

Avalon Bearings - Company Profile

Engineered pollution-free bearings for industry



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Avalon bearings

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A division of Avalon Marine Ltd

pollution-free • cost-effective • peace-of-mind



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> Avalon Bearings Ltd.

Exclusive Thordon Bearings Distributors in Atlantic Canada since 1991

- Fully trained by Thordon Bearings Inc. in application engineering.
- We have more than 35 years experience in ship design, construction, alteration, classification and repair
- Offering:
 - All Thordon bearing products
 - Marine and industrial bearings
 - Marine and industrial seals
 - Feasibility assessments and survey
 - Consulting on rudder and propeller shaft systems
 - Application engineering support
 - Installation support
 - Bearing design
 - Access to Thordon product development

Exclusive Distributors for



Certified FOOD and WATER process conveyor bearings featuring Thordon THORPLAS-WHITE thermoplastic bearings.



And yes we innovate and become "Pioneer Winners". Thinking outside the Box.

Avalon Marine Ltd. was the recipient of the award "2015 Pioneer in a New Market"

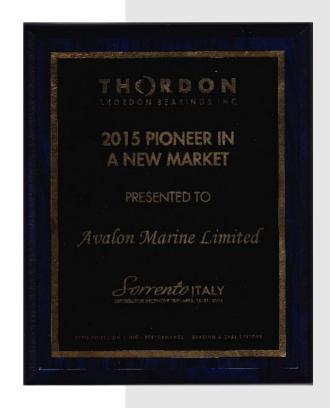
AVALON Marine Ltd.

pollution-free

cost-effective

risk-reduction





Key Management Maxims:

- Protect the Environment
- Provide Premium Products & Systems

- Products Designed for Long Life
- Maintain Intense Distributor Involvement
- Continuous Improvement
- Develop and Expand Internal Capabilities
- Provide Premium Value at a Fair Price
- Identify and Pursue Target Accounts



Core Values:

Accessible We are approachable and responsive to the needs of our clients, our suppliers, the general public, and to each other. We use language that is clear, concise and understood. We value our team and our clients and work hard to build warm, meaningful and respectful relationships. We are responsive and maintain an open door policy for those who need us.

Expertise We are all experts in our respective fields and are fully competent to complete the tasks which we have been assigned. Wherever possible we leverage each other's expertise, best practices, and experiences. We are committed to investing in ongoing learning and development opportunities thereby remaining current in our areas of expertise.

Innovation We are subject matter experts and leaders in our field and as such are not bound by historical or traditional methods or solutions. We embrace change and proactively collaborate to find a better and customized solution. We effectively focus our efforts and create best practices in our respective fields for the betterment of our clients, each other, and the company.

Quality We develop and adhere to well defined and managed processes. As a matter of practice, we actively measure our outcomes and we proactively take action to improve. We meet our clients', and each other's, expectations thereby ensuring a service excellent experience.

Core Values:

Client Service Excellence We are efficient, effective, and dependable. We solicit our client's insights and we take the time to understand both our clients' pain points and their experiences. We guide and empower our clients to make the best possible decision. We deliver on-time. We are professional, warm, and act with tact at all times.

Decision Making We are effective problem solvers. We are focused and transparent, proactively advising our clients of solutions, alternatives, and jeopardies so that the best and most up-to-date decisions are made. We proactively solicit information, methods, and means, and actively consider alternatives, to ensure the best possible decisions and outcomes. We understand the importance of making a decision and moving forward.

Environmental Stewardship Our products and services set the standard for reduction of pollution: reduction of waste, of materials, of time and resources. We understand we are all resource managers and accept and espouse our responsibilities to reduce longer term costs of procurement, risk to personnel safety, risk to equipment and assets, as well as to the environment. We actively protect the natural environment through conservation and sustainable practices, products, and services. We passionately steer our clients towards more eco-friendly solutions.

Product Line

- Elastomer Bearings Wear Components:
 COMPAC, SXL, XL, Composite, HPSXL
- Thermoplastic Bearings (ThorPlas)
- Raw material stocks
- Fully engineered finished products
- Consulting Services
- Direct replacement flange bearings PacFlange





Proprietary Thordon Elastomer Bearings

- A unique elastomeric synthetic polymer
- Best combination of strength/stiffness and flexibility/elasticity
 - structural recoverability and stability
 - toughness
 - abrasion resistance
 - shock loading and fatigue
- Thordon is homogeneous
 - there are no layers of differing materials
 - properties are consistent throughout the wall thickness

Proprietary Thermoplastics:

- High Load Capacity.
- Self-Lubricated.
- Easily Machined.



