

Supplement Table: Modified world port ranking and ballast water volumes derived from the biggest 100 cargo and container ports with respect to annual throughput in 2016 (AAPA, 2016). Ballast water volume was calculated as 33 % of total goods loaded in 2016, which is 3.4 billion m3 and divided among all ports listed.

PORT	COUNTRY	Latitude	Longitude	% of total market	
				volume 2016	BW volume [m <sup>3</sup> ]
Shanghai	China	31.230	121.474	5.11	173622371
Singapore	Singapore	1.352	103.820	4.59	155770045
Guangzhou	China	23.129	113.253	3.89	132210129
Ningbo	China	29.868	121.544	3.54	120107924
Qingdao	China	36.067	120.383	3.27	111095972
Rotterdam	Netherlands	51.924	4.478	3.20	108668142
Tianjin	China	39.084	117.201	3.06	103831507
Port Hedland	Australia	-20.312	118.575	2.95	100285267
Busan	South Korea	35.180	129.076	2.74	92914291
Dalian	China	38.914	121.615	2.25	76290834
Hong Kong	Hong Kong	22.396	114.109	2.19	74275073
Shenzhen	China	22.543	114.063	1.91	64773732
Port Kelang	Malaysia	3.005	101.409	1.85	62817843
Kwangyang	South Korea	33.493	126.535	1.80	60997903
Xiamen	China	24.480	118.089	1.73	58747979
Antwerp	Belgium	51.219	4.402	1.62	55037257
Dubai Ports	United Arab Emirates	25.205	55.271	1.56	52796632
South Louisiana	United States	30.021	-90.471	1.45	49177886
Houston	United States	29.760	-95.370	1.44	48893230
Nagoya	Japan	35.181	136.906	1.26	42836935
Hamburg	Germany	53.551	9.994	1.12	38100756
Itaqui	Brazil	-2.578	-44.367	1.10	37239115
Qinhuangdao	China	39.929	119.620	1.10	37186541
Ulsan	South Korea	35.538	129.311	1.07	36297343
Inchon	South Korea	37.456	126.705	1.07	36245605
Kaohsiung	Taiwan	22.627	120.301	1.04	35302384
Chiba	Japan	35.607	140.106	1.04	35275262

Tanjung Pelepas	Malaysia	1.364	103.552	1.03	34876413
Newcastle	Australia	-32.927	151.779	1.02	34723238
Dampier	Australia	-20.664	116.708	1.02	34708749
Saigon	Viet Nam	10.750	106.742	0.98	33413647
New York/New Jersey	United States	40.713	-74.006	0.93	31718108
Metro Vancouver	Canada	49.197	-123.182	0.92	31179303
Tubarao	Brazil	-28.472	-49.015	0.82	27693686
Santos	Brazil	-23.968	-46.329	0.81	27360136
Algeciras - La Linea	Spain	36.141	-5.456	0.74	25149429
Gladstone	Australia	-23.852	151.264	0.73	24922393
Laem Chabang	Thailand	13.104	100.916	0.71	24144802
Kobe	Japan	34.690	135.196	0.69	23337570
Itaguai	Brazil	-22.863	-43.778	0.69	23262183
Pyeongtaek	South Korea	36.983	126.841	0.68	23226582
Tokyo	Japan	35.689	139.692	0.66	22325564
Hay Point	Australia	-21.306	149.292	0.65	22034361
Long Beach	United States	33.770	-118.194	0.64	21839071
Bremen/Bremerhaven	Germany	53.074	8.806	0.63	21445428
Los Angeles	United States	34.052	-118.244	0.62	21205994
Richards Bay	South Africa	-28.781	32.038	0.61	20578650
Kitakyushu	Japan	33.883	130.875	0.60	20393401
Valencia	Spain	39.470	-0.376	0.60	20266218
Amsterdam Ports	Netherlands	52.370	4.895	0.59	19877599
Ust-Luga	Russia	59.653	28.270	0.57	19324334
Osaka	Japan	34.694	135.502	0.56	19061373
Colombo	Sri Lanka	6.927	79.861	0.55	18724791
Chittagong	Bangladesh	22.348	91.812	0.54	18497631
Paradip	India	20.317	86.611	0.54	18411126
Bandar Abbas	Iran	27.183	56.267	0.54	18388178
Marseilles	France	43.296	5.370	0.53	18035493
Daesan	South Korea	36.940	126.434	0.52	17777758
Jawaharlal Nehru	India	18.950	72.951	0.52	17664711
Manila	Philippines	14.600	120.984	0.51	17363339

