

TABLE S8-25

## USPTO patents and patent families granted in surface technology, coating, by region, country, or economy: 1998–2018

(Number)

Region, country, or economy	1998		1999		2000		2001		2002		2003		2004		2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		2018		
	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families			
World	2,133	4,983	2,356	5,419	2,502	4,911	2,654	4,735	2,678	4,332	2,619	4,621	2,474	4,621	1,915	4,742	1,760	5,440	1,665	6,226	1,575	5,964	1,565	6,283	2,232	7,615	2,305	8,836	2,607	9,783	2,763	9,651	2,929	10,161	3,036	10,373	3,184	11,783	3,577	11,090	3,519	11,263	
North America	1,150	834	1,265	842	1,325	825	1,420	865	1,393	825	1,406	791	1,270	712	1,040	867	905	618	867	624	798	607	812	619	1,071	857	1,076	787	1,222	818	1,270	713	1,331	594	1,369	530	1,541	474	1,451	418			
Canada	28	30	28	23	35	26	41	36	42	27	39	24	34	21	29	26	29	23	29	23	20	20	18	16	21	25	36	26	52	46	39	37	40	36	40	22	52	24	55	17	52	16	
Mexico	0	1	2	1	0	0	1	0	0	0	0	0	3	2	0	1	1	0	1	0	1	0	1	0	0	2	0	0	1	0	2	2	2	3	6	4	9	6	7				
Puerto Rico	1	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
United States	1,120	803	1,236	833	1,289	815	1,377	829	1,351	797	1,365	767	1,233	689	1,010	578	875	595	836	601	777	587	794	602	1,049	830	1,040	761	1,169	772	1,226	781	1,230	675	1,289	570	1,314	500	1,482	449	1,394	395	
All others	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Central and South America	3	2	4	1	3	3	3	3	7	0	7	3	8	5	1	3	2	3	4	3	2	3	2	3	9	4	11	5	12	11	8	9	4	13	5	10	6	5	8	13			
Argentina	1	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	1	0	0	0	0	0	0	0	0				
Brazil	1	1	2	0	0	1	3	0	1	0	1	3	0	3	0	1	2	2	2	2	2	2	0	3	1	11	1	11	4	7	2	16	3	11	4	9	4	12					
All others	2	1	2	1	3	0	2	0	7	0	6	2	5	1	1	2	1	2	1	2	1	0	2	0	2	3	0	3	2	1	2	3	2	2	1	2	1	4	3				
Europe	368	950	389	833	390	759	482	774	463	824	444	963	403	1,015	306	896	310	912	256	923	254	853	219	965	396	904	417	974	448	978	471	945	500	1,226	576	1,029	594	878	661	1,040	656	911	
EU	339	529	358	565	358	510	438	519	425	534	407	542	362	571	282	573	279	548	234	567	227	477	206	486	396	904	417	974	448	978	471	945	500	1,226	576	1,029	594	878	661	1,040	656	911	
Austria	7	19	10	22	10	12	14	25	14	21	10	17	8	11	6	19	6	20	6	12	6	20	5	18	10	10	12	15	12	21	19	12	23	14	19	12	25	20	22	23	20		
Belgium	17	6	9	5	11	7	17	8	17	8	13	9	8	5	12	6	8	8	10	8	8	10	5	17	7	20	8	17	9	16	8	20	5	24	9	25	3	26	15	25	21		
Denmark	1	2	2	2	4	3	1	4	5	0	2	4	2	2	2	1	0	4	1	3	3	1	3	5	2	4	2	2	4	8	2	4	2	4	2	7	2	7	5	9	3		
Finland	8	8	7	5	5	11	13	13	11	13	14	18	19	13	11	23	17	9	15	10	14	15	20	17	12	20	10	17	7	17	15	19	11	18	16	23	20	23	31	16	26	17	
France	52	104	49	106	53	89	60	77	51	82	57	111	50	106	30	84	35	128	33	125	26	100	36	81	53	98	43	125	57	128	63	112	73	143	78	138	79	122	98	133	107	99	
Germany	154	175	181	192	169	162	210	209	202	223	204	214	183	204	141	245	131	243	97	241	96	202	80	226	157	203	158	194	165	222	184	234	213	193	235	204	225	175	244	168	248	217	
Hungary	0	1	0	1	0	1	0	2	0	2	0	2	0	0	0	1	0	1	0	1	0	1	0	1	0	2	4	0	0	2	0	2	0	2	2	2	3	1	0	0	3		
Ireland	0	10	0	3	0	2	0	1	2	1	2	2	2	2	0	2	2	0	2	1	4	2	2	1	2	3	2	6	2	2	5	4	2	5	4	2	5	4	2	3	1		
Italy	26	58	19	74	28	88	27	52	22	58	24	40	20	97	13	36	16	8	16	10	7	13	6	20	22	19	30	26	26	7	26	5	26	7	26	9	21	82	32	56			
Netherlands	11	24	10	21	15	28	11	27	17	17	15	24	15	22	14	21	10	16	14	34	14	17	9	8	16	18	19	19	20	18	19	20	23	21	19	24	17	31	21	38	37	27	17
Spain	2	15	1	18	2	25	0	20	4	15	1	17	3	22	3	34	2	21	2	32	0	23	2	24	4	28	4	35	7	28	3	31	5	23	8	25	11	20	22	5	19		
Sweden	22	21	24	32	23	30	31	25	26	18	21	24	24	24	21	34	25	28	15	31	21	17	12	16	22	12	37	11	28	7	28	6	22	3	22	6	21	12	20	9			
United Kingdom	38	23	44	21	37	10	51	17	51	18	36	26	27	19	26	24	25	22	27	19	22	12	16	14	40	23	47	32	50	25	54	28	49	24	69	20	53	25	67	32	66	22	
All others	1	61	2	63	2	44	4	38	4	55	5	36	2	44	4	42	3	41	4	39	7	51	3	63	7	59	4	58	4	67	53	8	82	8	80	12	100	11	79	13	85		
Other Europe	28	421	31	268	32	248	44	255	38	422	38	444	24	444	24	323	31	364	23	357	26	376	13	480	30	395	35	421	37	407	43	393	36	684	44	470	57	346	58	410	50	321	
Former Soviet Union	2	13	2	3	1	6	1	14	1	14	1	38	1	104	3	33	0	40	1	61	2	52	0	68	0	54	0	51	1	40	48	2	49	3	60	2	45	0	36	0	32		
Norway	2	7	2	1	2	1	1	4	2	3	1	9	3	5	3	7	4	5	2	2	7	1	2	8	1	6	4	3	2	3	5	3	5	7	4	5	4	4	1	2			
Russia	7	387	5	242	7	228	12	212	7	260	8	361	6	317	3	263	4	300	4	278	2	304	3	385	3	320	4	352	5	344	1	326	3	616	5	286	4	359	4	269			
Switzerland	17	12	22	21	19	13	29	24	27	13	25	12	29	16	15	19	21	18	14	15	14	7	17	24	15	24	13	26	16	36	14	29	13	32	13	41	11	44	8	44	18		
All others	1	2	0	0	2	0	1	1	1	1	3	1	3	1	0	2	1	1	2	0	1	2	1	2	2	2	2	2	2	3	2	2	3	2	3	2	2	5	3	1	1		
Asia	599	3,171	675	3,620	768	3,225	728	3,058	792	2,655	743	2,912	770	2,869	556	3,196	532	3,893	520	4,657	506	4,482	517	4,666	741	5,791	785	7,028	910	7,932	988	7,810	1,125	8,178	1,094								