Engineered Product Considerations All Thordon Products are 'engineered'

Bearing application engineering:

- Application evaluation/grade/cost/operating environment
- Life cycle cost analysis.
- Bearing loads / shaft diameter to length ratios / alignment
- Installation: Interference fit (freeze, press), bonding, mechanical
- Thermal expansion
- Lubricant/cooling medium
- Water absorption
- Bore closure
- Water quality
- Installation method / Handling



Why use Thordon?

- Premium products only
- Full service support
- Specialists in design and development of pollution-free equipment
- Highest IRB Canadian content of any competitive equipment supplied in Canada
- Full engineering support of all products
- Timely and reliable delivery at competitive cost
- Lowest life-cycle costs on the market
- All products are appropriately approved or certified



Why rely on Avalon Bearings?

- One of the oldest distributors of Thordon Bearing Inc. (TBI) products – extensive knowledge and experience
- One of the most innovative of TBI distributor family with a conservative approach to engineering success
- Very broad ship design and construction experience
- Recognized experts in the application of and compliance with Classification Rules
- Proven track record for top quality service, reliability and expertise
- Ultra-conscious of cost benefit trade-off and the management of risk

And "yes" we have an engineer on staff to ensure quality.

"I take a personal interest in your project and We will do our utmost to support your requirements." Thom Hofmann .Eng. Applications Engineer / President

"If it does not work then we will not sell it."

Health, Safety and Environment

Avalon Bearings Ltd cares about people and their health and safety. The health of all employees is our top priority.

"Safety First" is more than just a goal or a stated commitment, it is one of the core principles embedded into the foundation of our organization while keeping in mind to fully comply with the safety standards and programs of our customers.

Consequently, health and safety is not just about rules and regulations but also about people, their behaviour and attitude. All Avalon Bearing employees are encouraged to take responsibility for themselves and others while always being committed to identifying opportunities for improvement.

From an environmental point of view, our clear aim is to reduce our ecological footprint in our offices, on sites and in communities. Using Bearings with no oil or grease can play a large role in:

- ➤Increase safety..... "Ask Us"
- ➤ Reduce pollution...... "Ask Us"
- ➤ Reduce risk..... "Ask Us"
- Reduce maintenance .. "Ask Us"
- >Avoid costs......" "Ask Us"

Quality

Quality is not just about rules but is also about attitude and behaviour. We work together towards providing good quality in everything we do while being committed to improve at all times. Quality is a key business objective for Avalon Bearings and is essential in order to be and stay successful. That is one of the advantages of having an engineer on staff to guide the relationship between the product and the opportunity.

Quality at Avalon Bearings means to ...

- ensure the delivery of a project to expectations
- have good procedures and following them
- have the right skills and team
- maintain sustainable customer relationship: listen and tell
- deliver what the customer specified
- involve with our mind-set, procedures, capabilities and feedback
- and to ensure that Technical Quality is the outcome, not the cause

Excellence in Quality is one of our Core Principles

- We base our long-term client relationships and profitability on excellence in quality and continuous process improvement.
- We work together with our customers and all the stakeholders towards providing good quality while being committed to improve at all times.
- We are committed every day to continuous improvement. Thanks to this, our products are highly recognized worldwide.



Major Industries we operate in:

Marine
Hydro
Offshore / Oil and Gas
Pulp and Paper
Mining
Food Processing
Other Industrial



Prop' Shaft & Rudder Bearing & Seals

Globally, over 4,000 rudder bearings installed and over 2,000 vessels with Thordon propeller shaft bearings installed on

Coast Guard ships, Fisheries research and patrol Ice breakers, Navies and specialty ships Commercial ships OSV and fishing vessels

- XL propeller shafts
- SXL Propeller shafts and rudders
- COMPAC propeller shafts
- River tough (composite) Extremely abrasive conditions









ThorPlas Grease Free Deck Equipment Bearings





Eliminate grease and labor cost with ThorPlas bearings













Direct replacement flange bearings

Ideal applications

- Areas exposed to frequent wash downs
- Wet, clean room or moist environments
- Limited access
- Abrasive environments
- Areas exposed to chemicals
- Food handling and processing







Industries

- Dairy
- Meat and Poultry
- Aquaculture
- Food processing
- Ready to eat food packaging
- Bottling Plants
- Confectionery
- Bakery
- Horticulture





