- To avoid sediments (sludge), ensure that at least 5 litres of foam is drained out before collecting the foam sample
- Make sure the data of the foam concentrate and other obligatory information are given together with the foam sample
- The certificate of inspection issued will be based on the information as found in the provided sample. It is therefore very important that this information is accurate and complete

Fixed High Expansion Foam System



DNV APPROVAL FINDER

high expansion foam Clear filters Export

[All approvals] [Select country] Search for company Search for city

Certificate number	Product name	Expires	Company	Country	City	Approval group
<input checked="" type="checkbox"/> MEDB00001D6	Survitec HiFoam	2026-07-05	Survitec Fire Solutions Poland Sp. z o.o.	Poland	Doluje	MED
<input checked="" type="checkbox"/> MEDD00000A3		2025-05-26	NK Co., Ltd.	Republic of Korea	Busan	MED
<input checked="" type="checkbox"/> MEDB00006NS	HI-EX Foam 1% (NK.D-101M)	2025-05-18	NK Co., Ltd.	Republic of Korea	Busan	MED
<input checked="" type="checkbox"/> MEDB00001GZ	SKUM HOTFOAM	2024-07-02	SABO FOAM S.r.l.	Italy	Cologno Al Serio Bg	MED
<input checked="" type="checkbox"/> TAF00000NB	KASHIWA Inside Air High Expansion Foam S...	2023-12-02	Kashiwa Co., Ltd., Tsukuba Works	Japan	Bando	TA
<input checked="" type="checkbox"/> MEDB00004AA	BIO FOAM	2023-10-02	BIO-EX	France	Montrottier	MED
<input checked="" type="checkbox"/> MEDB00003ND	SKUM Hotfoam System	2023-04-18	Macron Safety Systems (UK) Limited	United Kingdom of Great Britain and Northern Ireland	Great Yarmouth	MED
<input checked="" type="checkbox"/> MEDB00001UB	PLUREX M	2023-04-11	SABO FOAM S.r.l.	Italy	Cologno Al Serio	MED
<input checked="" type="checkbox"/> MEDB00001H1	METEOR T-10	2023-04-11	SABO FOAM S.r.l.	Italy	Cologno Al Serio	MED

- Only the foams (type and manufacturer) listed in its type approval can be used throughout its service life
- Changing the foam loses the type approval of the system and effectiveness in extinguishing the fire in the enclosed machinery spaces by total flooding method within a specified time
- High expansion foams are 1% or 2%, synthetic and non-alcohol resistant foams.
- There is no high expansion foam that is alcohol resistant
- Hence not a requirement to carry out chemical stability test and small scale fire test

Fixed High Expansion Foam System



DNV

**EC-TYPE EXAMINATION
CERTIFICATE (MODULE B)**

Certificate No:
MEDB00001D6
Revision No:
3

Application of: Directive 2014/90/EU of 23 July 2014 on marine equipment (MED), issued as "Forskrift om Skipsutstyr" by the Norwegian Maritime Authority. This Certificate is issued by DNV AS under the authority of the Government of Norway.

This is to certify:
That the Inside air high expansion foam systems for the protection of machinery spaces, cargo pump rooms, vehicle and ro-ro spaces, special category spaces and cargo spaces
with type designation(s)
Survitec HiFoam

Issued to
Survitec Fire Solutions Poland Sp. z o.o.
Doluge, Poland

is found to comply with the requirements in the following Regulations/Standards:
Regulation (EU) 2020/1170,
Item No. MED/3.61a. SOLAS 74 as amended Regulation II-2/10 and FSS Code 6, IMO MSC.1/Circ.1528

Further details of the equipment and conditions for certification are given overleaf.

This Certificate is valid until **2026-06-22**.

Issued at **Høvik** on **2021-06-23**

DNV local station:
Katowice CMC

Approval Engineer:
Helge Bjørnarå

Notified Body
No.: **0575**

for DNV AS



Sverre Olav Bergli
Head of Notified Body

Job Id: **344.1-002968-11**
Certificate No: **MEDB00001D6**
Revision No: **3**

Product description
"Survitec HiFoam", is a fixed high-expansion inside air foam fire-fighting system consisting of foam generator(s), foam concentrate, water and foam pump(s), foam proportioner, steel distribution piping, strainer, valves, test and blow through lines, power and control system.

