Marine Thai Shipyard & Engineering
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Sleeve and Flanged Bearings

ABS TYPE APPROVED PRODUCT

LLOYD'S REGISTER
TYPE APPROVED PRODUCT

PRODUCT INFORMATION AND SELECTION GUIDE

Duramax Marine® is an ISO 9001:2015 Certified Company

DURAMAX MARINE®

Johnson® CUTLESS® BEARINGS

The Water-Lubricated Bearing That Has Nothing More To Prove.

It's proven itself for years at sea. No other water-lubricated bearing is used in more vessels worldwide than a Johnson Cutless® Rubber Bearing. It has set industry standards for decades in the harshest working environments, earning the trust of more marine professionals than any other bearing. The performance and operating characteristics of our resilient bearings are unique when compared to other water-lubricated bearings. 90% of the U.S. Navy surface ships and submarines run with the same water-lubricated bearing technology.

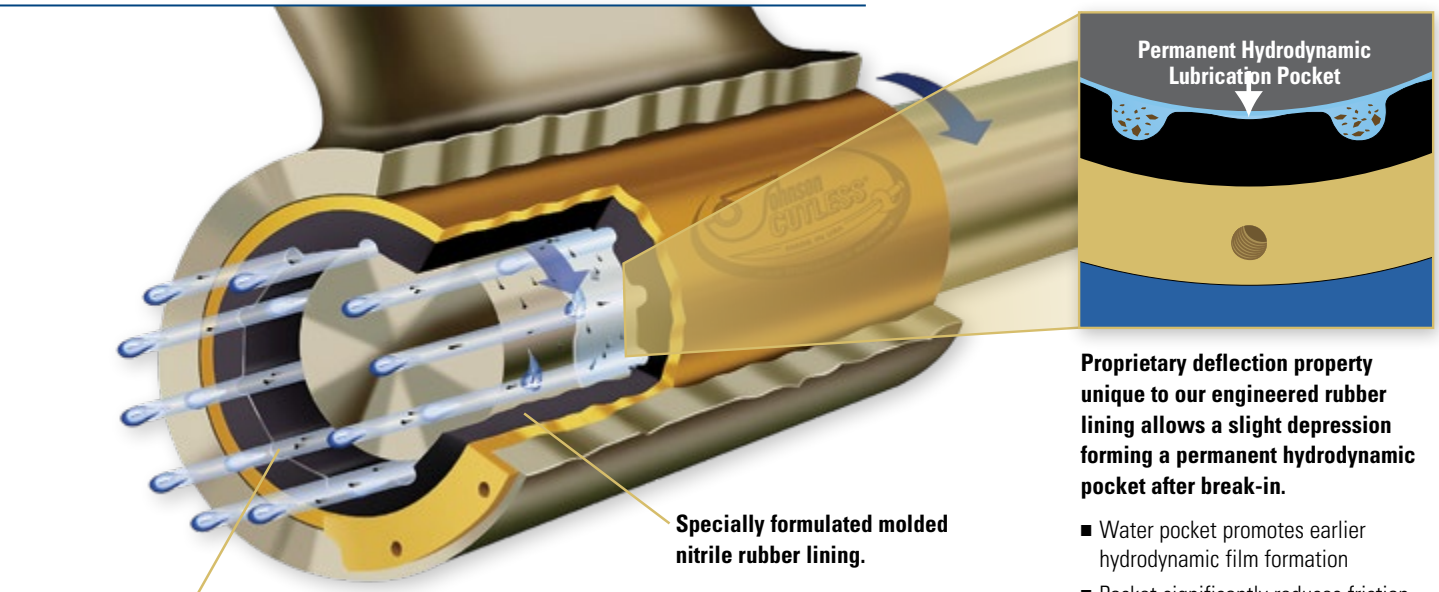
Johnson Cutless® is Designed for Unmatched Performance and Long Life.

High Quality Materials & Design.

Johnson Cutless® Sleeve and Flanged Bearings for heavy-duty commercial, government and pleasure craft applications, feature a specially formulated nitrile molded rubber lining firmly bonded to a shell material. Shells for sleeve bearings are seamless naval brass and are also available with a rugged non-metallic shell. Shells for flanged bearings are one-piece centrifugally cast naval bronze with an integral flange.

Other types of shells, such as stainless steel, Monel, or aluminum can be furnished to order. All bearings are precision machined to close tolerances and fully inspected.

