Marine Stern Drive Production Volumes and Market Shares: an Overview

A Polson Enterprises Market Research Paper

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Abstract: *Several companies contemplating entering the marine drive or marine drive accessory market have asked us "How many stern drives are made in a year?, How many does MerCruiser make?" This paper provides a brief overview of recent stern drive production volumes, identifies major manufacturers and provides insights into current and historical market shares.*

Only free, public sources of information are used. Most sources are widely available. We avoided citing expensive market studies sold by others. An extensive list of references used in this report is provided at the end of the paper.

Those contemplating entering the industry may also find two of our earlier papers interesting. "U.S. Commercialization of Innovative, Propeller Driven Recreational Marine Drive Designs" and "Propeller Driven Recreational Marine Drive Designs: Learning from the Past with an Eye to the Future" can be viewed from our marine drive design papers page at: http://www.rbbi.com/white/white.htm

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Introduction

Prior to 1959, outboards were widely used to power small boats. They were economical, widely available and easy to steer. They even tilted up rapidly when striking underwater obstacles, reducing drive and propeller damages. When boats were left on the water, outboards could be tilted up or entirely removed to reduce corrosion problems. In addition, they were easily trailered, eliminating marina berth fees.

During those times, inboards (shaft drives) dominated larger power boats. They featured powerful, more reliable engines mounted inside the boat. Propellers remained in the water while the boat was in the water (corrosion problems) and were easily damaged when striking underwater obstructions. Inboards typically steered with a rudder, making steering less responsive, especially in reverse. Propeller location (many under the middle of the hull) made inboards more difficult to trailer. Boaters sacrificed many outboard features when selecting an inboard in their quest for more power.

Unbeknownst to most, stern drives were about to come on the scene, bringing together many of the best features of both drives. Few could imagine this new drive would not only replace many inboards, but also attract even more people to boating.

Birth of the Stern Drive

The origin of stern drives is well documented in Iron Fist: The Lives of Carl Kiekhaefer[1,2] by Jeffrey L. Rodengen. J.R. Wynne's name appears on the patent (U.S. Patent 3,376,842)[3] and it was assigned to AB Volvo Penta. When Volvo Penta unveiled the Aquamatic stern drive in January 1959 at the New York Motor Boat Show, sales were slow at first, but OMC and Mercury Marine soon entered the market and the rest is history. Stern drives rapidly captured market share from inboards and larger outboards. Early stern drives had limited features and used engines much smaller than those in use today. Modern stern drives use marinized automotive engines to power more complex drives incorporating steering, trim, tilt, contrarotating propellers, water pickups, water pumps, hydraulic clutches, two speed transmissions, electronic fuel injection, and many other features. Stern drives are much more powerful than in the early days. Production drives are approaching 500 gasoline horsepower and some are built to handle higher torques of diesel engines. Production high performance and racing drives are even more powerful.

Stern Drive Manufacturers

As mentioned earlier, Volvo-Penta launched the first entry in the stern drive market. They were followed shortly later by Outboard Marine Corporation's (OMC) stern drives and by Mercury Marine's MerCruiser stern drives. Yamaha entered the U.S. stern drive market in the late 1980's, then left in the 1990's. Yamaha still sells stern drives in Europe and Asia. In 1993, Volvo Penta signed a joint venture agreement with OMC to produce stern drives at OMC's plant in Lexington Tennessee. Volvo Penta became the major partner, then took the over the operation in 1998 when OMC closed.

At least three firms produce stern drives in the U.K. All are minor players. Sillette-Sonic entered the market in 1975. Sternpowr and Enfield also produce stern drives there.

Two U.S. companies focusing on rebuilt or replacement drives produce their own drives. Konrad Marine and Sterndrive Engineering are in this category.

Toyota has sold a few stern drives outside the United States. Their drive may be a "branded" version of Yamaha's drive.

At least three companies focus on high performance or racing stern drives. Mercury Racing, previously known as Mercury High Performance, produce Mercury Racing Drives. Weismann produces high performance stern drives and The Bravo Shop produces high performance stern drives based on Mercury drives.

DBD Marine of Australia produces a drive that is somewhat of a cross between a stern drive and a shaft drive.

