

# THE WORLD ICEBREAKER AND ICEBREAKING SUPPLY VESSEL FLEET



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## **FOREWORD**

This listing of world icebreakers and icebreaker fleet was commissioned by the Finnish Maritime Administration on behalf of the Baltic Icebreaker Management, BIM. The purpose of the compilation is to advance the use of world icebreakers and ice breaking supply vessels in the multitude of tasks available for them. At first the aim was to include only icebreakers but the definition of an icebreaker was not very clear – even if the towing notch is usually deemed to be required from an icebreaker – and thus also the fleet of icebreaking supply vessels and research vessels with an icebreaking capability were included in the list. All corrections and additions to the list are welcome – these should be addressed to undersigned.

The present list is an updated one, based on the comments received from many sources. This active participation is greatly appreciated.

The compilation work has been carried out by Prof. Kaj Riska from ILS Oy. BIM expresses their gratitude to him for the tedious and unthankful work of endeavouring to find correct data for ships.

Helsinki 17 November, 2008

Ilmari Aro  
Chairman of the Baltic Icebreaking Management

Please send corrections and additions to: [winternavigation@fma.fi](mailto:winternavigation@fma.fi)

The icebreakers on the front cover are from top left clockwise: MSV Fennica, IB Varandej, IB Tarmo and IB Tor Viking II.

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## 1. INTRODUCTION

The operation of icebreakers to support maritime trade is usually included in the infrastructure given by the port state. The icebreaker support is given in Finland by the Merenkululaitos (Finnish Maritime Administration), in Sweden by Sjöfartsverket (Swedish Maritime Administration), in Estonia by Veteede Amet (Estonian Maritime Administration), in Latvia by the Port of Riga, in Denmark by the Danish navy, in the USA by the US Coast Guard, in Canada by the Canadian Coast Guard and in Japan by the Japanese Navy i.e. the Self Defence Force in Japan. In Russia the state offers the ice breaking services through the state company RosMorPort but there is also some private ice breaking services. An example of private ice breaking services is given by Gazprom icebreaker that were intended to assist the oil export from the Prirazlomnaja oil field. There does not exist economic competition anywhere in the world in ice breaking services as there does not exist any free icebreakers to participate in the competition. Only in the Okhotsk Sea there exists some competition in offering offshore supply services.

As complete list as possible of world icebreakers and ice breaking supply vessels has been compiled into this report. The aim is to give an overview of the ships that might be available to ice breaking escort services in the Baltic. A list of this kind cannot be perfect as information about all icebreakers does not exist and especially in Russia there can be other icebreakers not mentioned in the list – even if the recent second hand purchases tend to point out that also in Russia there is lack of ice breaking capacity.

As good an accuracy as possible has been used in compiling the list. The data on ship particulars, bollard pull, ice breaking capability and the ship owner or operator have either been collected from the database of the author or public sources. There exist various different data on these particulars, especially on the ice breaking capability and all efforts have been made to cross check data but surely some errors exist in the list. The Baltic Icebreaker Management would be thankful in receiving all the corrections.

## **2. THE LIST OF ICEBREAKERS AND ICE BREAKING SUPPLY SHIPS**

The icebreaker and ice breaking supply vessel fleet is compiled into the tables below. An icebreaker is a ship that is intended to break ice in order to escort merchant vessels, do ice management or carry out some other special task in ice. Usually these kinds of vessels are pure icebreakers, ice breaking supply vessels or cruise ships (modified usually from icebreakers). The borderline between different vessels is not exact and if there are some omissions, they are not made on purpose.

The list has been done considering each country in itself. This division into countries has been done based on the operational area – not necessarily based on the nationality of the owner. The owner of the vessel is sometimes not clear and sometimes instead of the owner, the operator is mentioned in the list. This uncertainty is evident in the case of Russian icebreaking fleet.

The ship length and beam are those at the waterline but some information does not mention whether the data is referring to waterline or length overall. The bollard pull is also mentioned in the list. The bollard pull characterises the ship's ability to break ice – naturally together with a hull form suitable for ice breaking. The bollard pull information can also be related to the force required to keep an AFRAMAX tanker stationary in a storm – at least 100 t bollard pull is required. An AFRAMAX tanker requires two icebreakers to escort her in more severe ice conditions. The bollard pull is usually estimated from the data on power and propellers, and sometimes checked with some other public data. Overall, some caution is necessary concerning the ice breaking capability.

