



IPCV8-NACE Rev.2 Update (version 2.0)

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1. Introduction

In December 2006, the revision to NACE Rev. 2 was introduced. The implementation of this modified classification scheme has implications when mapping or analysing the relationship between industries, on the one hand, and technology, on the other. Such activities necessitate the presence of a concordance scheme which relates industries to relevant technological classes. A concordance scheme has been developed in the past, based on the original NACE classification and the IPC classification v7 (Schmoch, U., LaVille, F., Patel, P., Frietsch, R., 2003. Linking technology areas to industrial sectors: final reports to the European commission. DG Research). Revising the NACE calls for revisiting and adapting this concordance scheme. This document outlines the approach followed to arrive at the updated concordance, and it includes the updated concordance table and identifies some notable changes.

The outcomes of this exercise have been first published in October 2014. Within this version, a number of new IPC codes are introduced (B33Y, H02S) and IPC codes which have been allocated previously by means of co-IPC are now being classified when they appear alone. In addition, we include in this report an overview of the main applicants (Top 15) by industry (EPO patent applications). This overview further substantiates the relevance and validity of the current concordance scheme.

This exercise has been initiated by Eurostat and executed by KU Leuven (INCENTIM & ECOOM). As part of the process, experts at Eurostat (Bernard Félix), Sogeti (Gaëtan Châteaugiron) and EPO (Geert Boedt) were consulted. Last but not least, Ulrich Schmoch and Rainer Frietsch (Fraunhofer ISI) participated by systematically reviewing and validating suggested changes.

2. Overview of the methodology

In December 2006, the revision to NACE Rev. 2 was introduced. Any shift/conversion in the NACE classification system has an impact on concordance tables used to arrive at patent statistics by industry. Over the last decade, patent indicators reporting activity by industry have been built on the well-known concordance table between industries and technologies developed by Schmoch et al (2003)¹. This concordance scheme has been developed and validated by matching IPC subclasses to industries via an assessment of a representative sample of firm-owned patents². This exercise has resulted in an allocation of IPC codes to NACE categories.

Initiated by Eurostat, the IPC-NACE concordance has been updated by INCENTIM/ECOOM (KU Leuven). This work has relied on two sources: (1) the existing concordance between 44 technology sectors of the Fraunhofer classification¹ with corresponding IPC subclasses (International Patent Classification) and NACE 1.1 industries, and (2) the official conversion table NACE 1.1 to NACE Rev. 2³, edited and published by Eurostat.

The conversion table from NACE 1.1 to NACE Rev.2 was the starting point.

¹ Schmoch, U., LaVille, F., Patel, P., Frietsch, R., 2003. Linking technology areas to industrial sectors: final reports to the European Commission. DG Research November. ftp://ftp.cordis.europa.eu/pub/indicators/docs/ind_report_isi_ost_spru.pdf

² Alternative approaches rely on the probabilities calculated based on the frequency of 'industrial' keywords observed in patent documents. See: Lybbert T. & Zolas N. (2013) Getting patents and economic data to speak to each other: An 'Algorithmic Links with Probabilities' approach for joint analysis of patenting and economic activity. Research Policy.

³ http://epp.eurostat.ec.europa.eu/portal/page/portal/nace_rev2/correspondence_tables

Table 1: overview of NACE 1.1 and NACE Rev.2 concordance

Values in the Table correspond to the number of unique NACE 1.1/NACE Rev.2 combinations on the 3- or 4-digit level.

The cells in light red represent the highest values in a row and uncover the most significant correspondence between NACE 1.1 and NACE Rev.2.

		Industry links between NACE 1.1 & NACE Rev.2 on 3 & 4-digit level																																						
		10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	38	41	43	58	59	62	95	Grand Total	Count of NACE Rev.2/NACE 1.1 on 2-digit level						
Food products and Beverages	15	34	8									1																				43	3							
Tobacco products	16			1																												1	1							
Textiles	17				20	3			1																1	2						1	28	6						
Wearing apparel; dressing and dyeing of fur	18				2	6	1																		2								11	4						
Tanning and dressing of leather; luggage, handbags, saddlery, harness and footwear	19						3	1						2											1							7		4						
Wood and of products of wood and cork, except furniture; articles of straw and plaiting materials	20							7																	2	2		1	2				14	5						
Pulp, paper and paper products	21								7	2																							9	2						
Publishing, printing and reproduction of recorded media	22									1	8																													
Coke, refined petroleum products and nuclear fuel	23										2	1	1			1																	17	5						
Chemicals and chemical products	24										1	19	2					2							1		2						7	5						
Rubber and plastic products	25													7																				26	6					
Other non-metallic mineral products	26														25										3	4		1	1				18	6						
Basic metals	27																																	31	2					
Fabricated metal products, except machinery and equipment	28															16	1																17	2						
Machinery and equipment n.e.c.	29																1	19			3			1	11			1	1				37	7						
Office machinery and computers	30																		2						1	23							1	63	8					
Electrical machinery and apparatus n.e.c.	31														1		1	5	13	2	2	1			1								4	4						
Radio, television and communication equipment and apparatus	32																	8	1	1						6							31	8						
Medical, precision and optical instruments, watches and clocks	33																								3									14	5					
Motor vehicles, trailers and semi-trailers	34																		5	1	3				6	8							23	5						
Other transport equipment	35																				2	3	1		2								8	4						
Furniture; manufacturing n.e.c.	36				1		1	1	1			1		4			1	1			2		8	1		8							19	4						
Recycling	37																				3	1	4	7	9	3						5	43	15						
Grand Total		34	8	1	23	9	5	9	10	10	3	22	3	13	26	18	24	22	20	47	6	16	8	28	79	6	3	5	6	1	1	8	474	112						

The column 'Count of NACE Rev.2/NACE 1.1' on the right side, shows the amount of NACE Rev.2 industries per NACE 1.1 industry, on the 2-digit level.

Two cases can occur: i) a 1:1 relationship between the old and the new NACE category exists on the 2-digit level (e.g. Tobacco Products is relabelled from 16 (NACE 1.1) to category 12 (NACE Rev.2)) or ii) NACE 1.1 categories on the 2-digit level are classified into different NACE Rev.2 categories (e.g. Food Products and Beverages used to be classified together (label 15) under NACE 1.1 while the constituent industries are classified under Food Products (label 10), Beverages (label 11), and even Chemicals and chemical products (label 20) in the NACE Rev.2 classification. As soon as industries are regrouped, the question arises which IPC codes – previously related to NACE 1.1 (Schmoch et al.) categories – need to be transferred to which NACE Rev.2 category .

In case a 1:1 relationship exists between the old and the new NACE version, the relevance of the IPC code for the NACE Rev.2 category has been inspected, relying on a content analysis of the IPC description as well as potential relevant NACE Rev.2 categories. In cases where doubt existed, co-occurrence and co-citation patterns of IPC codes have been inspected and used (whereby IPC subclasses that are highly related are allocated to one and the same NACE Rev.2 category). In total, 44 of the IPC codes have been allocated in this manner.

