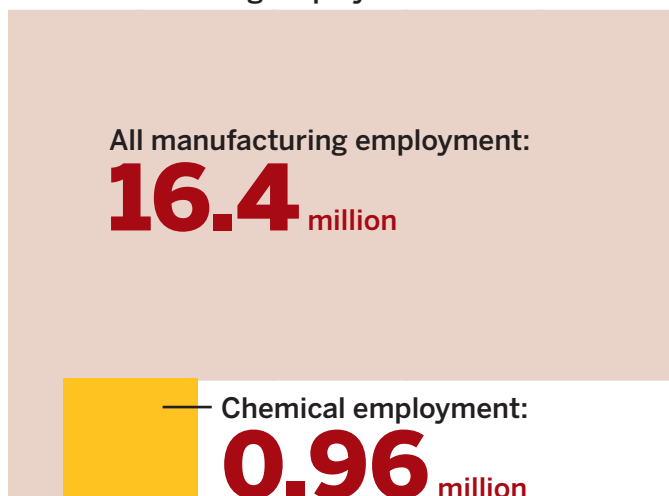
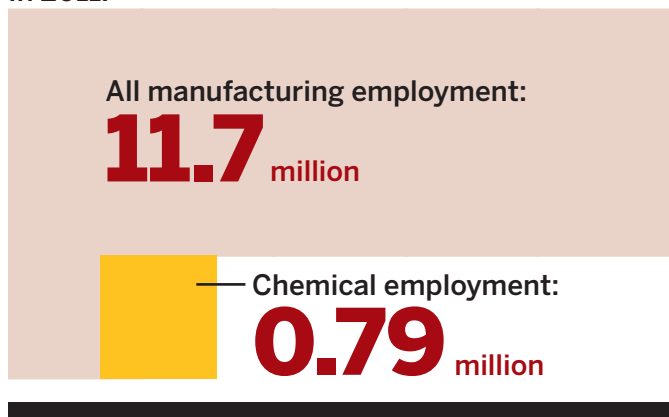


U.S. manufacturing employment in 2001:



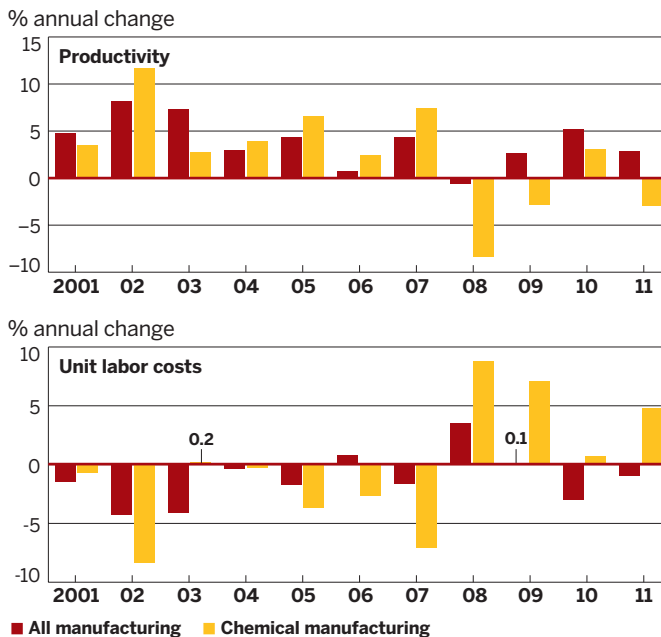
In 2011:



Number of employees per \$10 million in sales at chemical firms:



U.S. chemical sector's productivity dropped, while labor costs rose



SOURCES: Federal Reserve Board, Bureau of Labor Statistics, C&EN estimates

CONSOLIDATION MUDDIES JOBS PICTURE

Overall chemical **EMPLOYMENT** grew slightly as acquisitions in the U.S. and Europe drove up company payrolls

ECONOMISTS SAY employment is a trailing indicator of economic growth. The 2011 jobs figures in this year's Facts & Figures report come after two years of post-recession growth in chemical company profits. They show a few signs that firms have done some hiring, though the activity was barely enough to budge the needle on total U.S. chemical employment.

