

BUILDING COST ESTIMATE

FOR

Kystforskningsfartøy

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SUMMARY OF BUILDING COST ESTIMATE

Delivery time: 2018

Calculation currency: NOK

SFI Item	Material costs [NOK]	Man-hours [h]	Average man-hour rate [NOK / h]	Labour costs [NOK]	Sub total cost [NOK]	Relative cost	Confidence
1 Ship general	10 570 000	6 400	650	4 160 000	14 730 000	18 %	59 %
2 Hull	11 662 000	750	650	487 500	12 149 500	15 %	94 %
3 Equipment for cargo	2 350 000	1 000	650	650 000	3 000 000	4 %	60 %
4 Ship equipment	8 128 200	3 500	650	2 275 000	10 403 200	13 %	55 %
5 Equipment for crew and passengers	8 686 250	3 000	650	1 950 000	10 636 250	13 %	73 %
6 Machinery main components	9 249 000	5 000	650	3 250 000	12 499 000	15 %	74 %
7 Systems for machinery main components	3 650 000	6 500	650	4 225 000	7 875 000	10 %	0 %
8 Ship common systems	9 350 000	2 500	650	1 625 000	10 975 000	13 %	0 %
SUM	63 645 450	28 650	650	18 622 500	82 267 950	100 %	54 %

	Price [NOK]	Relative cost	Confidence
Material costs	63 645 450	77 %	70 %
Labour costs	18 622 500	23 %	0 %
SUM PRODUCTION COSTS	82 267 950	100 %	54 %
Contingency	2 % of production costs		
Yard Profit	3 % of production costs		
TOTAL BUILDING COST	86 381 348		

Currency exchange ratio		
Euro	9 NOK/EUR	
Unit costs		
Steel purchase and fabrication from European (not Norway) yard	6 EUR/kg	54 NOK/kg
Secondary steel	6 EUR/kg	54 NOK/kg
Pipe fitting, European yard	6 EUR/kg	54 NOK/kg
Aluminium purchase and fabrication from European (not Norway) yard	10 EUR/kg	90 NOK/kg

GROUP 1 - SHIP GENERAL								
SFI	Item	Units	Unit cost [NOK / unit]	Comment	Material Cost NOK	Man-hours h	Vendor info	Maturity
10	Ship general				-			
101	Contract/specific. work, general design, model testing	1	4 000 000	Basic design package from ship designer	4 000 000			V
101	Contract/specific. work, general design, model testing	1	250 000	Model testing	250 000			V
101	Contract/specific. work, general design, model testing	1	2 000 000	Detail design package	2 000 000			V
101	Contract/specific. work, general design, model testing			Yard administration man-hours	-	3 000		A
11	Insurance, fees, certificates, representation				-			
111	General insurance	1	150 000		150 000			A
112	Classification & statutory fees & certificates	1	2 000 000	DNV GL class	2 000 000			V
113	Building advance interest, discount, finance costs	1	200 000		200 000			A
117	Representation, travels, conferences	1	150 000		150 000			A
118	Launching & delivery representation	1	100 000		100 000			A
12	Quality assurance, general work, models				-			
121	Quality assurance, planning, work preparation				-	1 500		A
122	Work management, fire guard, supervision, watch keeping				-	500		A
123	Clearing & cleaning				-	500		A
126	Assistance with owner's supply				-	400		A
127	Models, albums, photos	1	20 000		20 000			A
13	Provisional rigging				-			
131	Prov. gangways, roofs, hatches, stairs, stages for hullxet				-	300		A
139	Prov. lifting & transport equipment	1	100 000		100 000			A
14	Work on ways, launching, docking				-			
144	Dry docking, slip docking				-	200		A
145	Shifting, towing (excl. launching)	1	450 000	Towing of hull to outfitting yard, incl. Insurance	450 000			V
15	Quality control, measurements, tests, trials				-			
153	Fuel & lube oil for tests & trial trips	1	100 000		100 000			A
154	Trial trips	1	250 000		250 000			A
16	Guarantee/mending work				-			
162	Guarantee work	1	500 000		500 000			A
19	Consumption articles	1	300 000		300 000			A
SUM GROUP 1 - SHIP GENERAL					10 570 000	6 400		