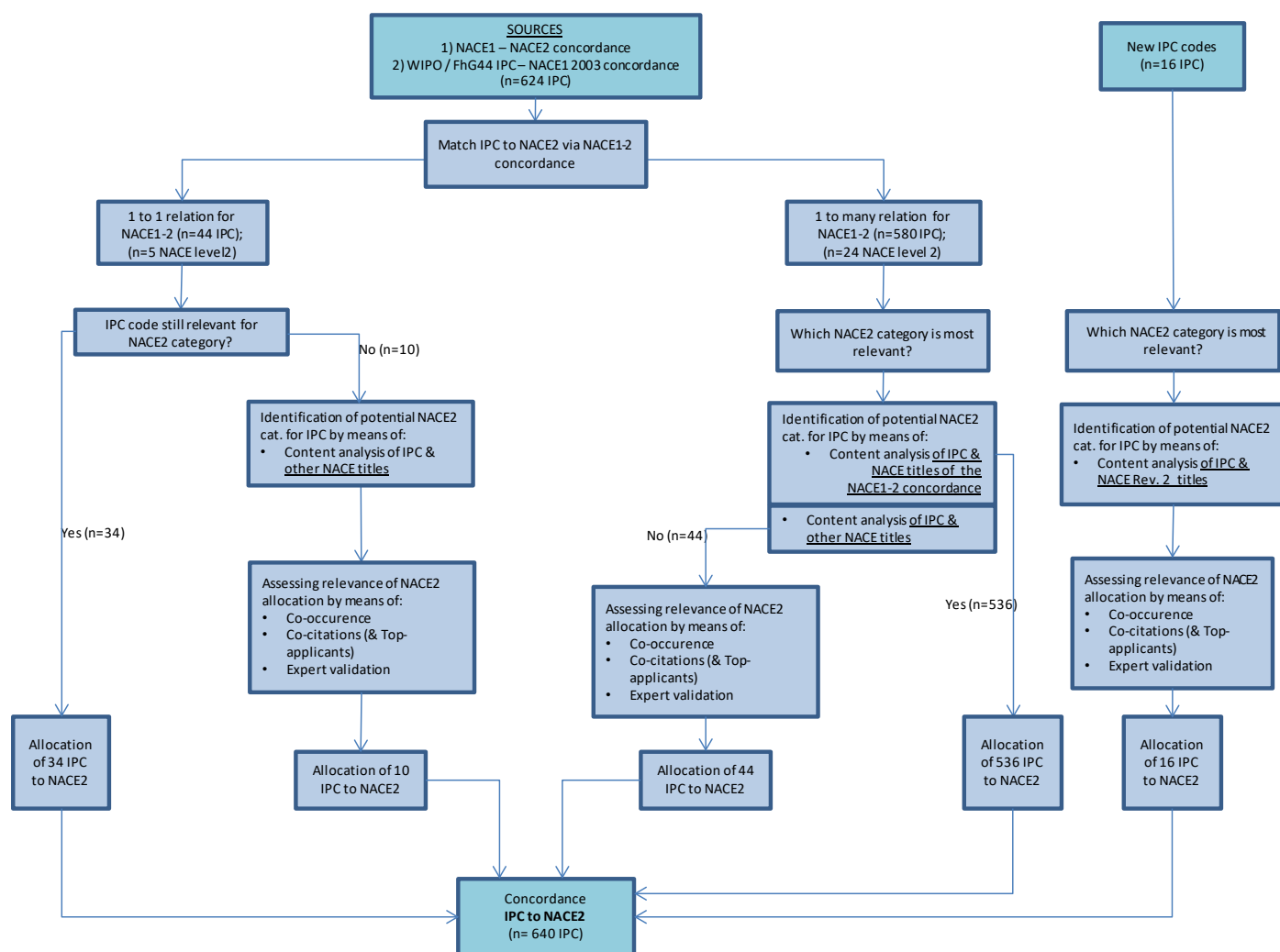
In case (NACE Rev. 2) categories do not display a 1:1 relationship with old NACE 1.1 categories, all the IPC codes involved (previously allocated to one NACE category) are assessed in terms of relevance to multiple NACE categories. The majority of IPC codes are situated here (n=580). NACE categories that have been considered stem initially from the concordance scheme from NACE 1.1 to NACE Rev.2. In a limited number of cases (n=44), IPC codes shifted to another industry. Decisions on allocating IPC codes to industries have been based on co-occurrence and co-citation patterns as well as an assessment of the industries in which main patent applicants are active.

Finally, a limited number of novel IPC codes (n=16) had to be included. For these codes, content analysis of the IPC description, combined with inspecting the co-occurrence/co-citation patterns and an analysis of main players, has also been used to arrive at allocation decisions.

Figure 1 summarizes the approach adopted and reports the number of IPC codes (total = 640) that have been allocated to the different situations encountered.

The outcomes of this exercise have been inspected and validated by a team of experts, operating independently (Eurostat, EPO, Fraunhofer-Gesellschaft).

Figure 1: Overview of the methodology adopted to allocate IPC subclasses to NACE Rev.2 categories



Note: Numbers correspond to the first version of the concordance report.

3. Concordance Table IPC V8 - NACE Rev.2

In Table 2, the outcomes of this exercise can be found on the NACE 2-digit level. For a number of IPC codes, it was feasible to allocate them more precisely to the NACE 3-digit level. This more fine-grained classification scheme can be found in annex 1.

Table 2: NACE Rev. 2 – IPC V8 concordance (NACE 2-digit level)

10	Manufacture of Food Products [10]	A23J A23C A23K C13B	A01H A23D A23L 1/* C13F	A01J A23F A23L 3/* C13J	A21D A23G A23P C13K	A23B A23J C12J
11	Manufacture of Beverages [11]	A23L 2/*	C12C	C12F	C12G	C12H
12	Manufacture of Tobacco Products [12]	A24B	A24D	A24F		
13	Manufacture of Textiles [13]	D04D D06M	D04G D06N	D04H D06P	D06C D06Q	D06J
14	Manufacture of Wearing Apparel [14]	A41B	A41C	A41D	A41F	
15	Manufacture of Leather and Related Products [15]	A43B	A43C	B68B	B68C	
16	Manufacture of Wood and of Products of Wood and Cork, except Furniture; Manufacture of Articles of Straw and Plaiting Materials [16]	B27D	B27H	B27M	B27N	
17	Manufacture of Paper and Paper Products [17]	B42F	D21C	D21H	D21J	
18	Printing and Reproduction of Recorded Media [18]	B41M	B42D	B44F		
19	Manufacture of Coke and Refined Petroleum Products [19]	C10G	C10L			
20	Manufacture of Chemicals and Chemical Products [20]	A01N B01J C01C C05B C06B C07B not A61K except A61K 8/* C07C not A61K except A61K 8/* C07F not A61K except A61K 8/* C07G not A61K except A61K 8/* C08B C08K C09F C10B C10M C12S not A61K except A61K 8/* C23G	A01P B09B C01D C05C C06C C08F C08L C09G C10C C10N C11B C12S not A61K except A61K 8/* C25B	A61K 8/* B09C C01F C05D C06D C08G C09B C09H C10H C11B C40B not A61K except A61K 8/*	A61Q B27K C01G C05F C08H C09C C09J C10J C11C C14C	A62D C01B C02F C05G C08J C09D C09K C10K C11D C23F

		D01C F25J	D01F F42B	D06L F42D	F17C G21F	F17D
21	Manufacture of Basic Pharmaceutical Products and Pharmaceutical Preparations [21]	A61K C07H	A61K except A61K 8/* C07J C07K	A61P C12N	C07D	
22	Manufacture of Rubber and Plastic Products [22]	B29B C08C	B29C	B29D	B60C	B67D
23	Manufacture of Other Non-Metallic Mineral Products [23]	B28B C04B	B28C E03D	B32B	C03B	C03C
24	Manufacture of Basic Metals [24]	B21C C22B G21H	B22D C22C	C21B C22F	C21C C25C	C21D C25F
25	Manufacture of Fabricated Metal Products, except Machinery and Equipment [25]	A01L B63G E05D F17B F41A F41H G21D	A44B C23D E05F F22B F41B F41J G21J	A47H C25D E06B F22G F41C F42C	B21G E05B F16B F24J F41F G21B	B22F E05C F16T F27D F41G G21C
26	Manufacture of Computer, Electronic and Optical Products [26]	A61N C30B G01F G01M G01V G03B G04D G05F G06G G08C H01C H01Q H03F H03L H04K H04R H05K	B81B F15C G01H G01N G01W G03C G04F G06C G06J G09C H01F H01S H03G H03M H04L H04S	B81C G01B G01J G01Q G02B G03H G04G G06D G06N G11C H01G H03B H03H H04B H04M H04W	B82B G01C G01K G01R G02C G04B G04R G06E G06T G12B H01J H03C H03J H04H H04N H05G	B82Y G01D G01L G01S G02F G04C G05B G06F G08B G21K H01L H03D H03K H04J H04Q H05H
27	Manufacture of Electrical Equipment [27]	A21B B01B F21H F21Q F24B G08G H01M H02G	A45D B60M F21K F21S F24C G10K H01P H02H	A47G B61L F21L F21V F24D H01B H01R H02J	A47J D06F F21M F21W F25C H01H H01T H02K	A47L E06C F21P F21Y F25D H01K H02B H02M