The rubber, a proprietary formulation of extremely tough chemical and oil-resistant nitrile, is molded to fit the shaft in accordance with U.S. Navy BuShips approved clearances for efficient water lubrication.



Engineered geometry optimized for superior performance.

- Prevents shaft whip and absorbs vibration
- Assures maximum water lubrication
- Flushes abrasives away, preventing scoring of shaft

Specially formulated molded nitrile rubber lining.

- Permanently bonded to a precision-machined naval brass outer shell
- Resists oil, grease and chemicals

Proprietary deflection property unique to our engineered rubber lining allows a slight depression forming a permanent hydrodynamic pocket after break-in.

- Water pocket promotes earlier hydrodynamic film formation
- Pocket significantly reduces friction and wear
- The longer a Cutless® runs the better it gets

Water -The Ideal lubricant.

Water is the ideal lubricant because of its non-compressibility, cooling properties and abundant availability. When contained between sliding surfaces it forms a lubricating film with low coefficient of friction. And water is, of course, non-polluting. In rubber-lined bearings for metal shafts, water as a lubricant is at its most efficient -owing to its affinity for metal, but not for rubber. With Johnson Cutless® rubber bearings, the water enters the grooves and moves radially between the propeller shaft and the rubber. Contaminants and abrasives are flushed away through the grooves.

Better Concentricity.

Some bearings are manufactured using centerless grinding techniques to finish the outside diameter. Centerless grinding the shell on a sleeve bearing provides a fine finish, but it may not be an indication of a high quality bearing. Since the centerless grinding process does not take the inside diameter of the bearing into account, the centers of the outside diameter and inside diameter may not be the same. When you install a bearing like this into a housing, the shaft may be off-center in the bearing. Johnson Cutless® Bearings are machined on the inside diameter. Once the inside diameter is bored to the correct dimension, a mandrel is inserted and the outside diameter is turned to the correct dimension. This results in good bearing concentricity and provides you with a quality product you can trust.

Class II Bearing on US Navy Qualified Products List.

Duramax® Marine LLC has gone to great lengths to provide you with one of the best quality and highest-performing bearings available. Johnson Cutless® Bearings meet all requirements of MIL-DTL-17901C (SH) Class II. This United States military specification is more than just a classification approval; it is a stringent set of performance tests that a bearing must pass to become approved.

Quality Inspection.

After machining the bearings, Duramax® Marine LLC inspects them to verify the accuracy of dimensions. Plug gages, one of the most accurate ways to measure a rubber bearing, are used on bearings for shaft sizes under 6-inches (152.40mm) in diameter. For larger sizes, Duramax® Marine LLC inspectors use ID micrometers. The bearings are also inspected for blemishes, imperfections and delamination in both the rubber and shell material. The bond between the rubber and shell material is also checked.

Research & Development Program.

When a company is dedicated to producing the highest quality bearings, research and development becomes a critical aspect of creating technology for the industry. Duramax® Marine LLC has over 50 years of experience in the bearing business and operates a bearing test laboratory for the development of new bearing materials and performance testing of competitive materials. As a result, Duramax® Marine LLC is looked to as a leader in water-lubricated bearing technology and will continue to innovate and to provide you with longer lasting, better-performing bearings.

Excellent Distribution & Availability.

In addition to high quality bearings, Duramax® Marine LLC is committed to having the bearings available for you when you need them. This is accomplished with field warehouses around the world. Duramax® Marine LLC has one of the largest distribution networks in the industry. The answer to your bearing needs is only a telephone call, fax or email away. If the bearing is not available locally, chances are it can be shipped from another location from stock.