GROUP 2 - HULL								
SFI	Item	Units	Unit cost [NOK / unit]	Comment	Material Cost NOK	Man-hours h	Vendor info	Maturity
20	Hull materials, general hull work				-			
201	Hull materials	160 000	54	Primary steel hull	8 640 000			V
202	Transportation, sorting & storage of hull materials				-			
25	Deck houses & superstructures				-			
253	Superstructures	1 500	54	Primary steel superstructure	81 000			V
253	Superstructures	15 000	90	Primary aluminium superstructure	1 350 000			V
26	Hull outfitting				-			
263	Foundations	16 000	54	Assumed 10 % of primary steel	864 000			V
267	Gutter bars, bulwark, breakwaters, gas barriers	8 000	54	General steel outfitting. Assume 5 % of primary steel	432 000			V
27	Material protection, external	1	220 000	Painting	220 000	750		A
276	Galvanizing, nickel plating, metallizing	1	50 000	Galvanizing	50 000			A
278	External cathodic protection	1	25 000	Cathodic protection	25 000			A
SUM GROUP 2 - HULL					11 662 000	750		

GROUP 3 - EQUIPMENT FOR CARGO								
SFI	Item	Units	Unit cost [NOK / unit]	Comment	Material Cost NOK	Man-hours h	Vendor info	Maturity
3	Equipment for cargo			Yard man-hours, complete	-	1 000		A
30	Hatches and ports				-			
301	Cargo hatch covers w/equipment on weather decks			Included in group 2	-			
302	Cargo hatch covers w/equipment, on tween decks			Included in group 2	-			
307	Side ports	1	500 000	CTD hangar side door hydraulics	500 000			A
308	Cargo doors in bulkheads	1	50 000	Roller in CTD hangar	50 000			A
309	Common hydraulic oil system for hatches/ports			Included in group 4	-			
33	Deck cranes for cargo	1	1 800 000	Both cranes, incl. HPU	1 800 000			V
331	Rotating cranes w/crane pillars			Main deck crane	-			
333	Travelling traverse cranes w/rails			CTD crane	-			
SUM GROUP 3 - EQUIPMENT FOR CARGO					2 350 000	1 000		