Chemical employers, like those in most industries, are slow to hire back workers

after a downturn. Hiring managers, unable to accurately predict demand for their firms' products, make the most of contract and part-time workers rather than bringing on additional full-time employees. Once growth appears ensured, hiring tends to pick up.

In 2011, employment in the U.S. chemical industry increased by a slim 0.2% to 788,000, according to the Department of Labor. This move into positive territory, though slight, contrasts with a 2.1% de-

crease in the workforce in 2010. But even if the U.S. economy came roaring back to life, it would be difficult to counteract a decadelong erosion of the chemical workforce, which has been eaten away at a rate of almost 2% per year.

ALTHOUGH HIRING was incrementally positive for the U.S. chemical industry as a whole, readers of C&EN will not be surprised to learn that the pharmaceutical industry shed 4,000 workers in 2011 after losing 7,000 jobs in 2010. Consolidation and budget cutting continue to affect the industry as the lingering effects of acquisitions, such as Merck & Co.'s 2009 purchase of Schering-Plough, shake out. Subsequent deals, including Sanofi's purchase of the biotech drug firm Genzyme, will likely take a toll on pharmaceutical employment.

On a company basis, total employment at

U.S. and European firms tracked by C&EN grew compared with 2010; only Cytec Industries, Kemira, and Praxair cut back. But of the 13,500 additional workers brought on by the U.S. firms, 10,000 of them went to work for DuPont. It is likely that most of them came from DuPont's 2011 acquisition of Danish life sciences firm Danisco.

Similarly, the record employment num-

bers posted by European firms are likely because of acquisitions. In 2011, Solvay acquired Rhodia, Clariant bought Süd-Chemie, and Lonza purchased U.S.-based Arch Chemicals. The jobs count for the three acquiring firms leapt by a combined 23,000. In total, the 16 European firms tracked by C&EN raised employment by 36,400 workers compared with 2010. Eu-

ropean companies that added workers to their ongoing operations included Air Liquide, AkzoNobel, Arkema, BASF, Lanxess, and Linde.

In Japan, chemical employment remained essentially flat from 2009 through 2011. Last year, the 12 Japanese firms tracked by C&EN added only 600 workers to their payrolls.

OVERALL U.S. EMPLOYMENT

The total workforce increased very slightly for the chemical industry, but shrank for pharmaceuticals

THOUSANDS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ANNUAL CHANGE	
												2010-11	2001-11
Manufacturing	16,441	15,259	14,509	14,315	14,227	14,155	13,879	13,406	11,847	11,528	11,733	1.8%	-3.3%
Chemicals	959	928	906	887	872	866	861	847	804	787	788	0.2	-1.9
Basic chemicals	181	170	162	156	150	147	149	152	145	142	142	-0.1	-2.4
Resin, synthetic rubber & fibers	126	115	112	110	108	105	106	104	92	89	91	2.1	-3.2
Agricultural chemicals	46	45	42	42	40	38	36	37	37	35	36	2.5	-2.3
Pharmaceuticals	283	291	292	290	288	292	295	291	284	277	273	-1.5	-0.4
Paints, coatings & adhesives	75	72	69	68	68	67	65	62	57	57	57	0.7	-2.7
Soaps & toiletries	127	121	119	115	114	111	110	107	103	102	103	0.8	-2.1
Other chemicals	120	114	111	107	104	105	101	95	86	84	86	2.3	-3.3