The ice breaking performance reflects the capability of the ship in ice. This breaking performance does not necessarily make a good icebreaker. The requirements for a good icebreaker include a sufficient speed in the ice conditions of the operational area (in the Gulf of Bothnia for example 10-12 knots in 80 cm thick ice) and good manoeuvrability in ice for escort operations. Additionally it can be observed that even a technically good icebreaker is not performing well in escort services if the crew cannot use all the capability invested into their ship. The experienced icebreaker crews indicate short escort times and larger escort speeds. The average escort speed is one of the main measures of a good, smooth winter navigation system. The ice breaking capability and the bollard pull help in assessing the capability of a ship in escort operations.

The world's icebreaker and ice breaking supply vessel fleet is seemingly large in this list format; more than 80 ships – partly because many of the ice breaking research vessels like RV Polarstern are included in the list. The ships included in the list are divided into very different ship types. The supply vessels are intended to operate in various tasks at offshore oil and gas fields and thus they are not intended to be used in escort duties – this is reflected for example in that these supply vessels do not have a towing notch. An example of the necessity for an icebreaker to have a notch is given by the addition of a notch into the Estonian icebreaker EVA – 316. The bridge of a supply ship is not suitable for escort operations as a large sector visibility astern is required for icebreakers. Apart from research and supply ships the list includes some ships used in cruising in polar waters.

<b>ARGENTINA</b>										
Ship	Owner (or operator)	Completed	L <sub>wl</sub> [m]	B <sub>wl</sub> [m]	T [m]	P [MW]	T <sub>B</sub> [t]	h <sub>i</sub> [m] / v [kn]	Propulsion	Remarks
Almirante Irizar	Argentinean Navy	1978	113.4	24.8	9.5	11.95	138	1.0 / 3	2 x FPP	Towing notch but not meant to escort duties. Fire in the auxiliary generator room, in shipyard at least year 2008.

<b>AUSTRALIA</b>										
Ship	Owner (or operator)	Completed	L <sub>wl</sub> [m]	B <sub>wl</sub> [m]	T [m]	P [MW]	T <sub>B</sub> [t]	h <sub>i</sub> [m] / v [kn]	Propulsion	Remarks
Aurora Australis	Antarctic Shipping Ltd (P&O Polar)	1989	88.4	20.3	7.9	10	NA	1.23 / 2.5	1 x CPP	Antarctic supply and oceanographic research, nozzle

<b>BRITANNIA</b>										
Ship	Owner (or operator)	Completed	L <sub>wl</sub> [m]	B <sub>wl</sub> [m]	T [m]	P [MW]	T <sub>B</sub> [t]	h <sub>i</sub> [m] / v [kn]	Propulsion	Remarks
James Clark Ross	British Antarctic Survey	1991	90.0	18.9	6.4	8.2	NA	NA	1 x FPP	Antarctic supply and oceanographic research, nozzle

<b>CANADA</b>										
Ship	Owner (or operator)	Completed	L <sub>wl</sub> [m]	B <sub>wl</sub> [m]	T [m]	P [MW]	T <sub>B</sub> [t]	h <sub>i</sub> [m] / v [kn]	Propulsion	Remarks
Louis S. St. Laurent	Canadian Coast Guard	1969	101.9	23.8	9.9	17.7	202	1.2 / 3	3 x FPP	Modernized in 1988
Pierre Radisson	Canadian Coast Guard	1978	88.9	19.2	7.2	10.1	115	1.1 / 2	2 x FPP	
Amundsen	Canadian Coast Guard	1979	88.9	19.2	7.2	10.0	115	1.1 / 2	2 x FPP	Ex. Sir John Franklin, research vessel
Des Groseilliers	Canadian Coast Guard	1982	88.9	19.2	7.2	10.0	115	1.1 / 2	2 x FPP	
Terry Fox	Canadian Coast Guard	1983	80.6	17.2	8.3	17.7	190	1.2 / 7	2 x CPP	Previously a Beaufort Sea supply vessel
Arctic Shiko, Seaforth Atlantic		1984	60.9	14.5	5.9	9.0	125	1.05 / 2	2 x CPP	Sold to Maersk (Maersk Trader and Maersk Tracker) but sold further
Arctic Ivik	Canadian Coast Guard	1985	64.7	14.0	5.8	5.3	81	0.9 / 2	2 x CPP	Beaufort Sea supply vessel, no towing notch. At present registered at Vanuatu
Henry Larsen	Canadian Coast Guard	1987	94.1	19.4	7.2	12.0	115	1.2 / 2	2 x FPP	

