

Working paper
1/2016

**Occupational crosswalk,
data and language
requirements**

Maria Forthun Hoen



*Stiftelsen Frischsenteret for samfunnsøkonomisk forskning
Ragnar Frisch Centre for Economic Research*

Working paper 1/2016

Occupational crosswalk, data and language requirements

Maria Forthun Hoen

Abstract: In this technical paper, I describe how I create a crosswalk between the standard occupational classification systems in Norway and the U.S. I use the "Standard yrkesklassifisering, NOS C521" ("STYRK") from 1998 for the former, and the occupational taxonomy from the 2000 Census of Population and Housing for the latter. The crosswalk enables linking of Norwegian occupations to worker and occupational characteristics from the O*NET database under the U.S. Department of Labor. From O*NET data, I construct a "language index" that ranks all occupations by the required level and importance of majority language skills, as well as several cognitive abilities measures, as explained in section 2. In section 3, I explain how I obtain data on workers' occupations from Norwegian register data starting in 2003. Occupation was gradually introduced as a variable in the Employer-Employee Register for a selection of employers in 2003. I supplement with occupation from the Wage Statistics survey from Statistics Norway, and with translations of position codes into occupations for employees in the public sector. I end with a brief description of the construction of mappings between the three standard industrial classification systems in the Norwegian register data after 1994 (SIC94, SIC2002 and SIC2007) in section 4. The occupational crosswalk is attached as a table in the appendix. For other formats (csv, excel, dta) or further details on any of the technical issues, please contact the author.

Contact: www.frisch.uio.no

This work is financed by the Norwegian Ministry of Labor (project "Effects of labor migration") and the Norwegian Research Council (projects "European Strains" and "Egalitarianism under pressure? New perspectives on inequality and social cohesion"). Data made available by Statistics Norway have been essential.

ISBN 978-82-7988-230-5
ISSN 1501-9241

1 Occupational crosswalk

Albeit the quality and quantity of Norwegian administrative register data is excellent, there exists no complete and consistent data on occupation-specific characteristics. I therefore use data provided by the O*NET database.¹ To link O*NET data to Norwegian occupations, I manually construct a crosswalk from the Norwegian standard occupational classification system ("Standard yrkesklassifisering, NOS C521" from 1998, or "STYRK", henceforth) to the occupational taxonomy of O*NET. To go from STYRK to O*NET is however not straightforward. In between there are several steps, illustrated in figure 1: STYRK is a modified version of EU's International Standard Classification of Occupations, ISCO-88(COM), which again is a modified version of the International Labour Organizations's system ISCO-88. ISCO-88 can be mapped to the occupational classification system used in the 2000 Census of Population and Housing ("CEN2000") with a crosswalk facilitated by the National Crosswalk Center ("NCC"). CEN2000 can again be mapped to the U.S. Standard Occupational Classification system ("SOC") as of 2000, which is the basis for O*NET's occupational taxonomy ("O*NET-SOC"). 120 of the 821 SOC occupations are split into more detailed O*NET-SOC occupations, making a total of 1,094 unique occupations. In contrast, CEN2000 consist of 509 occupations and STYRK of 349.²

The constructed crosswalk maps STYRK to CEN2000, and is based on the NCC-crosswalk from CEN2000 to ISCO-88.³ I use CEN2000 because it resembles more the Norwegian system than either SOC or O*NET-SOC, and therefore makes a more transparent mapping. I do some small changes to the NCC-crosswalk as follows. I make almost identical titles identical so they can be matched with Stata. I add one missing match from CEN2000 to ISCO-88 (136 Civil Engineers to 2142 Civil Engineers), change one mapping (146 Mechanical Engineers from 9999 No Census Equivalent to 2145 Mechanical Engineers), and correct some typos (3469, which does not exist, to 3460, 7233 to 7243 when mapped to 732, and 7422 to 7442 when mapped to 871).⁴ Because the NCC-crosswalk goes *from* CEN2000 *to* ISCO-88, i.e., maps

¹For more information on the O*NET data, see section 2.

²See <http://www.bls.gov/soc/2000/soc-structure-2000.pdf> for the coding structure of the 2000 SOC.

³"cenxisco.zip" from <http://data.widcenter.org/download/xwalks/>

⁴I contacted NCC about these issues, but they were unable unravel the reason for the missing/incorrect mappings.

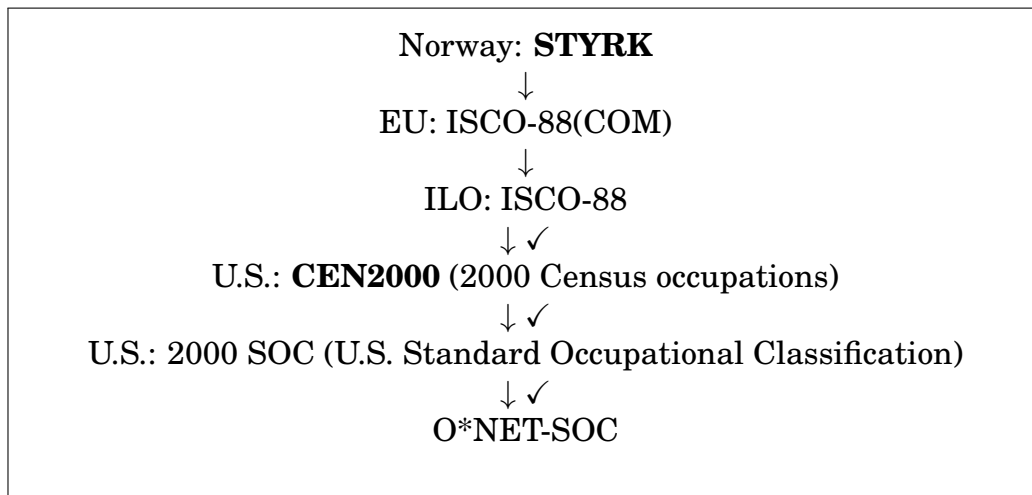


Figure 1: The long and winding road from STYRK to O*NET.