In the late 1960's, Monarch-Crescent AB of Uppsala Sweden built a tractor drive (prop on front side of drive leg) mounted to a plate rotating in the transom that might be considered a stern drive.

Currently, MerCruiser strongly dominates the stern drive market with something over 70 percent market share. Volvo Penta similarly dominates the remaining players.

Statistics

Annual production data for stern drives is available from several sources. Before using a particular set of data, you need to understand exactly what the data applies to (stern drive production, stern drive sales, stern drive engine sales, stern drive boat sales, does it include repower drives (drives used to replace a worn out or failed existing drive), does it include rebuilt drives, do the statistics include inboards, are commercial vessels included? do they include imports, do they include exports, etc). You also need to understand if the data represents the United States (sold here or built here?), or represents worldwide sales. We will try to point out the source and population described by each set of statistics presented in this report. Several data sets do not explicitly define their population.

We will also provide some conversions/rules of thumb that might allow you to use one population to estimate another. Each data set will be provided by itself and discussed. Some data sets estimate the total population of stern drive boats in the U.S. Many outside the U.S. refer to a population of boats as a "boat park".

Stern Drive Boat Sales

The National Marine Manufacturers Association (NMMA) prints an annual study on the boating industry. One element of their study reports stern drive boat sales. NMMA data is based on U.S. Coast Guard and individual state registration data. It only includes boats used in the United States. They do not specify if it includes commercial boats (police, harbor patrol, fireboats, workboats, small commercial fishing boats, water taxi's, small excursion craft, etc). Their statistics probably include some, but not all commercial boats. Branches of the U.S. military and military service providers own both recreational and military craft. NMMA data probably includes "off the shelf" recreational boats owned by the military and its service providers, but not actual military vessels.

NMMA data represents recreational stern drive boats registered in the United States. Few stern drive boats are imported, so it reasonably represents U.S. sales to U.S. boaters, but does not include exports. Portions of the NMMA's 2003 study were printed in the June 2004 edition of Soundings Trade Only[4] and are summarized in the table below.

Stern Drive Boat Sales NMMA data				
Year	**Sales**		**Year**	**Sales**
1997	92,000		2001	72,000
1998	77,700		2002	69,300
1999	79,600		2003	69,200
2000	78,400			

Some stern drive boats use twin drives, a few even have triple installations. The U.S. Environmental Protection Agency (EPA) models twin installations as 7 percent of the stern drive market. The table below estimates stern drive sales based on 7 percent twin installations and the table above. A small portion of the drives in the table below are manufactured outside the United States.

Stern Drive Sales for use in U.S. Registered Boats estimated from 7 percent twin installations				
Year	**Sales**		**Year**	**Sales**
1997	98,400		2001	77,000
1998	83,100		2002	74,200
1999	85,200		2003	74,000
2000	83,900			

Burkenroad Reports prepared a stock analysis report[5] on Marine Products Corporation (a boat builder) in March of 2004 estimating total U.S. sales of new fiberglass stern drive powered boats from 18 to 35 feet at 56,009 units in 2003, and as 60,350 in 2002 based on data provided by Info-Link.

Statistical Abstract of the U.S.

An annual U.S. government statistical publication titled, Statistical Abstract of the U.S., reports historical stern drive engine and stern drive boat sales. Their data comes from the National Marine Manufacturers Association (NMMA).

The table below is a combination of data printed in their 2002 edition[6] (their Table 1225) and 2003 edition[7] (their Table 1246).

Statistical Abstract of the U.S. A Composite of the 2002 and 2003 Editions		
Year	**Sterndrive Boat Retail Unit Sales**	**Stern Drive and Inboard Engines Retail Unit Sales**
1980	56,000	88,000
1985	115,000	155,000
1990	97,000	134,000
1995	94,000	120,000
1997	92,000	116,000
1998	78,000	105,000
1999	80,000	109,000
2000	78,000	110,000
2001	72,000	104,000

EPA Engine Population Estimates for NonRoad2002

In its efforts to estimate emissions, the U.S. Environmental Protection Agency (EPA) developed the NonRoad2002 model[8,9]. It allows them to estimate past, current and future emissions based on engine populations and duty cycles. The stern drive segment of NonRoad2002 includes inboards because the engines are very similar. NonRoad2002 uses 1998 data as its baseline. It calculates future populations by horsepower class and fuel type based on market forecasts and scrap rates. Base year data (1998) shows 1,865,000 inboard and stern drive boats in the United States. This same model estimates seven percent of stern drives have twin engines or a 1998 population of 1,996,000 stern drives and inboards.