<b>CHILE</b>										
Ship	Owner (or operator)	Completed	L <sub>wl</sub> [m]	B <sub>wl</sub> [m]	T [m]	P [MW]	T <sub>B</sub> [t]	h <sub>i</sub> [m] / v [kn]	Propulsion	Remarks
Almirante Viel	Chilean Navy	1969	89.2	19.1	6.3	8.8	112	0.9 / 2	2 x FPP	No towing notch, ex. CCG Norman McLeod Rogers

<b>CHINA</b>										
Ship	Owner (or operator)	Completed	L <sub>pp</sub> [m]	B [m]	T [m]	P [MW]	T <sub>B</sub> [t]	h <sub>i</sub> [m] / v [kn]	Propulsion	Remarks
Bo Hai	Bohai Bay Oil Company	1982	73.0	18.0	7.5	7.1	107	1.5 / 2	2 x CPP (nozzles)	Ex. Beaufort Sea supplier Robert LeMeur

<b>DENMARK</b>										
Ship	Owner (or operator)	Completed	L <sub>wl</sub> [m]	B <sub>wl</sub> [m]	T [m]	P [MW]	T <sub>B</sub> [t]	h <sub>i</sub> [m] / v [kn]	Propulsion	Remarks
Danbjörn	Danish Navy	1965	68.0	17.0	6.0	8.7	96	1.0 / 2	2+2 x FPP	
Isbjörn	Danish Navy	1966	68.0	17.0	6.0	8.7	96	1.0 / 2	2+2 x FPP	
Thorbjörn	Danish Navy	1980	57.6	15.0	4.7	4.6	55	NA	2 x FPP	

<b>ESTONIA</b>										
Ship	Owner (or operator)	Completed	L <sub>pp</sub> [m]	B [m]	T [m]	P [MW]	T <sub>B</sub> [t]	h <sub>i</sub> [m] / v [kn]	Propulsion	Remarks
Tarmo	Veteede Amet	1963	82.0	21.2	7.4	8.8	108	0.85 / 2	2+2 x FPP	
EVA-316	Veteede Amet	1980 / 2005	48.6	12.2	3.8	4.4	45.3	0.65 / 3	2 x FPP (Rolls Royce)	In use at the Pärnu Bay

<b>FINLAND</b>										
Ship	Owner (or operator)	Completed	L <sub>wl</sub> [m]	B <sub>wl</sub> [m]	T [m]	P [MW]	T <sub>B</sub> [t]	h <sub>i</sub> [m] / v [kn]	Propulsion	Remarks
Voima	Finstaship	1954, 1979	83.5	18.7	7.0	10.2	113	NA	2+2 x FPP	Modernized in 1979
Urho, Sisu	Finstaship	1975, 1976	96.0	22.5	7.3	16.2	185	0.8 / 8.5	2+2 x FPP	
Otso, Kontio	Finstaship	1986, 1987	90.0	23.4	7.3	15	160	0.8 / 10	2 x FPP	
Fennica, Nordica	Finstaship	1993, 1994	96.7	25.2	8.4	15	234	0.8 / 9.5	2 x FPP (Rolls Royce)	Multipurpose offshore/icebreaking
Botnica	Finstaship	1998	77.9	23.1	7.2	10	117	0.6 / 8	2 x FPP (Azipod)	Multipurpose offshore/icebreaking