The system is accepted for use in machinery spaces, cargo-pump rooms and similar spaces. The system can also be used for ro-ro, special category and cargo spaces. The system is to be designed according to IMO FSS Code Ch.6 as amended by IMO Res. MSC.327(90) for fixed high-expansion inside air foam fire-fighting systems.

Only the foam generators are type approved by this certificate. All other system components are subject to case-by-case approval.

Application/Limitation
The system shall be installed according to the below specifications:

Volume of protected space	Minimum required filling rate
Up to 500 m ³	2.0 l/min
Between 500 m ³ and 3348 m ³	1.8 + 0.0000702 x (3348 - V) l/min
Above 3348 m ³ 1)	1.8 l/min

1) The filling rate may also be applied to systems for the protection of small spaces within protected machinery spaces having volumes less than test 3348 m³, such as workshops and similar spaces not containing combustion engines, boilers, purifiers and similar equipment (IMO MSC.1/Circ.1384, Annex, 7.1.3).

The inside air system is approved for use with the below specifications for the foam generator(s):

	UFG-90	UFG-60	UFG-30
Foam production 1)	20.8 m ³ /min at 3.0 bar 67.2 m ³ /min at 6.0 bar 38.0 m ³ /min at 8.0 bar 25.9 m ³ /min at 9.0 bar	14.2 m ³ /min at 3.0 bar 41.8 m ³ /min at 6.0 bar 30.6 m ³ /min at 7.0 bar 22.1 m ³ /min at 9.0 bar	5.2 m ³ /min at 3.0 bar 15.6 m ³ /min at 6.0 bar 9.3 m ³ /min at 8.0 bar 8.1 m ³ /min at 9.0 bar
k-factor (Q = k x p ^{1/2}) 1)	38.1 lpm/bar ^{1/2} 3)	25.6 lpm/bar ^{1/2} 3)	12.8 lpm/bar ^{1/2} 3)
Premix consumption 2)	69.2 l/min at 3.0 bar 92.9 l/min at 6.0 bar 105.4 l/min at 8.0 bar 111.5 l/min at 9.0 bar	46.7 l/min at 3.0 bar 62.2 l/min at 6.0 bar 66.8 l/min at 7.0 bar 74.7 l/min at 9.0 bar	23.5 l/min at 3.0 bar 31.1 l/min at 6.0 bar 35.6 l/min at 8.0 bar 37.7 l/min at 9.0 bar
Expansion ratio 3)	1:301 at 3.0 bar 1:723 at 6.0 bar 1:361 at 8.0 bar 1:232 at 9.0 bar	1:305 at 3.0 bar 1:672 at 6.0 bar 1:458 at 7.0 bar 1:296 at 9.0 bar	1:222 at 3.0 bar 1:502 at 6.0 bar 1:262 at 8.0 bar 1:214 at 9.0 bar
Drawing	53-09-056	53-09-057	53-09-058

1) Cold condition, fresh water
2) Solution of foam concentrate and water
3) At 6.0 bar (nominal operating pressure)

The following additional applications / limitations apply:

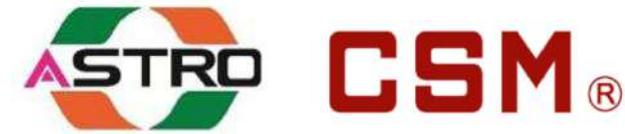
A. Nominal pressure is 6.0 bar. Approved pressure range is 3-9 bar. Application of generators at a pressure above or below the approved pressure range is subject to case by case approval.

B. Only MED approved foam concentrate of the type "Survitec High Expansion Foam Concentrate 2%" manufactured by Dr. Stämer, Germany shall be used.

C. With respect to cargo pump rooms, the system is approved for pump rooms which handle oil cargoes only, the system can not be applied for pump rooms which are also intended for alcohol cargoes (polar solvents).

