

# Fluid Power Products for Motion Control, Including Aerospace: 2005

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### SUMMARY OF FINDINGS

In 2005, fluid power product manufacturers, including aerospace, had shipments of \$12,686.9 million, an increase of 9.4 percent, from \$11,596.1 million reported in 2004.

Hydraulic and pneumatic valves increased 10.7 percent to \$3,118.3 million in 2005, from \$2,817.7 million in 2004. Fittings and assemblies for tubing and hose, excluding plumbers' brass goods, increased 9.2 percent to \$2,818.2 million in 2005, from \$2,580.9 million in 2004. Hydraulic and pneumatic cylinder, actuators, accumulators, cushions, and nonvehicular shock absorbers increased by 11.8 percent to \$3,508.0 million in 2005, from \$3,137.0 million in 2004. Compressed air and gas dryers and lubricators decreased 3.9 percent to \$67.4 million in 2005, from \$70.2 million in 2004. Filters of hydraulic and pneumatic systems increased 0.8 percent to \$550.1 million in 2005, from \$545.6 million in 2004. Hydraulic and pneumatic pumps, motors, and hydrostatic transmission components increased 7.4 percent to \$2,625.0 million in 2005, from \$2,444.6 million in 2004.

For general CIR information, explanation of general terms and historical note, see the appendix.

Address inquiries concerning these data to Investment Goods Industries Branch, Manufacturing and Construction Division (MCD), Washington, DC 20233-6900, or call Paul Corey, 301-763-4787.

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# U S C E N S U S B U R E A U

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Economics and Statistics Administration  
U.S. CENSUS BUREAU

Table 1. Value of Shipments of Fluid Power Products for Motion Control, Including Aerospace: 2005 and 2004  
 [Value in thousands of dollars]

Product code	Product description	2005		2004
	Fluid power products, including aerospace.....	12,686,921		11,596,063
3329125	Nonaerospace type hydraulic directional control valves.....	496,244		426,799
3329127	Nonaerospace type hydraulic valves (except directional control).....	869,015		787,981
3329129	Nonaerospace type pneumatic directional control valves.....	566,725		528,925
332912B	Nonaerospace type pneumatic valves (except directional control).....	194,022	r/	202,694
3329121	Aerospace type hydraulic fluid power valves.....	426,091		386,924
3329123	Aerospace type pneumatic fluid power valves.....	361,590	r/	281,241
332912D	Parts for fluid power valves.....	204,565	r/	203,173
332912H	Nonaerospace type flared (metal) fittings and couplings for, and assemblies of, tubing used in fluid power transfer systems...	415,793		381,098
332912J	Nonaerospace type flareless fittings and couplings, including nonmetal fittings, used in fluid power transfer systems.....	493,215		437,894
332912L	Nonaerospace type hydraulic and pneumatic fittings and couplings for hose, and manifolds.....	831,428		836,722
332912N	Nonaerospace type hydraulic and pneumatic assemblies of hose....	388,442		357,079
332912F	Aerospace type hydraulic and pneumatic hose or tube end fittings and assemblies and manifolds.....	689,328		568,117
3339993	Nonaerospace type filters for hydraulic fluid power systems.....	348,323		308,308
3339994	Nonaerospace type filters for pneumatic fluid power systems.....	104,755		132,447
3339996	Aerospace type hydraulic and pneumatic filters.....	96,987		104,884
3339998 pt.	Compressed air and gas dryers, and lubricators.....	67,441	r/	70,180
3339951	Nonaerospace type hydraulic fluid power cylinders and actuators, linear and rotary.....	1,355,328	r/	1,146,084
3339953	Nonaerospace type pneumatic fluid power cylinders and actuators, linear and rotary.....	449,240		407,496
3339955	Parts for nonaerospace type hydraulic and pneumatic fluid power cylinders, actuators, and related items, n.e.c. ....	500,326		451,574
3339957	Aerospace type fluid power cylinders and actuators, hydraulic and pneumatic.....	1,203,065		1,131,820
3339961	Nonaerospace type reciprocating pumps.....	858,261		768,540
3339963	Nonaerospace type rotary and other fluid power pumps.....	589,982		537,937
3339965	Nonaerospace type fluid power motors.....	633,460	r/	592,126
3339967	Aerospace type fluid power pumps and motors.....	280,593	r/	261,682
3339969	Parts for fluid power pumps, motors, and hydrostatic transmissions.....	262,702	r/	284,338

n.e.c. Not elsewhere classified. pt. Part. r/Revised by 5 percent or more from previously published data.