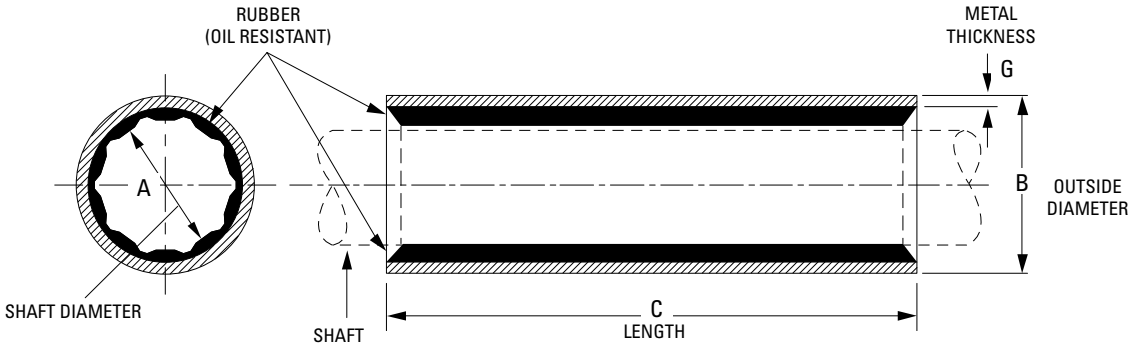
Naval Brass Sleeve Bearings

INCH SIZE SERIES

Johnson Cutless® Naval Brass Sleeve Bearings adapt equally well to strut and stern tube mounts, and are often used effectively as rudder-stock and pintle bushings. Bearing diameters are precision fitted to the designated shaft size with the correct clearance for efficient water lubrication. External brass shells are machined and polished to provide easy fitting. Specially formulated oil and chemical resistant nitrile rubber is securely bonded to the shell. Units with thin shells are available for the struts of small craft. Sleeve bearings are usually installed by light press-fitting and locked in place with cone-pointed set screws.

PRECAUTION:
When shrink fitting of the bearing is required, chilling must be achieved by gradual cooling to not more than minus 20°F(-28°C) using freezer or regular ice **(DO NOT DRY ICE)**. NOTE: Pounding or shocking the bearing while in the chilled state could cause the rubber to separate from the shell.

Approved Bearings: Johnson Cutless® Naval Brass Sleeve Bearings meet military specification MIL-DTL-17901C (SH) Class II Full-Molded type and have full type approval from The American Bureau of Shipping.



LLOYD'S REGISTER
TYPE APPROVED PRODUCT

Part Number	Code	A Shaft Diameter inches	A Shaft Diameter mm	B Outside Diameter inches	B Outside Diameter mm	C Length inches	C Length mm	G Metal Thickness inches	G Metal Thickness mm	Gross Wt. lb.	Gross Wt. kg.
870192100	ABLE	3/4	19.05	1 1/4	31.75	3	76.20	1/8	3.18	0.5	0.2
870222100	* ACID	7/8	22.23	1 1/4	31.75	3 1/2	88.90	1/16	1.59	0.4	0.2
870222101	APEX	7/8	22.23	1 3/8	34.93	3 1/2	88.90	1/8	3.18	0.7	0.3
870222102	ATOM	7/8	22.23	1 1/2	38.10	3 1/2	88.90	1/8	3.18	0.8	0.4
870252100	* BACK	1	25.40	1 1/4	31.75	4	101.60	1/16	1.59	0.4	0.2
870252144	* BADE	1	25.40	1 1/4	31.75	6	152.40	1/16	1.59	0.6	0.3
870252101	BAIT	1	25.40	1 3/8	34.93	4	101.60	1/16	1.59	0.5	0.2
870252102	BALE	1	25.40	1 1/2	38.10	4	101.60	1/8	3.18	0.7	0.3
870252103	BAND	1	25.40	1 5/8	41.28	4	101.60	1/8	3.18	0.9	0.4
870252104	BASE	1	25.40	2	50.80	4	101.60	1/8	3.18	1.3	0.6
870292100	* BEAM	1 1/8	28.58	1 1/2	38.10	4 1/2	114.30	1/16	1.59	0.6	0.3
870292101	BELT	1 1/8	28.58	1 5/8	41.28	4 1/2	114.30	1/8	3.18	1.0	0.5
870292102	BEND	1 1/8	28.58	1 3/4	44.45	4 1/2	114.30	1/8	3.18	1.1	0.5
870292103	BILL	1 1/8	28.58	2	50.80	4 1/2	114.30	1/8	3.18	1.4	0.6
870322100	* BIND	1 1/4	31.75	1 1/2	38.10	5	127.00	1/16	1.59	0.6	0.3
870322101	BIRD	1 1/4	31.75	1 3/4	44.45	5	127.00	1/8	3.18	1.2	0.5
870322102	BITE	1 1/4	31.75	2	50.80	5	127.00	1/8	3.18	1.5	0.7
870322103	BLOW	1 1/4	31.75	2 1/8	53.98	5	127.00	1/8	3.18	1.7	0.8
870352100	BOAT	1 3/8	34.93	1 7/8	47.63	5 1/2	139.70	1/8	3.18	1.4	0.6
870352101	BOLD	1 3/8	34.93	2	50.80	5 1/2	139.70	1/8	3.18	1.5	0.7
870352102	BOND	1 3/8	34.93	2 1/8	53.98	5 1/2	139.70	1/8	3.18	1.8	0.8
870352103	BOOT	1 3/8	34.93	2 3/8	60.33	5 1/2	139.70	1/8	3.18	1.8	0.8
870382100	BOSS	1 1/2	38.10	2	50.80	6	152.40	1/8	3.18	1.6	0.7
870382101	BRAD	1 1/2	38.10	2 3/8	60.33	6	152.40	1/8	3.18	2.2	1.0
870412100	BREW	1 5/8	41.28	2 1/8	53.98	6 1/2	165.10	1/8	3.18	2.0	1.9
870412101	BRIM	1 5/8	41.28	2 5/8	66.68	6 1/2	165.10	1/8	3.18	2.6	1.2
870452100	BROW	1 3/4	44.45	2 3/8	60.33	7	177.80	1/8	3.18	2.3	1.0

