

THE WORLD ICEBREAKER, ICE BREAKING SUPPLY AND RESEARCH VESSEL FLEET



February 2011



FOREWORD

This listing of world icebreakers and icebreaker fleet was commissioned by the Finnish Maritime Administration on behalf of the Baltic Icebreaker Management, BIM in 2008. Since that time, several corrections have been made and it was deemed necessary to produce an updated list. The purpose of the compilation is still to advance the use of world icebreakers and ice breaking supply and research vessels in the multitude of tasks available for them. As the definition of an icebreaker was not very clear – even if the towing notch is usually deemed to be required in an icebreaker – 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 naturally welcome – these should be addressed to undersigned.

The present list is an update made in November 2010, 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.

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The icebreakers on the front cover are from top left clockwise: IB Urho (Finland), IB Varandey (Russia), IB Tarmo (Estonia) and IB Tor Viking II (Sweden).

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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 in Finland is given by the Finnish Transport Agency, 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 are also some private ice breaking services. An example of private ice breaking services is given by Gazprom icebreakers 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 and additions.

2. THE LIST OF ICEBREAKERS, ICE BREAKING SUPPLY SHIPS AND ICE CAPABLE RESEARCH 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, to do ice management or to 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 propulsion power, propeller and propulsion system influence the bollard pull. It is here estimated from the data on power and propellers, and if possible checked with some other public data. Overall, some caution is necessary concerning the bollard pull or the ice breaking capability.

The ice breaking performance in level ice reflects the capability of the ship in ice. This breaking performance solely 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 high 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 visibility sector astern is required for icebreakers. Apart from research and supply ships the list includes some ships used in cruising in polar waters.

Note: The data that is estimated is marked with **bold**.

ARGENTINA										
Ship	Owner (or operator)	Completed	L _{wl} [m]	B _{wl} [m]	T [m]	P [MW]	T _B [t]	h _i [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.

AUSTRALIA										
Ship	Owner (or operator)	Completed	L _{wl} [m]	B _{wl} [m]	T [m]	P [MW]	T _B [t]	h _i [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

BRITANNIA										
Ship	Owner (or operator)	Completed	L _{wl} [m]	B _{wl} [m]	T [m]	P [MW]	T _B [t]	h _i [m] / v [kn]	Propulsion	Remarks
James Clark Ross	British Antarctic Survey	1991	90.0	18.9	6.4	6.3	74	NA	1 x FPP	Antarctic supply and oceanographic research, nozzle

CANADA										
Ship	Owner (or operator)	Completed	L _{wl} [m]	B _{wl} [m]	T [m]	P [MW]	T _B [t]	h _i [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	

CHILE										
Ship	Owner (or operator)	Completed	L _{wl} [m]	B _{wl} [m]	T [m]	P [MW]	T _B [t]	h _i [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

CHINA										
Ship	Owner (or operator)	Completed	L _{pp} [m]	B [m]	T [m]	P [MW]	T _B [t]	h _i [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

DENMARK										
Ship	Owner (or operator)	Completed	L _{wl} [m]	B _{wl} [m]	T [m]	P [MW]	T _B [t]	h _i [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	

ESTONIA										
Ship	Owner (or operator)	Completed	L _{pp} [m]	B [m]	T [m]	P [MW]	T _B [t]	h _i [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, modified Finnish ex. Lonna

FINLAND										
Ship	Owner (or operator)	Completed	L _{wl} [m]	B _{wl} [m]	T [m]	P [MW]	T _B [t]	h _i [m] / v [kn]	Propulsion	Remarks
Voima	Arctia Icebreaking Oy	1954, 1979	83.5	18.7	7.0	10.2	113	1.2 / 2	2+2 x FPP	Modernized in 1979
Urho, Sisu	Arctia Icebreaking Oy	1975, 1976	96.0	22.5	7.3	16.2	185	0.8 / 8.5	2+2 x FPP	
Otso, Kontio	Arctia Icebreaking Oy	1986, 1987	90.0	23.4	7.3	15	160	0.8 / 10	2 x FPP	
Fennica, Nordica	Arctia Offshore Oy	1993, 1994	96.7	25.2	8.4	15	234	0.8 / 9.5	2 x FPP (Rolls Royce)	Multipurpose offshore/icebreaking
Zeus	Alfons Håkans Oy	1995	42.0	14.0	6.66	5.4	101	NA	1 x CPP	Tug, towing notch
Botnica	Arctia Offshore Oy	1998	77.9	23.1	7.2	10	117	0.6 / 8	2 x FPP (Azipod)	Multipurpose offshore/icebreaking