Taichung	Taiwan	24.148	120.674	0.51	17256258
New Orleans	United States	29.951	-90.072	0.50	16950597
Le Havre	France	49.494	0.108	0.48	16263062
Botas	Turkey	36.885	35.928	0.48	16236564
Novorossisk	Russia	44.715	37.762	0.47	15962518
Tanjung Priok	Indonesia	-6.132	106.871	0.47	15945438
Beaumont	United States	30.080	-94.127	0.47	15872245
Jeddah	Saudi Arabia	21.285	39.238	0.46	15511232
Corpus Christi	United States	27.801	-97.396	0.45	15393982
Yanbu	Saudi Arabia	24.023	38.190	0.41	13872405
Saldanha Bay	South Africa	-33.028	17.918	0.41	13769949
Baton Rouge	United States	30.458	-91.140	0.40	13707294
Jubail	Saudi Arabia	26.960	49.569	0.40	13681567
Izmit (Kocaeli)	Turkey	40.765	29.941	0.40	13660041
Primorsk	Russia	46.723	36.354	0.39	13335285
Bombay	India	19.076	72.878	0.38	13050063
Virginia	United States	36.912	-76.324	0.38	12981932
Karachi	Pakistan	24.861	67.010	0.38	12952244
Visakhapatnam	India	17.702	83.290	0.37	12696329
Alexandria and El-Dekheila	Egypt	31.200	29.919	0.37	12677791
Genoa	Italy	44.406	8.946	0.37	12615708
Constantza	Romania	44.160	28.635	0.36	12299957
Trieste	Italy	45.650	13.777	0.36	12261044
Barcelona	Spain	41.385	2.173	0.36	12160392
Chennai	India	13.084	80.290	0.36	12126121
St. Petersburg	Russia	59.934	30.335	0.35	11926082
London	United Kingdom	51.507	-0.128	0.35	11908807
Grimsby and Immingham	United Kingdom	53.567	-0.081	0.33	11260489
Sines	Portugal	37.957	-8.861	0.33	11230363
Mobile	United States	30.695	-88.040	0.32	10895508
Philadelphia	United States	39.813	-75.421	0.32	10856044

Pohang	South Korea	36.019	129.343	0.32	10770560
Plaquemines	United States	29.324	-89.474	0.31	10661975
Lake Charles	United States	30.227	-93.217	0.31	10523999
Calcutta	India	22.573	88.364	0.31	10414136
Aliaga	Turkey	38.800	26.971	0.31	10376051
Sao Sebastiao	Brazil	-23.806	-45.402	0.29	9744753
Dunkirk	France	51.034	2.377	0.28	9632362
Bintulu	Malaysia	3.171	113.042	0.28	9521005
Calais	France	50.951	1.859	0.27	9280698
Khor Fakkan	United Arab Emirates	25.337	56.343	0.15	5230532
Colon	Panama	9.335	-79.942	0.14	4593231
Gioia Tauro	Italy	38.426	15.899	0.12	4089343
Piraeus	Greece	37.943	23.647	0.12	3985329
Savannah	United States	32.084	-81.100	0.11	3887948
Felixstowe	United Kingdom	51.962	1.351	0.11	3877662
Northwest Seaport Alliance	United States	47.606	-122.332	0.11	3857258
Mina Raysu	Oman	16.970	53.981	0.10	3547086
East Port Said Port	Egypt	31.265	32.302	0.10	3417286
Marsaxlokk	Malta	35.840	14.545	0.10	3285001
Tanger	Morocco	35.759	-5.834	0.09	3162276
Keelung	Taiwan	25.128	121.739	0.09	3057715
Balboa	Panama	8.961	-79.563	0.09	3020852
Yokohama	Japan	35.444	139.638	0.09	2966353
Ambarli	Turkey	41.318	41.714	0.09	2965864
Durban	South Africa	-29.859	31.022	0.08	2795024
Melbourne	Australia	-37.814	144.963	0.08	2790294
Manzanillo	Mexico	20.333	-77.120	0.08	2751068
Dublin	Ireland	53.350	-6.260	0.08	2649232
Southampton	United Kingdom	50.910	-1.404	0.08	2623582
Oakland	United States	37.804	-122.271	0.07	2527916
Sydney Ports	Australia	-33.853	151.210	0.07	2521384
Cartagena	Colombia	10.391	-75.479	0.07	2454795

Callao	Peru	-12.051	-77.126	0.06	2192227
Charleston	United States	32.776	-79.931	0.06	2129613
Guayaquil	Ecuador	-2.171	-79.922	0.06	1943327
Dammam	Saudi Arabia	26.393	49.978	0.06	1908603
Kingston	Jamaica	44.231	-76.486	0.05	1672136
Gdansk	Poland	54.404	18.666	0.05	1663309
Bangkok	Thailand	13.756	100.502	0.05	1589441
La Spezia	Italy	44.102	9.824	0.05	1559103
Montreal	Canada	45.502	-73.567	0.05	1544253
Ashdod	Israel	31.804	34.655	0.05	1539463
Penang	Malaysia	5.415	100.330	0.05	1533109
Mersin	Turkey	36.812	34.641	0.04	1500337
Zeebrugge	Belgium	51.319	3.207	0.04	1492773
San Antonio	Chile	-33.593	-71.608	0.04	1373664
Haifa	Israel	32.794	34.990	0.04	1352627
San Juan	Puerto Rico	18.466	-66.106	0.04	1313309
Honolulu	United States	21.307	-157.858	0.04	1292949
Freeport	Bahamas	26.542	-78.646	0.04	1280151
Brisbane	Australia	-27.471	153.023	0.04	1262858
Limon-Moin	Costa Rica	9.991	-83.042	0.04	1256014
Belawan	Indonesia	3.784	98.694	0.04	1248633