NOTE: Average annual domestic employment. **SOURCE:** Department of Labor

U.S. COMPANY EMPLOYMENT

Jump in employment returned headcount to levels last seen in 2002

THOUSANDS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Air Products & Chemicals	17.8	17.2	18.5	19.9	20.2	20.7	22.1	21.1	18.9	18.3	18.9
Albemarle (a)	3.0	3.0	3.0	3.7	3.7	3.6	4.1	4.1	4.0	4.0	4.3
Cabot	4.3	4.5	4.4	4.3	4.4	4.3	4.3	4.3	4.0	3.9	4.1
Cytec Industries (b)	4.5	4.3	4.5	4.5	7.3	6.7	6.8	6.7	5.8	6.0	5.5
Dow Chemical (c)	52.7	50.0	46.4	43.2	42.4	42.6	45.9	46.1	52.2	49.5	51.7
DuPont (d)	79.0	79.0	81.0	60.0	60.0	59.0	60.0	60.0	58.0	60.0	70.0
Eastman Chemical	15.8	15.7	15.0	12.0	12.0	11.0	10.8	10.5	10.0	10.0	10.0
H.B. Fuller	4.9	4.6	4.5	4.5	4.0	3.7	3.2	3.1	3.1	3.3	3.5
Georgia Gulf (e)	1.2	1.2	1.2	1.2	1.1	6.7	5.2	4.5	3.5	3.6	3.7
W.R. Grace	6.4	6.4	6.3	6.4	6.4	6.4	6.5	6.3	5.9	6.0	6.3
Huntsman Corp. (f)	7.4	7.2	6.3	11.3	10.8	15.0	12.9	12.6	11.0	12.0	12.0
NewMarket Corp. (g)	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.3	1.1	1.6	1.6
PPG Industries	34.9	34.1	32.9	31.8	30.8	32.2	34.9	44.9	39.9	38.3	38.4
Praxair	24.3	25.0	25.4	27.0	27.3	27.0	28.0	26.9	26.2	26.3	26.2
Solutia	9.2	7.3	6.3	5.7	5.4	5.1	6.0	3.7	3.4	3.3	3.4
Stepan	1.5	1.5	1.4	1.4	1.5	1.5	1.5	1.6	1.6	1.8	1.8
TOTAL EMPLOYEES	268.0	262.1	258.2	238.0	238.4	246.6	253.4	257.7	248.6	247.9	261.4

NOTE: Data are not restated for acquisitions, divestitures, or similar developments. **a** Acquired Hercules in November 2008. **b** Acquired Surface Specialties in 2005. **c** Acquired Rohm and Haas in 2009; merged in 2001 with Union Carbide. **d** Acquired Danisco in 2011. **e** Acquired Royal Group in 2006. **f** Held initial public offering of stock in 2005; acquired Ciba's textile effects business in June 2006. **g** Formerly Ethyl Corp. **SOURCE:** Company data

EMPLOYMENT

EUROPE COMPANY EMPLOYMENT

European firms posted record number of people employed in 2011

THOUSANDS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Air Liquide (France)	30.8	30.8	31.9	35.9	35.9	36.9	40.3	43.0	42.3	43.6	46.2
AkzoNobel (Netherlands) (a)	70.4	60.7	64.6	61.5	61.3	61.9	42.6	60.0	54.7	55.6	57.2
Arkema (France) (b)	ne	ne	ne	18.6	17.7	17.0	15.2	15.0	13.8	13.9	15.8
BASF (Germany) (c)	92.5	89.4	87.2	82.0	80.9	95.2	95.2	96.9	104.8	109.1	111.1
Bayer (Germany)	116.9	122.6	94.9	93.3	93.7	106.0	106.2	108.6	111.0	111.4	111.8
Clariant (Switzerland) (d)	28.9	27.8	27.0	24.8	23.4	21.7	20.3	20.1	17.5	16.2	22.1
DSM (Netherlands)	21.5	18.5	26.1	24.5	22.8	22.2	23.3	23.6	22.7	21.9	22.2
Givaudan (Switzerland)	5.3	5.8	6.0	5.9	5.9	6.1	8.8	8.8	8.5	8.6	8.9
Kemira (Finland) (e)	10.2	10.4	10.5	9.7	7.7	9.2	10.0	10.0	8.8	5.6	5.0
Lanxess (Germany) (f)	ne	ne	20.5	19.7	18.3	16.5	14.6	14.8	14.3	14.6	16.4
Linde (Germany)	46.4	46.0	46.2	41.4	42.2	55.5	50.5	51.9	47.7	48.4	50.4
Lonza (Switzerland) (g)	6.2	6.2	5.9	5.7	5.0	6.1	6.9	8.5	8.4	8.3	11.0
Merck (Germany) (h)	34.3	34.5	34.2	28.9	29.1	30.0	31.0	32.8	33.1	40.6	40.7
Solvay (Belgium) (i)	29.4	30.3	30.1	29.3	28.7	29.3	28.3	29.4	28.2	14.7	29.1
Syngenta (Switzerland)	20.5	20.0	19.1	19.5	19.0	19.5	21.2	24.1	25.9	26.2	26.3
Wacker (Germany) (j)	ne	ne	ne	14.7	14.4	14.7	15.0	15.9	15.6	16.3	17.2
TOTAL EMPLOYEES (k)	513.3	503.0	504.2	515.4	506.0	547.8	529.4	563.4	557.3	555.0	591.4

