

Fluid Power Products, Including Aerospace: 2003

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SUMMARY OF FINDINGS

In 2003, fluid power product manufacturers, including aerospace, had shipments of \$10,567.2 million, a decrease of 1.6 percent, from \$10,735.6 million reported in 2002.

Hydraulic and pneumatic valves decreased 1.7 percent to \$2,703.0 million in 2003, from \$2,750.4 million in 2002. Fittings and assemblies for tubing and hose, excluding plumbers' brass goods, decreased 4.9 percent to \$2,247.1 million in 2003, from \$2,363.6 million in 2002. Hydraulic and pneumatic cylinder, actuators, accumulators, cushions, and nonvehicular shock absorbers decreased by 0.9 percent to \$2,753.9 million in 2003, from \$2,778.9 million in 2002. Compressed air and gas dryers and lubricators decreased 6.0 percent to \$70.3 million in 2003, from \$74.8 million in 2002. Filters of hydraulic and pneumatic systems increased 1.5 percent to \$518.1 million in 2003, from \$510.2 million in 2002. Hydraulic and pneumatic pumps, motors, and hydrostatic transmission components decreased 0.75 percent to \$2,274.7 million in 2003, from \$2,257.7 million in 2002.

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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Table 1. Value of Shipments of Fluid Power Products, Including Aerospace: 2003 and 2002
 [Value in thousands of dollars]

Product code	Product description	2003		2002
	Fluid power products, including aerospace.....	10,567,202	r/	10,735,584
3329125	Nonaerospace-type hydraulic directional control valves.....	386,495		382,962
3329127	Nonaerospace-type hydraulic valves (except directional control).....	698,281		656,432
3329129	Nonaerospace-type pneumatic directional control valves.....	469,449		502,012
332912B	Nonaerospace-type pneumatic valves (except directional control).....	192,153		221,338
3329121	Aerospace-type hydraulic fluid power valves.....	411,997		391,544
3329123	Aerospace-type pneumatic fluid power valves.....	300,055		335,380
332912D	Parts for fluid power valves.....	244,607	r/	260,752
332912H	Nonaerospace-type flared (metal) fittings and couplings for, and assemblies of tubing used in fluid power transfer systems.....	320,188	r/	334,111
332912J	Nonaerospace-type flareless fittings and couplings, including non- metal fittings, used in fluid power transfer systems.....	441,119	r/	457,306
332912L	Nonaerospace-type hydraulic and pneumatic fittings and couplings for hose, and manifolds.....	665,935		725,335
332912N	Nonaerospace-type hydraulic and pneumatic assemblies of hose.....	292,803		315,868
332912F	Aerospace-type hydraulic and pneumatic hose or tube end fittings and assemblies and manifolds.....	527,014		530,996
3339993	Nonaerospace-type filters for hydraulic fluid power systems.....	294,222	r/	280,272
3339994	Nonaerospace-type filters for pneumatic fluid power systems.....	127,081		139,174
3339996	Aerospace-type hydraulic and pneumatic filters.....	96,845		90,761
3339998 pt.	Compressed air and gas dryers, and lubricators.....	70,330	r/	74,790
3339951	Nonaerospace-type hydraulic fluid power cylinders and actuators, linear and rotary.....	883,784		895,423
3339953	Nonaerospace-type pneumatic fluid power cylinders and actuators, linear and rotary.....	392,286		436,780
3339955	Parts for nonaerospace-type hydraulic and pneumatic fluid power cylinders, actuators, and related items, n.e.c.	382,428	r/	357,000
3339957	Aerospace-type fluid power cylinders and actuators, hydraulic and pneumatic.....	1,095,429		1,089,689
3339961	Nonaerospace-type reciprocating pumps.....	595,129		583,751
3339963	Nonaerospace-type rotary and other fluid power pumps.....	466,251	r/	466,807
3339965	Nonaerospace-type fluid power motors.....	497,962	r/	481,328
3339967	Aerospace-type fluid power pumps and motors.....	246,809	r/	221,084
3339969	Parts for fluid power pumps, motors, and hydrostatic transmissions.....	468,550	r/	504,689

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

Table 2. Manufacturer's Shipments of Fluid Power Products by Type, Including Aerospace: 2003 and 2002
 [Quantity in units. Value in thousands of dollars]