D. A strainer with maximum mesh openings of maximum 1.5 mm shall be fitted on the sea water pressure line before the foam proportioner (this to avoid clogging).

Fixed High Expansion Foam System



EC-TYPE EXAMINATION CERTIFICATE (MODULE B)

DNV-GL

Certificate No:
MEDB00006NS

Application of: Directive 2014/90/EU of 23 July 2014 on marine equipment (MED), issued as "Forskrift om Skipsutstyr" by the Norwegian Maritime Authority. This Certificate is issued by DNV GL AS under the authority of the Government of Norway.

This is to certify:

That the Concentrate for fixed high expansion foam fire extinguishing systems for machinery spaces and cargo pump rooms

with type designation(s)

1% High Expansion Foam (NK.D-101M)

Issued to

NK Co., Ltd.
Busan, Republic of Korea

is found to comply with the requirements in the following Regulations/Standards:

Regulation (EU) 2019/1397,
item No. MED/3.47. SOLAS 74 as amended Regulation II-2/10 and FSS Code 6, IMO
MSC/Circ.670

Further details of the equipment and conditions for certification are given overleaf.

This Certificate is valid until **2025-05-18**.

Issued at **Høvik** on **2020-05-19**

DNV GL local station:
Gimhae Station



for DNV GL AS

Approval Engineer:
Tessa Biever

Notified Body
No.: **0575**

Roald Vårheim
Head of Notified Body

Job Id: **344.1-004750-2**
Certificate No: **MEDB00006NS**

Product description

"1% High Expansion Foam (NK.D-101M)"

The synthetic foam concentrate "1% High Expansion Foam (NK.D-101M(1%))" is approved for use as high expansion foam for use against hydrocarbon fires. (non polar solvents)

Application/Limitation

Approved for use as high expansion foam concentrate in fixed and mobile fire extinguishing systems.

Description	NK.D-101M
Minimum storage/working temperature:	0 °C (32 F)
Maximum storage/working temperature:	+ 50 °C (122 F)
Expansion ratio:	1:960 *
Storage:	20 litre pails or 200 litre drums (NKT-HES-01)
Supplier:	NK Co., Ltd
Manufacturer:	NKTECH Co., Ltd

*) Data from initial fire test, when tested with seawater and IMO MSC/Circ.670 test apparatus.
Foam use, filling, maintenance, storage, transport, etc. are to be in accordance with the manufacturer's instructions.

General conditions:

This approval does not address the foam generating equipment, only the foam concentrate.

The foam concentrate does not contain PFOS.

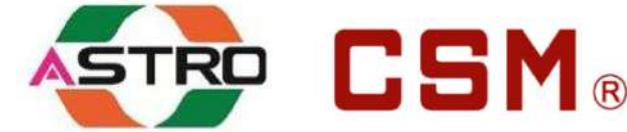
The validity of the certificate is dependent on the compliance of each manufactured product with the prototype which underwent the type approval tests and such compliance shall be stated by the manufacturer.

The fixed high expansion foam fire extinguishing system for machinery spaces and cargo pump rooms must be tested with the approved concentrate to the satisfaction of the Administration.

The storage facilities and piping arrangement onboard the vessel are to be designed and constructed with regard to seawater exposure (where applicable), and the minimum allowed temperature for the foam liquid.

Storage of the fire extinguishing media to be in compliance with IMO MSC/Circ. 1239 (SOLAS II-2/10.4.3).

Fixed High Expansion Foam System



TYPE APPROVAL CERTIFICATE

This is to certify:

That the **Inside Air Foam Fire Extinguishing System**

with type designation(s)

KASHIWA Inside Air High Expansion Foam System

Issued to

Kashiwa Co., Ltd., Tsukuba Works
Bando, Ibaraki, Japan

is found to comply with

DNV GL statutory interpretations DNVGL-SI-0364 – SOLAS interpretations

DNV GL rules for classification – Ships

DNV GL offshore standards

Application :

Approved for use as fixed foam fire extinguishing system for machinery spaces, cargo spaces, cargo pump-rooms (HC) and vehicle, special category and ro-ro spaces.

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Issued at **Høvik** on **2019-02-04**

This Certificate is valid until **2023-12-02**.