Table 2. Manufacturers' Shipments of Fluid Power Products for Motion Control by Type, Including Aerospace: 2005 and 2004  
 [Quantity in units. Value in thousands of dollars]

Product code	Product description	2005				2004			
		No. of cos.	Quantity	Value	No. of cos.	Quantity	Value		
3329125	Fluid power products, including aerospace.....	(X)	(X)	12,686,921	(X)	(X)	11,596,063		
	Nonaerospace type hydraulic directional control valves.....	(X)	8,038,806	496,244	(X)	r/ 7,079,656	426,799		
	Manual:								
3329125110	3- and 4-way monoblock.....	24	(D)	b/ 93,219	24	r/ (D)	a/ r/ 76,098		
3329125120	3- and 4-way sectional.....	17	a/ 1,372,333	a/ 180,436	17	r/ 1,139,741	a/ 153,101		
3329125130	Other manual.....	8	b/ 39,154	b/ 4,643	8	b/ 39,118	b/ 4,780		
	Solenoid:								
3329125140	2-way types.....	12	(D)	a/ 27,354	12	(D)	a/ 24,539		
3329125150	3- and 4-way types.....	22	b/ 1,324,401	b/ 117,384	22	1,100,526	109,042		
3329125160	Other directional control.....	29	2,375,792	b/ 73,208	28	2,471,632	a/ r/ 59,239		
3329127	Nonaerospace type hydraulic valves (except directional control).....	(X)	21,260,236	869,015	(X)	r/ 18,739,812	787,981		
	Pressure control:								
3329127110	Relief valves.....	24	a/ 642,555	b/ 34,218	24	a/ r/ 446,875	a/ r/ 32,286		
3329127120	Other, including load sensing and manual types.....	10	(D)	b/ 30,085	10	r/ (D)	25,796		
	Flow control:								
3329127130	Manual types.....	15	a/ 1,500,527	a/ 25,288	15	a/ r/ 1,663,949	a/ r/ 26,502		
3329127140	Other flow control valves.....	17	a/ 1,260,272	b/ 50,495	17	a/ 1,138,900	a/ 39,960		
3329127150	Cartridge valves (all types).....	20	a/ 13,760,473	a/ 294,653	22	r/ 11,668,938	r/ 265,283		
	Electrohydraulic valves:								
3329127160	Pilot-operated, torque motor servovalves.....	7	(D)	b/ 84,651	7	(D)	a/ 95,314		
3329127170	Other types, including proportional.....	11	b/ 286,930	b/ 78,941	11	264,416	85,738		
3329127180	Other nonaerospace-type hydraulic valves, including stack and logic.....	16	2,815,536	270,684	17	2,490,087	217,102		
3329129	Nonaerospace type pneumatic directional control valves.....	(X)	19,090,018	566,725	(X)	18,720,530	528,925		
	Manual.....	29	c/ 4,428,278	b/ 82,642	31	b/ r/ 4,102,070	a/ r/ 73,256		
	Solenoid:								
3329129120	Under 1/8 inch port diameter.....	12	b/ 4,896,422	b/ 114,073	11	a/ 5,127,882	b/ 109,421		
	1/8 inch up to and including 1/4 inch port diameter:								
3329129130	3-way types.....	16	b/ 2,134,851	a/ 57,406	16	b/ r/ 2,174,639	r/ 51,145		
3329129140	4-way types.....	17	c/ 3,649,742	b/ 127,305	17	c/ 3,752,137	a/ 127,180		
	Over 1/4 inch port diameter:								