Product code	Product description	2003			2002		
		No. of cos.	Quantity	Value	No. of cos.	Quantity	Value
3329125	Fluid power products, including aerospace.....	(X)	(X)	10,567,202	(X)	(X)	r/ 10,735,584
	Nonaerospace-type hydraulic directional control valves.....	(X)	7,439,685	386,495	(X)	r/ 6,706,639	382,962
	Manual:						
3329125110	3- and 4-way monoblock.....	27	(D)	a/ 58,934	27	702,798	r/ 59,439
3329125120	3- and 4-way sectional.....	17	2,014,758	a/ 153,098	16	(D)	(D)
3329125130	Other manual.....	8	39,681	b/ 4,012	9	(D)	r/ 4,058
	Solenoid:						
3329125140	2-way types.....	12	(D)	b/ 25,252	12	(D)	(D)
3329125150	3- and 4-way types.....	21	896,362	86,170	20	r/ 696,352	82,833
3329125160	Other directional control.....	32	2,625,024	b/ 59,029	32	(D)	53,109
3329127	Nonaerospace-type hydraulic valves (except directional control).....	(X)	18,254,111	698,281	(X)	16,457,537	656,432
	Pressure control:						
3329127110	Relief valves.....	25	1,799,943	a/ 26,953	27	r/ 1,819,988	26,632
3329127120	Other, including load sensing and manual types.....	13	(D)	21,085	13	(D)	20,934
	Flow control:						
3329127130	Manual types.....	17	a/ 1,916,357	b/ 26,703	17	a/r/ 1,597,354	27,059
3329127140	Other flow control valves.....	18	1,031,145	38,411	17	1,125,800	38,153
3329127150	Cartridge valves (all types).....	22	a/ 10,467,384	a/ 241,349	21	8,895,378	216,630
	Electrohydraulic valves:						
3329127160	Pilot-operated, torque motor servovalves.....	7	(D)	76,314	7	(D)	80,560
3329127170	Other types, including proportional.....	11	238,549	71,329	11	221,037	72,168
3329127180	Other nonaerospace-type hydraulic valves, including stack and logic.....	18	1,768,427	196,137	17	1,056,304	r/ 174,296
3329129	Nonaerospace-type pneumatic directional control valves.....	(X)	16,765,323	469,449	(X)	17,598,294	502,012
3329129110	Manual.....	30	b/ 4,348,224	b/ 79,039	31	b/ 4,452,786	a/ 84,207
	Solenoid:						
3329129120	Under 1/8 inch port diameter.....	10	a/ 4,511,188	b/ 95,547	12	4,302,565	96,904
	1/8 inch up to and including 1/4 inch port diameter:						
3329129130	3-way types.....	17	a/ 2,047,570	a/ 49,139	20	r/ 2,076,176	48,882
3329129140	4-way types.....	18	c/ 3,015,004	b/ 107,522	21	3,324,822	118,636
	Over 1/4 inch port diameter:						
3329129150	3-way types.....	16	a/ 478,645	37,252	19	601,411	38,233
3329129160	4-way types.....	15	c/ 1,120,064	c/ 69,448	18	1,253,845	73,594
3329129170	All other types.....	3	b/ 36,038	3,658	4	58,899	5,991
3329129180	Mechanical, remote pilot, and all other types.....	20	a/ 1,208,590	b/ 27,844	24	r/ 1,527,790	35,565
332912B	Nonaerospace-type pneumatic directional control valves.....	(X)	9,034,840	192,153	(X)	10,531,803	221,338
332912B110	Filter-regulator combination units, integral types.....	9	b/ 891,331	c/ 19,947	10	1,109,323	22,293
332912B120	Other FRs and filter-regulator-lubricator combo units.....	10	b/ 165,570	b/ 9,184	11	124,062	8,249
332912B130	Regulators, sold separately.....	13	c/ 2,527,532	c/ 55,225	15	2,602,021	56,436
332912B140	Flow control valves.....	20	a/ 3,057,079	63,336	23	3,997,156	86,944
332912B150	Check, shuttle, exhaust, needle, and all other types.....	27	2,393,328	b/ 44,461	30	2,699,241	a/r/ 47,416
3329121	Aerospace-type hydraulic fluid power valves.....	(X)	1,590,344	411,997	(X)	1,560,760	391,544
	2-, 3-, and 4-way directional control valves:						
3329121110	Manually or mechanically operated.....	17	(D)	84,854	16	(D)	88,530
3329121120	Solenoid operated.....	21	c/ 117,363	c/ 80,784	21	a/ 118,045	a/r/ 76,337
3329121130	Motor operated.....	9	18,641	b/ 14,646	9	(D)	r/ 14,489
3329121140	Electrohydraulic servovalves.....	9	(D)	b/ 111,520	8	91,491	109,953
3329121150	Flow, pressure, and other types of hydraulic valves.....	23	373,162	120,193	23	384,416	102,235
3329123	Aerospace-type pneumatic fluid power valves.....	(X)	300,412	300,055	(X)	345,776	335,380
3329123110	Pneumatic valves (all types).....	24	b/ 300,412	a/ 300,055	22	a/ 345,776	a/ 335,380
332912D	Parts for fluid power valves.....	(X)	(X)	244,607	(X)	(X)	260,752
332912D110	Parts for nonaerospace-type hydraulic and pneumatic valves, sold separately.....	55	(X)	b/ 193,293	58	(X)	r/ 204,814
332912D120	Parts for aerospace type hydraulic and pneumatic valves, sold separately.....	20	(X)	a/ 51,314	21	(X)	a/ 55,938
332912H	Nonaerospace-type flared (metal) fittings and couplings for, and assemblies of tubing used in, fluid power transfer systems.....	(X)	(X)	320,188	(X)	(X)	r/ 334,111
	Flared fittings:						
332912H110	Brass and bronze (SAE 45 degrees and 37 degrees).....	14	(X)	c/ 134,096	15	(X)	r/ 148,429