		H02N	H02P	H02S	H05B	H05C
28	Manufacture of Machinery and Equipment N.E.C. [28]	A01B	A01C	A01D	A01F	A01G
		A01K	A01M	A21C	A22B	A22C
		A23N	A24C	A41H	A42C	A43D
		A47K	A62C	B01D	B01F	B02B
		B02C	B03B	B03C	B03D	B04C
		B05B	B05C	B05D	B06B	B07B
		B07C	B08B	B21B	B21D	B21F
		B21H	B21J	B21K	B21L	B22C
		B23B	B23C	B23D	B23F	B23G
		B23H	B23K	B23P	B23Q	B24B
		B24C	B24D	B25B	B25C	B25D
		B25F	B25G	B25H	B25J	B26B
		B26D	B26F	B27B	B27C	B27F
		B27G	B27J	B27L	B28D	B30B
		B31B	B31C	B31D	B31F	B33Y
		B41B	B41C	B41D	B41F	B41G
		B41J	B41K	B41L	B41N	B42B
		B42C	B43M	B44B	B44C	B60S
		B61B	B65B	B65C	B65F	B65F 1/*
		B65F 5/*	B65F 7/*	B65F 9/*	B65G	B65H
		B66B	B66C	B66D	B66F	B67B
		B67C	B68F	C10F	C12L	C13C
		C13D	C13G	C13H	C14B	C23C
		D01B	D01D	D01G	D01H	D02G
		D02H	D02J	D03C	D03D	D03J
		D04B	D04C	D05B	D05C	D06B
		D06G	D06H	D21B	D21D	D21F
		D21G	E01C	E01D	E01F	E01H
		E02C	E02D	E02F	E05G	E21B
		E21C	E21D	E21F	F01B	F01C
		F01D	F01K	F01M	F01N	F01P
		F02C	F02G	F02K	F03B	F03C
		F03D	F03G	F04B	F04C	F04D
		F04F	F15B	F15D	F16C	F16D
		F16F	F16G	F16H	F16K	F16M
		F16N	F16P	F22D	F23B	F23C
		F23D	F23G	F23H	F23J	F23K
		F23L	F23M	F23N	F23R	F24F
		F24H	F25B	F26B	F27B	F28B
		F28C	F28D	F28F	F28G	G01G
		G03G	G05D	G05G	G06K	G06M
		G07B	G07C	G07D	G07F	G07G
		G09D	G09G	G10L	G11B	H05F
29	Manufacture of Motor Vehicles, Trailers	B60B	B60D	B60G	B60H	B60J

	and Semi-Trailers [29]	B60K B60R F02B F02P	B60L B60T F02D F16J	B60N B60W F02F G01P	B60P B62D F02M	B60Q F01L F02N
30	Manufacture of Other Transport Equipment [30]	B60F B61G B62H B63B B64C E01B	B60V B61H B62J B63C B64D F03H	B61C B61J B62K B63H B64F	B61D B61K B62L B63J B64G	B61F B62C B62M B64B B65F 3/*
31	Manufacture of Furniture [31]	A47B	A47C	A47D	A47F	
32	Other Manufacturing [32]	A45F A41G A46B A61F A62B A63H B43K C06F F16L G09B G10G	A61G A42B A46D A61H A63B A63J B43L C12M not A61K except A61K 8/* F23Q G09F G10H	A63G A44C A61B A61J A63C A63K B44D G01T G10B G21G	B62B A45B A61C A61L A63D B01L B65D G03D G10C	G10F A45C A61D A61M A63F B04B B68G D07B G03F G10D
42	Civil Engineering [42]	E02B	E03B	E03C		
43	Specialised Construction Activities [43]	E03F E04G	E04B E04H	E04C	E04D	E04F
62	Computer Programming, Consultancy and Related Activities [62]	G06Q				
Co-IPC	remove this code and allocate by following the co-IPC	F16S	B29K	B29L	C12R	-99Z

4. Explanatory comments on the concordance

a. 4.1. Food & Beverages

- The category 'Food & Beverages', present in the NACE 1.1 classification, has been disaggregated into 'Manufacture of Food Products' and 'Manufacture of Beverages' in the NACE Rev.2 classification. For IPC A23L (foods, foodstuffs, or non-alcoholic beverages, not covered by subclasses A23B to A23J) that spans both foods/foodstuffs and beverages, the more fine-grained IPC 'main group' level (IPC5-digit) is used to arrive at a correct classification under either 'Food' or 'Beverages'.

Table 3: Distribution of IPC A23L over NACE Rev.2 industries

Subclass (IPC4-digit)	NACE 1.1	Main group (IPC5-digit)	IPC5 Description	NACE Rev.2	NACE Rev.2 Description
A23L	Food & Beverages 15	A23L 1/*	Foods or foodstuffs; Their preparation or treatment (preservation thereof in general A23L 3/00) [4]	10	Food
A23L	Food & Beverages 15	A23L 2/*	Non-alcoholic beverages; Dry compositions or concentrates thereof; Their preparation (soup concentrates A23L 1/40; preparation of non-alcoholic beverages by removal of alcohol C12H 3/00) [2]	11	Beverages
A23L	Food & Beverages 15	A23L 3/*	Preservation of foods or foodstuffs, in general, e.g. pasteurising, sterilising, specially adapted for foods or foodstuffs (preserving foods or foodstuffs in association with packaging B65B 55/00)	10	Food

- Whereas parts of C13B (production of sucrose; apparatus specially adapted thereof) explicitly deal with juice, the majority of patents with this IPC code are related to the food industry. Hence, this IPC code is attributed to NACE Rev.2 category 10, 'Manufacture of Food Products'.

b. 4.2. Pharmaceuticals/Cosmetics/Chemicals

- For A61K (Preparations for Medical, Dental, or Toilet purposes) the more fine-grained IPC main group level is used to separate A61K 8/ from all other main groups under A61K. All A61K groups belong to the 'Manufacture of Basic Pharmaceutical Products and Pharmaceutical Preparations' (NACE 21) except A61K 8/, which belongs to NACE 20.4, the 'Manufacture of Soap and Detergents. Cleaning and Polishing Preparations. Perfumes and Toilet Preparations' industry. Therefore, the concordance table contains a Boolean condition for A61K:
 - If any group under A61K, except for group A61K 8/, appears in a patent application, the NACE Rev.2 category 21 'Manufacture of Basic Pharmaceutical Products and Pharmaceutical Preparations' is assigned to the patent.
 - If A61K 8/ appears in a patent application, the NACE Rev. 2 category 20.4 'Manufacture of Soap and Detergents. Cleaning and Polishing Preparations. Perfumes and Toilet Preparations' is assigned to the patent.
 - If any group under A61K appears together with A61K 8/ in a patent application, both industries are assigned to the patent ('Manufacture of Basic Pharmaceutical Products and Pharmaceutical

Preparations' (NACE 21) and 'Manufacture of Soap and Detergents. Cleaning and Polishing Preparations. Perfumes and Toilet Preparations' (NACE 20.4)).

For a limited number of patents, no A61K subclass is provided. After inspecting a considerable sample (n= 34.302), these patents are allocated to NACE 21 'Manufacture of Basic Pharmaceutical Products and Pharmaceutical Preparations' as the majority pertains to pharmaceutical products and preparations. Do notice that a number of cosmetic oriented patents (as well as soap/detergents) appear with only A61K as IPC code.

- Moreover, the IPC codes C07B (general methods of organic chemistry; apparatus thereof), C07C (acyclic or carbocyclic compounds), C07F (acyclic, carbocyclic, or heterocyclic compounds containing elements other than carbon, hydrogen, halogen, oxygen, nitrogen, sulphur, selenium or tellurium), C07G (compounds of unknown composition), C12M (apparatus for enzymology or microbiology), C12S (processes using enzymes or micro-organisms to liberate, separate or purify a pre-existing compound or composition) and C40B (combinatorial chemistry; libraries, e.g. chemical libraries, in-silico libraries) contain another Boolean condition regarding A61K that stems from the Fraunhofer 35 Classification developed by Schmoch U. in 2008⁴. The NACE Rev.2 industries 20.1 'Manufacture of Basic Chemicals, Fertilisers and Nitrogen Compounds, Plastics and Synthetic Rubber in Primary Forms', 20.5 'Manufacture of Other Chemical Products', and 32.5 'Manufacture of Medical and Dental Instruments and Supplies' of these IPC codes are valid, only when they do not co-occur with any group of A61K (except with group A61K 8/ because of the condition specified in the previous bullet point):
 - If C07B, C07C, C07F, C07G, C12M, C12S and C40B do co-occur with any group of A61K (except with group A61K 8/) in a patent application, the NACE Rev.2 category 21 'Manufacture of Basic Pharmaceutical Products and Pharmaceutical Preparations' corresponding to any group of A61K except A61K 8/ is assigned to the patent and not the original NACE Rev.2 category of C07B, C07C, C07F, C07G, C12M, C12S and C40B.
 - In case these 7 IPC codes co-occur with A61K 8/, both industries are assigned to the patent. (e.g. C07B (original industry, NACE 20.1 Basic Chemicals) and A61K 8/ (NACE 20.4 'Manufacture of Soap and Detergents. Cleaning and Polishing Preparations. Perfumes and Toilet Preparations')).
 - In case these 7 IPC codes co-occur with A61K as well as A61K 8/, all three industries are assigned to the patent. (e.g. C07B (original industry, NACE 20.1 Basic Chemicals) and e.g. A61K6 (NACE 21 Pharma) and A61K 8/ (NACE 20.4 'Manufacture of Soap and Detergents. Cleaning and Polishing Preparations. Perfumes and Toilet Preparations'))

c. 4.3. Measuring Instruments & Industrial Control

- Two technology fields (Measuring Instruments and Industrial Control), which were separate categories on the NACE 3-digit level in the previous NACE 1.1 classification, are brought together in the NACE Rev.2 classification under the category Manufacture of Instruments and Appliances for Measuring, Testing and Navigation; Watches and Clocks (NACE 26.5).