DNV GL local station: **Yokohama**

Approval Engineer: **Synnøve Bolstad Eri**

DNV-GL

Certificate No:
TAF00000NB
Revision No:
2

Job Id: **262.1-007097-6**
Certificate No: **TAF00000NB**
Revision No: **2**

Product description

"KASHIWA Inside Air Foam System", consists of foam generators, foam concentrate as specified below and other system components like water and foam pumps, foam proportioner, steel distribution piping, strainer, valves, test and blow through lines, power and control system.

The system is accepted for use in machinery spaces, cargo-pump rooms and similar spaces. The system can also be used for ro-ro, special category and cargo spaces. The system is to be designed according to IMO FSS Code Ch.6 as amended by IMO Res. MSC.327(90) for fixed high-expansion inside air foam fire-fighting systems.

Only the foam generators are type approved by this certificate. All other system components are subject to case-by-case approval.

The generators are produced by Kashiwa, Tsukuba Works at Ibaraki, Japan.

Application/Limitation

The system shall be installed according to the below specifications:

Volume of protected space	Minimum required filling rate [m/min]
Up to 500 m ³	2.1
Between 500 m ³ and 3500 m ³	1.95 + 0.000050 x (3500 – V)
Above 3500 m ³	1.95 ¹⁾

1) The filling rate may also be applied to systems for the protection of small spaces within protected machinery spaces having volumes less than test 3500 m³, such as workshops and similar spaces not containing combustion engines, boilers, purifiers and similar equipment (IMO MSC.1/Circ.1384, Annex, 7.1.3).

The inside air system is approved for use with the below specifications for the foam generators:

	30MD/V2 (1/2F JJP)	60MD/V2 (3/4F JJP)
Foam production ¹⁾	14 m ³ /min at 2 bar 35 m ³ /min at 4 bar 44 m ³ /min at 6 bar	32 m ³ /min at 2 bar 70 m ³ /min at 4 bar 83 m ³ /min at 6 bar
k-factor (Q = k x p ^{1/2}) ¹⁾	8.43 lpm/bar ^{1/2} ³⁾	16.91 lpm/bar ^{1/2} ³⁾
Premix consumption ²⁾	37 lpm at 2 bar 50 lpm at 4 bar 63 lpm at 6 bar	74 lpm at 2 bar 100 lpm at 4 bar 125 lpm at 6 bar
Expansion ratio ¹⁾	1:700	1:700
Drawing	HAU-07587	HAU-07587

1) cold condition, fresh water

2) solution of foam concentrate and water

3) at 4 bar

The following additional applications/limitations apply:

- A. Nominal pressure is 4.0 bar. Approved pressure range is 2-6 bar. Application of generators at a pressure above or below the approved pressure range is subject to case by case approval.
- B. Only type approved foam concentrate "STHAMEX-SV-HT" (2 %) manufactured by Fabrik Chemischer Praeparate von Dr.Richard Sthamer GmbH & Co.KG shall be used.
- C. The foam generators shall be equally spaced in a horizontal plane at a level above the main and auxiliary engines. Generators shall also be arranged to cover other high-risk objects at all levels in the machinery spaces. Extra foam generators may be required in locations where the normally required generators have problem to reach due to obstructions like gratings. (semi-)tight

Marine Common PSC Inspections that Lead to Vessel Detention - Most Immediate Financial Hit



Budget-driven selection of safety services turns a manageable incident to a catastrophic disaster.

Firefighting systems and lifesaving appliances are the vessels' **last line of defence** when an emergency occurs.

- What does the service cost?
- What is the cost of the service failing?