a Divested pharmaceuticals in 2007 and purchased ICI in 2008. **b** Spun off from Total in 2006; prior figures are pro forma. **c** Acquired Engelhard in 2006. Purchased Ciba in 2009 and Cognis in 2010. **d** Purchased Süd-Chemie in 2011. **e** Spun off Tikkurila in 2010. **f** Spun off from Bayer in January 2005; prior figures are pro forma. **g** Purchased Arch Chemicals in 2011. **h** Purchased Millipore in 2010. **i** Sold its pharmaceuticals unit in 2010, bought Rhodia in 2011, and changed accounting procedures beginning in 2010. **j** Became a publicly traded company in 2005. **k** For companies reporting. **ne** = nonexistent. **SOURCE:** Company data

JAPAN COMPANY EMPLOYMENT

Overall headcount has barely changed in the past three years

THOUSANDS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Asahi Kasei	26.2	25.7	25.0	23.8	23.0	23.7	23.9	24.2	25.1	25.0	25.4
DIC (a)	28.4	27.0	26.5	26.8	25.6	25.4	25.2	23.6	22.6	21.6	20.4
JSR	4.4	4.3	4.3	4.4	4.6	4.7	5.1	5.3	5.2	5.3	5.4
Kaneka (b)	6.7	6.7	6.6	6.6	7.3	7.4	7.5	7.3	7.6	8.4	8.4
Mitsubishi Chemical Holdings (c)	38.6	37.6	33.5	33.3	33.0	33.4	39.3	41.8	53.9	53.9	54.0
Mitsui Chemicals	13.2	12.7	12.3	12.2	12.5	12.5	12.8	12.0	12.9	12.8	12.9
Shin-Etsu Chemical	16.5	16.6	17.4	18.2	18.9	19.2	20.2	19.2	16.9	16.3	16.2
Showa Denko	12.0	10.9	10.6	11.2	11.1	11.2	11.3	11.8	11.6	11.6	11.6
Sumitomo Chemical	17.0	17.9	19.0	20.2	24.2	24.7	25.6	26.9	27.8	29.4	29.8
Teijin	24.0	23.3	20.6	19.0	18.8	19.1	19.1	19.4	18.8	17.5	16.8
Toray	34.9	33.8	32.9	33.7	34.7	36.6	38.6	37.9	37.9	38.7	40.2
Tosoh	9.4	9.2	9.2	9.1	9.5	10.5	11.1	11.2	11.1	11.2	11.2
TOTAL EMPLOYEES	231.3	225.7	218.0	218.4	223.1	228.4	239.7	240.6	251.4	251.7	252.3

NOTE: Fiscal year ends on March 31 of the following year at all companies, except Showa Denko, where it ends on Dec. 31. **a** Formerly Dainippon Ink & Chemicals. **b** Number for 2011 is an estimate based on 2010 numbers; newer data were unavailable at press time. **c** Holding firm made up of Mitsubishi Chemical, Mitsubishi Rayon, Mitsubishi Tanabe Pharma, and Mitsubishi Plastics. **SOURCE:** Company data

U.S. PRODUCTION WORKERS

Despite a small increase in 2011, the production workforce remained below prerecession levels

THOUSANDS	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ANNUAL CHANGE	
												2010-11	2001-11
Manufacturing	11,677	10,768	10,189	10,072	10,060	10,137	9,975	9,629	8,322	8,077	8,231	1.9%	-3.4%
Chemicals	562	532	525	520	510	508	504	513	479	474	483	1.9	-1.5
Basic chemicals	115	104	100	95	86	83	88	96	95	92	90	-2.3	-2.5
Resin, synthetic rubber & fibers	89	81	78	75	71	70	70	69	60	58	59	2.3	-4.0
Pharmaceuticals	132	128	133	139	144	149	153	159	157	160	159	-0.7	1.9
Paints, coatings & adhesives	39	38	37	40	41	39	38	37	32	33	34	3.4	-1.4
Soaps & toiletries	80	76	77	74	73	72	69	68	62	62	63	1.9	-2.4