NonRoad2002 estimates the current 2004 population of inboard and stern drive boats at 2,100,000 boats or about 2,247,000 inboards and stern drives.

The model can be downloaded online. With a few hours experience, and careful reading of the manual, population estimates can be generated for any year desired.

EPA's NonRoad model estimates a 20 year life for stern drives. If the total population remains relatively constant, then using the 1998 baseline data -

1,996,000 / 20 = 99,800 inboards and stern drives would be replaced annually.

About 10,000 inboard boats are currently sold per year.

99,800 - (10,000 X 1.07) = 99,800 - 10,700 = 89,100 or approximately 89,000 stern drives.

The 6,000 drive discrepancy between the 89,000 stern drives sold estimated from the NonRoad2002 data and the 83,100 stern drives sold estimated from the NMMA data for stern drive boats sold in 1998 is probably partially due to rebuilt drives. Several drives that fail are rebuilt and re-enter the market, reducing the demand for new drives. Another portion of the discrepancy is due to the variability of the total stern drive boat population from year to year.

EPA Economic Impact Study of Boat Manufacturing Emissions

A November 1999 EPA report[10] on the Economic Impact of Proposed Boat Manufacturing Regulations reported:

> Over the ten year period from 1988-1997, stern drive production has fallen by over 30% (an average of 3.2% per year). However, most of that decline occurred in the years 1988-1991. Since 1994, sterndrive production has been fairly steady at roughly 100,000 boats produced per year.
>
> Exports in this sector are projected to hold steady at 9,000 boats per year. The import share of domestic sales is expected to hold steady at 1.3% of domestic sales.

A June 2001 version[11] of the same report presented the same data in a different format. Domestic production was not directly reported. They calculated it by subtracting imports from domestic sales and adding exports. U.S. sales data was obtained from the NMMA and trade data (imports/exports) from the International Trade Commission. Portions of data from both reports above are summarized in the table below.

Economic Impact Analysis of the Boat Manufacturing NESHAP - Stern Drive Boat Sales Data		
Year	**Sterndrive Boat Retail Unit Sales (in the U.S.)**	**Stern Drive Boats Estimated Domestic Production**
1988	148,000	
1989	133,000	
1990	97,000	
1991	73,000	
1992	75,000	
1993	75,000	80,000
1994	90,000	95,000
1995	94,000	101,000
1996	95,000	102,000
1997	92,000	100,000

The SBI Market Profile on Pleasure Boats

This 1994 market study[38] was available free from the U.S. Environmental Protection Agency. It was used as reference data in evaluating the impact of some EPA emission regulations.

Unit Boat Shipments by Industry Sector (Thousands). Pg. 8.
from U.S. Dept. of Commerce data

Inboard-Outdrive boats (in thousands_
1987 108.8
1992 estimate 54.3

Shipment of Inboard Motorboats by Boat Type (% total dollar shipments). Pg. 17.

Military (all types specifically designed for the Army, Navy and Coast Guard)
1967 11.2%
1982 5.0%
1987 2.6%
1992 estimate 1.9%
1994 estimate 1.5%
1999 forecast 1.5%

Pleasure Boats, New U.S. Boat Exports by Type of Boat. Pg. 89.

Pleasure Boats, Inboard-Outdrive Boats, Exports			
Year	**21 Feet and Under**	**Over 21 Feet**	**Total**
1987	3,065	2,086	5,151
1988	5,763	3,560	9,323
1989	7,098	3,868	10,966
1990	4,235	5,859	10,094
1991	4,521	5,435	9,956
1992	5,426	5,090	10,516
1993	3,593	3,542	7,135
1994 estimate	3,185	3,552	6,737

The SBI Market Profile on Pleasure Boats Contd.

Pleasure Boats, New U.S. Boat Imports by Type of Boat. Pg. 102.