All Bearings Shown Are Carried in Stock

*Slimline Bearing

Part Number	Code	A Shaft Diameter		B Outside Diameter		C Length		G Metal Thickness		Gross Wt.	
		inches	mm	inches	mm	inches	mm	inches	mm	lb.	kg.
870452102	BRUT	1 3/4	44.45	2 1/2	63.50	7	177.80	3/32	2.38	2.5	1.1
870452101	BUCK	1 3/4	44.45	2 5/8	66.68	7	177.80	1/8	3.18	2.8	1.3
870482100	BULB	1 7/8	47.63	2 5/8	66.68	7 1/2	190.50	1/8	3.18	2.8	1.3
870482101	BULL	1 7/8	47.63	2 15/16	74.61	7 1/2	190.50	3/32	2.38	3.1	1.4
870512100	CALL	2	50.80	2 5/8	66.68	8	203.20	1/8	3.18	2.8	1.3
870512143	CAMP	2	50.80	2 3/4	69.85	8	203.20	1/8	3.18	3.3	1.5
870512101	CALM	2	50.80	3	76.20	8	203.20	1/8	3.18	3.8	1.7
870542100	CAME	2 1/8	53.98	2 15/16	74.61	8 1/2	215.90	1/8	3.18	3.1	1.4
870542101	CAPE	2 1/8	53.98	3 1/8	79.38	8 1/2	215.90	1/8	3.18	4.1	1.9
870572100	CARE	2 1/4	57.15	2 15/16	74.61	9	228.60	3/32	2.38	3.1	1.4
870572133	CARD	2 1/4	57.15	3	76.20	9	228.60	1/8	3.18	3.9	1.8
870572101	CART	2 1/4	57.15	3 1/8	79.38	9	228.60	1/8	3.18	4.3	2.0
870572102	CASE	2 1/4	57.15	3 3/8	85.73	9	228.60	1/8	3.18	5.1	2.3
870602100	COOK	2 3/8	60.33	3 3/8	85.73	9 1/2	241.30	1/8	3.18	4.8	2.2
870642100	CORD	2 1/2	63.50	3 1/8	79.38	10	254.00	1/8	3.18	4.5	2.0
870642174	CORK	2 1/2	63.50	3 1/4	82.55	10	254.00	1/16	1.59	3.1	1.4
870642101	CORN	2 1/2	63.50	3 3/8	85.73	10	254.00	1/8	3.18	5.1	2.3
870642134	COVE	2 1/2	63.50	3 1/2	88.90	10	254.00	5/32	3.97	6.6	3.0
870672100	CRAB	2 5/8	66.68	3 3/8	85.73	10 1/2	266.70	1/8	3.18	5.2	2.4
870702100	CROW	2 3/4	69.85	3 3/8	85.73	11	279.40	1/8	3.18	4.8	2.2
870702139	CUBE	2 3/4	69.85	3 1/2	88.90	11	279.40	5/32	3.97	6.6	3.0
870702101	CURD	2 3/4	69.85	3 3/4	95.25	11	279.40	1/8	3.18	6.6	3.0
870732100	CURE	2 7/8	73.03	3 3/4	95.25	11 1/2	292.10	1/8	3.18	6.5	2.9
870762100	DANE	3	76.20	3 3/4	95.25	12	304.80	1/8	3.18	6.8	3.1
870762101	DARE	3	76.20	4	101.60	12	304.80	1/8	3.18	7.7	3.5
870802100	DARK	3 1/8	79.38	4 1/4	107.95	12 1/2	317.50	1/8	3.18	8.6	3.9
870832100	DARN	3 1/4	82.55	4	101.60	13	330.20	1/8	3.18	7.8	3.5
870832101	DELL	3 1/4	82.55	4 1/4	107.95	13	330.20	1/8	3.18	8.7	3.9
870862100	DIKE	3 3/8	85.73	4 1/2	114.30	13 1/2	342.90	1/8	3.18	10.2	4.6