⁴ Schmoch U. (2008) Concept of a Technology Classification for Country Comparisons.

http://www.wipo.int/export/sites/www/ipstats/en/statistics/patents/pdf/wipo_ipc_technology.pdf

Table 4: FhG38 and FhG39 under 1 and the same NACE Rev.2

FhG44	FhG44_title	NACE 1.1	NACE 1.1_title	NACE Rev.2	NACE Rev.2_title
38	Measuring instruments	33.2	Measuring instruments	26.5	Manufacture of Instruments and Appliances for Measuring, Testing and Navigation; Watches and Clocks [26.5]
39	Industrial control	33.3	Industrial process control equipment	26.51	Manufacture of Instruments and Appliances for Measuring, Testing and Navigation [26.51]

d. 4.4. Indexing schemes IPC's '-99Z', B29K, B29L, C12R and F16S

- The following IPC codes, have been allocated to the NACE Rev.2 industries associated with the co-IPC codes : F16S (constructional elements in general; structures built-up from such elements, in general), B29K (indexing scheme associated with subclasses B29B, B29C or B29D, relating to moulding materials or to materials for reinforcements, fillers or preformed parts), B29L (indexing scheme associated with subclass B29C, relating to particular articles), C12R (indexing scheme associated with subclasses C12C-C12Q or C12S, relating to micro-organisms) and all '-99Z' IPC's (Subject matter not otherwise provided for in this section). All these IPC codes have a limited number of patent applications, hardly occur alone, and mostly co-occur in a secondary position.

e. 4.5. Containers

- In the first version of the concordance (October 2014), the container-IPC code B65D (Containers for storage or transport of articles or materials) was allocated to different industries by means of a weighting scheme, reflecting the material used to construct the container.

Table 5: Fractional count for B65D (Containers)

CATEGORY	NACE Rev.2 category & title	PT CNT	%
Plastic containers	22.22 - Manufacture of Plastic Packing Goods	3188	35,96%
Glass containers	23.13 - Manufacture of Hollow Glass	1889	21,31%
Paper containers	17.21 - Manufacture of Corrugated Paper and Paperboard and of Containers of Paper and Paperboard	1812	20,44%
Metal containers	25.91 - Manufacture of Steel Drums and Similar Containers	1345	15,17%
Textile containers	13.9 - Manufacture of Other Textiles	521	5,88%
Wooden containers	16.24 - Manufacture of Wooden Containers	111	1,25%
TOTAL		8866	100,00%

- While this scheme offers a solution for aggregated patent statistics, it is not useful for allocating individual patent documents⁵. When inspecting a sample of patent documents (EP and USPTO, 2000 onwards) containing this IPC code, a considerable majority implies several IPC's (n=21.203 ; +/- 66%). For these patents, it becomes feasible to use the co-IPC to arrive at an industry allocation. In case of multiple co-IPC's, referring to different

⁵ As less than 25% (23.46%) of the patent documents with this IPC code contains a reference to certain materials in title and abstract.

industries, fractional counting can be applied. In case no other IPC code is associated with the patent (n=11896; +/- 33%), the more generic NACE Rev.2 category 32.99 'Manufacturing N.E.C.' applies.

f. 4.6. Nuclear Technology

- G21B (fusion reactors) has been attributed to NACE Rev.2 category 25.30 (Manufacture of steam generators, except central heating hot water boilers) as this industry covers the manufacture of nuclear reactors.
- G21H (obtaining energy from radioactive sources; applications of radiation from radioactive sources; utilising cosmic radiation): As most applicants have a 'nuclear' profile, this IPC code is associated with NACE Rev.2 category 24.46 (Processing of Nuclear Fuel).

g. 4.7. Nano-Technology

- B81B (micro-structural devices or systems), B82Y (specific uses or applications of nano-structures; measurement or analysis of nano-structures; manufacture or treatment of nano-structures) and B82B (nano-structures formed by manipulation of individual atoms, molecules, or limited collections of atoms or molecules as discrete units; manufacture or treatment thereof) are rather broad technological fields, which might result in applications being situated in different industries. Currently, B81B has been associated with NACE Rev.2 category 26.11 (Manufacture of Electronic Components and Boards). Depending on co-occurring IPC codes, other options might be considered (within the NACE 26 category).

h. 4.8. Services

- E02B (hydraulic engineering), E03B (installations or methods for obtaining, collecting, or distributing water), E03C (domestic plumbing installations for fresh water or waste water), E03F (sewers; cesspools), E04B (general building constructions), E04C (structural elements; building materials), E04D (roof coverings; sky-lights; gutters; roof-working tools), E04F (finishing work on buildings), E04G (scaffolding; forms; shuttering), E04H (buildings or like structures for particular purposes; swimming or splash baths or pools; masts; fencing; tents or canopies) and G06Q (data processing systems or methods, specially adapted for administrative, commercial, financial, managerial, supervisory or forecasting purposes) are classified under a service related NACE Rev.2 category since no appropriate match was found in the industrial categories.

Table 6: IPC codes classified under service related NACE Rev.2 categories

Subclass (IPC4-digit)	Subclass (IPC4-digit) Description	NACE Rev.2	NACE Rev.2_title
E02B	Hydraulic Engineering	42.91	Construction of Water Projects
E03B	Installations or Methods for obtaining, collecting, or distributing water), E03C (domestic plumbing installations for fresh water or waste water)	42.2	Construction of Utility Projects
E03F	Sewers; Cesspools	43	Specialised Construction Activities
E04B	General Building Constructions	43	Specialised Construction Activities
E04C	Structural Elements; Building Materials	43	Specialised Construction Activities
E04D	Roof coverings; Sky-lights; Gutters; Roof-working tools	43	Specialised Construction Activities
E04F	Finishing work on Buildings	43	Specialised Construction Activities
E04G	Scaffolding; Forms; Shuttering	43	Specialised Construction Activities
E04H	Buildings or like structures for Particular purposes; Swimming or Splash baths or Pools; Masts; Fencing; Tents or Canopies	43	Specialised Construction Activities
G06Q	Data processing Systems or Methods, specially adapted for administrative, commercial, financial, managerial, supervisory or forecasting purposes	62	Computer Programming, Consultancy and Related Activities

i. 4.9. Miscellanea

- B65F (Gathering or Removal of Domestic or Like Refuse) was previously allocated to 1 NACE 1.1 category 28 (Fabricated Metal Products). During validation, it became clear that this IPC code covers not only the Metal industry but also the Transport Equipment industry. Therefor B65F was analysed on the more fine grained Main group IPC level. Table 7 below shows the results of the analysis.

Table 7: Distribution of IPC B65F over NACE Rev.2 industries

Subclass (IPC4-digit)	NACE 1.1	Main group (IPC5-digit)	IPC5 Description	NACE Rev.2	NACE Rev.2 Description
B65F	28	B65F 1/*	Refuse receptacles (containers not specially adapted for refuse, features of refuse receptacles of general interest B65D)	28.9	Manufacture of Other Special Purpose Machinery [28.9]
B65F	28	B65F 3/*	Vehicles particularly adapted for collecting refuse (vehicles in general B60; driving vehicle equipment or auxiliaries B60K; discharging contents by tilting entire vehicles B65G; wheeled apparatus for emptying sewers or cesspools E03F 7/10)	30	Manufacture of Other Transport Equipment [30]
B65F	28	B65F 5/*	Gathering or removal of refuse otherwise than by receptacles or vehicles (storage silos, charging or discharging thereof B65G)	28.9	Manufacture of Other Special Purpose Machinery [28.9]
B65F	28	B65F 7/*	Cleaning or disinfecting devices combined with refuse receptacles or refuse vehicles (such devices per se A61L, B08B)	28.9	Manufacture of Other Special Purpose Machinery [28.9]
B65F	28	B65F 9/*	Transferring of refuse between vehicles or containers with intermediate storage or pressing (presses for baling per se B30B 9/30) [4]	28.9	Manufacture of Other Special Purpose Machinery [28.9]

If no IPC5 code is provided NACE Rev.2 category 28.9 'Special-purpose machinery' applies.