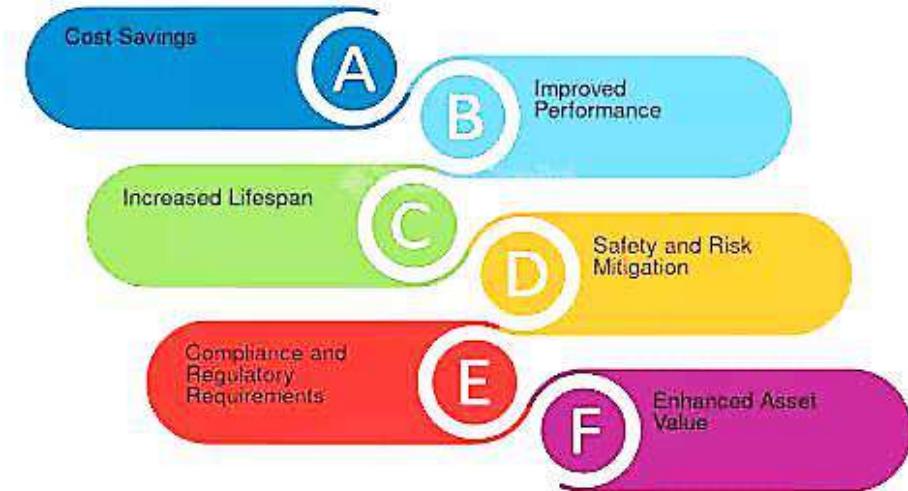
Marine Common PSC Inspections that Lead to Vessel Detention



Tangible Business Risks:

- Costs 10s of thousands in off-hire time, repairs and fines. On blacklist for future targeted inspections
- Insurer may void coverage if investigations reveal improper service and maintenance by an unqualified vendor
- Criminal and civil liabilities if accidents lead to fatalities

Understanding the Importance of Asset Maintenance

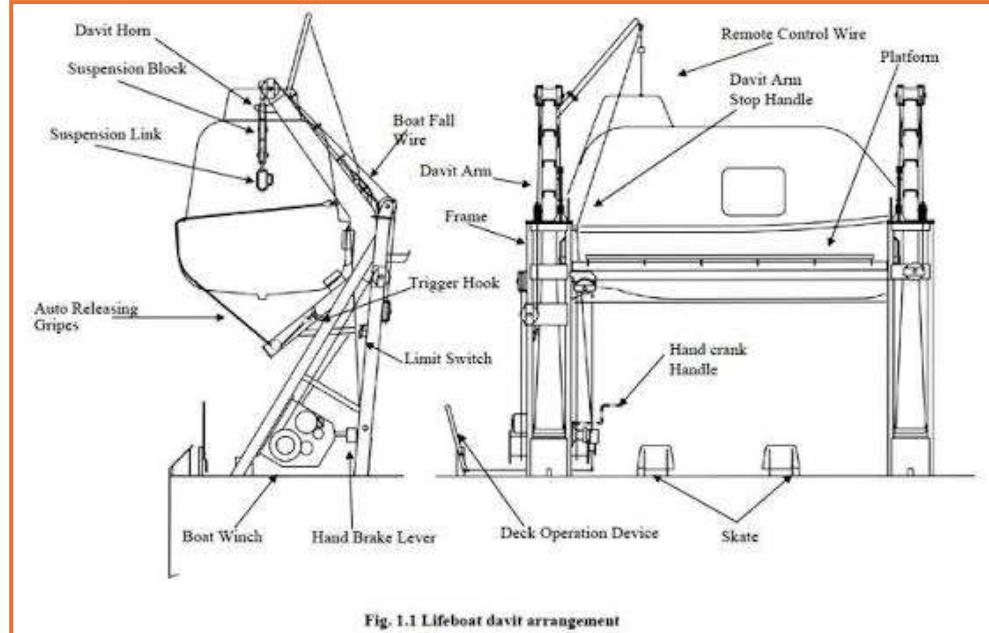


Given the immense risks at stake, can your company truly afford the lowest costs?
- A transactional expense with significant hidden risks.

Marine Common PSC Inspections that Lead to Vessel Detention



#1 Category - LSA



3. Davit Winches & Wire Falls: Corroded, cracked, or improperly maintained wires and brakes.
4. Lifeboat wire rope failure



Marine Common PSC Inspections that Lead to Vessel Detention



#2 Category - Fire Safety Systems - A Very Close Second

Fixed Fire-Fighting Systems



PSC officers view fire as one of the greatest threats to a vessel.