870892100	DINE	3 1/2	88.90	4 1/4	107.95	14	355.60	1/8	3.18	8.9	4.0
870892101	DOCK	3 1/2	88.90	4 1/2	114.30	14	355.60	1/8	3.18	10.3	4.7
870922100	DOLE	3 5/8	92.08	4 1/2	114.30	14 1/2	368.30	1/8	3.18	10.0	4.5
870952100	DONE	3 3/4	95.25	4 1/2	114.30	15	381.00	1/8	3.18	9.6	4.4
870952101	DOVE	3 3/4	95.25	5	127.00	15	381.00	3/16	4.76	16.5	7.5
870952102	DRAW	3 3/4	95.25	5 1/4	133.35	15	381.00	3/16	4.76	18.2	8.3
870992100	DULL	3 7/8	98.43	5 1/4	133.35	15 1/2	393.70	3/16	4.76	18.7	8.5
871022100	EARN	4	101.60	5	127.00	16	406.40	3/16	4.76	16.9	7.7
871022101	EASE	4	101.60	5 1/4	133.35	16	406.40	3/16	4.76	18.7	8.5
871052100	ECHO	4 1/8	104.78	5 1/4	133.35	16 1/2	419.10	3/16	4.76	19.0	8.6
871082100	EDIT	4 1/4	107.95	5 1/2	139.70	17	431.80	3/16	4.76	22.0	10.0
871112100	ELSE	4 3/8	111.13	5 3/4	146.05	17 1/2	444.50	3/16	4.76	23.7	10.8
871152100	EPIC	4 1/2	114.30	5 1/2	139.70	18	457.20	3/16	4.76	21.3	9.7
871152101	EDGE	4 1/2	114.30	5 3/4	146.05	18	457.20	3/16	4.76	23.7	10.8
871182100	EVEN	4 5/8	117.48	6 1/8	155.58	18 1/2	469.90	1/4	6.35	42.0	19.1
871212100	EVER	4 3/4	120.65	6 1/8	155.58	19	482.60	1/4	6.35	41.0	18.6
871242100	EVIL	4 7/8	123.83	6 1/8	155.58	19 1/2	495.30	1/4	6.35	41.7	18.9
871272100	FACE	5	127.00	6 1/8	155.58	20	508.00	1/4	6.35	42.3	19.2
871272101	FACT	5	127.00	6 1/2	165.10	20	508.00	1/4	6.35	48.7	22.1
871342100	FADE	5 1/4	133.35	6 3/4	171.45	21	533.40	1/4	6.35	50.3	22.8
871342101	FARE	5 1/4	133.35	7	177.80	21	533.40	1/4	6.35	55.0	24.9
871372100	FEAR	5 3/8	136.53	6 3/4	171.45	21 1/2	546.10	1/4	6.35	51.3	23.3
871372101	FELT	5 3/8	136.53	7	177.80	21 1/2	546.10	1/4	6.35	56.0	25.4
871402100	FIND	5 1/2	139.70	7	177.80	22	558.80	1/4	6.35	56.0	25.4
871402181	FLAG	5 1/2	139.70	7 1/4	184.15	22	558.80	3/8	9.53	58.2	26.4
871432100	FLAT	5 5/8	142.88	7	177.80	22 1/2	571.50	1/4	6.35	55.5	25.2
871462100	FORK	5 3/4	146.05	7	177.80	23	584.20	1/4	6.35	56.5	25.6
871502100	FUEL	5 7/8	149.23	7 1/2	190.50	24	609.60	1/4	6.35	65.8	29.8
871532100	GALE	6	152.40	7 1/2	190.50	24	609.60	1/4	6.35	66.0	29.9
871662100	GOLD	6 1/2	165.10	8 3/8	212.73	30	762.00	7/16	11.11	150.0	68.0