Continued

Table 2. Manufacturer's Shipments of Fluid Power Products by Type, Including Aerospace: 2003 and 2002
 [Quantity in units. Value in thousands of dollars]

Product code	Product description	No. of cos.	2003		No. of cos.	2002	
			Quantity	Value		Quantity	Value
332912H120	Carbon steel (JIC 37 degrees).....	12	(X)	85,107	13	(X)	85,377
332912H130	Other, including alloy steel.....	13	(X) c/	42,972	15	(X) c/	44,139
332912H140	Assemblies of tubing.....	11	(X) b/	33,001	12	(X)	31,337
332912H150	Assemblies of tubing and hose.....	7	(X)	25,012	7	(X)	24,829
332912J	Nonaerospace-type flareless fittings and couplings, including nonmetal fittings, used in fluid power transfer systems.....	(X)	(X)	441,119	(X)	(X) r/	457,306
	Metal types:						
332912J110	Brass and bronze.....	19	(X)	80,022	20	(X)	82,889
332912J120	Carbon steel.....	12	(X)	(D)	13	(X)	67,853
332912J130	Stainless steel.....	14	(X)	(D)	16	(X)	(D)
332912J140	Other, including alloy steel.....	5	(X)	10,244	6	(X)	(D)
332912J150	Nonmetal fittings, including plastic.....	9	(X)	3,003	9	(X)	3,188
332912L	Nonaerospace-type hydraulic and pneumatic fittings and couplings for hose, and manifolds.....	(X)	(X)	665,935	(X)	(X)	725,335
332912L110	Permanent hose end fittings (crimped and swaged).....	18	(X)	263,022	22	(X)	313,185
332912L120	Hydraulic and pneumatic reusable end fittings.....	23	(X)	98,364	28	(X)	102,672
332912L130	Hydraulic quick connect and disconnect couplings.....	18	(X)	107,219	20	(X)	121,311
332912L140	Pneumatic quick connect and disconnect couplings.....	21	(X)	85,742	24	(X) r/	85,003
332912L150	Manifolds and manifold assemblies for fluid power systems.....	22	(X)	74,940	22	(X)	64,807
332912L160	All other, including steel adaptor, swivel, rotating, and extension fittings.....	18	(X) b/	36,648	22	(X)	38,357
332912N	Nonaerospace-type hydraulic and pneumatic assemblies of hose.....	(X)	(X)	292,803	(X)	(X)	315,868
332912N110	Assemblies with permanent end fittings.....	21	(X)	243,464	22	(X)	262,493
332912N120	Assemblies with reusable end fittings.....	9	(X) a/	49,339	11	(X) r/	53,375
332912F	Aerospace-type hydraulic and pneumatic hose or tube end fittings and assemblies and manifolds.....	(X)	(X)	527,014	(X)	(X)	530,996
332912F110	Assemblies of hose and/or tubing.....	15	(X)	(D)	15	(X) r/	(D)
332912F120	Quick connect, rotating, swivel, and extension fittings.....	11	(X)	168,260	11	(X)	166,787
332912F130	Manifolds for aerospace hydraulic systems.....	4	(X)	(D)	4	(X)	(D)
332912F140	Aerospace hose and tube fittings, n.e.c.....	13	(X)	151,208	15	(X) r/	165,526
3339993	Nonaerospace-type filters for hydraulic fluid power systems.....	(X)	(X)	294,222	(X)	(X) r/	280,272
	Hydraulic fluid filter assemblies, with or without filter element installed:						
3339993010	Low pressure (below 301 psi).....	18	c/	673,119	18	a/	668,364
3339993020	Medium pressure (301 to 2,999 psi).....	14	a/	469,384	14	r/	448,290
3339993030	High pressure (3,000 psi and above).....	12		116,108	12	r/	120,573
	Filter replacement elements:						
3339993040	Reusable (cleanable) type.....	12	b/	554,203	12	b/r/	533,742
3339993050	Nonreusable type.....	22		15,430,812	22	r/	14,630,350
3339993060	Strainers and separators, filter parts, and accessories.....	16	(X) a/	36,028	15	(X) a/	37,900
3339994	Nonaerospace-type filters for pneumatic fluid power systems.....	(X)	(X)	127,081	(X)	(X)	139,174
	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) c/	63,264	19	(X) c/	67,423
3339994020	Other types, including elements sold separately.....	9	(X) c/	20,743	11	(X)	31,004
3339994030	Air exhaust mufflers, diffusers, filter parts, and air preparation accessories.....	14	(X)	43,074	16	(X)	40,747
3339996	Aerospace-type hydraulic and pneumatic filters.....	(X)	(X)	96,845	(X)	(X)	90,761
3339996010	Hydraulic.....	7	(X) a/	70,122	8	(X) a/	67,104
3339996020	Pneumatic.....	7	(X)	26,723	7	(X)	23,657
3339998 pt.	Compressed air and gas dryers, and lubricators.....	(X)		313,745	(X)		318,017
	Compressed air and gas dryers:						
3339998872	Refrigerated dryers.....	2	(D)	(D)	3	(D)	(D)
3339998874	Dessicant dryers.....	4		12,920	5		13,809
3339998879	Other compressed air and gas dryers.....	2	(D)	(D)	3	(D)	(D)