<b>GERMANY</b>										
Ship	Owner (or operator)	Completed	L <sub>wl</sub> [m]	B <sub>wl</sub> [m]	T [m]	P [MW]	T <sub>B</sub> [t]	h <sub>i</sub> [m] / v [kn]	Propulsion	Remarks
Polarstern	Alfred Wegener Institute (BMBF)	1982	109.2	24.0	11.2	14	NA	1.5 / 5	2 x FPP	Antarctic supply and oceanographic research
Neuwerk	Wasser- und Schifffahrtsamt Cuxhaven	1998	78.9	18.6	5.8	5.8	115	0.5 / 5	2 x FPP (Schottel)	Standby and oil combating ship
Maria S. Merian	Land Mecklenburg-Vorpommern	2005	88.2	19.2	6.5	3.8	NA	NA	2 x Schottel tandem props	Marginal ice zone research vessel

<b>JAPAN</b>										
Ship	Owner (or operator)	Completed	L <sub>wl</sub> [m]	B <sub>wl</sub> [m]	T [m]	P [MW]	T <sub>B</sub> [t]	h <sub>i</sub> [m] / v [kn]	Propulsion	Remarks
Soya	Japan Coast Guard	1978	94.0	15.6	5.5	11.5	132	1.0 / 2	2 x CPP	No towing notch
Shirase	Ministry of Defense	1982	124.0	27.0	9.2	22.1	243	1.5 / 3	3 x FPP	Retired
Teshio	Japan Coast Guard	1995	54.9 (OA)	10.2	5.0	2.6	NA	0.55 / 3	2 x CPP	Nozzles
Shirase	Ministry of Defense	2009	126.0	27.0	9.2	22.1	NA	1.5 / 3	2 x FPP	To be delivered in 2009, cruises to Antarctica

<b>KAZAKSTAN</b>										
Ship	Owner (or operator)	Completed	L <sub>pp</sub> [m]	B [m]	T [m]	P [MW]	T <sub>B</sub> [t]	h <sub>i</sub> [m] / v [kn]	Propulsion	Remarks
Arcticaborg, Antarcticaborg	Wagenborg (ENI)	1998	57.7	16.6	4.4	3.2	32	0.6 / 3	2 x FPP (Azipod)	Supply ship in the Caspian Sea
Tulpar	BUE Marine Ltd	2003	87.3	21.0	4.0	4	NA	0.6 / 2	2 x FPP (Schottel)	Supply ship in the Caspian Sea

<b>LATVIA</b>										
Ship	Owner (or operator)	Completed	L <sub>pp</sub> [m]	B [m]	T [m]	P [MW]	T <sub>B</sub> [t]	h <sub>i</sub> [m] / v [kn]	Propulsion	Remarks
Varma	Port of Riga	1968	82.0	21.2	7.4	8.8	108	0.85 / 2	4 x FPP	

<b>NORWAY</b>										
Ship	Owner (or operator)	Completed	L <sub>pp</sub> [m]	B [m]	T [m]	P [MW]	T <sub>B</sub> [t]	h <sub>i</sub> [m] / v [kn]	Propulsion	Remarks
Svalbard	Royal Norwegian Navy	2001	89.0	19.1	6.5	10	NA	1.0 / 3	2 X FPP (Azipod)	Coast guard vessel, no towing notch

<b>RUSSIA</b>										
Ship	Owner (or operator)	Completed	L <sub>wl</sub> [m]	B <sub>wl</sub> [m]	T [m]	P [MW]	T <sub>B</sub> [t]	h <sub>i</sub> [m] / v [kn]	Propulsion	Remarks
Karu	(rosMorPort)	1958	68.3	16.7	5.8	5.5	70	0.7 / 2	2+2 x FPP	Ex. Karhu
Ivan Kruzen-shtern, Yuriy Lisyanskiy, Fyodor Litke, Semen Dezhnev	RosMorPort	1964, 1965, 1970, 1971	62.0	17.5	6.2	3.5	54	0.7 / 2	2+1 x FPP	Port icebreakers
Tor	(RosMorPort)	1964	79.5	20.5	6.2	8.7	108	0.8 / 2	2+2 x FPP	
Dudinka	OJSC MMC Norilsk Nickel	1970	79.5	20.5	6.2	8.7	108	0.8 / 2	2+2 x FPP	Ex. Apu
Jermak	RosMorPort	1974	130.0	25.6	11.0	26.5	320	1.8 / 2	3 x FPP	
Admiral Makarov, Krasin	Fesco	1975, 1976	130.0	25.6	11.0	26.5	320	1.8 / 2	3 x FPP	
Kapitan M. Izmaylov, Kapitan Kosolapov	RosMorPort	1976	52.2	15.6	4.5	2.5	36	0.6 / 2	2 x FPP	Port icebreakers
Kapitan Plakhin	Severo-Zaãadny Flot	1977	71.0	16.0	3.5	3.3	42	0.7 / 2	3 x CPP	River icebreaker