Oil and grease free bearings for FOOD and WATER processes



Simple design for reliability
Featuring
THORPLASWHITE certified bearings



4 Bolt Flange



2 Bolt Flange



3 Bolt Offset Flange



Tapped Base Pillow Block



Pillow Block



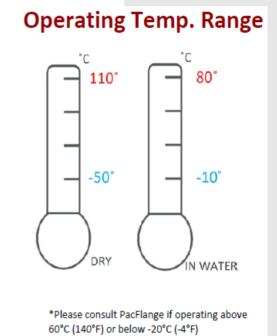
Take-Up Housing

Avalon Bearings - Exclusive distributor Eastern Canada



Reduce Your Plant's Maintenance Costs

- > Grease free no need for expensive food grade grease and eliminating chance of contamination.
- Maintenance free as there is no need for grease, staff do not need to attend to each unit to apply grease periodically, freeing up their time for other maintenance tasks.
- No catastrophic failure the PacFlange unit will wear out gradually, thus avoiding unexpected failure.
- Planned replacement as there is no catastrophic failure for PacFlange units when installed within PV limits, you are able to plan well in advance when a unit is due for replacement, therefore reducing down time from unexpected unit failure.
- Longer life reduced replacement of units and higher MTBF (Mean Time Between Failure)
- Operating temperatures: -50 to 110 °C (dry)







Hydro Wicket Gates: Newfoundland Hydro

End User:

Newfoundland Hydro, Bay D'Espoir, NL, Canada

Application:

Units #4 and #3 wicket gate bearings.

Application Details:

- Existing Traxl metal backed bearings were replaced by Thorplas Blue
- Thorplas bearings were custom machined for each housing / pin as-found dimensional combinations which included a significant amount of ovality.
- New bearing were interference fitted by using dry ice and press fitting.

Date of Installation:

- 2015, 2016, 2017







ecc friendly

Hydro Main Guide Bearings:

Newfoundland Hydro

End User:

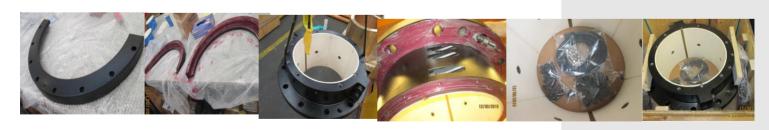
 Newfoundland Hydro, Star Lake, Canada

Application:

 Complete refurbishment of Main Guide Bearing housing and renewal of Thordon SXL bearing shells. Below is an example of our quality process from the beginning to completion.









Hydro Pump bearings: Grand Falls Hydro

End User:

 New Brunswick Power, Grand Falls, Canada

Application:

 Seepage Sump Pump Vertical Drive Shaft Bearings

Application Details:

- ThorPlas-Blue was used to replace greased white metal bearings in 100 year old housings
- A packing gland was included to encourage water flow circulation through the bearings
- Water is supplied automatically when the pump starts and is fed to the top of bearing
- Vertical shaft consisted of 3 bearings plus the pump itself

Date of Installation:

December 2014





Gate Opening Mechanism





End User:

Maxwell Lock and Dam, Pennsylvania, USA

Applications:

Taintor Gate Opening Mechanism bearings.

Floating Mooring Bit bearings

Application Details:

- Thordon replaced bronze with SXL bearings to eliminate grease
- SXL bearings installed for over
 2 years with no issues

Installation Date:

April 2011

> And many other Hydro applications available!!





Offshore:

Main Turret Bearing

Segmented Main Turret Bearings for the C7 project Bumi Armada.

128 bronze backed pads with SXL hot bonded.

Diameter 9434mm

Delivered August 2014







Thordon HPSXL TRAXL Bearings for Tower Yoke U-joint Assembly

Thordon HPSXL TRAXL

bearings supplied for FMC SOFEC

ESSO Chad Development

FPSO





And many more Offshore applications including pumps and more.



Overview of Thordon Offshore Applications

An application with no margin for error, the offshore industry has turned to Thordon Bearings for its unique bearing needs when faced with the unpredictable challenges of extracting oil at sea. Thordon bearing system solutions are being designed into oil platform and FPSO vessel applications where reliability, long life, low friction and nonpolluting grease free operations are of key importance.