3329129150	3-way types.....	16	a/ 553,106	a/ 47,729	16	(D)	41,105		
3329129160	4-way types.....	15	c/ 1,586,742	b/ 92,327	15	c/ 1,404,992	b/ 84,819		
3329129170	All other types.....	4	27,504	a/ 3,739	3	(D)	r/ 3,632		
3329129180	Mechanical, remote pilot, and all other types.....	20	b/ 1,813,373	b/ 41,504	21	b/ 1,613,136	38,367		
332912B	Nonaerospace type pneumatic valves (except directional control).....	(X)	9,630,432	194,022	(X)	10,642,214	r/ 202,694		
	Filter-regulator combination units, integral types....	8	667,326	13,320	10	1,008,860	21,711		
	Other FRs and filter-regulator-lubricator combo units.....	9	151,539	a/ 7,797	10	201,632	10,791		
332912B130	Regulators, sold separately.....	13	1,538,335	30,897	14	2,904,540	r/ 44,247		
332912B140	Flow control valves.....	20	a/ 4,262,474	86,537	23	a/ 3,736,807	76,447		
332912B150	Check, shuttle, exhaust, needle, and all other types.....	25	a/ 3,010,758	b/ 55,471	26	2,790,375	a/ 49,498		
3329121	Aerospace type hydraulic fluid power valves.....	(X)	1,834,193	426,091	(X)	1,674,584	386,924		
	2-, 3-, and 4-way directional control valves:								
3329121110	Manually or mechanically operated.....	15	(D)	c/ 94,654	16	(D)	85,820		
3329121120	Solenoid operated.....	20	c/ 93,077	c/ 72,889	20	c/ 94,635	a/ r/ 70,826		
3329121130	Motor operated.....	7	(D)	a/ 11,103	7	(D)	r/ 10,406		
3329121140	Electrohydraulic servovalves.....	9	c/ 73,875	125,695	10	(D)	107,245		
3329121150	Flow, pressure, and other types of hydraulic valves.....	23	c/ 474,306	b/ 121,750	22	c/ 395,141	b/ 112,627		
3329123	Aerospace type pneumatic fluid power valves.....	(X)	279,400	361,590	(X)	r/ 246,794	r/ 281,241		
3329123110	Pneumatic valves (all types).....	21	a/ 279,400	361,590	21	a/ r/ 246,794	r/ 281,241		
332912D	Parts for fluid power valves.....	(X)	(X)	204,565	(X)	(X)	r/ 203,173		
332912D110	Parts for nonaerospace type hydraulic and pneumatic valves, sold separately.....	47	(X)	(D)	50	(X)	(D)		
332912D120	Parts for aerospace type hydraulic and pneumatic valves, sold separately.....	18	(X)	(D)	19	(X)	(D)		
332912H	Nonaerospace type flared (metal) fittings and couplings for, and assemblies of tubing used in, fluid power transfer systems.....	(X)	(X)	415,793	(X)	(X)	381,098		
	Flared fittings:								
332912H110	Brass and bronze (SAE 45 degrees and 37 degrees).....	13	(X)	a/ 92,050	13	(X)	r/ 80,864		
332912H120	Carbon steel (JIC 37 degrees).....	12	(X)	194,661	12	(X)	r/ 181,207		
332912H130	Other, including alloy steel.....	13	(X)	c/ 52,331	13	(X)	c/ 50,888		
332912H140	Assemblies of tubing.....	11	(X)	46,627	11	(X)	40,405		
332912H150	Assemblies of tubing and hose.....	7	(X)	30,124	7	(X)	27,734		