Kapitan Sorokin	RosMorPort	1977/1991	130.2	30.5	8.5	16.2	181	1.9 / 2	3 x FPP	Bow changed to Thyssen Waas bow
Kapitan Zarubin	RosMorPort	1978	74.4	16.3	3.5	3.3	42	0.7 / 2	3 x CPP	River icebreaker
Kapitan Bukaev, Kapitan Chadayev, Kapitan Krutov	(RosMorPort)	1978	71.0	16.0	3.3	3.3	42	0.7 / 2	3 x FPP	River icebreakers. Kapitan Krutov operates in the Sea of Azov.
Talagi	(Rosneft)	1978	84.2	17.3	8.4	12.2	196	1.5 / 3	1 x CPP	Ex. Canmar Kigoriak, Beaufort Sea supply vessel, no towing notch, nozzle
Kapitan Nikolaev	Murmansk Shipping Co.	1978/1990	125.8	25.6	8.5	16.2	181	1.8 / 2	3 x FPP	Bow changed to conical bow. Changed to be also as a rescue ship.
Kapitan Dranitsyn	Murmansk Shipping Co.	1980	121.3	25.6	8.5	16.2	181	1.3 / 2	3 x FPP	In use as a research and cruise ship
Kapitan Khlebnikov	Fesco	1981	121.3	25.6	8.5	16.2	181	1.3 / 2	3 x FPP	In use as a cruise ship
Magadan	Fesco	1982	78.5	20.0	6.0	7.0	87	1.0 / 2	2 x FPP	In the Okhotsk Sea
Smit Sakhalin, Smit Sibiu	Smit Singapore (FEMCO)	1982	75.5	16.6	7.5	11.2	165	1.2 / 4	2 x CPP	Ex. Miscaroo and Ikaluk, Beaufort Sea supply vessels
Mudyug	RosMorPort	1982/1989	89,8	20.0	6.0	7.0	87	1.5 / 2	2 x CPP	Changed to have a Thyssen Waas bow
Vladimir Ignatjuk	Murmansk Shipping Co.	1983	80.6	17.2	8.0	17.1	200	1.2 / 3	2 x CPP	Ex. (Arctic) Kalvik, Beaufort Sea supply vessel, no towing notch
Dikson	(RosMorPort)	1983	78.5	20.0	6.0	7.0	87	1.0 / 2	2 x CPP	In the White Sea

Kapitan Yevdokimov, Kapitan Demidov, Kapitan Moshkin	(RosMorPort)	1983, 1984, 1986	73.0	16.0	2.5	3.8	41	0.9 / 2	4 x FPP	River icebreakers, Kapitan Demidov and Kapitan Moshkin operate in the Sea of Azov.
Akademik Feodorov	AARI	1987	139.0	23.5	8.5	13.9	140	1.0 / 2	1 x FPP	Antarctic supply and oceanographic research
Rjurik, Askold	Sovfraht	2004, 2005	36.5	12.8	5.9	4.0	64	0.7 / 2	2 x CPP	LU5 class tugs, nozzles
Fesco Sakhalin	Fesco	2005	93.5	21.2	7.5	13.0	150	1.5 / 2	2 x FPP (Azipod)	Supply vessel in the Okhotsk Sea, no towing notch
Pacific Enterprise, Pacific Endeavour, Pacific Endurance	Swire Offshore	2006	77.6	19.0	7.5	14.0	158	NA	2 x FPP (Rolls Royce)	Supply vessel in the Okhotsk Sea, no towing notch, Russian flag
Polar Pevek	Rieber Shipping	2006	74.4	17.0	6.5	10	115	NA	2 x FPP (Azipod)	Supply vessel in the Okhotsk Sea, at Dekastri terminal, no towing notch
Yuri Topchev, Vladislav Strizhov	Sevmorneftegaz (Gazprom)	2006	84.4	19.0	8.0	15.0	163	1.7 / 2	2 x FPP (Azipod)	Originally aimed for the Pechora Sea but Vladislav Strizhov at present in the Okhotsk Sea, no towing notch
Svetlyy, Vzmorye	Lukoil Kaliningrad-morneft	2007	65.0	15.0	4.3	5.3	60	NA	2 x CPP	AHTS ships in Caspian Sea
Toboj	Lukoil	2008	73.3	18.5	9.1	10.4	NA	NA	2 x FPP (SteerProp)	Pechora Sea supply / icebreaker