GROUP 4 - SHIP EQUIPMENT								
SFI	Item	Units	Unit cost [NOK / unit]	Comment	Material Cost NOK	Man-hours h	Vendor info	Maturity
4	Ship equipment			Yard man-hours, complete	-	3 500		A
40	Manoeuvring machinery & equipment				-			
401	Rudder w/welded parts	1	850 000	Flap rudder, complete	850 000			V
403	Steering gear/columns, telemotor sys., rudder ind., emerg.st	1	650 000	Steering gear, complete	650 000			V
404	Side thrusters	0	1 978 200	Bow retractable thruster 340 kW, complete	-			V
404	Side thrusters	1	650 000	Bow tunnel thruster, 250 kW, complete	650 000			A
404	Side thrusters	1	590 000	Aft tunnel thruster, 155 kW, complete	590 000			V
41	Navigation & searching equipment				-			
411	Radar plants	1	206 900	Radar	206 900			V
411	Radar plants	1	30 860	Bridge alarm	30 860			V
412	Decca, loran, omega, radio direction finder	1	21 300	GPS	21 300			V
412	Decca, loran, omega, radio direction finder	1	37 200	AIS	37 200			V
413	Gyro plants, autopilots, compasses	1	44 770	GPS Compass	44 770			V
413	Gyro plants, autopilots, compasses	1	149 900	Gyro Compass	149 900			V
413	Gyro plants, autopilots, compasses	1	80 400	Auto Pilot	80 400			V
414	Underwater searching equipm.: asdic, echo sounder, speed log	1	97 400	Doppler Log	97 400			V
414	Underwater searching equipm.: asdic, echo sounder, speed log	0	249 800	Current Log	-			V
414	Underwater searching equipm.: asdic, echo sounder, speed log	1	66 550	Navigational Echo Sounder	66 550			V
414	Underwater searching equipm.: asdic, echo sounder, speed log	0	159 700	Echo Sounder	-			V
414	Underwater searching equipm.: asdic, echo sounder, speed log	0	371 000	Echo Sounder	-			V
414	Underwater searching equipm.: asdic, echo sounder, speed log	0	399 580	Multi Beam Echo Sounder	-			V
417	Clocks, facsimile recorders, misc. nautical equipment	1	218 850	Chart plotter	218 850			V
417	Clocks, facsimile recorders, misc. nautical equipment	1	125 380	PC Based Chart plotter	125 380			V
42	Communication equipment				-			
421	Radio plant, gmdss	1	16 150	Navtex	16 150			V
421	Radio plant, gmdss	1	23 900	GMDSS Power	23 900			V
421	Radio plant, gmdss	1	192 000	SAT TV	192 000			V
421	Radio plant, gmdss	1	77 690	MF/HF system	77 690			V
424	Vhf/uhf telephones	1	23 950	VHF system	23 950			V
427	Light & signal equipment, lanterns, typhons	1	50 000	Lanterns	50 000			A
43	Anchoring, mooring & towing equipment				-			
431	Anchors w/chains & equipment	2	200 000	Anchors	400 000			A
432	Windlasses w/chain stoppers, rollers	1	1 300 000	Winch, guide rolls and capstans	1 300 000			V
436	Loose mooring equipment	1	50 000	Mooring ropes etc.	50 000			A
439	Common hydr. oil syst. for anchoring/mooring/cargo winches			Included in gr. 33	-			
44	Rep./maint./clean. equip. workshop/store outfit, name plates	1	250 000	Complete workshop outfitting	250 000			A
46	Hunting & fishing equipment				-			
464	Trawling equipment			Bottom trawl	-			
464	Trawling equipment			Pelagic trawl	-			
464	Trawling equipment			Trawl winches - detachable	-			
464	Trawling equipment			Trawl drum - detachable	-			
464	Trawling equipment	1	875 000	Trawl gallow/A-frame	875 000			V
48	Special equipment				-			
484	Laboratory equipment			CTD	-			
484	Laboratory equipment			Watersampler system (rosette)	-			
484	Laboratory equipment	1	200 000	General Equipment in CTD hangar	200 000			A
484	Laboratory equipment	1	100 000	General Equipment in wet lab	100 000			A
484	Laboratory equipment	1	100 000	General Equipment in dry lab	100 000			A
484	Laboratory equipment			Scientific equipment	-			
484	Laboratory equipment	1	50 000	General Equipment in sample freezer	50 000			A
484	Laboratory equipment	1	50 000	General Equipment in De-pressurized store	50 000			A
488	Seismic equipment	1	400 000	Multi-purpose winch below deck	400 000			A
488	Seismic equipment	1	150 000	Co-axial cable winch below deck	150 000			A
SUM GROUP 4 - SHIP EQUIPMENT					8 128 200	3 500		