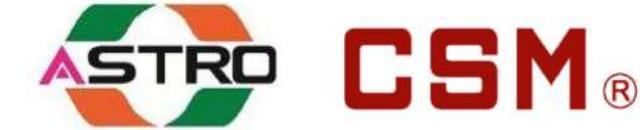
1. Fixed Fire-Fighting Systems (e.g. fixed high pressure CO₂ system):
 - * Blocked/Seized Piping: Pipes leading to the protected space (engine room) must be clear.
 - * Lack of Maintenance/Certification: Cylinders not weighed or tested, missing safety pins, incorrect signage.
 - * System not left in operational mode by incompetent service technicians
 - CO₂ will not release in an emergency.
2. Leaking foam proportioner unit and fire (emergency) pump - inability to maintain adequate pressure, fuel issues, or inability to start
3. Fire Main & Hydrants: Significant corrosion, leaks, or inoperative isolation valves.
4. Portable Extinguishers: Expired, discharged, or incorrect type for the space.



Leaking foam proportioner unit and fire pump

Characteristics of A Cheap Service Provider:

1. Use unqualified and / or inexperienced technicians, and freelance workers - "hit and run" service
2. Does not invest in proper training or tools
3. Use non-certified or counterfeit parts
4. Rushes the inspection to do more jobs per day
5. Provide paperwork compliance - dangerous practice where focus shifts from actual service and maintenance to just providing documentation to satisfaction PSC - liken to selling cheap false security.



Astro Fire - Your Strategic Partner in Risk Management (not just a vendor):



- 1. Expertise** - Our technicians are trained, certified, experienced and trained on the latest equipment
- 2. Integrity** - We never cut corners, our reports are thorough and honest
- 3. Accountability** - We stand by our work. Our certifications are your guarantee of compliance
- 4. Protection** - We protect your assets, your crew and your reputation

Our Value Proposition



Core Proposition:

Mitigation of catastrophic risks for shipowners, operators and seafarers.
A demonstrable commitment to quality, expertise and ethical practice.



Our full commitment to our clients

Our Value Proposition



For the Client - Shipowners and Operators

1. Enhanced Safety & Risk Reduction

Safety systems and appliances are genuinely functional and reliable in an emergency

Protection of human life

2. Regulatory Compliance & Audit Assurance

Documentation provided (certificates) is audit-proof, thus eliminating PSC detentions, deficiencies or fines related to LSA/FFE

Avoids costly delays and protects the vessel's/owner's reputation with flag states and port authorities

3. Asset Protection & Longevity

Preserves the value and extends the lifespan of expensive safety equipment

Lower total cost of ownership

4. Reputation Management

Demonstrates due diligence and proactive safety culture (mark of a quality operator)

Enhanced brand value

5. Reduced Insurance Premiums

Reputable and reliable insurers look favourably upon operators who engage ethical and accredited service providers

Lower insurance costs

Our Value Proposition

For the Service Provider - Astro Fire & Safety



1. Competitive Differentiation - key differentiator - compliance (verifiable mark of quality)
2. Operational Excellence - robust quality management systems



3. Reduced Liability Exposure - delivers highest accepted standard services

In conclusion we offer:

1. Comprehensive risk management
2. Operational assurance
3. Preservation of what matters most - lives, assets and reputation



Happy ship owner - safe voyage!

Why is Astro Fire & Safety Pte Ltd and CSM Lifesaving Pte Ltd your preferred business partner?



- 1) Single point of contact:
regardless of geographical location and time zone
- 2) Best business practices according to industry
standards
- 3) Provides ethical and professional services
- 4) Ease of doing business with us – fully service oriented and always contactable!
- 5) Full transparency of business costs – no hidden costs!
- 6) Simple and straightforward agreements – NO fanciful Ts&Cs!
- 7) Due date monitoring



We are trusted by :



Fleet Management Limited
A Caravel Group Company



We are trusted by :



Spring Valley Shipping



A photograph of three wooden blocks arranged horizontally. The first block contains the letter 'Q', the second block contains the symbol '&', and the third block contains the letter 'A'. The blocks are light-colored wood with dark letters and symbols.

THANK YOU!



ISO 9001
ISO 14001
ISO 45001