Pleasure Boats, Inboard-Outdrive Boats, Imports			
Year	**21 Feet and Under**	**Over 21 Feet**	**Total**
1989	126	241	367
1990	115	332	447
1991	92	143	235
1992	40	124	164
1993	40	155	195
1994 estimate	60	179	239

U.S. Marine Engine Imports by Type (units). Pg. 110.
Note, looking at the data, many stern drives may have been incorrectly categorized as Inboard Engines with Inboard Drives exceeding 18.46 KW or they came across separate from the engines. The numbers below look to small to include Volvo and Yamaha drives.

Inboard Engines with Outboard Drives, Imports	
Year	**Number of Engines**
1989	10,418
1990	3,495
1991	1,989
1992	2,532
1993	5,340
1994 estimate	5,861

Canadian Boat Imports and Exports by Vessel by Major Country of Destination. Pgs. 120,121

Canadian Inboard and Inboard-Outdrive Motor Boats Total (number of boats)		
Year	**Exports to U.S.**	**Imports from U.S.**
1991	404	5,142
1992	235	5,443

Brunswick

Mercury Marine, a Brunswick Company, produces MerCruiser stern drives in Stillwater, Oklahoma. Brunswick has dominated the market with a 70 plus percent share of the U.S. market in recent years. The U.S. consumes the most of the stern drives produced in the world. Most other developed countries use diesel inboards (shaft drives) in larger recreational boats because gas is much more expensive in other parts of the world. Less developed countries have few recreational power boats of any type. Brunswick especially "owns" the U.S. high performance recreational stern drive market. They also dominate the racing market.

Their Stillwater location marinizes General Motors automotive engines (modifies them for running in boats and in marine environments). On-site aluminum die cast operations produce stern drive housings and related components. Marinization of diesel engines for use on inboards and stern drives also occurs in Stillwater. Marinization, combined with die casting, machining, painting, assembly, testing, packaging and many other operations result in boxed engines and stern drives ready for shipment. Racing stern drives are built in Wisconsin.

Brunswick's vertical integration and marketing practices separate them from the competition. Depending on which side you are talking to, somewhere between a little and a lot of Brunswick's domination is due to the captive market they established by purchasing Bayliner, Sea Ray, and about a dozen other boat companies. Their strong dealership network is also a plus. Recently, they took it one step further by purchasing some major marine parts houses. Brunswick's pricing practices have also helped them dominate the market. They encourage builders to purchase higher volumes and more product lines from Brunswick to receive the largest discounts possible. Stern drives represent a large percentage of the total cost of building a stern drive boat. In order to be price competitive with boats from other builders receiving the maximum discount, many independent (non-captive) builders purchase a large percentage (or all) of their outboards and stern drives from Brunswick to get the highest discounts. Some independents do not like dealing with Brunswick because they have to compete with Brunswick owned boat companies in the marketplace.

Brunswick's annual corporate reports have been of no value in estimating stern drive volumes. They are a huge company and lumps any stern drive data into the discussion of their entire marine segment. The most they ever say is that stern drives are up or down "x" percent in volume or dollars, but they never provide a base line.

Several statistical sources for MerCruiser stern drive production volume and market share are provided on the following pages.

MerCruiser Milestone Production Data

MerCruiser opened their plant in Stillwater Oklahoma in 1973. The Stillwater newspaper[12,13] the Newspress, as well as Mercury press releases[14] have reported their milestone production dates.

MerCruiser plant opened - 1973

1 millionth stern drive produced - July 16, 1985

2 millionth stern drive produced - March 15, 1995

2.5 millionth stern drive produced 16 Nov. 2000

It does not require a lot of calculation to see the are averaging about 100,000 drives a year over the 15 year span from 1985 to 2000.

This data is probably based on stern drive engine production (not drives). However, as they are usually installed as a pair (one drive per engine), it should provide a reasonably estimate of drive production. These numbers probably do not include those drives produced by Mercury Racing, but do probably included stern drives sold by their European affiliate, Marine Power Europe.

Brunswick Market Share Statements in the Anti-Trust Suit 1997-1999

Brunswick's marketing practices were challenged by several independent boat builders in a major lawsuit. They alleged the various bundling discount practices used by Brunswick were monopolistic. A lengthy statement[15] submitted by the National Association of Manufacturers in behalf of Brunswick on 15 Sept. 1999 to the United States Court of Appeals for the Eight Circuit contains several statements about their historical market share. Statements below come from that document.