Typical applications include:

- FPSO mooring and rotation equipment
- FPSO turret bearings
- Stern roller radial and thrust bearings
- Fairlead bearings
- Alternatives to slewing bearings
- Spherical net catcher bearings and deck pad bearings
- Vertical pump bearings and more.





Pulp and Paper

- > Linear Bearing of Paper Cutter.
- > Grinder Bearing- Customer satisfied with ThorPlas-Blue performance. Less clearance adjustment than bronze. (3 times better)



Plus many other Pulp and Paper applications.





Above is a Bleachery Drum split bearing at Irving Pulp and Paper.



Pulp & Paper- Screw Feeder

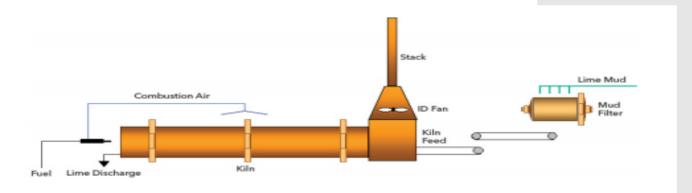
Application:

Lime Kiln Screw Feeder

Notes:

- PT80 bearings were installed in the lime kiln screw feeders in a pulp factory in Thailand
- pH14, temperature of 104°C
- The original material was Teflon which was lasting only 3 weeks
- PT80 has been installed for over 5 months







And many other pulp and paper applications!!

Forestry: Saw Mill Bumper Bar

Application:

Saw mill bumper bar – Saw Mill / Lumber Industry

End User:

Canadian Saw Mill

Installation Date:

April 2016

Notes:

- A piece of vulcanized rubber bonded to steel was being used to try and prevent damage to the stopper
- The rubber/pipe solution needed to replaced every 4 weeks in some positions
- Thordon SXL was recommended due to its ability to resist impact, vibration and wear
- Results have been successful, as the saw mill is retrofitting all bumper arms in the mill as they are need to be replaced with SXL





More ways to save you money!!





Mining:

Mining, Construction, Forestry: Excavator Pivot Points

OEM: Gilles Cusson Inc.

End User: Bock Equipment,

Québec, Canada

Application: Excavator pivot point

bearings. Digs soil, rocks.

Installation Date: Nov. 2010









Mining, Construction and Forestry: Pivot Points

End User: Lamgold Corp., Westwood Project, Québec, Canada

Application: Mining single boom jumbo drill articulation boom and pivot point bearings.

Installation Date: August 2008; last update was May 2010 and bearings still working fine













Mining, Construction and Forestry: Excavator Pivot Points

OEM: Gilles Cusson Inc.

End User: Bock Equipment,

Québec, Canada

Application: Excavator pivot point

bearings. Digs soil, rocks.

Installation Date: Nov. 2010











New Applications

<u>Tree Harvester:</u> Replacement of greased bronze bushings with Thorplas Blue self-lubricated bearings.

(Through our team in Brazil) the harvester below was converted to Thordon bearings and extensively tested side-by-side with the original bearings and was proven superior in performance and longevity. There are advantages:

- Lasts longer > 1800 hrs w/o grease
- Lower life cycle costs.
- Less down time.
- Easier on the environment.
- Runs quieter.







Food Processing: Pork Processing Hangers

Application:

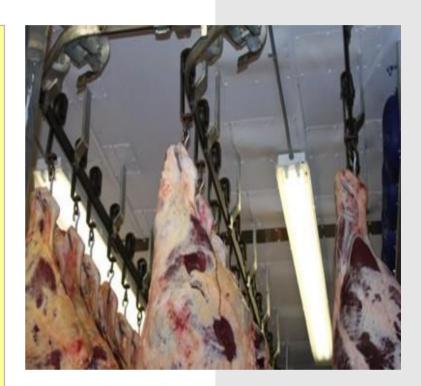
Pig Hanger Wheels- Roller Bearings

Installation Date:

• June 2010

Notes:

- Replaced roller bearings with ThorPlas-Blue bearing solution
- One ThorPlas-Blue bearing replaced 2 Roller Bearings
- Roller bearings had to be replaced monthly, while the ThorPlas-Blue bearings had a service life of over 1 year
- Significantly reduced maintenance costs







Material Processing: Sugar Cane

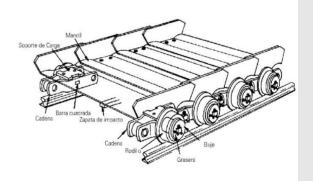
Application:

Sugar Cane Conveyer System- Feeding Table Wheels

Notes:

- Wheels in the feeding tables had bronze bushings initially
- Dirt in system had caused severe abrasion
- Bronze bushings lasted maximum of 15 days
- Thordon SXL bearings were installed and achieved a service life of greater then 1 year
- Modifications to the sugar cane cleaning process were also introduced





Many more food processing applications available with our food safe certified products!!