GROUP 5 - EQUIPMENT FOR CREW AND PASSENGERS								
SFI	Item	Units	Unit cost [NOK / unit]	Comment	Material Cost NOK	Man-hours h	Vendor info	Maturity
5	Equipment for crew and passengers			Yard man-hours, complete	-	3 000		A
50	Lifesaving, protection, medical equipm.				-			
501	Liferafts w/equipment	1	650 000		650 000			V
502	Liferafts w/equipment	2	25 000		50 000			A
503	Lifesaving, safety & emergency equipment	1	300 000	General life saving equipment	300 000			A
504	Medical, first aid & dental equipment, medicines			Incl. in 503	-			
51	Insulation, panels, bulkheads, doors, sidescuttles,skylights				-			
511	Insulation, partition bulkheads, panelling, wallpaper	60	16 500	Interior outfitting bridge deck, complete incl. Furniture	990 000			V
511	Insulation, partition bulkheads, panelling, wallpaper	17	16 500	Interior outfitting CTD control room, complete incl. Furniture	280 500			V
511	Insulation, partition bulkheads, panelling, wallpaper	23	3 500	Interior outfitting HVAC & instrument room	78 750			V
511	Insulation, partition bulkheads, panelling, wallpaper	100	16 500	Interior outfitting Main deck, complete incl. Furniture	1 650 000			V
511	Insulation, partition bulkheads, panelling, wallpaper	100	16 500	Interior outfitting accomodation below main deck, complete incl. Furniture	1 650 000			V
511	Insulation, partition bulkheads, panelling, wallpaper	80	3 500	Interior outfitting in engine room	280 000			V
511	Insulation, partition bulkheads, panelling, wallpaper	42	3 500	Interior outfitting in cargo hold	147 000			V
512	Doors w/coamings in accommodation			Incl. In 511	-			V
514	External doors w/coamings	-	10 000	Incl. in gr 2	-			V
515	Side scuttles & windows w/equipment	-	8 000	Windows in wheelhouse, Incl. In gr 2	-			V
515	Side scuttles & windows w/equipment	-	6 000	Windows in CTD hangar, Incl. In gr 2	-			V
515	Side scuttles & windows w/equipment	-	4 500	Windows on main deck, Incl. In gr 2	-			V
515	Side scuttles & windows w/equipment	-	4 000	Portholes below main deck, Incl. In gr 2	-			V
515	Side scuttles & windows w/equipment	1	10 000	Wipers in wheelhouse	10 000			A
57	Ventilation, air-conditioning & heating systems	1	2 000 000		2 000 000			V
58	Sanitary syst. w/discharges, accomodation drain systems				-			
581	Sanitary supply systems	1	400 000		400 000			A
582	Sanitary discharge systems, accomodation drainage systems	1	200 000		200 000			A
SUM GROUP 5 - EQUIPMENT FOR CREW AND PASSENGERS					8 686 250	3 000		

GROUP 6 - MACHINERY MAIN COMPONENTS								
SFI	Item	Units	Unit cost [NOK / unit]	Comment	Material Cost NOK	Man-hours h	Vendor info	Maturity
6	Machinery main components			Yard man-hours, complete	-	5 000		A
60	Diesel engines for propulsion				-			
601	Diesel engines	1	3 020 000	Propulsion engine 1400 kW, complete incl. Silencer and commissioning	3 020 000			V
601	Diesel engines	0	2 650 000	Propulsion engine 1000 kW, complete incl. Silencer and commissioning	-			V
62	Other types of propulsion machinery				-			
625	El. generator/el. motor plants	0	1 139 000	Gensets 600 kW, complete incl. Silencer and commissioning	-			V
625	El. generator/el. motor plants	2	990 000	Gensets 430 kW, complete incl. Silencer and commissioning	1 980 000			V
625	El. generator/el. motor plants	0	271 000	Enclosure for genset	-			V
63	Propellers, transmissions, foils				-			
634	Controllable pitch propeller plants incl. nozzles	1	4 000 000	CP Propeller incl. reduction gear for mechanical propulsion	4 000 000			V
634	Controllable pitch propeller plants incl. nozzles	0	6 362 000	CP Propeller incl. reduction gear and electric motors for electrical propulsion	-			V
634	Controllable pitch propeller plants incl. nozzles	0	8 050 000	CP Propeller incl. permanent magnet motor	-			V
635	Spec. propeller plants incl. nozzles (excl. side thrusters)	0	6 000 000	Permanent magnet azimuth thrusters	-			V
635	Spec. propeller plants incl. nozzles (excl. side thrusters)	0	2 130 000	Conventional rotatable thrusters	-			V
66	Other aggr. & gen. for main & emergency el. power production				-			
665	Harbour & emergency aggregates w/equipment	1	249 000	Complete incl. Silencer and commissioning	249 000			V
SUM GROUP 6 - MACHINERY MAIN COMPONENTS					9 249 000	5 000		