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	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families		
China	2	56	3	57	2	94	4	90	4	92	3	186	4	339	6	404	6	539	6	613	4	820	7	1,265	25	1,698	20	2,126	34	2,652	50	2,275	63	2,751	60	4,784	92	6,066	120	5,681	134	6,158
India	0	1	2	2	0	1	0	0	1	0	1	2	1	1	2	5	2	5	1	2	3	2	1	1	3	7	4	4	6	6	7	4	9	3	13	3	13	3	13	3		
Japan	540	2,861	588	3,035	652	2,747	619	2,545	656	2,208	616	2,159	624	1,864	451	1,804	417	2,081	424	2,696	392	2,757	414	2,814	561	3,220	605	3,823	673	3,782	669	3,573	767	3,511	748	2,412	756	2,650	835	2,290	873	2,283
Malaysia	0	0	0	0	0	0	0	0	1	0	0	1	1	2	1	1	1	2	0	1	0	3	0	3	0	1	4	8	3	9	4	8	2	8	2	7	1	8	3	3	3	
Singapore	0	0	1	1	4	2	7	4	8	6	8	4	7	4	6	4	5	4	4	4	3	2	3	1	5	2	4	4	4	3	6	4	6	3	12	4	10	2	11	2		
South Korea	28	193	37	453	54	278	39	268	68	229	59	398	76	469	54	828	65	1,088	44	1,170	68	788	68	476	93	681	92	874	103	1,278	113	1,528	149	1,492	179	1,103	203	1,207	248	1,255	213	1,257
Taiwan	28	57	43	71	54	104	59	149	54	121	54	160	57	188	38	152	37	174	41	169	35	111	24	106	52	182	59	193	87	200	139	417	128	395	98	384	100	311	109	197		
All others	0	2	2	1	1	1	0	1	0	0	2	2	1	1	0	2	0	0	0	1	1	1	0	1	1	1	1	3	1	2	1	4	3	3	3	3	4	3	4	3	4	2
Middle East	6	3	8	5	3	12	6	7	11	8	9	3	6	4	4	5	2	7	6	4	6	4	6	4	7	6	10	8	13	12	8	13	6	13	8	21	9	8	26	8		
Israel	5	1	8	5	3	4	5	2	11	4	9	2	6	4	4	5	1	5	2	3	2	6	4	6	4	7	5	11	3	7	12	3	10	4	14	2	12	1	12	2		
All others	1	1	0	0	0	8	0	5	1	4	1	1	0	0	4	1	1	1	3	0	3	0	0	0	1	1	3	3	2	6	9	2	3	3	4	7	6	9	7	13	6	
Africa	1	10	2	6	4	5	3	4	1	7	0	11	1	2	0	4	0	3	0	5	0	3	0	15	3	7	2	4	7	1	6	2	6	3	4	3	4	1	2	1	2	
South Africa	1	8	2	4	3	3	3	1	3	0	4	1	2	1	0	3	0	2	0	2	0	5	0	15	2	3	0	3	1	3	2	1	0	3	2	0	2	0	0	1	0	
All others	0	2	0	1	1	3	0	3	0	7	0	8	0	1	0	0	0	0	1	0	0	0	0	0	1	4	0	2	1	7	0	4	1	6	0	3	0	4	0	1	0	2
Australia and Oceania	6	6	11	7	10	8	12	11	10	12	9	8	16	9	8	6	11	7	11	7	9	8	9	11	11	16	11	22	9	19	9	16	13	16	13	14	12	15	15	7	16	5
Australia	5	6	9	6	9	8	11	11	9	12	9	8	14	9	7	6	10	7	11	7	9	8	7	11	10	16	10	22	9	18	9	15	11	16	11	14	11	15	11	7	13	5
New Zealand	1	0	2	1	1	0	1	0	1	0	0	0	2	0	0	0	0	0	0	1	2	1	2	0	1	1	0	0	0	0	0	2	0	0	2	0	1	0	4	0	2	0
All others	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unclassified	0	7	3	90	0	59	0	13	0	2	0	0	0	5	0	0	1	3	0	3	0	0	0	0	0	0	0	5	0	10	0	34	0	1	0	0	12	1	0	1	0	