- H03K (pulse technique) and H03L (automatic control, starting, synchronisation, or stabilisation of generators of electronic oscillations or pulses) are relevant to electronic circuits, telecommunications, audio-visual electronics, computers etc., hence, the corresponding NACE Rev.2 categories 26.2, 26.3, 26.4. Currently, most applications are situated in audio-visual electronics and, therefore, the IPC is allocated to NACE Rev.2 category 26.4 (Manufacture of Consumer Electronics). These IPC codes can, however, be considered relevant to other industries.

- H05H (plasma technique) can be affiliated to several NACE Rev.2 categories. NACE 26.60 (Manufacture of Irradiation Equipment) seems the most suitable category although a part of this IPC deals with metal welding.
- C30B (single-crystal growth) covers all materials made into single crystals/homogeneous poly-crystals, and the applications are far-ranging from pharmaceuticals to aeronautics. Currently, most applications are situated in (opto-) electronics so NACE Rev.2 category 26.1 (Manufacture of Electronic Components and Boards) has been affiliated to this IPC code.
- E03D (water-closets or urinals with flushing devices; flushing valves thereof) is classified under NACE Rev.2 category 23.42 (Manufacture of Ceramic Sanitary Fixtures) rather than 22.23 (Manufacture of Builders' Ware of Plastic).
- F16P (safety devices in general): Within the NACE Rev.2 classification, no separate category dealing with safety is discerned. Therefore, F16P is classified under NACE Rev.2 category 28.99 (Manufacture of Other Special Purpose Machinery N.E.C.).

5. Main Applicants by Industry

Within this section, we provide an overview of main applicants (EPO applications) by industry for the time period from 1990 onwards (data extracted from PATSTAT October 2014). The resulting overview reveals that a large majority of main applicants are indeed economically active within the respective industries, which confirms the relevance and validity of the current concordance scheme.

In case certain applicants appear 'outside' their industry, we examined more closely the nature of the appearance (underlying IPC codes) as well as the profile of the applicant (via corporate websites). In all cases, the observed rankings turned out to be consistent with the obtained information. For instance, the appearance of Philips Electronics within the industry 'Wearing Apparel' stems from patents related to light emitting and wearable electronic textile (wearable monitoring systems). Whereas the amount of patents in this field is relatively small for a company like Philips (less than 1% of the total EPO portfolio), the absolute number ranks Philips Electronics in the top 10 for that industry. Likewise, a company like Sara Lee – current core activities are situated in beverages and food - experimented in the recent past with garment/undergarment and jewellery, resulting as well in a top 15 ranking for this industry.

The main applicants per NACE Rev.2 category can be found on the next pages.

TOP 15 PLAYERS AT EPO BY NACE REV.2 INDUSTRY (1990 onwards)

NACE REV.2 '10 FOOD'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	UNILEVER	1183
2	NESTEC	976
3	NESTLE	953
4	BASF (BADISCHE ANILIN & SODA FABRIK)	553
5	P&G (PROCTER & GAMBLE COMPANY)	410
6	DSM IP ASSETS (DUTCH STATE MINES IP ASSETS)	406
7	KRAFT FOODS	333
8	AJINOMOTO COMPANY	316
9	NUTRICIA	308
10	NOVOZYMES	292
10	WM. WRIGLEY JR. COMPANY	292
12	PIONEER HI-BRED INTERNATIONAL	262
13	DELAVAL	256
14	CARGILL	246
14	MONSANTO TECHNOLOGY	246

NACE REV.2 '11 BEVERAGES'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	P&G (PROCTER & GAMBLE COMPANY)	105
2	SUNTORY HOLDINGS	98
3	UNILEVER	92
4	NESTEC	91
5	COCA-COLA COMPANY	76
6	DSM IP ASSETS (DUTCH STATE MINES IP ASSETS) ⁶	71
7	NESTLE	68
8	KRONES	60
9	NOVOZYMES	59
10	PEPSICO	49
11	KAO CORPORATION	45
12	TROPICANA PRODUCTS	41
13	HAYASHIBARA SEIBUTSU KAGAKU KENKYUJO	37
13	SAPPORO BREWERIES	37
15	KRAFT FOODS	32

NACE REV.2 '12 TOBACCO'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	PHILIP MORRIS PRODUCTS	394
2	BAT (BRITISH AMERICAN TOBACCO COMPANY)	273
3	HAUNI	239
4	JAPAN TOBACCO	213
5	R.J. REYNOLDS TOBACCO COMPANY	144
6	G.D	56
7	REEMTSMA CIGARETTENFABRIKEN	53
8	ROTHMANS INTERNATIONAL SERVICES	36
9	SCHWEITZER-MAUDUIT INTERNATIONAL	30
10	INTERNATIONAL TOBACCO MACHINERY POLAND	26
11	IMPERIAL TOBACCO	24
12	DAICEL CORPORATION	18
13	FOCKE & COMPANY	15
14	BROWN & WILLIAMSON HOLDINGS	14
14	RHODIA ACETOW	14

⁶ DSM IP Assets is mainly known as a chemical company. It also holds a considerable number of patents relevant for this industry (e.g. A23L 2 - Improved method for the prevention or reduction of haze in beverages; C12C - Improved brewing process)

NACE REV.2 '13 TEXTILES'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	P&G (PROCTER & GAMBLE COMPANY)	736
2	KIMBERLY-CLARK CORPORATION	539
3	DUPONT	471
4	3M COMPANY (MINNESOTA MINING AND MANUFACTURING COMPANY)	395
5	BASF (BADISCHE ANILIN & SODA FABRIK)	392
6	CIBA-GEIGY	384
7	L'OREAL	229
8	HENKEL	225
9	BAYER	221
10	UNI-CHARM CORPORATION	184
11	DYSTAR TEXTILFARBEN & COMPANY DEUTSCHLAND	172
12	CARL FREUDENBERG	156
13	HOECHST	141
14	MILLIKEN & COMPANY	139
15	UNILEVER	128

NACE REV.2 '14 WEARING APPAREL'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	KIMBERLY-CLARK CORPORATION	200
2	P&G (PROCTER & GAMBLE COMPANY)	129
3	DUPONT	109
4	3M COMPANY (MINNESOTA MINING AND MANUFACTURING COMPANY)	89
5	NIKE	86
6	W.L. GORE & ASSOCIATES	85
7	UNI-CHARM CORPORATION	76
8	PHILIPS ELECTRONICS ⁷	54
9	SALOMON	41
10	GORE ENTERPRISE HOLDINGS	36
10	SHIMA SEIKI MANUFACTURING	36
12	SARA LEE/DE ⁸	32
13	X-TECHNOLOGY SWISS	31
14	DAINESE	30
15	WACOAL CORPORATION	26

NACE REV.2 '15 LEATHER AND RELATED PRODUCTS'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	NIKE	462
2	SALOMON	283
3	NORDICA	99
4	LANGE INTERNATIONAL	97
5	GEOX	52
6	ADIDAS INTERNATIONAL MARKETING	51
7	W.L. GORE & ASSOCIATES	45
8	PUMA AKTIENGESELLSCHAFT RUDOLF DASSLER SPORT	42
9	SHIMANO	41
10	TECNICA	38
11	SKIS ROSSIGNOL	36
12	THE BURTON CORPORATION	35
13	HTM SPORT	33
14	BENETTON GROUP	32
15	MIZUNO CORPORATION	31

⁷ Philips Electronics' main activities are situated in electrical equipment and machinery but it also holds a considerable number of patents relevant for this industry (e.g. A41D - Garments incorporating audio devices).