Table 2. Manufacturer's Shipments of Fluid Power Products by Type, Including Aerospace: 2003 and 2002
 [Quantity in units. Value in thousands of dollars]

Product code	Product description	No. of cos.	2003		No. of cos.	2002		
			Quantity	Value		Quantity	Value	
3339998880	Lubricators for pneumatic systems, sold separately.....	7 c/	222,646	c/	12,253	8	223,012	12,979
3339951	Nonaerospace-type hydraulic fluid power cylinders and actuators, linear and rotary.....	(X)	3,453,458		883,784	(X) r/	3,581,308	r/ 895,423
	Hydraulic cylinders, excluding electrohydraulic: Tie-rod types:							
	Standard NFPA and JIC tie-rod types:							
3339951110	Less than 1,500 psi.....	18	172,699		52,584	21	200,866	(D)
3339951120	1,500 to 3,000 psi.....	17 b/	175,466	b/	68,205	18	193,939	67,478
3339951130	Greater than 3,000 psi.....	6	(D)		(D)	6	(D)	(D)
3339951140	Other tie-rod types.....	15 a/	215,806	a/	24,190	15	252,379	27,640
3339951150	Threaded/weld fused combination.....	44 a/	2,401,469	a/	477,130	46	2,418,108	r/ 454,364
3339951160	Telescoping.....	20	108,942		93,874	20 r/	117,789	r/ 96,480
3339951170	Mill type.....	11	(D)		(D)	11	(D)	20,542
3339951180	Other, including those threaded at both ends.....	14	267,623	a/	65,873	15 r/	290,020	a/r/ 63,130
3339951190	Electrohydraulic types.....	7 a/	2,932		7,243	8	5,260	(D)
33399511A0	Hydraulic rotary actuators.....	12	53,159		59,305	12	51,870	55,008
3339953	Nonaerospace-type pneumatic fluid power cylinders and actuators, linear and rotary.....	(X)	5,330,987		392,286	(X)	5,849,558	436,780
	NFPA interchangeable cylinders:							
3339953110	Steel.....	16 b/	234,884	b/	56,976	18 r/	252,479	r/ 64,097
	Aluminum:							
3339953120	Less than 1-1/2 inch bore size.....	6 a/	29,716	b/	2,303	6	31,671	2,437
3339953130	1-1/2 inch bore size and over.....	15 a/	247,892		36,777	16	293,533	41,401
3339953140	Rodless cylinders.....	9	93,995		31,118	10 a/	107,590	a/ 36,833
	Other pneumatic cylinders:							
3339953150	Less than 1-1/2 inch bore size.....	20 a/	3,469,614		156,873	23	3,774,976	171,126
3339953160	1-1/2 inch bore size and over.....	29 a/	1,179,666	a/	88,408	33 r/	1,293,040	92,048
3339953170	Pneumatic rotary actuators.....	12	75,220		19,831	12 b/	96,269	b/ 28,838
3339955	Parts for nonaerospace-type hydraulic and pneumatic fluid power cylinders, actuators, and related items, n.e.c.	(X)	(X)		382,428	(X)	(X)	r/ 357,000
3339955110	Accumulators (bladder, piston, and other types).....	18 a/	187,931	a/	54,938	20 r/	167,702	r/ 54,674
3339955120	Shock absorbers, not for vehicle suspension, and cushions (hydraulic and pneumatic).....	14 b/	1,462,682	c/	70,267	15	1,464,690	65,744
3339955130	Reservoirs, intensifiers, and other devices for fluid energy absorption and/or storage.....	10	(D)		4,499	12	(D)	r/ 5,160
3339955140	Parts for nonaerospace-type hydraulic and pneumatic cylinders, actuators, accumulators, cushions, and nonvehicular shock absorbers, sold separately.....	48	(X)	a/	252,724	57	(X)	r/ 231,422
3339957	Aerospace-type fluid power cylinders and actuators, hydraulic and pneumatic.....	(X)	(X)		1,095,429	(X)	(X)	1,089,689
	Hydraulic servo-actuator assemblies (linear and rotary):							
3339957110	Mechanical input.....	12	39,769		361,655	11 b/r/	38,840	376,591
3339957120	Electrical input.....	9	23,889		318,439	8 r/	24,358	(D)
3339957130	Combination input.....	4	(D)		(D)	4	(D)	(D)
	Hydraulic utility actuators:							
3339957140	Linear actuators (cylinders).....	12	45,024	a/	89,653	12 c/r/	54,936	r/ 99,105
3339957150	Rotary actuators (limited rotation).....	2	(D)		(D)	2	(D)	(D)
3339957160	Shock absorbers, snubbers, and cushions, all types, excluding oleo strut assemblies.....	7	(D)		(D)	7	(D)	(D)
3339957170	Pneumatic actuators (linear and rotary).....	8 a/	53,590		71,185	8	54,157	83,643
3339957180	Accumulators (bladder, piston, and other types).....	10	11,270		22,069	11	(D)	r/ 20,713
3339957190	Reservoirs, intensifiers, and other devices for fluid energy absorption and/or storage.....	7	1,816		17,505	7 r/	1,840	r/ 16,289
33399571A0	Other aerospace-type fluid power cylinders, rotary actuators, cushions, and related items, n.e.c.	4	(X)		2,298	4	(X)	2,301
3339955150	Parts for aerospace-type hydraulic and pneumatic cylinders, actuators, accumulators, cushions, and related items, sold separately.....	13	(X)	c/	60,609	14	(X)	r/ 58,920
3339961	Nonaerospace-type reciprocating pumps.....	(X)	3,229,200		595,129	(X)	3,061,589	583,751
	Axial piston:							
	Variable displacement types:							
3339961110	Closed loop.....	13	2,587,781		373,876	13	2,377,406	356,062
3339961120	Open loop.....	12	(D)		138,596	11	197,669	137,748
3339961130	Fixed displacement types.....	10	(D)		(D)	10	(D)	(D)
3339961140	Radial piston types.....	4	(D)		(D)	4	(D)	(D)