GERMANY										
Ship	Owner (or operator)	Completed	L _{wl} [m]	B _{wl} [m]	T [m]	P [MW]	T _B [t]	h _i [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, nozzles
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 FPP Schottel tandem props	Marginal ice zone research vessel

JAPAN										
Ship	Owner (or operator)	Completed	L _{wl} [m]	B _{wl} [m]	T [m]	P [MW]	T _B [t]	h _i [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	Cruises to Antarctica

KAZAKSTAN										
Ship	Owner (or operator)	Completed	L _{pp} [m]	B [m]	T [m]	P [MW]	T _B [t]	h _i [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
Mangystau-1, ...,5	JSC Circle Marine Invest	2010,2011	61.9	16.4	3.0	4.8	52	0.6 / 4	3 x FPP (Schottel)	Kashagan field in the Caspian Sea

LATVIA										
Ship	Owner (or operator)	Completed	L _{pp} [m]	B [m]	T [m]	P [MW]	T _B [t]	h _i [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	

NORWAY										
Ship	Owner (or operator)	Completed	L _{pp} [m]	B [m]	T [m]	P [MW]	T _B [t]	h _i [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

RUSSIA										
Ship	Owner (or operator)	Completed	L _{wl} [m]	B _{wl} [m]	T [m]	P [MW]	T _B [t]	h _i [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	Formerly Swedish
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

RUSSIA										
Ship	Owner (or operator)	Completed	L _{wl} [m]	B _{wl} [m]	T [m]	P [MW]	T _B [t]	h _i [m] / v [kn]	Propulsion	Remarks
Kapitan Plakhin	Severo-Zapadny 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 ship, 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 ships

RUSSIA										
Ship	Owner (or operator)	Completed	L _{wl} [m]	B _{wl} [m]	T [m]	P [MW]	T _B [t]	h _i [m] / v [kn]	Propulsion	Remarks
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 ship, 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	1.5 / 4	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

RUSSIA										
Ship	Owner (or operator)	Completed	L _{wl} [m]	B _{wl} [m]	T [m]	P [MW]	T _B [t]	h _i [m] / v [kn]	Propulsion	Remarks
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
Toboy	Lukoil	2008	73.3	18.5	9.1	10.4	NA	1.5 / 3	2 x FPP (SteerProp)	Pechora Sea supply / icebreaker
Varandey	Lukoil	2008	88.8	21.0	10.5	16.8	NA	1.7 / 4	2 x FPP (SteerProp)	Pechora Sea icebreaker / supply
Moskva, Sankt Petersburg	RosMorPort	2008, 2009	97.2	26.5	8.5	16.0	NA	NA	2 x FPP (SteerProp)	
Langepas, Kogalym, Svetlyy, Vzmore	Lukoil	2009, 2010	62.4	15.0	4.3	5.3	60	NA	2 x CPP	Korchagin field in the Caspian Sea
Nuclear powered icebreakers										
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

RUSSIA										
Ship	Owner (or operator)	Completed	L _{wl} [m]	B _{wl} [m]	T [m]	P [MW]	T _B [t]	h _i [m] / v [kn]	Propulsion	Remarks
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

SOUTH AFRICA										
Ship	Owner (or operator)	Completed	L _{wl} [m]	B _{wl} [m]	T [m]	P [MW]	T _B [t]	h _i [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

SWEDEN										
Ship	Owner (or operator)	Completed	L _{wl} [m]	B _{wl} [m]	T [m]	P [MW]	T _B [t]	h _i [m] / v [kn]	Propulsion	Remarks
Ale	Sjöfartsverket	1973	47.0	13.0	5.0	3.5	48.0	NA	2 x CPP	Lake icebreaker
Atle, Frej, Ymer	Sjöfartsverket	1974, 1975, 1977	96.0	22.5	8.3	16.2	185	1.4 / 2	2+2 x FPP	Same as Urho- class
Oden	Sjöfartsverket	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 / Sjöfartsverket	2000, 2000, 2001	75.2	18.0	7.2	13.4	200	NA	2 x CPP	Removable notch, nozzles, multipurpose offshore/icebreaker

USA										
Ship	Owner (or operator)	Completed	L _{wl} [m]	B _{wl} [m]	T [m]	P [MW]	T _B [t]	h _i [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