⁸ While Sara Lee's main activities are situated in the food sector, it holds a considerable number of patents relevant for this industry as well (e.g. A41B – Boxer short-type underwear article and production method thereof)

NACE REV.2 '16 WOORD AND PRODUCSTS OF WOOD AND CORK EXCEPT FURNITURE; MANUFACTURE OF ARTICLES OF STRAW AND PLAINTING MATERIALS'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	HOMAG MASCHINENBAU	88
2	DIEFFENBACHER & COMPANY	65
3	VAELINGE INNOVATION	48
4	BIESSE	40
5	SCM GROUP	39
6	BASF (BADISCHE ANILIN & SODA FABRIK)	38
6	IMA KLESSMANNHOLZBEARBEITUNGSSYSTEME	38
8	FRITZ EGGER & COMPANY	34
9	KRONOTEC	33
10	SIEMPELKAMP MASCHINEN- UND ANLAGENBAU & COMPANY	29
11	MASONITE CORPORATION	26
12	UNILIN BEHEER	25
13	FLOORING TECHNOLOGIES	22
14	MEINAN MACHINERY WORKS	18
14	OLYMPUS CORPORATION	18

NACE REV.2 '17 PAPER AND PAPER PRODUCTS'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	BASF (BADISCHE ANILIN & SODA FABRIK)	303
2	P&G (PROCTER & GAMBLE COMPANY)	288
3	VOITH	283
4	KIMBERLY-CLARK CORPORATION	248
5	METSO PAPER	200
6	HERCULES	153
7	DUPONT	120
8	AKZONOBEL	114
9	EKA CHEMICALS	99
9	INTERNATIONAL PAPER COMPANY	99
11	NALCO	97
11	SCA HYGIENE PRODUCTS	97
13	WEYERHAEUSER COMPANY	92
14	CIBA SPECIALTY CHEMICALS HOLDING	87
15	BAYER	85

NACE REV.2 '18 PRINTING AND REPRODUCTION OF RECORDED MEDIA'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	KODAK	1056
2	FUJIFILM CORPORATION	646
3	3M COMPANY (MINNESOTA MINING AND MANUFACTURING COMPANY)	496
4	G&D (GIESECKE & DEVRIENT)	466
5	CANON	407
6	HP (HEWLETT-PACKARD COMPANY)	403
7	AGFA-GEVAERT	393
8	DNP (DAINIPPON PRINTING COMPANY)	324
9	RICOH COMPANY	289
10	SEIKO EPSON CORPORATION	207
11	BASF (BADISCHE ANILIN & SODA FABRIK)	167
12	XEROX CORPORATION	164
13	BUNDESDRUCKEREI	160
14	DUPONT	152
15	OJI PAPER COMPANY	144

NACE REV.2 '19 COKE AND REFINED PETROLEUM PRODUCTS'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	EXXONMOBIL	1249
2	SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ	773
3	CHEVRON CORPORATION	268
4	BASF (BADISCHE ANILIN & SODA FABRIK)	265
5	UNIVERSAL OIL PRODUCTS COMPANY (UOP)	236
6	MOBIL OIL CORPORATION	209
7	LUBRIZOL CORPORATION	150
8	ENI	122
9	JX NIPPON OIL & ENERGY CORPORATION	121
10	TEXACO DEVELOPMENT CORPORATION	105
11	COSMO OIL COMPANY	103
12	NIPPON OIL CORPORATION	92
13	SAUDI ARABIAN OIL COMPANY	81
14	HALDOR TOPSOE	77
15	INPEX CORPORATION	71

NACE REV.2 '20 CHEMICALS AND CHEMICAL PRODUCTS'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	BASF (BADISCHE ANILIN & SODA FABRIK)	12152
2	BAYER	7753
3	P&G (PROCTER & GAMBLE COMPANY)	5603
4	DUPONT	5133
5	L'OREAL	4170
6	HENKEL	3910
7	DOW	3905
8	3M COMPANY (MINNESOTA MINING AND MANUFACTURING COMPANY)	3774
9	UNILEVER	2970
10	GE (GENERAL ELECTRIC COMPANY)	2433
11	SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ	2287
12	SUMITOMO CHEMICAL COMPANY	2184
13	ROHM & HAAS COMPANY	1817
14	MERCK PATENT	1727
15	FUJIFILM CORPORATION	1592

NACE REV.2 '21 BASIC PHARMACEUTICAL PRODUCTS AND PHARMACEUTICAL PREPARATIONS'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	NOVARTIS	4208
2	MERCK	3807
3	BASF (BADISCHE ANILIN & SODA FABRIK)	3252
4	BAYER	3109
5	ROCHE	3069
6	PFIZER	2625
7	SMITHKLINE BEECHAM CORPORATION	2599
8	BOEHRINGER INGELHEIM INTERNATIONAL	2544
9	ASTRAZENECA	2235
10	ELI LILLY & COMPANY	2038
11	SCHERING CORPORATION	1941
12	BRISTOL-MYERS SQUIBB COMPANY	1684
13	ABBOTT	1671
14	GLAXO GROUP	1522
15	GENENTECH	1441

NACE REV.2 '22 RUBBER AND PLASTIC PRODUCTS'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	MICHELIN	2484
2	BRIDGESTONE CORPORATION	1833
3	THE GOODYEAR TIRE & RUBBER COMPANY	1543
4	SUMITOMO	1517
5	3M COMPANY (MINNESOTA MINING AND MANUFACTURING COMPANY)	962
6	CONTINENTAL	819
7	PIRELLI	547
8	YOKOHAMA RUBBER CO LTD	443
9	DUPONT	432
10	BASF (BADISCHE ANILIN & SODA FABRIK)	382
11	HUSKY (HUSKY INJECTION MOLDING SYSTEMS)	373
12	BOEING COMPANY	313
13	KRONES	310
14	BAYER	304
15	P&G (PROCTER & GAMBLE COMPANY)	289

NACE REV.2 '23 OTHER NON-METALLIC MINERAL PRODUCTS'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	3M COMPANY (MINNESOTA MINING AND MANUFACTURING COMPANY)	1334
2	CORNING	1252
3	DUPONT	835
4	NGK INSULATORS	769
5	SAINT-GOBAIN GLASS	714
6	ASAHI GLASS COMPANY	563
7	BASF (BADISCHE ANILIN & SODA FABRIK)	514
8	P&G (PROCTER & GAMBLE COMPANY)	470
9	SUMITOMO ELECTRIC INDUSTRIES	465
10	GE (GENERAL ELECTRIC COMPANY)	447
11	KIMBERLY-CLARK CORPORATION	392
12	NSG	350
13	SCHOTT	335
14	NITTO DENKO CORPORATION	307
15	SHIN-ETSU CHEMICAL COMPANY	297

NACE REV.2 '24 BASIC METALS'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	SMS SIEMAG	759
2	NIPPON STEEL CORPORATION	733
3	SIEMENS	619
4	JFE STEEL	570
5	SUMITOMO	508
6	GE (GENERAL ELECTRIC COMPANY)	474
7	KOBE STEEL	432
8	SANDVIK	311
8	HITACHI	311
10	KAWASAKI STEEL CORPORATION	244
11	NIPPON STEEL & SUMITOMO METAL	227
12	PAUL WURTH	224
13	POSCO (POHANG IRON AND STEEL COMPANY)	219
14	VOEST-ALPINE INDUSTRIEANLAGENBAU	213
15	UNITED TECHNOLOGIES CORPORATION (UTC)	210

NACE REV.2 '25 FABRICATED METAL PRODUCTS, EXCEPT MACHINERY AND EQUIPMENT'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	SIEMENS	833
2	GE (GENERAL ELECTRIC COMPANY)	659
3	YOSHIDA KOGYO	634
4	DORMA	585
5	ROBERT BOSCH	392
6	ITW	326
7	ROTO FRANK	320
8	WINKHAUS COMPANY	313
9	HILTI	310
10	VKR HOLDING	285
11	HUF HUELSBECK & FUERST & COMPANY	283
12	MITSUBISHI HEAVY INDUSTRIES	267
12	WESTINGHOUSE ELECTRIC CORPORATION	267
14	VALEO SECURITE HABITACLE	231
15	GEZE	226

NACE REV.2 '26 COMPUTER, ELECTRONIC AND OPTICAL PRODUCTS'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	PHILIPS ELECTRONICS	21022
2	PANASONIC CORPORATION	15638
3	SIEMENS	15142
4	SAMSUNG ELECTRONICS COMPANY	14693
5	TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)	12545
6	SONY CORPORATION	12152
7	QUALCOMM	10269
8	CANON	9405
9	NEC CORPORATION	8960
10	NOKIA CORPORATION	8774
11	FUJITSU	8613
12	IBM (INTERNATIONAL BUSINESS MACHINES CORPORATION)	8585
13	ROBERT BOSCH	7276
14	LG ELECTRONICS	6585
15	TOSHIBA CORPORATION	6321

NACE REV.2 '27 ELECTRICAL EQUIPMENT'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	SIEMENS	6084
2	BSH (BOSCH UND SIEMENS HAUSGERAETE)	4881
3	PHILIPS ELECTRONICS	4487
4	PANASONIC CORPORATION	4165
5	ROBERT BOSCH	3685
6	LG ELECTRONICS	2670
7	SAMSUNG ELECTRONICS COMPANY	2083
8	GE (GENERAL ELECTRIC COMPANY)	1956
9	TOYOTA MOTOR CORPORATION	1925
10	SUMITOMO WIRING SYSTEMS	1771
11	ELECTROLUX HOME PRODUCTS CORPORATION	1458
12	MITSUBISHI ELECTRIC CORPORATION	1407
13	SONY CORPORATION	1291
14	HITACHI	1267
15	SAMSUNG	1174