Table 2. Manufacturers' Shipments of Fluid Power Products for Motion Control by Type, Including Aerospace: 2005 and 2004  
 [Quantity in units. Value in thousands of dollars]

Product code	Product description	No. of cos.	2005			2004				
			Quantity		Value	No. of cos.	Quantity	Value		
332912J	Nonaerospace type flareless fittings and couplings, including nonmetal fittings, used in fluid power transfer systems.....	(X)	(X)		493,215	(X)	(X)	437,894		
	Metal types:									
332912J110	Brass and bronze.....	19	(X)	a/	117,141	20	(X)	104,104		
332912J120	Carbon steel.....	11	(X)		98,828	11	(X)	87,152		
332912J130	Stainless steel.....	13	(X)		(D)	13	(X)	(D)		
332912J140	Other, including alloy steel.....	4	(X)		(D)	5	(X)	a/ 11,122		
332912J150	Nonmetal fittings, including plastic.....	8	(X)		(D)	8	(X)	(D)		
332912L	Nonaerospace type hydraulic and pneumatic fittings and couplings for hose, and manifolds.....	(X)	(X)		831,428	(X)	(X)	836,722		
332912L110	Permanent hose end fittings (crimped and swaged).....	20	(X)		293,458	20	(X)	333,093		
332912L120	Hydraulic and pneumatic reusable end fittings.....	22	(X)		96,093	23	(X)	108,465		
332912L130	Hydraulic quick connect and disconnect couplings.....	19	(X)		147,188	19	(X)	128,627		
332912L140	Pneumatic quick connect and disconnect couplings.....	21	(X)	a/	102,804	21	(X)	95,550		
332912L150	Manifolds and manifold assemblies for fluid power systems.....	18	(X)	b/	109,885	19	(X)	a/ 105,986		
332912L160	All other, including steel adaptor, swivel, rotating, and extension fittings.....	18	(X)		82,000	18	(X)	65,001		
332912N	Nonaerospace type hydraulic and pneumatic assemblies of hose.....	(X)	(X)		388,442	(X)	(X)	357,079		
332912N110	Assemblies with permanent end fittings.....	21	(X)		327,104	21	(X)	297,305		
332912N120	Assemblies with reusable end fittings.....	9	(X)		61,338	9	(X)	59,774		
332912F	Aerospace-type hydraulic and pneumatic hose or tube end fittings and assemblies and manifolds.....	(X)	(X)		689,328	(X)	(X)	568,117		
332912F110	Assemblies of hose and/or tubing.....	14	(X)	b/	236,192	14	(X)	178,678		
332912F120	Quick connect, rotating, swivel, and extension fittings.....	11	(X)		235,045	11	(X)	a/ 195,494		
332912F130	Manifolds for aerospace hydraulic systems.....	4	(X)		(D)	4	(X)	(D)		
332912F140	Aerospace hose and tube fittings, n.e.c. ....	13	(X)		(D)	13	(X)	(D)		
3339993	Nonaerospace type filters for hydraulic fluid power systems.....	(X)	(X)		348,323	(X)	(X)	308,308		
	Hydraulic fluid filter assemblies, with or without filter element installed:									
3339993010	Low pressure (below 301 psi).....	16	c/	632,592	b/	28,458	16	c/ r/	575,783	
3339993020	Medium pressure (301 to 2,999 psi).....	11	c/	353,054	c/	25,271	12	c/ r/	407,789	
3339993030	High pressure (3,000 psi and above).....	12	a/	122,187	b/	14,346	12	a/	129,443	
	Filter replacement elements:									
3339993040	Reusable (cleanable) type.....	11	b/	798,482	b/	14,748	11	b/	624,015	
3339993050	Nonreusable type.....	20	b/	16,623,022	b/	218,437	20	c/	15,700,789	
3339993060	Strainers and separators, filter parts, and accessories.....	14	(X)	a/	47,063	14	(X)	a/	41,045	
3339994	Nonaerospace type filters for pneumatic fluid power systems.....	(X)	(X)		104,755	(X)	(X)	132,447		
	Air supply filter assemblies and filter replacement elements, excluding those shipped as part of a FR or FRL combo unit:									
3339994010	Coalescing types, including elements sold separately.....	15	(X)	b/	59,082	15	(X)	c/	63,976	
3339994020	Other types, including elements sold separately.....	10	(X)	a/	11,070	10	(X)		23,195	
3339994030	Air exhaust mufflers, diffusers, filter parts, and air preparation accessories.....	11	(X)	a/	34,603	13	(X)	a/	45,276	
3339996	Aerospace type hydraulic and pneumatic filters.....	(X)	(X)		96,987	(X)	(X)	104,884		
3339996010	Hydraulic.....	7	(X)	b/	76,927	7	(X)	a/	80,931	
3339996020	Pneumatic.....	6	(X)		20,060	6	(X)		23,953	
3339998 pt.	Compressed air and gas dryers, and lubricators.....	(X)		178,860	67,441	(X)	292,915	r/	70,180	
	Compressed air and gas dryers:									
3339998872	Refrigerated dryers.....	4	(D)	b/	30,013	4	(D)	c/	26,949	
3339998874	Desiccant dryers.....	7	(D)	a/	33,073	7	r/	(D)	a/ 36,207	
3339998879	Other compressed air and gas dryers.....	4	(D)		1,377	4	(D)	c/	1,595	
3339998880	Lubricators for pneumatic systems, sold separately.....	6		104,851	2,978	6	230,385	r/	5,429	
3339951	Nonaerospace type hydraulic fluid power cylinders and actuators, linear and rotary.....	(X)		4,782,060	1,355,328	(X)	r/ 4,434,653	r/	1,146,084	
	Hydraulic cylinders, excluding electrohydraulic:									
	Tie-rod types:									
	Standard NFPA and JIC tie-rod types:									
3339951110	Less than 1,500 psi.....	21	a/	192,231	62,081	21	a/	187,783	60,826	
3339951120	1,500 to 3,000 psi.....	18	b/	179,525	b/	94,791	18	a/	169,462	
3339951130	Greater than 3,000 psi.....	6	(D)		7,411	6	(D)		(D)	
3339951140	Other tie-rod types.....	15		230,215	25,958	16	a/	254,582	a/	26,122