All Bearings Shown Are Carried in Stock

Naval Brass Sleeve Bearings

METRIC SIZE SERIES

Johnson Cutless® Naval Brass Sleeve Bearings adapt equally well to strut and stern-tube mounts, and are often used effectively as rudder-stock and pintle bushings. Bearing diameters are precision fitted to the designated shaft size with the correct clearance for efficient water lubrication. External brass shells are machined and polished to provide easy fitting. Specially formulated oil and chemical resistant nitrile rubber is securely bonded to the shell. Units with thin shells are available for the struts of small craft. Sleeve Bearings are usually installed by light press-fitting and locked in place with cone-pointed set screws.

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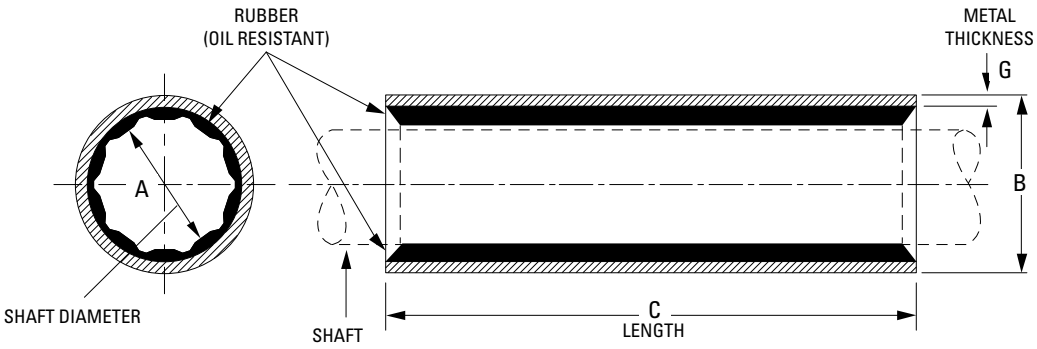
When shrink fitting of the bearing is required, chilling must be achieved by gradual cooling to not more than minus 20˚F(-28˚C) using freezer or regular ice **(DO NOT DRY ICE)**. NOTE: Pounding or shocking the bearing while in the chilled state could cause the rubber to separate from the shell.

Approved Bearings: Johnson Cutless® Naval Brass Sleeve Bearings meet military specification MIL-DTL-17901C (SH) Class II Full-Molded type and have full type approval from The American Bureau of Shipping.



LLOYD'S REGISTER
TYPE APPROVED PRODUCT

Part Number	A Shaft Diameter mm	B Outside Diameter mm	C Length mm	G Metal Thickness mm	Gross Wt. lb.	Gross Wt. kg.
870254100	25	40	100	2.54	0.8	0.4
870284100	28	42	112	2.35	0.7	0.3
870304100	30	45	120	3.07	1.2	0.5
870324100	32	45	128	3.07	1.3	0.6
870354100	35	50	140	3.07	1.5	0.7
870384100	38	55	152	3.07	1.7	0.8
870404100	40	55	160	3.07	1.8	0.8
870454100	45	65	180	3.30	2.8	1.3
870504100	50	70	200	3.26	3.1	1.4
870554100	55	75	220	2.58	3.8	1.7
870604100	60	80	240	3.26	4.5	2.0
870654100	65	85	260	2.82	4.8	2.2
870704100	70	90	280	4.76	5.8	2.6
870754100	75	95	300	3.05	6.7	3.0
870804100	80	100	320	3.17	7.7	3.5
870854100	85	105	340	3.19	8.7	3.9
870904100	90	110	360	4.78	12.5	5.7
870954100	95	115	380	4.51	13.3	6.0
871004100	100	125	400	3.77	14.3	6.5
871054100	105	130	420	4.52	17.6	8.0
871104100	110	135	440	4.51	19.0	8.6
871154100	115	145	460	4.25	25.3	11.0
871204100	120	155	480	6.06	31.6	14.0
871304100	130	170	520	5.63	49.0	22.0
871404100	140	180	560	7.45	56.0	25.0