EU = European Union; USPTO = U.S. Patent and Trademark Office.

## Note(s)

USPTO patents are allocated according to patent inventorship information. USPTO patents are fractionally allocated among regions, countries, or economies based on the proportion of residences of all named inventors. Patents are classified under the World Intellectual Property Organization (WIPO) classification of patents, which classifies International Patent Classification (IPC) codes under 35 technical fields. IPC reformed codes take into account changes that were made to the WIPO classification in 2006 under the eighth version of the classification and were used to prepare these data. However, because PatentsView only provides the original IPC codes as they appeared on patents and not the IPC reformed codes, current Cooperative Patent Classification codes on patents were converted back to the most recent IPC classification to prepare these statistics. Fractional counts of patents were assigned to each technological field on patents to assign the proper weight of a patent to the corresponding technological fields under the classification. International Patent Documentation (INPADOC) patent families across all patent offices covered in the Worldwide Patent Statistical Database (PATSTAT) are counted according to the year of the first granted patent in the patent family. Patent families are allocated according to patent inventorship information found on the priority patent of the INPADOC patent families. To account for missing ownership information in PATSTAT for some offices, a method designed by de Rassenfosse et al. (2012) is used to fill in missing information on priority patents using information in successive filings within the patent families (see technical documentation for details). Patent families are fractionally allocated among regions, countries, or economies based on the proportion of residences of all named inventors. Because of data coverage issues for some patent offices in PATSTAT, statistics for some countries may be underestimated partially for some years or across the whole trend. Countries with identified issues include India (missing data) and South Africa (no data for 2018). For Italy, because of data gaps regarding information on granted patents, patent applications are used instead, which slightly overestimates Italy's output and creates a small shift in the year for which its output is accounted. The EU includes 28 member countries. China includes Hong Kong.

## Source(s)

Science-Matrix; PATSTAT, accessed April 2019; PatentsView, USPTO, accessed June 2019.