Other Applications:

End User:

New Brunswick Power, Milltown #7

Grade:

ThorPlas-Blue with Thorseal

Notes:

- New design by Thordon and Avalon Marine
- Upper diaphragm bearing and seal assembly were supplied
- Material replaced greased guide bearings

Date of Installation:

October, 2015



HYDRO segmented Seals:

We also design and manufacture segmented seals.

Axial and radial segmented seals for new or refurbished housings.



Just ask me!!!!



Benefits of Thordon Engineered Products

Proven operational performance

Thordon is environmentally-friendly

All Thordon products are designed to be used without grease or oil

Accepted by major integrators and shipbuilding yards

Thordon is less expensive based on Life Cycle Costs & environmental considerations

\$\$\$ We will save you money and improve your carbon footprint!!!

Many other water and dry lubricated applications like:

- Sewage Treatment.
- Vertical Pumps
- Wear plates.

Just ask me!!!!



References:

Avalon References list as at Oct 2017

Industry Sector

B- Bearing house

H - Hydro power generation

I - Industrial

M- Marine

Industry sector	Customer	Product / application	Completion date
М	Canadian Patrol Frigates	Shaft bearings / COMPAC split	
М	Midshore Patrol Vessels	Propeller shaft bearings / rudder bearings and wear pads.	
М	Arctic Offshore Patrol ships	Propeller shaft bearings / COMPAC / rudder bearings	
В	ABI Bearings	12 pieces conveyor bearings F163004	2017
В	Source Atlantic Bathurst NB	4pieces XL RM 130x60x500	2017
В	Source Atlantic Truro	F21056XL 1 pc	2017
В	Wajax NL	screw conveyor bearings	2017
В	Motion Canada	80x140x500 Thordon XL	2017
н	NL Hydro Bay d'Espoir	Unit refurb. Bottom Bushings: 7.410 x 6.39 x 6 length ; Upper Bushings: 7.410 x 6.39 x 7.5 length	2017
Н	NS Power Tufts cove	Pump bearings for cooling pumps	2017
Н	NS Power Tufts Cove	F31146, F31142 Pump bearings for cooling pumps	2017
Н	NL Hydro Bay d'Espoir BDE #6	Wicket gate bearings Thorplas 190x160x1000 9 pieces SUBSTITUTED 190X150 X 1000 TUBES	2017
1	Target Hydraulics and Machine Works	Deck gewr: Thordon SXL rough moulded tube F#M160110	2017
- 1	Laird Plastics	shell fish equipment: 2" solid rod	2017
1	Irving Pulp and Paper	Bleachery Washer Drum split bearing fabrication based on Thordon design (ref also job 3905)	2017
М	DFO-CCG Dartmouth	CCGS Hudson: stern tube conversion staves to tube plus WQP and project management	2017
М	DND Cape Scott	bronze fasteners RFQ 6000367546	2017
М	Newdock	CCGS Samuel Risley: FSR support dry docking	2017
М	Newdock	Thordon XL 300 x 240 x 1000 RM tube	2017
М	CCGS NL CCGS M Pearly/Vladikov	SXL 140 x 90 x 1m rudder bearing material	2017
М	Nautican PEI	5000 series set 1 only supply and manufacture fully finished bearings	2017
М	CCG NL CCGS Henry Larson	two shaft sets of Staves	2017
М	Coastal Transport GMA	Water sampling bottles	2017
М	CCG NL	Louis S St. Laurent - poker gauges	2017
М	Atlantic Pilotage Authority APA Chebucto Pilot	Rudder bushings	2017
М	Atlantic Pilotage Authority APA Fundy Pilot	propeller shaft bearings 3.375x2.5x10" semi finished	2017
М	CCG-NL CCGS George R Perkes Type 1100	Shaft bearing spares (previous order 6030 in 2012)	2017
М	Atlantic Pilotage Authority APA Fundy Pilot	propeller shaft bearings 3.375x2.5x10* semi finished; rudder bearings 85.95x64.82x102	2017
М	Nautican PEI	Legacy bearings RFQ 02530supply and manufacture fully finished bearings	2017
М	Canship Ugland APA Avalon Pilot	4 pieces fully grooved 4.5 OD x 3.5 ID x 14" with green material on ID and OD.	2017