Table 2. Manufacturer's Shipments of Fluid Power Products by Type, Including Aerospace: 2003 and 2002
 [Quantity in units. Value in thousands of dollars]

Product code	Product description	No. of cos.	2003		No. of cos.	2002		Value
			Quantity	Value		Quantity	Value	
3339963	Nonaerospace-type rotary and other fluid power pumps.....	(X)	3,666,196	466,251	(X)	r/ 3,618,369	r/	466,807
	Gear type:							
3339963110	Internal gear type, including gerotors.....	16 a/	2,155,436 a/	251,701	24 r/	2,106,688	r/	247,385
3339963120	External gear type.....	13	1,463,683	176,629	15 a/r/	1,456,684	r/	176,771
	Vane type:							
3339963130	Fixed displacement.....	3	(D)	(D)	3	(D)		(D)
3339963140	Variable displacement.....	3	(D)	(D)	3	(D)		(D)
3339965	Nonaerospace-type fluid power motors.....	(X)	(X)	497,962	(X)	(X)	r/	481,328
3339965110	Pneumatic (air) motors.....	2	(D)	(D)	2	(D)		(D)
	Hydraulic motors:							
	Gear type:							
3339965120	Internal types, excluding gerotors.....	10	773,605 a/	70,971	13	(D)	r/	62,346
3339965130	Gerotor types.....	5	1,538,093	204,136	5	1,228,493		199,263
3339965140	External.....	5	78,195	9,074	6	73,028		8,352
3339965150	Vane types, fixed and variable.....	6	(D)	(D)	5	8,339		7,615
3339965160	Radial piston types, fixed and variable.....	5	80,655	56,822	5	(D)	r/	54,622
	Axial piston types:							
3339965170	Fixed displacement.....	9	125,787	46,095	9	(D)		43,649
3339965180	Variable displacement.....	9	160,888	80,909	8	r/ 176,149	r/	82,793
3339965190	Prime movers shipped with pumps or sold separately.....	3	(X)	(D)	3	(X)		(D)
3339967	Aerospace-type fluid power pumps and motors.....	(X)	98,676	246,809	(X)	109,085	r/	221,084
	Hydraulic pumps:							
3339967110	Fixed and variable displacement types.....	9	27,003	125,541	9	r/ 30,111	r/	106,288
3339967120	Pump/electric motor assemblies, fixed and variable displacement types.....	9	36,565	85,711	10	43,305		(D)
3339967130	Other pump packages, n.e.c.	8 b/	31,037 b/	16,620	8 r/	27,108	r/	15,575
	Motors:							
3339967140	Pneumatic (air) motors and motor packages.....	1	(D)	(D)	2	(D)		(D)
3339967150	Hydraulic motors, fixed and variable displacement types.....	3	(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)	468,550	(X)	(X)	r/	504,689
	Hydraulic:							
3339969110	Nonaerospace.....	35	(X)	355,575	41	(X)	r/	364,637
3339969120	Aerospace.....	8	(X) b/	95,108	11	(X)		(D)
	Pneumatic:							
3339969130	Nonaerospace.....	4	(X)	(D)	6	(X)		(D)
3339969140	Aerospace.....	2	(X)	(D)	2	(X)		(D)