Table 2. Manufacturers' Shipments of Fluid Power Products for Motion Control by Type, Including Aerospace: 2005 and 2004  
 [Quantity in units. Value in thousands of dollars]

Product code	Product description	No. of cos.	2005		No. of cos.	2004				
			Quantity	Value		Quantity	Value			
3339951150	Threaded/weld fused combination.....	48	a/	3,437,891	800,704	46	a/ r/	3,236,373	r/	652,654
3339951160	Telescoping.....	22	b/	148,250	149,699	22		132,117	r/	127,997
3339951170	Mill type.....	12		(D)	33,886	12		(D)		(D)
3339951180	Other, including those threaded at both ends.....	17		476,403	102,667	17		349,122		93,434
3339951190	Electrohydraulic types.....	9	b/	3,233	10,139	8		2,801		7,353
33399511A0	Hydraulic rotary actuators.....	12		60,153	67,992	12		53,626		61,309
3339953	Nonaerospace type pneumatic fluid power cylinders and actuators, linear and rotary.....	(X)		6,015,108	449,240	(X)		5,638,475		407,496
	NFPA interchangeable cylinders:									
3339953110	Steel.....	16	a/	279,821	a/ 69,357	16		245,538		61,177
	Aluminum:									
3339953120	Less than 1-1/2 inch bore size.....	7	a/	44,044	b/ 2,678	7	a/	38,028	a/ r/	2,530
3339953130	1-1/2 inch bore size and over.....	15		293,395	43,958	15		263,103		39,807
3339953140	Rodless cylinders.....	10		116,523	36,478	10		96,840		33,202
	Other pneumatic cylinders:									
3339953150	Less than 1-1/2 inch bore size.....	21	a/	3,793,828	163,406	21		3,573,077		154,384
3339953160	1-1/2 inch bore size and over.....	29	a/	1,407,803	a/ 115,028	28	a/	1,344,670		98,629
3339953170	Pneumatic rotary actuators.....	13		79,694	18,335	12		77,219		17,767
3339955	Parts for nonaerospace type hydraulic and pneumatic fluid power cylinders, actuators, and related items, n.e.c. ....	(X)		(X)	500,326	(X)		(X)		451,574
3339955110	Accumulators (bladder, piston, and other types).....	18	a/	313,848	a/ 81,104	17	a/	234,163	a/	65,827
3339955120	Shock absorbers, not for vehicle suspension, and cushions (hydraulic and pneumatic).....	13		1,944,956	b/ 86,560	13		1,820,277		79,018
3339955130	Reservoirs, intensifiers, and other devices for fluid energy absorption and/or storage.....	12		(D)	c/ 5,477	12		(D)	c/	5,987
3339955140	Parts for nonaerospace type hydraulic and pneumatic cylinders, actuators, accumulators, cushions, and nonvehicular shock absorbers, sold separately.....	54		(X)	c/ 327,185	50		(X)		300,742
3339957	Aerospace type fluid power cylinders and actuators, hydraulic and pneumatic.....	(X)		(X)	1,203,065	(X)		(X)		1,131,820
	Hydraulic servo-actuator assemblies (linear and rotary):									
3339957110	Mechanical input.....	10		35,774	406,215	10	a/	50,864		361,105
3339957120	Electrical input.....	7		22,187	360,081	7	a/	22,227		349,245
3339957130	Combination input.....	4		(D)	(D)	4		(D)		(D)
	Hydraulic utility actuators:									
3339957140	Linear actuators (cylinders).....	11	a/	45,089	b/ 92,240	11		36,687	a/	82,520
3339957150	Rotary actuators (limited rotation).....	2		(D)	(D)	2		(D)		(D)
3339957160	Shock absorbers, snubbers, and cushions, all types, excluding oleo strut assemblies.....	6		(D)	(D)	6		(D)	b/	30,798
3339957170	Pneumatic actuators (linear and rotary).....	8	a/	55,123	a/ 75,306	8		57,213		93,689
3339957180	Accumulators (bladder, piston, and other types).....	11		10,504	a/ 25,555	11		10,326		22,979
3339957190	Reservoirs, intensifiers, and other devices for fluid energy absorption and/or storage.....	6	a/	1,572	21,559	6		1,376		18,293
33399571A0	Other aerospace type fluid power cylinders, rotary actuators, cushions, and related items, n.e.c. ....	4		(X)	a/ 2,314	4		(X)		2,164
3339955150	Parts for aerospace type hydraulic and pneumatic cylinders, actuators, accumulators, cushions, and related items, sold separately.....	11		(X)	a/ 48,311	12		(X)	r/	46,638
3339961	Nonaerospace type reciprocating pumps.....	(X)		4,236,748	858,261	(X)		4,214,756		768,540
	Axial piston:									
	Variable displacement types:									
3339961110	Closed loop.....	13		3,763,391	587,747	13		3,737,706	r/	537,524
3339961120	Open loop.....	13	a/	345,545	227,912	13		306,462		179,842
3339961130	Fixed displacement types.....	8		(D)	(D)	8		(D)		(D)
3339961140	Radial piston types.....	4		(D)	(D)	4		(D)		(D)
3339963	Nonaerospace type rotary and other fluid power pumps.....	(X)		5,041,278	589,982	(X)		5,131,388		537,937
	Gear type:									
3339963110	Internal gear type, including gerotors.....	18	a/	1,625,131	b/ 218,033	19	a/ r/	1,617,354	b/	197,317
3339963120	External gear type.....	14		2,217,543	290,624	14		2,066,998		258,586
	Vane type:									
3339963130	Fixed displacement.....	5		(D)	(D)	5		(D)		(D)
3339963140	Variable displacement.....	4		(D)	(D)	4		(D)		(D)
3339965	Nonaerospace type fluid power motors.....	(X)		(X)	633,460	(X)		(X)	r/	592,126
3339965110	Pneumatic (air) motors.....	3		(D)	(D)	2		(D)		(D)
	Hydraulic motors:									
	Gear type:									
3339965120	Internal types, excluding gerotors.....	12		(D)	99,120	12		(D)		90,970
3339965130	Gerotor types.....	4	b/	2,191,894	259,695	4		2,234,985		249,833
3339965140	External.....	6	a/	120,586	a/ 14,905	6		113,114		13,868
3339965150	Vane types, fixed and variable.....	6		9,727	11,492	6		8,390		8,016
3339965160	Radial piston types, fixed and variable.....	5	b/	97,982	88,083	5		114,963		87,592

Table 2. Manufacturers' Shipments of Fluid Power Products for Motion Control by Type, Including Aerospace: 2005 and 2004  
 [Quantity in units. Value in thousands of dollars]