> Brunswick has been the leader in stern drive manufacturing for many years, and by 1983 it had earned a 75% market share.
>
> In the year after Brunswick and other stern drive manufacturers instituted market share discount programs, Brunswick's largest competitor, OMC, introduced a new stern drive called the "Cobra" *(introduced in 1985).* The Cobra engine registered solid early sales, which increased OMC's stern drive engine market share and simultaneously reduced Brunswick's market share to approximately 50%.
>
> Dr. Hall further testified that Brunswick's programs, combined with the market power Brunswick acquired by purchasing Bayliner and Sea Ray, enabled Brunswick to capture 78% of the stern drive market.

A Redacted Version[16] of a Brief Filed Under Seal by Brunswick in the same case contains the data below.

> Reports market shares in 1983 of:
>
> | | |
> |---|---|
> | Brunswick | 75 percent |
> | OMC | 10 percent |
> | Volvo Penta | 15 percent |
>
> Total stern drive sales equaled 160,000 in 1988.
>
> Brunswick's market share in 1988 and 1989, after introduction of OMC Cobra drive, plunged to almost 50 percent.
>
> Currently (1998), Brunswick has about 75 percent, Volvo Penta about 20 percent and 5 percent is split among other manufacturers.

Data in both reports above probably only refer to U.S. sales and U.S. market shares.

Brief Brunswick Market Share Quotes

Firm Answers Federal Query[17]. Tulsa World. 10 Dec. 1997.

> Brunswick has about 90 percent of the marine stern drive engine market, and about 50 percent of the outboard market, Ball said. *David Ball was representing the IBBI a group of boat builders suing Brunswick for alleged anti-trust practices.*

MerCruiser Plant Continues to Get GM Engines[18]. Stillwater Newspress. 18 July 1998.

> The Stillwater MerCruiser plant will continue to receive General Motors engines, despite the continuing strike by the United Auto Workers. Vice President of Operations Vic Schutte said he received work late Wednesday afternoon that GM would continue to produce marine long blocks. "MerCruiser will not be interrupted in its flow of stern-drive engines," said Schutte. ... Long blocks are basic engine assemblies, including engine block, crankshaft and pistons, which MerCruiser uses to build completed stern-drive marine engines. GM provides approximately 9,000 long blocks a month from plants in Flint, Toluca, Mexico and Tonowanda, New York.
>
> *9,000 long blocks per month X 12 months per year = 108,000 engines per year (note a small percentage of these become inboards, about 10 percent per estimates elsewhere in this report)*

Mercury Marine: Focusing on the Demand Side[19]. Fortune. 8 November 1999. Pg. 272.

> The competitive picture is different in the stern-drive and inboard market. Mercury's share is somewhere north of 70 % .... Although Mercury doesn't say, probably nearly half of the Stillwater's plant output is shipped to the two biggest pleasure-and-fishing-boat builders, sister divisions of Brunswick, whose brands include Sea Ray, Bayliner, and Boston Whaler. The rest of the production goes to several hundred other boat builders. Market dominance is not all its cracked up to be. Business is flat. Politically, Mercury can't increase market share. Nor can it push up prices, since that makes all boats, including Brunswick's more expensive and encourages potential buyers to do something else with their extra cash.

Izusu Press Release[20]. 18 October 2000.

> Mercruiser has in excess of 70% of the world sterndrive gasoline market share.

Volvo May Expand Marine Operations[21]. Soundings Trade Only. 21 February 2001.

> It is the only significant producer of sterndrives apart from Mercury Marine's MerCruiser operation, which holds a nearly 90 percent market share.

Tough Economic Waters May Lay Ahead for Stillwater Okla., Boat-Engine Maker[22]. Daily Oklahoman. 1 May 2001.

> MerCruiser power packages "drive 75 percent of the world's pleasure boats. (*They are only be talking about stern drive boats).*
>
> Almost 90 percent of MerCruiser's production is sterndrive; the rest is inboard.
>
> Production can run as high as 500 power plants a day in the spring, then drop to 275 units a day in winter.

RBC Capital Markets Research Report[23]. 27 August 2003.