D Withheld to avoid disclosing data for individual companies. n.e.c. Not elsewhere classified. pt. Part. 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 3a. Manufacturers' Shipments of Fluid Power Products, Including Aerospace by Use: 2003
 [Quantity in units. Value in thousands of dollars]

Product code	Product description	No. of cos.	Mobile shipments				Industrial shipments			
			Quantity	Percent	Value	Percent	Quantity	Percent	Value	Percent
3329125	Fluid power products, including aerospace.....	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)
	Nonaerospace-type hydraulic directional control valves.....	(X)	4,837,137	65	298,804	77	2,602,548	35	87,691	23
	Manual:									
3329125110	3- and 4-way monoblock.....	27	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
3329125120	3- and 4-way sectional.....	17	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
3329125130	Other manual.....	8	24,150	61	2,020	50	15,531	39	1,992	50
	Solenoid:									
3329125140	2-way types.....	12	(D)	(D)	20,891	83	(D)	(D)	4,361	17
3329125150	3- and 4-way types.....	21	435,374	49	46,439	54	460,988	51	39,731	46
3329125160	Other directional control.....	31	(D)	(D)	32,452	55	(D)	(D)	26,577	45
3329127	Nonaerospace-type hydraulic valves (except directional control).....	(X)	13,695,386	75	517,500	74	4,558,725	25	180,781	26
	Pressure control:									
3329127110	Relief valves.....	24	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
3329127120	Other, including load sensing and manual types.....	13	(D)	(D)	4,945	23	(D)	(D)	16,140	77
	Flow control:									
3329127130	Manual types.....	17	a/ 1,102,108	58	14,811	55	b/ 814,249	42	c/ 11,892	45
3329127140	Other flow control valves.....	18	366,677	36	17,543	46	664,468	64	20,868	54
3329127150	Cartridge valves (all types).....	22	a/ 8,501,320	81	177,262	73	b/ 1,966,064	19	b/ 64,087	27
	Electrohydraulic valves:									
3329127160	Pilot-operated, torque motor servo-valves.....	7	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
3329127170	Other types, including proportional.....	11	220,993	93	66,092	93	17,556	7	5,237	7
3329127180	Other nonaerospace-type hydraulic valves, including stack and logic.....	17	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
3339993	Nonaerospace-type filters for hydraulic fluid power systems.....	(X)	(X)	(X)	150,170	51	(X)	(X)	144,052	49
	Hydraulic fluid filter assemblies, with or without filter element installed:									
3339993010	Low pressure (below 301 psi).....	18	c/ 387,937	58	b/ 10,269	46	b/ 285,182	42	a/ 11,905	54
3339993020	Medium pressure (301 to 2,999 psi).....	14	(D)	(D)	8,412	32	(D)	(D)	18,051	68
3339993030	High pressure (3,000 psi and above).....	12	15,473	13	a/ 3,006	27	a/ 100,635	87	b/ 8,115	73
	Filter replacement elements:									
3339993040	Reusable (cleanable) type.....	11	b/ 162,606	29	b/ 3,953	25	b/ 391,597	71	b/ 11,905	75
3339993050	Nonreusable type.....	22	a/ 8,459,426	55	b/ 107,712	59	b/ 6,971,386	45	b/ 74,866	41
3339993060	Strainers and separators, filter parts, and accessories.....	16	(X)	(X)	b/ 16,818	47	(X)	(X)	b/ 19,210	53
3339951	Nonaerospace-type hydraulic fluid power cylinders and actuators, linear and rotary.....	(X)	2,706,967	78	635,962	72	746,491	22	247,822	28
	Hydraulic cylinders, excluding electro-hydraulic:									
	Tie-rod types:									
	Standard NFPA and JIC tie-rod types:									
3339951110	Less than 1,500 psi.....	18	11,364	7	c/ 1,787	3	161,335	93	50,797	97
3339951120	1,500 to 3,000 psi.....	17	(D)	(D)	c/ 3,067	4	(D)	(D)	b/ 65,138	96
3339951130	Greater than 3,000 psi.....	6	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
3339951140	Other tie-rod types.....	15	a/ 207,823	96	a/ 18,153	75	7,983	4	6,037	25
3339951150	Threaded/weld fused combination.....	44	a/ 2,062,564	86	a/ 406,512	85	a/ 338,905	14	a/ 70,618	15
3339951160	Telescoping.....	20	(D)	(D)	87,658	93	(D)	(D)	6,216	7
3339951170	Mill type.....	11	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
3339951180	Other, including those threaded at both ends.....	14	233,409	87	55,703	85	a/ 34,214	13	b/ 10,170	15
3339951190	Electrohydraulic types.....	7	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
33399511A0	Hydraulic rotary actuators.....	12	42,595	80	35,882	61	10,564	20	23,423	39
3339961	Nonaerospace-type reciprocating pumps.....	(X)	1,869,683	58	444,130	75	1,359,517	42	150,999	25
	Axial piston:									
	Variable displacement types:									
3339961110	Closed loop.....	11	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
3339961120	Open loop.....	10	(D)	(D)	101,551	73	(D)	(D)	37,045	27
3339961130	Fixed displacement types.....	8	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
3339961140	Radial piston types.....	3	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
3339963	Nonaerospace-type rotary and other fluid power pumps.....	(X)	2,464,654	67	333,035	71	1,201,541	33	133,216	29
	Gear type:									
3339963110	Internal gear type, including gerotors.....	16	a/ 1,125,179	52	148,530	59	1,030,257	48	103,171	41
3339963120	External gear type.....	12	1,308,052	89	156,415	89	155,631	11	20,214	11
	Vane type:									
3339963130	Fixed displacement.....	3	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
3339963140	Variable displacement.....	3	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
3339965 pt.	Nonaerospace-type fluid power motors.....	(X)	(X)	(X)	423,562	89	(X)	(X)	52,007	11
	Hydraulic motors:									
	Gear type:									
3339965120	Internal types, excluding gerotors.....	10	(D)	(D)	63,487	89	(D)	(D)	7,484	11
3339965130	Gerotor types.....	4	(D)	(D)	167,565	82	(D)	(D)	36,571	18
3339965140	External.....	5	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
3339965150	Vane types, fixed and variable.....	6	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
3339965160	Radial piston types, fixed and variable.....	5	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
	Axial piston types:									
3339965170	Fixed displacement.....	9	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
3339965180	Variable displacement.....	9	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)