 GROUP 7 - SYSTEMS FOR MACHINERY MAIN COMPONENTS								
SFI	Item	Units	Unit cost [NOK / unit]	Comment	Material Cost NOK	Man-hours h	Vendor info	Maturity
7	Systems for machinery main components			Yard man-hours, complete	-	6 500		A
70	Fuel systems	1	200 000	Piping	200 000			A
702	Fuel oil purification plants	2	250 000	Separators	500 000			A
71	Lube oil systems			Piping, incl. In Gr. 2	-			A
712	Lube oil purification plants	2	250 000	Separators	500 000			A
72	Cooling systems			Piping, incl. In Gr. 2	-			A
721	Sea water cooling systems	2	250 000		500 000			A
722	Fresh water & other cooling systems	2	250 000		500 000			A
73	Compressed air systems				-			
731	Starting air systems (high pressure)	1	100 000	Compressor & piping	100 000			A
733	General purpose air systems for deck (low pressure)	1	50 000		50 000			A
74	Exhaust systems & air intakes				-			
743	Exhaust gas systems for propulsion machinery	3	-	Included in gr. 6	-			
79	Automation systems for machinery	1	1 300 000		1 300 000			A
791	Manoeuvre consoles, main consoles				-			
792	Common automation equipment, engine room alarm systems				-			
793	Autom. equip. for prop. mach. & transmis., eng. telegraph				-			
795	Automation equipment for motor/turbo aggregates				-			
SUM GROUP 7 - SYSTEMS FOR MACHINERY MAIN COMPONENTS					3 650 000	6 500		



GROUP 8 - SHIP COMMON SYSTEMS

SPI	Item	Units	Unit cost [NOK / unit]	Comment	Material Cost NOK	Man-hours h	Vendor info	Maturity
8	Ship common systems				-	2 500		A
80	Ballast & bilge systems, gutter pipes				-			V
801	Ballast systems, solid ballast	1	150 000	Piping, incl. In gr. 2	150 000			A
81	Fire & lifeboat alarm, fire fighting & wash down systems	1	300 000		300 000			A
811	Fire detection, fire & lifeboat alarm systems				-			
815	Fire fighting systems w/gas (co2, halon, etc)				-			
82	Air & sounding systems from tanks to deck	1	100 000		100 000			A
823	Automatic/remote sounding system				-			
85	Common electric & electronic systems	1	800 000		800 000			A
855	Common computer systems				-			
86	Electric power supply	1	5 000 000	Complete electro components	5 000 000			A
861	Generators/alternators			Incl. In gr. 6	-			
865	Transformers				-			
867	Rectifiers & converters				-			
87	Common electric distribution systems			Incl. In gr. 86	-			
871	Main switchboards				-			
872	Emergency switchboards				-			
874	Local starters				-			
875	Distribution panels & boards				-			
88	Electric cable installation	1	2 500 000		2 500 000			A
881	Cable trays & installation in engine & boiler rooms				-			
882	Cable trays w/installation in accommodation				-			
883	Cable trays & installation on deck & in cargo holds				-			
89	Electric consumer systems	1	500 000	Lighting	500 000			A
891	Electric lighting systems for engine & boiler room				-			
892	Electric lighting systems for accommodation				-			
893	Electric lighting systems for deck & cargo holds				-			
SUM GROUP 8 - SHIP COMMON SYSTEMS					9 350 000	2 500		