NOTE: Average annual domestic employment. **SOURCE:** Department of Labor

U.S. PAY

Many chemical workers did not get a pay increase in 2011

	HOURLY EARNINGS				WEEKLY EARNINGS			
	2008	2009	2010	2011	2008	2009	2010	2011
Manufacturing	\$17.75	\$18.24	\$18.61	\$18.94	\$724.20	\$725.95	\$764.87	\$784.12
Chemicals	19.50	20.30	21.07	21.46	809.25	840.42	889.15	912.05
Basic chemicals	23.30	24.09	24.93	24.16	1,029.86	1,057.55	1,114.37	1,070.29
Resin, synthetic rubber & fibers	20.54	21.08	21.11	21.12	881.17	908.55	935.17	912.38
Pharmaceuticals	20.10	21.12	21.95	23.77	822.09	863.81	924.10	1,031.62
Paints, coatings & adhesives	16.48	16.85	16.94	17.17	688.86	679.06	679.29	649.03
Soaps & toiletries	15.21	15.71	16.90	16.34	588.63	600.12	642.20	645.43

NOTE: For production workers in domestic employment. **SOURCE:** Department of Labor

U.S. PRODUCTIVITY

Productivity dropped in the pharmaceuticals and coatings sectors ...

PRODUCTIVITY INDEX (a), 2004 = 100	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ANNUAL CHANGE,
												2010-11
Manufacturing	83.7	90.5	97.1	100.0	104.3	105.1	109.7	109.0	111.8	117.6	120.9	2.8%
Chemicals	83.9	93.6	96.2	100.0	106.6	109.1	117.2	107.4	104.4	107.7	104.6	-2.9
Basic chemicals	68.8	81.1	87.4	100.0	114.0	118.9	128.8	102.6	86.6	94.8	105.0	10.7
Resin, synthetic rubber & fibers	86.3	96.4	97.5	100.0	112.1	112.9	120.1	104.5	102.2	109.1	117.7	7.9
Pharmaceuticals	97.6	104.1	103.4	100.0	101.9	103.4	103.0	97.7	93.3	89.8	79.0	-12.1
Paints, coatings & adhesives	100.4	101.9	105.7	100.0	97.9	97.6	98.4	91.9	91.8	99.4	93.5	-6.0
Soaps & toiletries	76.2	89.5	86.4	100.0	110.3	116.2	133.8	128.8	129.7	135.5	139.3	2.8

... and the sectors with lower productivity paid more for labor per unit of output

UNIT LABOR COST INDEX (b), 2004 = 100	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ANNUAL CHANGE,
												2010-11
Manufacturing	109.3	104.6	100.4	100.0	98.3	99.1	97.5	100.9	101.1	98.0	97.1	-1.0%
Chemicals	109.3	100.1	100.3	100.0	96.3	93.7	87.0	94.7	101.4	102.1	107.1	4.8
Basic chemicals	134.6	116.3	109.3	100.0	90.2	84.3	77.9	98.1	120.2	113.6	99.4	-12.5
Resin, synthetic rubber & fibers	110.9	101.1	100.4	100.0	93.1	96.5	96.1	107.7	113.1	106.1	98.4	-7.3
Pharmaceuticals	87.1	83.3	91.5	100.0	100.0	98.8	94.6	98.5	108.3	116.9	144.0	23.2
Paints, coatings & adhesives	90.5	94.4	93.1	100.0	102.4	101.2	99.8	110.3	112.8	104.8	112.9	7.8
Soaps & toiletries	125.7	108.1	111.3	100.0	94.6	87.8	77.2	80.2	82.2	84.6	79.6	-6.0

a Productivity index is calculated by dividing indexes for production by indexes for workhours of production employees. **b** Unit labor cost index is calculated by dividing indexes for hourly wages by indexes for output per workhour. **SOURCES:** Federal Reserve Board, Department of Labor