D Withheld to avoid disclosing data for individual companies. pt. Part. 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 3b. Manufacturers' Shipments of Fluid Power Products, Including Aerospace by Use: 2002
 [Quantity in units. Value in thousands of dollars]

Product code	Product description	No. of cos.	Mobile shipments				Industrial shipments			
			Quantity	Percent	Value	Percent	Quantity	Percent	Value	Percent
3329125	Fluid power products, including aerospace.....	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)
	Nonaerospace-type hydraulic directional control valves.....	(X)	4,406,424	66	296,663	77	2,300,215	34	86,299	23
	Manual:									
332912511	3- and 4-way monoblock.....	26	526,326	75	55,601	94	176,472	25	3,838	6
332912512	3- and 4-way sectional.....	16	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
332912513	Other manual.....	8	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
	Solenoid:									
332912514	2-way types.....	12	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
332912515	3- and 4-way types.....	21	253,143	36	44,192	53	443,209	64	38,641	47
332912516	Other directional control.....	31	(D)	(D)	29,041	55	(D)	(D)	24,068	45
3329127	Nonaerospace-type hydraulic valves (except directional control).....	(X)	11,391,470	69	460,884	70	5,066,067	31	195,548	30
	Pressure control:									
332912711	Relief valves.....	25	(D)	(D)	11,802	44	(D)	(D)	14,830	56
332912712	Other, including load sensing and manual types.....	13	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
	Flow control:									
332912713	Manual types.....	17	888,241	56	14,961	55	a/ 709,113	44	12,098	45
332912714	Other flow control valves.....	17	417,615	37	16,328	43	708,185	63	21,825	57
332912715	Cartridge valves (all types).....	21	6,365,462	72	138,534	64	2,529,916	28	78,096	36
	Electrohydraulic valves:									
332912716	Pilot-operated, torque motor servo-valves.....	7	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
332912717	Other types, including proportional.....	12	198,412	90	64,618	90	22,625	10	7,550	10
332912718	Other nonaerospace-type hydraulic valves, including stack and logic.....	17	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
3339993	Nonaerospace-type filters for hydraulic fluid power systems.....	(X)	(X)		143,394	51	(X)		136,878	49
	Hydraulic fluid filter assemblies, with or without filter element installed:									
333999301	Low pressure (below 301 psi).....	20	b/ 375,307	56	a/ 8,851	42	293,057	44	a/ 12,277	58
333999302	Medium pressure (301 to 2,999 psi).....	14	(D)	(D)	c/ 8,579	32	(D)	(D)	b/ 17,973	68
333999303	High pressure (3,000 psi and above).....	12	14,193	12	2,748	26	106,380	88	7,807	74
	Filter replacement elements:									
333999304	Reusable (cleanable) type.....	12	b/ 156,297	29	b/ 4,778	28	a/ 377,445	71	a/ 12,245	72
333999305	Nonreusable type.....	24	b/ 8,203,141	56	b/ 101,075	60	b/ 6,427,209	44	b/ 66,039	40
333999306	Strainers and separators, filter parts, and accessories.....	16	(X)	b/	17,363	46	(X)	a/	20,537	54
3339951	Nonaerospace-type hydraulic fluid power cylinders and actuators, linear and rotary.....	(X)	2,758,760	77	609,263	68	822,548	23	286,160	32
	Hydraulic cylinders, excluding electrohydraulic:									
	Tie-rod types:									
	Standard NFPA and JIC tie-rod types:									
333995111	Less than 1,500 psi.....	20	12,683	6	(D)	(D)	188,183	94	(D)	(D)
333995112	1,500 to 3,000 psi.....	18	7,541	4	c/ 3,027	4	186,398	96	64,451	96
333995113	Greater than 3,000 psi.....	6	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
333995114	Other tie-rod types.....	14	236,397	94	21,252	77	15,982	6	6,388	23
333995115	Threaded/weld fused combination.....	45	b/ 2,060,701	85	381,177	84	357,407	15	a/ 73,187	16
333995116	Telescoping.....	22	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
333995117	Mill type.....	11	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
333995118	Other, including those threaded at both ends.....	16	252,488	87	a/ 53,083	84	a/ 37,532	13	b/ 10,047	16
333995119	Electrohydraulic types.....	8	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