Varandej	Lukoil	2008	88.8	21.0	10.5	16.8	NA	NA	2 x FPP (SteerProp)	Pechora Sea icebreaker / supply
Moskva, Sankt Petersburg	RosMorPort	Launched 2006, 2007	97.2	26.5	8.5	16.0			2 x FPP (SteerProp)	To be delivered in 2008 and 2009.
<b>Nuclear powered icebreakers</b>										
Lenin	AtomFlot	1959	124.0	26.8	10.5	28.8	330	1.6 / 2	3 x FPP	Retired, museum
Arktika, Sibir, Rossija, Sovetskiy Soyuz, Yamal	AtomFlot	1974-1992	136.0	28.0	11.0	49.0	480	2.3 / 2	3 x FPP	Arktika and Sibir not in use
Taimyr, Vaigach	AtomFlot	1989, 1990	140.6	28.0	8.0	32.5	295	2.0 / 2	3 x FPP	Shallow draught
50 Let Popedy	AtomFlot	2007	145.6	28.0	11.0	49.0	480	2.7 / 2	3 x FPP	Arktika class with improved bow form

<b>SOUTH AFRICA</b>										
Ship	Owner (or operator)	Completed	L <sub>wl</sub> [m]	B <sub>wl</sub> [m]	T [m]	P [MW]	T <sub>B</sub> [t]	h <sub>i</sub> [m] / v [kn]	Propulsion	Remarks
S.A. Agulhas	Smit Amandla Marine Ltd.	1977	112.0	18.1	6.05	4.48	NA	NA	1 x CPP	Antarctic supply / oceanographic research

<b>SWEDEN</b>										
Ship	Owner (or operator)	Completed	L <sub>wl</sub> [m]	B <sub>wl</sub> [m]	T [m]	P [MW]	T <sub>B</sub> [t]	h <sub>i</sub> [m] / v [kn]	Propulsion	Remarks
Ale	Sjöfarts-verket	1973	47.0	13.0	5.0	3.5	48.0	NA	2 x CPP	Lake icebreaker
Atle, Frej, Ymer	Sjöfarts-verket	1974, 1975, 1977	96.0	22.5	8.3	16.2	185	1.4 / 2	2+2 x FPP	Same as Urho- class
Oden	Sjöfarts-verket	1989	100.2	31.2	8.5	17.7	240	1.8 / 3	2 x CPP	
Tor Viking II, Balder Viking, Vidar Viking	Transatlantic AS / Sjöfarts-verket	2000, 2000, 2001	75.2	18.0	7.2	13.4	200	NA	2 x CPP	Removable notch, nozzles, multipurpose offshore/icebreaker

<b>USA</b>										
Ship	Owner (or operator)	Completed	L <sub>wl</sub> [m]	B <sub>wl</sub> [m]	T [m]	P [MW]	T <sub>B</sub> [t]	h <sub>i</sub> [m] / v [kn]	Propulsion	Remarks
Polar Star, Polar Sea	US Coast Guard	1973, 1976	107.3	23.8	8.5	44.8	454	1.8 / 3	3 x CPP	
Nathaniel B. Palmer	Edison Chouest (NSF)	1992	85.3	18.3	9.1	9.5	NA	0.9 / 3	2 X CPP	Research vessel, Kort nozzles
Healy	US Coast Guard	1999	120.9	24.4	8.5	22.4	204	1.4 / 3	2 x FPP	Research vessel, no towing notch
Mackinaw	US Coast Guard	2006	73.2	17.7	4.9	6.7	66	0.8 / 3	2 x FPP (Azipods)	Great Lakes ice-breaker, no towing notch