NACE REV.2 '28 MACHINERY AND EQUIPMENT N.E.C.'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	CANON	7706
2	SIEMENS	7680
3	ROBERT BOSCH	7193
4	GE (GENERAL ELECTRIC COMPANY)	6058
5	PANASONIC CORPORATION	5992
6	PHILIPS ELECTRONICS	5906
7	SONY CORPORATION	5777
8	MITSUBISHI	5289
9	SAMSUNG ELECTRONICS COMPANY	4371
10	SEIKO EPSON CORPORATION	3401
11	KODAK	3277
12	TOYOTA MOTOR CORPORATION	3127
13	XEROX CORPORATION	2831
14	LG ELECTRONICS	2809
15	FUJIFILM CORPORATION	2748

NACE REV.2 '29 MOTOR VEHICLES, TRAILERS AND SEMI-TRAILERS'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	ROBERT BOSCH	8703
2	TOYOTA MOTOR CORPORATION	5515
3	HONDA MOTOR COMPANY	3535
4	SIEMENS	2227
5	NISSAN MOTOR COMPANY	2214
6	RENAULT	2202
7	BMW (BAYERISCHE MOTOREN WERKE)	2150
8	DELPHI TECHNOLOGIES	2120
9	FORD MOTOR COMPANY	1976
10	CONTINENTAL	1892
11	VOLKSWAGEN	1762
12	PEUGEOT CITROEN AUTOMOBILES	1625
13	DAIMLERCHRYSLER	1602
14	DENSO CORPORATION	1177
15	HITACHI	1117

NACE REV.2 '30 OTHER TRANSPORT EQUIPMENT'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	AIRBUS OPERATIONS	1815
2	SHIMANO	983
3	HONDA MOTOR COMPANY	976
4	BOEING COMPANY	934
5	YAMAHA MOTOR COMPANY	746
6	SIEMENS	536
7	HONEYWELL INTERNATIONAL	425
8	BOMBARDIER TRANSPORTATION	291
9	BELL HELICOPTER TEXTRON	261
10	UNITED TECHNOLOGIES CORPORATION (UTC)	251
11	FRANZ PLASSER BAHNBAUMASCHINEN-INDUSTRIEGESELLSCHAFT	243
12	EUROCOPTER	224
13	HAMILTON SUNDSTRAND CORPORATION	183
14	GE (GENERAL ELECTRIC COMPANY)	171
14	SIKORSKY AIRCRAFT CORPORATION	171

NACE REV.2 '31 FURNITURE'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	HETTICH HOLDING	233
2	BSH (BOSCH UND SIEMENS HAUSGERAETE)	196
3	JULIUS BLUM	195
4	HILL-ROM SERVICES	148
5	GRASS	104
6	L & P PROPERTY MANAGEMENT COMPANY	95
7	SEDUS STOLL	91
8	STEELCASE	78
9	TS TECH COMPANY	70
10	CARRIER CORPORATION	59
11	HERMAN MILLER	57
12	LEONARDO	55
13	DEWERT ANTRIEBS- UND SYSTEMTECHNIK	53
14	LINAK	49
14	SANYO ELECTRIC COMPANY ⁹	49

NACE REV.2 '32 OTHER MANUFACTURING'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	PHILIPS ELECTRONICS	5749
2	P&G (PROCTER & GAMBLE COMPANY)	2818
3	BOSTON SCIENTIFIC	2760
4	COVIDIEN	2631
5	ETHICON	2412
6	3M COMPANY (MINNESOTA MINING AND MANUFACTURING COMPANY)	2341
7	OLYMPUS CORPORATION	2304
8	FUJIFILM CORPORATION	2180
9	ROCHE	2113
10	KIMBERLY-CLARK CORPORATION	1783
11	BECTON, DICKINSON & COMPANY	1468
12	CANON	1305
13	MEDTRONIC	1274
14	UNI-CHARM CORPORATION	1227
15	KODAK	1139

NACE REV.2 '42 CIVIL ENGINEERING'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	HANSGROHE	120
2	HANSA METALLWERKE	115
3	GROHE (FRIEDRICH)	110
4	NEOPERL	89
5	GEBERIT INTERNATIONAL	74
6	KOHLER COMPANY	70
7	VIEGA & COMPANY	49
8	IDEAL-STANDARD	39
9	BLANCO & COMPANY	37
9	KWC	37
11	EMERSON ELECTRIC COMPANY	35
12	TOTO	32
13	NIRO-PLAN	24
13	TECHNIP FRANCE	24
15	MASCO CORPORATION OF INDIANA	22

⁹ While Sanyo's main activities are situated in electronics and electrical equipment, it holds a considerable number of patents relevant for this industry as well (e.g. A47C – Moveable bed – Chair type massage machine)

NACE REV.2 '43 SPECIALISED CONSTRUCTION ACTIVITIES'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	ROCKWOOL INTERNATIONAL	201
2	VKR HOLDING	166
3	HILTI	137
4	VAELINGE INNOVATION	136
5	FISCHERWERKE ARTUR FISCHER & COMPANY	83
6	SCHOECK BAUTEILE	79
7	ACO SEVERIN AHLMANN & COMPANY	77
8	SAINT-GOBAIN ISOVER	76
9	BASF (BADISCHE ANILIN & SODA FABRIK)	73
10	SCHUECO	70
11	PERI	67
12	REHAU & COMPANY	64
13	SIKA TECHNOLOGY	62
13	USG INTERIORS	62
15	ARMSTRONG WORLD INDUSTRIES	60

NACE REV.2 '62 COMPUTER PROGRAMMING, CONSULTANCY AND RELATED ACTIVITIES'

RANK	COMPANY NAME TOP PLAYER	PATENT COUNT
1	MICROSOFT CORPORATION	802
2	SAP	515
3	SONY CORPORATION	469
4	SIEMENS	432
5	RIM (RESEARCH IN MOTION)	380
6	PHILIPS ELECTRONICS	335
7	IBM (INTERNATIONAL BUSINESS MACHINES CORPORATION)	325
8	NCR CORPORATION	316
9	GOOGLE	315
10	NOKIA CORPORATION	305
11	FUJITSU	301
12	HITACHI	299
13	ACCENTURE GLOBAL SERVICES	294
14	SAMSUNG ELECTRONICS COMPANY	292
15	PANASONIC CORPORATION	276

ANNEX

Annex 1. Concordance IPC V8 - NACE Rev. 2 on the 3-digit level

10	Manufacture of Food Products [10]	A23J A23D A23L 1/* C13F	A01H A23F A23L 3/* C13J	A21D A23G A23P C13K	A23B A23J C12J	A23C A23K C13B
10.5	Manufacture of Dairy Products [10.5]	A01J				
11	Manufacture of Beverages [11]	A23L 2/*	C12C	C12F	C12G	C12H
12	Manufacture of Tobacco Products [12]	A24B	A24D	A24F		
13	Manufacture of Textiles [13]	D04D D06M	D04G D06N	D04H D06P	D06C D06Q	D06J
14	Manufacture of Wearing Apparel [14]	A41B	A41C	A41D	A41F	
15	Manufacture of Leather and Related Products [15]	A43B	A43C	B68B	B68C	
16	Manufacture of Wood and of Products of Wood and Cork. Except Furniture; Manufacture of Articles of Straw and Plaiting Materials [16]	B27D	B27H	B27M	B27N	
17	Manufacture of Paper and Paper Products [17]	B42F	D21C	D21H	D21J	
18.1	Printing and Service Activities Related to Printing [18.1]	B41M	B42D	B44F		
19	Manufacture of Coke and Refined Petroleum Products [19]	C10G	C10L			
20.1	Manufacture of Basic Chemicals. Fertilisers and Nitrogen Compounds. Plastics and Synthetic Rubber in Primary Forms [20.1]	B01J C01D C05C C07B not A61K except A61K 8/* C07C not A61K except A61K 8/* C07F not A61K except A61K 8/* C07G not A61K except A61K 8/* C08B C08L C10C C12S not A61K except A61K 8/* C25B	B09B C01F C05D C08F C09B C10H F17C	B09C C01G C05F C08G C09C C10J F17D	C01B C02F C05G C08J C09K C10K F25J	C01C C05B C08K C10B G21F
20.2	Manufacture of Pesticides and Other Agrochemical Products [20.2]	A01N	A01P			
20.3	Manufacture of Paints. Varnishes and Similar Coatings. Printing Ink and Mastics [20.3]	B27K	C09D			
20.4	Manufacture of Soap and Detergents. Cleaning and Polishing Preparations. Perfumes and Toilet Preparations [20.4]	A61K 8/*	A61Q	C09F	C11D	D06L
20.5	Manufacture of Other Chemical Products [20.5]	A62D	C06B	C06C	C06D	C08H