References:

(Others available upon request)

IVI	Newdock CCG3 Grennell	SAL tubes 330X300X400 (QUOTE to Newdock 4061 IIT effor)	2017
М	Newdock CCGS Grenfell	SXL solid rod 230 OD x 80mm lomg	2017
М	CCG NS CCGS Earl Grey	Rudder bearings	2017
М	Newdock	6x XL 7x5x13 and 2x XL 8x5x13	2017
М	Burrys Shipyard	SXL 210x140x750mm long	2017
М	CCG-NL CCGS Harp	1 set of shaft bearings (formerly part of 6013)	2017
М	CCG NL CCGS Leonard J Cowley	Thordon SXL rudder stock bearing	2017
М	CCG NL CCGS Leonard J Cowley	Thordon SXL Rudder Pintle bearing	2017
М	CCG-NS	4 pieces XL semi-finished 4.25x2.75x11"	2017
М	CCG-NS	12 pieces XL semi-finished 3.75x2.75x12"	2017
М	AF Theriault	1 piece Part # E061525001 Thorflex 106T Bumper Pad 50mm thick x 150mmwide x 3000mm long	2017
М	Burry's shipyard	6 XL bearings ^.625 x 5 x 13" long plus TG75	2017
М	AF Theriault	XL Shaft bearing 5x4x16"	2017
М	HGOE	SXL 145x80x1000	2017
М	Canship Ugland APA Atlantic Pilot	SXL 130x60x1000 x 26"; 4pieces 4.5x3.3x14.5 semi finished XL	2017
М	TRT Services Ltd.	3 pieces Thordon XL semi finished propeller shaft bearings part no. F21132 6.5"od x 5" shaft x 10" long (standard 4:1 L:D)	2017
М	Norseboat Spade Rudder	Shoal draft rudder fabrication	2017
М	Norseboat Spade Rudder	rudder fabrication	2017
М	CCGS Hudson forward axial retention rings	CONTRACT AMENDMENT - Axial retention rings for forward carriers.	2017
М	CCGS Hudson forward axial retention rings	Q-S3156MJ-AVALON MARINE-HUDSON AXIAL RETENTION RINGS PROJECT NO. 6011	2017
М	DFO-CCG NL CCGS Harp	stern tube bearing carrier engineering	2017
М	CCGS Hudson shaft grounding system	Shaft grounding system - Tech Spec Prep.	2017
М	Danny Nieforth	ST21 open trap boat stern tube, rudder and skeg ENG'G Only	2017
М	Thordon Bearings CCGS HUDSON	Concept, engineering and implementation of stern tube conversion and WQP integration	2017
М	Thordon Bearings CCGS HUDSON	Technical support to Thordon Bearings: Concept and preliminary engineering for SeaThigor seals BCIP PROJECT - Technical Consultancy	2017
М	Oceanex	Thordon SXL for a rudder stock bushing. The finished size is $720 \times 790 \times 550$ long. (Quoted in 2016 for Sept 2017 dry docking)	2017
В	Motion Ind. New Glasgow	conveyor bearings	2016
В	Motion Ind. New Glasgow	conveyor bearings	2016
В	ABI Bearings	2" type 226 SXL hanger bearings 20x	2016
В	ABI Bearings	2" type 226 SXL hanger bearings 20x	2016
В	Wajax Mt. Pearl	2" hanger bearings Type 226 6X	2016
В	Wajax Mt Pearl	70x20x1000 sxl tube 6 pcs	2016
В	Wajax Mt Pearl	shell fish equipment: 70x20x1000 sxl tube 6 pcs	2016
В	Wajax Mt Pearl	SXL 50mm x 24"	2016
В	Motion Canada New Glasgow	SXL type 226: 2x 2* and 6x 3*	2016
В	Source Atlantic Bathurst NB	130x60x500 2 pcs	2016
В	Source Atlantic Truro	Pump bearings: F21056XL 1 pc	2016
н	NL Hydro Bay d'Espoir	BDE #4: wicket gate bearings : Thorplas to replace Traxl bearings. SXL tubes to be returned for credit. Ordered in error to replace Traxl. SEE ALSO 3997 FOR PARTIAL PAYMENT Received.	2016



Thank You.

For further information on Avalon Bearings please contact me...

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