33399511A	Hydraulic rotary actuators.....	12	41,784	81	34,576	63	a/ 10,086	19	a/ 20,432	37
3339961	Nonaerospace-type reciprocating pumps.....	(X)	1,724,136	56	441,487	73	1,337,453	44	142,264	27
	Axial piston:									
	Variable displacement types:									
333996111	Closed loop.....	11	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
333996112	Open loop.....	10	162,087	82	107,353	78	35,582	18	30,395	22
333996113	Fixed displacement types.....	7	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
333996114	Radial piston types.....	3	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
3339963	Nonaerospace-type rotary and other fluid power pumps.....	(X)	2,386,705	71	328,620	76	1,231,664	29	138,187	24
	Gear type:									
333996311	Internal gear type, including gerotors.....	12	(D)	(D)	145,532	59	(D)	(D)	102,253	41
333996312	External gear type.....	13	1,247,911	86	150,413	85	208,773	14	26,358	15
	Vane type:									
333996313	Fixed displacement.....	3	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
333996314	Variable displacement.....	4	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
3339965 pt	Nonaerospace-type fluid power motors.....	(X)	(X)		395,119	86	(X)		63,521	14
	Hydraulic motors:									
	Gear type:									
333996512	Internal types, excluding gerotors.....	10	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
333996513	Gerotor types.....	5	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
333996514	External.....	6	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
333996515	Vane types, fixed and variable.....	5	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
333996516	Radial piston types, fixed and variable.....	4	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
	Axial piston types:									
333996517	Fixed displacement.....	9	(D)	(D)	42,062	96	(D)	(D)	b/ 1,587	4
333996518	Variable displacement.....	8	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)

D Withheld to avoid disclosing data for individual companies. pt. Part. 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 4. Shipments, Exports, and Imports of Fluid Power Products: 2003
 [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.....	27,284,140	1,496,773	2,735,382	209,867	28,634,871	223,826
3329123, 129, 12B	Pneumatic fluid power valves.....	26,100,575	961,657	3,720,846	124,997	28,610,096	260,246
332912D	Parts for fluid power valves: hydraulic, pneumatic, all types.....	(X)	244,607	(X)	117,057	(X)	171,187
3339951 pt., 957 pt.	Hydraulic cylinders and hydraulic actuators (except electrohydraulic types).....	3,604,206	1,766,158	446,674	107,384	2,173,264	293,272
3339953 pt.	Pneumatic cylinders (tie-rod types).....	512,492	96,056	865	1,119	29,583	5,499
3339953 pt., 957 pt.	Pneumatic cylinders (except tie-rod types).....	4,872,085	367,415	296,070	37,450	978,240	53,677
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)	132,362	170,479	91,287	552,527	99,400
3339965 pt., 967 pt.	Pneumatic (air) motors and motor packages, all types.....	(D)	(D)	22,798	4,720	7,096	1,081
3339965 pt., 967 pt.	Hydraulic motors, all types.....	2,767,948	492,291	429,812	90,721	231,371	141,692
3339961, 963, 967 pt.	Hydraulic pumps, all types.....	6,990,001	1,289,252	4,338,408	383,599	4,746,981	405,966
3339969	Parts for fluid power pumps and motors.....	(X)	468,550	(X)	224,454	(X)	351,511
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.

Note: For comparison of North American Industry Classification System (NAICS)-based product codes, Schedule B export codes, and HTSUSA import codes, see Table 5.

Table 5. Comparison of North American Industry Classification System (NAICS)-Based Product Codes with Schedule B Export Codes, and HTSUSA Import Codes: 2003

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
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: 2003 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 (2003).

Appendix.

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

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.)

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.

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.