		C09G C11B C40B not A61K except A61K 8/* F42D	C09H C11C	C09J C14C	C10M C23F D01C	C10N C23G F42B
20.6	Manufacture of Man-Made Fibres [20.6]	D01F				
21	Manufacture of Basic Pharmaceutical Products and Pharmaceutical Preparations [21]	A61K C07D C12P	A61K except A61K 8/* C07H C12Q	C07J C07K		A61P C12N
22	Manufacture of Rubber and Plastic Products [22]	B29C	B29D	B60C	B67D	
22.1	Manufacture of Rubber Products [22.1]	C08C				
23	Manufacture of Other Non-Metallic Mineral Products [23]	B32B				
23.1	Manufacture of Glass and Glass Products [23.1]	C03C	C03B			
23.3	Manufacture of Clay Building Materials [23.3]	B28B	B28C			
23.4	Manufacture of Other Porcelain and Ceramic Products [23.4]	E03D				
23.5	Manufacture of Cement, Lime and Plaster [23.5]	C04B				
24	Manufacture of Basic Metals [24]	B21C C22B	B22D C22C	C21B C22F	C21C C25C	C21D C25F
24.4	Manufacture of Basic Precious and Other Non-Ferrous Metals [24.4]	G21H				
25.1	Manufacture of Structural Metal Products [25.1]	A44B	A47H	B21G	F27D	
25.2	Manufacture of Tanks. Reservoirs and Containers of Metal [25.2]	F16T	F22B	F22G	F24J	
25.3	Manufacture of Steam Generators. Except Central Heating Hot Water Boilers [25.3]	G21B	G21C	G21D		
25.4	Manufacture of Weapons and Ammunition [25.4]	B63G F41G	F41A F41H	F41B F41J	F41C F42C	F41F G21J
25.5	Forging. Pressing. Stamping and Roll-Forming of Metal; Powder Metallurgy [25.5]	B22F				
25.6	Treatment and Coating of Metals; Machining [25.6]	C23D	C25D			
25.7	Manufacture of Cutlery, Tools and General Hardware [25.7]	E05B	E05D	E05F	E06B	
25.9	Manufacture of Other Fabricated Metal Products [25.9]	A01L	E05C	F16B		
26.1	Manufacture of Electronic Components and Boards [26.1]	B81B G11C H01L	B81C H01C H05K	B82B H01F	B82Y H01G	C30B H01J
26.2	Manufacture of computers and peripheral equipment [26.2]	G02F G06G	G06C G06J	G06D G06N	G06E G06T	G06F G09C
26.3	Manufacture of Communication	G03H	G08B	H01Q	H01S	H03B

	Equipment [26.3]	H03C H03M H04L H04S	H03D H04B H04M H04W	H03G H04H H04N	H03H H04J H04Q	H03J H04K H04R
26.4	Manufacture of Consumer Electronics [26.4]	H03F	H03K	H03L		
26.5	Manufacture of Instruments and Appliances for Measuring, Testing and Navigation; Watches and Clocks [26.5]	F15C G01H G01N G01W G04G G12B	G01B G01J G01Q G04B G04R	G01C G01K G01R G04C G05B	G01D G01L G01S G04D G05F	G01F G01M G01V G04F G08C
26.6	Manufacture of irradiation. Electro-medical and electrotherapeutic equipment [26.6]	A61N	G21K	H05G	H05H	
26.7	Manufacture of Optical Instruments and Photographic Equipment [26.7]	G02B	G02C	G03B		
26.8	Manufacture of Magnetic and Optical Media [26.8]	G03C				
27.1	Manufacture of Electric Motors. Generators. Transformers and Electricity Distribution and Control Apparatus [27.1]	H02B H02S	H02J	H02K	H02N	H02P
27.2	Manufacture of Batteries and Accumulators [27.2]	H01M				
27.3	Manufacture of Wiring and Wiring Devices [27.3]	H01B	H01H	H01R	H02G	
27.4	Manufacture of Electric Lighting Equipment [27.4]	F21P F21Q H01K	F21H F21S	F21K F21V	F21L F21W	F21M F21Y
27.5	Manufacture of Domestic Appliances [27.5]	A21B B01B F24D	A45D D06F F25C	A47G E06C F25D	A47J F24B H05B	A47L F24C
27.9	Manufacture of other electrical equipment [27.9]	B60M H01T	B61L H02H	G08G H02M	G10K H05C	H01P
28.1	Manufacture of General Purpose Machinery [28.1]	A47K F01K F02G F03G F16C F16M	B23F F01M F02K F04B F16D F23R	F01B F01N F03B F04C F16F G05D	F01C F01P F03C F04D F16H G05G	F01D F02C F03D F15B F16K
28.2	Manufacture of Other General Purpose Machinery [28.2]	A62C B41K B66B C12L F23C F23K F24H F28D G06K	B01D B43M B66C E02C F23D F23L F25B F28F G06M	B04C B60S B66D F16G F23G F23M F27B F28G G07B	B05B B61B B66F F22D F23H F23N F28B G01G G07C	B41J B65G C10F F23B F23J F24F F28C G03G G07D

		G07F G11B	G07G H05F	G09D	G09G	G10L
28.3	Manufacture of Agricultural and Forestry Machinery [28.3]	A01B A01K	A01C A01M	A01D B27L	A01F	A01G
28.4	Manufacture of Metal Forming Machinery and Machine Tools [28.4]	B21D B21L B23H B24C B25F B26F B27J	B21F B23B B23K B24D B25G B27B B28D	B21H B23C B23P B25B B25H B27C B30B	B21J B23D B23Q B25C B25J B27F	B21K B23G B24B B25D B26B B27G
28.9	Manufacture of Other Special Purpose Machinery [28.9]	A21C A41H B02C B05D B21B B31D B41D B42B B65C B65F 1/* B65H C13D D01B D02H D04B D06G D21G E02D E21D F16P	A22B A42C B03B B06B B22C B31F B41F B42C B65F B65F 5/* B67B C13G D01D D02J D04C D06H E01C E02F E21F F26B	A22C A43D B03C B07B B26D B33Y B41G B44B B65F 7/*	A23N B01F B03D B07C B31B B41B B41L B44C B65F 9/* B68F C14B D01H D03D D05C D21D E01F E21B F15D	A24C B02B B05C B08B B31C B41C B41N B65B C13C C23C D02G D03J D06B D21F E01H E21C F16N
29.1	Manufacture of Motor Vehicles [29.1]	B60B B60K B60R F02D F16J	B60D B60L B60T F02F G01P	B60G B60N B62D F02M	B60H B60P F01L F02N	B60J B60Q F02B F02P
29.3	Manufacture of Parts and Accessories for Motor Vehicles [29.3]	B60W				
30	Manufacture of Other Transport Equipment [30]	B60F B61G B62H B63B B64C E01B	B60V B61H B62J B63C B64D F03H	B61C B61J B62K B63H B64F	B61D B61K B62L B63J B64G	B61F B62C B62M B64B B65F 3/*
31	Manufacture of Furniture [31]	A47B	A47C	A47D	A47F	

32	Other Manufacturing [32]	A41G A45F A63D A63K B68G G10B G10H	A42B A46B A63F B43K C06F G10C	A44C A46D A63G B43L D07B G10D	A45B A63B A63H B44D F16L G10F	A45C A63C A63J B62B F23Q G10G
32.5	Manufacture of Medical and Dental Instruments and Supplies [32.5]	A61B A61H B04B G01T	A61C A61J C12M not A61K except A61K 8/* G21G	A61D A61L	A61F A61M	A61G A62B B01L
32.9	Manufacturing N.E.C. [32.9]	B65D	G03D	G03F	G09B	G09F
42.2	Construction of Utility Projects [42.2]	E03B	E03C			
42.9	Construction of Other Civil Engineering Projects [42.9]	E02B				
43	Specialised Construction Activities [43]	E03F E04G	E04B E04H	E04C	E04D	E04F
62	Computer Programming. Consultancy and Related Activities [62]	G06Q				
NACE of Co-IPC	NACE-allocation by following the Co-IPC	F16S	B29K	B29L	C12R	-99Z