> Brunswick dominates the sterndrive/inboard engine segments with combined market shares of about 70%. The No. 2 competitor in these categories is Volvo, which has about 20% market share.

Brunswick Could Return to Shore[24]. Dow Jones News Service. 22 Dec. 2003.

> Brunswick has a 40% share of the U.S. outboard engine market and a 70% share of the inboard stern-drive market.

Volvo Penta

Volvo Penta, a division of Volvo, is the second largest player in the stern drive business. Their U.S. operation headquarters in Chesapeake Virginia. Volvo build stern drives in a plant they once shared with Outboard Marine Corporation (OMC)[25,26,27] in Lexington Tennessee. They also build stern drives in Koping Sweden.

Volvo's employee magazine, Volvo Global[28], covered their Lexington Tennessee stern drive operation in its July 2002 issue. The article titled, Proud Drive Builder Seeing Red, details operations at the plant. About 2/3 of the plant is used to produce the Aquamatic stern drive, they also produce the new composite Ocean Series drive at this location. Just like MerCruiser, they marinize General Motors automotive engines. Engines and drives are usually sold as a unit. The plant counts "one unit" as one engine plus one drive. They produced a record setting 30,000 units in 2000, then lost an important customer due to bankruptcy. In 2001 they produced 23,000 units and they hoped to produce 26,000 to 27,000 units in 2002.

An article[29] in the Virginian-Pilot and The Ledger-Star, Norfolk, VA on 24 November 1996 conducted a question and answer session with Clint More, president of Volvo Penta of the Americas. The article was titled, Q&A With Volvo Penta President Clint Moore.

> Q: Brunswick is almost a monopoly. They have 70 percent of the business in your market, they own boat companies, they make engines, they own dealerships. In an industry that's not growing, can you compete with them?
>
> A: Their good. They're certainly far better than we are, but they're not better than we're going to be. We're a minority participant in a market with significant potential for share growth. Destiny is in our hands. All the right pieces are in place to make this a really nice business. The nice thing about it is Volvo's a patient company.

Two references cited in the Brunswick stern drive market share portion of this report placed Volvo Penta's market share at: 15 percent in 1983, 20 percent in 1998 and 20 percent in 2003.

Outboard Marine Corporation

OMC was a major player in the stern drive market almost since the beginning. As mentioned earlier, in 1993 their Lexington Tennessee plant became a joint venture operation with Volvo Penta being the major owner and in 1998, Volvo Penta took over after the OMC bankruptcy. Thousands of their drives are still in service.

Commercial Vessels

Commercial vessels represent a small segment of the stern drive market. A 1995 report[30] promoting the use of Biodiesel estimated the commercial vessel population from U.S. Coast Guard data. They estimated there are about 55,000 powered inland, harbor and commercial vessels in the U.S. Many of those vessels are large inboard powered units, still others are outboard powered workboats and patrol boats. Only a small portion of them are stern drive powered. Most commercial vessels are built for a long life. If they are replaced at a constant rate, stern drive sales of commercial vessels would be very low. Post 9/11 concerns with harbor patrol and security may have breathed some life into the market.

International Sales

Canada

Canada's population is about ten percent that of the United States, however a large percentage of Canadians live near large bodies of water. Population centers are along their southern border close to the Great Lakes, the St. Lawrence Seaway or in the Vancouver British Columbia region near the sheltered waters of the Pacific. Others live near the colder eastern seaboard or near large inland lakes. Canada is a unique trader in stern drives due to their closeness (low shipping costs) and NAFTA (North American Free Trade Agreement). Several Canadian boat builders purchase stern drives from the U.S. for installation in their boats, then turn around and sell those boats to U.S. dealers. Some northern U.S. boaters buy their boats directly from Canadian dealers. Additionally, several Canadians buy stern drive boats directly from U.S. dealers, or from U.S. companies with Canadian boat building operations.

In 2000, Campion Marine, Canada's largest independent boat builder, produced about 840 stern drive boats per a report[31] on the Canadian Boat market in the April-May 2001 issue of International Boat Industry Magazine.

Some of captive boat companies (owned by Brunswick) produce boats in Canada. Until recently, Genmar also owned some Canadian boat companies.

Some historical Canadian stern drive import/export data can be found in the SBI Market Profile section of this report.