Product code	Product description	No. of cos.	2005			2004				
			Quantity	Value	No. of cos.	Quantity	Value			
	Axial piston types:									
3339965170	Fixed displacement.....	10	b/	128,934	62,100	10	r/	143,396	r/	58,620
3339965180	Variable displacement.....	10		170,691	69,864	10	r/	141,590	b/ r/	54,269
3339965190	Prime movers shipped with pumps or sold separately.....	4		(X)	(D)	4		(X)		(D)
3339967	Aerospace type fluid power pumps and motors.....	(X)		112,798	280,593	(X)	r/	110,443	r/	261,682
	Hydraulic pumps:									
3339967110	Fixed and variable displacement types.....	9		29,081	128,461	9		29,513		118,071
3339967120	Pump/electric motor assemblies, fixed and variable displacement types.....	10		(D)	(D)	10		(D)		(D)
3339967130	Other pump packages, n.e.c. ....	7	c/	34,944	b/ 29,260	7	c/ r/	33,951	b/ r/	22,321
	Motors:									
3339967140	Pneumatic (air) motors and motor packages.....	1		(D)	(D)	1		(D)		(D)
3339967150	Hydraulic motors, fixed and variable displacement types.....	4		(D)	(D)	3		(D)		(D)
3339967160	Hydraulic motor packages, including motor/gearbox, motor/valve, motor/generator, and similar combination units.....	2		(D)	(D)	2		(D)		(D)
3339969	Parts for fluid power pumps, motors, and hydrostatic transmissions.....	(X)		(X)	262,702	(X)		(X)	r/	284,338
	Hydraulic:									
3339969110	Nonaerospace.....	35		(X)	a/ 195,385	35		(X)	r/	215,723
3339969120	Aerospace.....	5		(X)	(D)	5		(X)		(D)
	Pneumatic:									
3339969130	Nonaerospace.....	4		(X)	a/ 9,782	4		(X)	a/	8,342
3339969140	Aerospace.....	2		(X)	(D)	3		(X)		(D)

D Withheld to avoid disclosing data for individual companies. n.e.c. Not elsewhere classified. r/Revised by 5 percent or more from previously published data. X Not applicable.

Note: Percent of estimation for each item is indicated as follows: a/10 to 25 percent of this item is estimated. b/26 to 50 percent of this item is estimated. c/Over 50 percent of this item is estimated.

Table 3. Shipments, Exports, and Imports of Fluid Power Products: 2005  
 [Quantity in units. Value in thousands of dollars]

Product code	Product description	Manufacturers' shipments		Export shipments 1/		Import shipments 2/	
		Quantity	Value	Quantity	Value	Quantity	Value
3329121, 125, 127	Hydraulic fluid power valves.....	31,133,235	1,791,350	4,361,396	300,486	33,597,811	418,480
3329123, 129, 12B	Pneumatic fluid power valves.....	28,999,850	1,122,337	3,960,705	186,361	36,570,578	373,026
332912D	Parts for fluid power valves: hydraulic, pneumatic, all types.....	(X)	204,565	(X)	127,730	(X)	300,218
3339951 pt., 957 pt.	Hydraulic cylinders and hydraulic actuators (except electrohydraulic types).....	4,891,280	2,335,098	568,279	146,545	4,282,331	448,649
3339953 pt.	Pneumatic cylinders (tie-rod types).....	617,260	115,993	3,389	5,008	68,486	9,522
3339953 pt., 957 pt.	Pneumatic cylinders (except tie-rod types).....	5,452,971	408,553	790,005	47,441	1,648,566	80,748
3339951 pt., 957 pt.	Fluid power accumulators, hydraulic and pneumatic, and other hydraulic, pneumatic or combination devices for fluid energy absorption and/or storage, all types.....	(X)	166,807	325,696	129,070	891,035	161,154
3339965 pt., 967 pt.	Pneumatic (air) motors and motor packages, all types.....	115,484	17,938	16,332	9,404	10,187	1,635
3339965 pt., 967 pt.	Hydraulic motors, all types.....	3,030,554	525,689	203,392	111,512	464,860	316,444
3339961, 963, 967 pt.	Hydraulic pumps, all types.....	(D)	(D)	5,192,269	517,642	5,286,721	630,071
3339969	Parts for fluid power pumps and motors.....	(X)	262,702	(X)	248,409	(X)	529,551

D Withheld to avoid disclosing data for individual companies. pt. Part. X Not applicable.

1/Source: Census Bureau report, EM 545, U.S. Exports.

2/Source: Census Bureau report, IM 145, U.S. Imports for Consumption.

Table 4. Comparison of North American Industry Classification System (NAICS)-Based Product Codes with Schedule B Export Codes, and HTSUSA Import Codes: 2005

Product code	Product description	Export code 1/	Import code 2/
3329121, 125, 127	Hydraulic fluid power valves.....	8481.10.0020	8481.10.0020
		8481.20.0010	8481.20.0010
		8481.20.0020	8481.20.0020
		8481.20.0030	8481.20.0030
		8481.20.0040	8481.20.0040
		8481.20.0050	8481.20.0050
3329123, 129, 12B	Pneumatic fluid power valves.....	8481.10.0040	8481.10.0040
		8481.10.0060	8481.10.0060
		8481.20.0060	8481.20.0060
		8481.20.0070	8481.20.0070
		8481.20.0080	8481.20.0080
332912D	Parts for fluid power valves: hydraulic, pneumatic, all types.....	8481.90.9010	8481.90.9020 8481.90.9040
3339951 pt., 957 pt.	Hydraulic cylinders and hydraulic actuators (except electrohydraulic types).....	8412.21.0015	8412.21.0015
		8412.21.0030	8412.21.0030
		8412.21.0045	8412.21.0045
		8412.21.0060	8412.21.0060
		8412.21.0075	8412.21.0075
3339953 pt.	Pneumatic cylinders (tie-rod types).....	8412.31.0040	8412.31.0040
3339953 pt., 957 pt.	Pneumatic cylinders (except tie-rod types).....	8412.31.0080	8412.31.0080
3339955 pt., 957 pt.	Fluid power accumulators, hydraulic and pneumatic, and other hydraulic, pneumatic or combination devices for fluid energy absorption and/or storage, all types.....	8412.29.8075	8412.29.8075
		8412.39.0080	8412.39.0080
		8479.89.9865	8479.89.9865
3339965 pt., 967 pt.	Pneumatic (air) motors and motor packages, all types.....	8412.39.0040	8412.39.0040
3339965 pt., 967 pt.	Hydraulic motors, all types.....	8412.29.8015	8412.29.8015
		8412.29.8030	8412.29.8030
		8412.29.8045	8412.29.8045
		8412.29.8060	8412.29.8060
3339961, 963, 967 pt.	Hydraulic pumps, all types.....	8413.50.0070	8413.50.0070
		8413.50.0080	8413.50.0080
		8413.60.0020	8413.60.0020
		8413.60.0030	8413.60.0030
		8413.60.0040	8413.60.0040
3339969	Parts for fluid power pumps and motors.....	8412.90.9005	8412.90.9005
		8412.90.9015	8412.90.9015
		8412.90.9025	8412.90.9025
		8412.90.9035	8412.90.9035
		8413.91.9050	8413.91.9050

pt. Part.

1/Source: 2005 edition, Harmonized System-based Schedule B, Statistical Classification of Domestic and Foreign Commodities Exported from the United States.

2/Source: Harmonized Tariff Schedule of the United States, Annotated (2005).



# Appendix.

## General CIR Survey Information, Explanation of General Terms and Historical Note

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### GENERAL

The CIR program has been providing monthly, quarterly, and annual measures of industrial activity for many years. Since 1904, with its cotton and fats and oils surveys, the CIR program has formed an essential part of an integrated statistical system involving the quinquennial economic census, manufacturing sector, and the annual survey of manufactures. The CIR surveys, however, provide current statistics at a more detailed product level than either of the other two statistical programs.

The primary objective of the CIR program is to produce timely, accurate data on production and shipments of selected products. The data are used to satisfy economic policy needs and for market analysis, forecasting, and decision making in the private sector. The product-level data generated by these surveys are used extensively by individual firms, trade associations, and market analysts in planning or recommending marketing and legislative strategies, particularly if their industry is significantly affected by foreign trade. Although production and shipments information are the two most common data items collected, the CIR program collects other measures also such as inventories, orders, and consumption. These surveys measure manufacturing activity in important commodity areas such as textiles and apparel, chemicals, primary metals, computer and electronic components, industrial equipment, aerospace equipment, and consumer goods.

The CIR program uses a unified data collection, processing, and publication system. The U.S. Census Bureau updates the survey panels for most reports annually and reconciles the estimates to the results of the broader-based annual survey of manufactures and the economic census, manufacturing sector. The manufacturing sector provides a complete list of all producers of the products covered by the CIR program and serves as the primary source for CIR sampling. Where a small number of producers exist, CIR surveys cover all known producers of a product. However, when the number of producers is too large, cutoff and random sampling techniques are used. Surveys are continually reviewed and modified to provide the most up-to-date information on products produced. The CIR program includes a group of mandatory and voluntary surveys. Typically the monthly and quarterly surveys are conducted on a voluntary basis. Those companies that choose not to respond to the voluntary surveys are required to submit a mandatory annual counterpart corresponding to the more frequent survey.

### NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS), 1997

The adoption of the North American Industry Classification System (NAICS) in the 1997 Economic Census has had a major impact on the comparability of current and historic data. Approximately half of the industries in the manufacturing sector of NAICS do not have comparable industries in the Standard Industrial Classification (SIC) system that was used in the past.

While most of the change affecting the manufacturing sector was change within the sector, some industries left manufacturing and others came into manufacturing. Prominent among those that left manufacturing are logging and portions of publishing. Prominent among the industries that came into the manufacturing sector are bakeries, candy stores where candy is made on the premises, custom tailors, makers of custom draperies, and tire retreading. The net effect of the classification changes are such that if the 1997 value of shipments data for all manufacturers were tabulated on an SIC basis, it would be approximately 3 percent higher.

Listed below are the NAICS sectors:

- 21 Mining
- 22 Utilities
- 23 Construction
- 31-33 Manufacturing
- 42 Wholesale Trade
- 44-45 Retail Trade
- 48-49 Transportation and Warehousing
- 51 Information
- 52 Finance and Insurance
- 53 Real Estate and Rental and Leasing
- 54 Professional, Scientific, and Technical Services
- 55 Management of Companies and Enterprises
- 56 Administrative and Support and Waste Management and Remediation Services
- 61 Educational Services
- 62 Health Care and Social Assistance
- 71 Arts, Entertainment, and Recreation
- 72 Accommodation and Food Services
- 81 Other Services (except Public Administration)

(Not listed above are the Agriculture, Forestry, Fishing, and Hunting sector (NAICS 11), partially covered by the census of agriculture conducted by the U.S. Department of Agriculture, and the Public Administration sector (NAICS 92), covered by the census of governments conducted by the Census Bureau.)