Mexico

Although Mexico is blessed with abundant warm water along their coast, they are less economically developed than Canada and are not currently a large market for stern drive boats.

Japan

A 2002 Statistics Summary of Japan Boating Industry[32] reports 589 domestic (built in Japan) stern drive engines were sold there in 2002 along with 378 imported stern drive engines (from outside Japan) for a total of 967 stern drive engines.

A 1997 seminar at the IMTEC boat show focused on exporting boats to Japan. Studies[33] distributed there included 1996 stern drive engine data for Japan. 1,592 stern drive engines manufactured in Japan were sold there, 754 stern drive engines manufactured in Japan were exported and 819 stern drive engines were imported.

Europe

Diesel drives are much more popular in Europe than in the United States. CITEPA, Europe's version of our EPA, published a document titled, Off Road Recreational Craft[34] dated 08/12/03 (probably 8 December 2003) indicating 70 percent of their recreational craft are outboards, 20 percent use inboard diesel engines, 3 percent use inboard gasoline engines, and 7 percent are Personal watercraft.

A Directive of the European Parliament[35] and of the Council dated 12.10.2000 (probably 12 Oct. 2000) for modifying Directive 94/25/EC estimates 1998 engine sales data for Europe as a whole.

Marine Engine Sales in Europe in 1998 (in units)	
Outboard Engines	196,700
Inboard Compression Ignition (diesel)	26,000
Inboard Spark-Ignition (gasoline)	4,916

Most of the inboard engines are used on diesel inboards. Stern drive sales in Europe are a very small fraction of U.S. sales.

Volvo Penta maintains a much higher market share in Europe than in the United States. Their strong share in Europe is probably due fewer boat builders being captive and to their headquarters being in Sweden.

France

The International Council of Marine Industry Associations (ICOMIA) web site[36] currently posts boating statistics data from France. It shows annual sales of about:

8,000 diesel inboards and stern drives
1,000 gasoline powered inboards and stern drives

and a "boat park" (term often used outside the U.S. for boat population) of about 135,000 inboards and stern drives

The year the data is based on is not specifically identified, but it is probably 2002.

Finland

Finland is cold, but blessed with an abundance of shoreline and inland water. The Finnish Marine Industries Federation[37] reports 190 gas stern drive engines and 579 diesel stern drive engines were sold in Finland in 2001 for a total of 769 engines.

Summary

Many data sets and comments have been provided surrounding stern drive production volumes and market shares. Few of them have a clearly defined population, but together, they provide a basic understanding of the market.

An extensive list of references follows this page.

We hope you have found this paper helpful and informative.

Please e-mail your comments and suggestions concerning this paper to Gary Polson at:

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References

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2. Invention of the Stern Drive. RBBI.Com. *Includes portions of the reference above.* http://www.rbbi.com/folders/pat/isd.htm

3. U.S. Patent 3,376,842. Boat Propulsion Mechanism. Invented by J.R. Wynne. Assigned to AB Volvo Penta of Gotenborg Sweden. Filed 11 May 1960. Issued 9 April 1968. *This is the patent that launched the industry.*

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6. Statistical Abstract of the U.S. 2002. Table 1225 reports stern drive boat and engine sales.

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10. Economic Impact Analysis of the Proposed Boat Manufacturing NESHAP. Final Report. EPA-452/R-99-005. November 1999. EPA.

11. Economic Impact Analysis of the Boat Manufacturing NESHAP. Final Report. EPA-452/R-01-011. June 2001. EPA. *This report provides information of the likely economical impacts of the final regulation. Data is similar to the 1999 report above, but is presented in different formats. Table 2-4 on page 2-7 details U.S. stern drive boat sales from 1988-1997. Table 2-8 on page 2-11 details estimated domestic production.*

SBI Market Profile on Pleasure Boats Reference

38. The SBI Market Profile on Pleasure Boats. Compiled by Specialists in Business Communication. Profile No. R-716. May 1994.

This 151 page study was available free from the Office of Air & Radiation, Docket and Information Center (Air Docket) of the U.S. Environmental Protection Agency by requesting:
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We have added a few references since the paper was originally published and rather than change all the reference numbers, we continued the reference number system used above. New materials have been placed with the sources in their relevant areas. Currently we have added references number 38, 39.

THE END