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The 20 NAICS sectors are subdivided into 96 subsectors (three-digit codes), 313 industry groups (four-digit codes), and, as implemented in the United States, 1170 industries (five- and six-digit codes).

## FUNDING

The Census Bureau funds most of the surveys. However, a number of surveys are paid for either fully or partially by other Federal Government agencies or private trade associations. A few surveys are mandated, but all are authorized by Title 13 of the United States Code.

## RELIABILITY OF DATA

Survey error may result from several sources including the inability to obtain information about all cases in the survey, response errors, definitional difficulties, differences in the interpretation of questions, mistakes in recording or coding the reported data, and other errors of collection, response, coverage, and estimation. These nonsampling errors also occur in complete censuses. Although no direct measurement of the biases due to these nonsampling errors has been obtained, precautionary steps were taken in all phases of the collection, processing, and tabulation of the data in an effort to minimize their influence.

A major source of bias in the published estimates is the imputing of data for nonrespondents, for late reporters, and for data that fail logic edits. Missing figures are imputed based on period-to-period movements shown by reporting firms. A figure is considered to be an impute if the value was not directly reported on the questionnaire, directly derived from other reported items, directly available from supplemental sources, or obtained from the respondent during the analytical review phase. Imputation generally is limited to a maximum of 10 percent for any one data cell. Figures with imputation rates greater than 10 percent are suppressed or footnoted. The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse, because the actual yearly movements for nonrespondents may or may not closely agree with the imputed movements. The range of difference between the actual and imputed figures is assumed to be small. The degree of uncertainty regarding the accuracy of the published data increases as the percentage of imputation increases. Figures with imputation rates above 10 percent should be used with caution.

## DATA REVISIONS

Statistics for previous years may be revised as the result of corrected figures from respondents, late reports for which imputations were originally made, or other corrections. Data that have been revised by more than 5 percent from previously published data are indicated by footnotes.

## DISCLOSURE

The Census Bureau collects the CIR data under the authority of Title 13, United States Code, which specifies that the information can only be used for statistical purposes and cannot be published or released in any manner that would identify a person, household, or establishment. "D" indicates that data in the cell have been suppressed to avoid disclosure of information pertaining to individual companies.

## EXPLANATION OF GENERAL TERMS

**Capacity.** The maximum quantity of a product that can be produced in a plant in 1 day if operating for 24 hours. Includes the capacity of idle plants until the plant is reported to be destroyed, dismantled, or abandoned.

**Consumption.** Materials used in producing or processing a product or otherwise removing the product from the inventory.

**Exports.** Includes all types of products shipped to foreign countries, or to agents or exporters for reshipment to foreign countries.

**Gross shipments.** The quantity or value of physical shipments from domestic establishments of all products sold, transferred to other establishments of the same company, or shipped on consignment, whether for domestic or export sale or use. Shipments of products purchased for resale are omitted. Shipments of products made under toll arrangements are included.

**Interplant transfers.** Shipments to other domestic plants within a company for further assembly, fabrication, or manufacture.

**Inventories.** The quantity or value of finished goods, work in progress, and materials on hand.

**Machinery in place.** The number of machines of a particular type in place as of a particular date whether the machinery was used for production, prototype, or sampling, or was idle. Machinery in place includes all machinery set up in operating positions.

**Net receipts.** Derived by subtracting the materials held at the end of the previous month from the sum of materials used during the current month.

**Production.** The total volume of products produced, including: products sold; products transferred or added to inventory after adjustments for breakage, shrinkage, and obsolescence, plus any other inventory adjustment; and products that undergo further manufacture at the same establishment.

**Quantities produced and consumed.** Quantities of each type of product produced by a company for internal consumption within that same company.

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**Quantity and value of new orders.** The sales value of orders received during the current reporting period for products and services to be delivered immediately or at some future date. Also represents the net sales value of contract change documents that increase or decrease the sales value of the orders to which they are related, when the parties concerned are in substantial agreement as to the amount involved. Included as orders are only those that are supported by binding legal documents such as signed contracts or letter contracts.

**Quantity and value of shipments.** The figures on quantity and value of shipments represent physical shipments of all products sold, transferred to other establishments of the same company, or shipped on consignment, whether for domestic or export sale. The value represents the net sales price, f.o.b. plant, to the customer or branch to which the products are shipped, net of discounts, allowances, freight charges, and

returns. Shipments to a company's own branches are assigned the same value as comparable appropriate allocation of company overhead and profit. Products bought and resold without further manufacture are excluded.

**Stocks.** Total quantity of ending finished inventory.

**Unfilled orders (backlog).** Calculated by adding net new orders and subtracting net sales from the backlog at the end of the preceding year.

#### **HISTORICAL NOTE**

Data on fluid power products have been collected by the Census Bureau since 1981. Historical data may be obtained from Current Industrial Reports available at your local Federal Depository Library.