each CEN2000 to one or more ISCO-88 occupation(s), and I need the opposite, I do some further adjustments to the crosswalk (see step 5 below). I use the following algorithm to create the crosswalk:⁵

1. Match STYRK to CEN2000 occupations with identical titles. Returns 28 matches out of 349 STYRK occupations.
2. Match unmatched STYRK to ISCO-88 occupations with identical titles. Further 166 STYRK codes are matched to ISCO-88 and will be mapped to CEN2000 in step 4. 155 STYRK remains unmatched.
3. Manual adjustments of the NCC mapping, either when identical ISCO-88 and STYRK codes represent different occupations, when CEN2000 occupations do not have O*NET data, or when there is a better match from STYRK to CEN2000 than via ISCO-88.⁶
4. Map STYRK to CEN2000 via ISCO-88 (except those adjusted above) with the NCC crosswalk.
5. Drop "redundant" matches and adjust inappropriate mappings due to the "wrong direction" of the NCC crosswalk.

⁵Complete Stata-code available upon request.

⁶I drop armed forces and "Unspecified" due to missing O*NET data.

I aim at making the crosswalk as transparent, consistent and simple as possible. In step 3 and 5, I map occupations with similar descriptions in Statistics Norway (1998) and "2000 SOC codes, titles, and definitions" from <http://www.bls.gov/soc/#archives> or the Occupational Outlook Handbook from Bureau of Labor Statistics.⁷ To simplify the mappings to O*NET characteristics and increase the transparency of the crosswalk, I minimize the number of CEN2000 matched to each STYRK and delete many of the returned matches from the NCC-crosswalk. Finally, I manually check that all matches are sensible, i.e., that each STYRK is mapped to one/more similar CEN2000 occupation(s), and that the language requirements assigned by the O*NET characteristics seem reasonable.

All countries in the European Union use occupational classification system similar or equal to ISCO-88(COM). To link O*NET data to occupations in these countries, it should be relatively straightforward to modify the current crosswalk. A few caveats are however called for:

1. The aim of the crosswalk is to connect language requirements from O*NET to Norwegian occupations. I therefore emphasized language similarities when in doubt of the best match.
2. I put less effort in finding a good match for small occupations in the Norwegian labor market, e.g., 7422 Boat Builders, and 7423 Basketry Weavers, Brush Makers and Related Workers.
3. Several CEN2000 occupations are not mapped to STYRK because of the direction of the crosswalk (from STYRK to CEN2000). The crosswalk should therefore be used with caution in the opposite direction. At the minimum, one should check that central occupations for the relevant study are not lost due to missing mappings.

To further map STYRK from CEN2000 to O*NET-SOC, I first use a mapping from NCC between CEN2000 and 2000 SOC.⁸ I then simply aggregate the more detailed O*NET-SOC occupations into the 2000 SOC and average over their O*NET characteristics. Whenever several CEN2000 occupations are mapped one STYRK in the constructed

⁷<http://www.bls.gov/ooh/>

⁸"cenxsoc.zip" from <http://www.workforceinfodb.org/ftp/download/xwalks/>. Three SOC codes are missing in the crosswalk and therefore added manually: 11-3040 Human Resource Managers to 013 Human Resources Managers; 19-1020 Biologists to 161 Biological Scientists; and 43-6014 (instead of 43-6019, which does not exist) Secretaries, Except Legal, Medical and Executive to 570 Secretaries and Administrative Assistants.

crosswalk, I again average over the O*NET characteristics. I am left with one value of the different O*NET characteristics per STYRK. Next, I explain more about these characteristics and how they are used.

2 O*NET

In what follows, I describe how I use O*NET data to construct the "language requirement index" that instruments for immigration into occupations in Hoen (2018). The U.S. Department of Labor supplies comprehensive data on worker and occupational characteristics through the Occupational Information Network (O*NET) Resource Center. The O*NET data are organized within the Content Model, which is organized into six main domains divided into sub-areas. The data build on surveys of workers, employers and job experts on information about workers and occupations within jobs, sectors and industries.⁹ The database version that I use (Version 9.0 from December 2005) contains O*NET data for 974 O*NET-SOC occupations, and is the latest version with the 2000 SOC taxonomy. Table 1 displays the different elements of each measure explained in the subsections below.

I use survey data on worker skills, knowledge and abilities, and occupational requirements from the domains "Worker Characteristics", "Worker Requirements", and "Occupational Requirements". A score between 1 and 5, where 5 is "extremely important" and 1 is "not important", is given to each question: "How important is (characteristic) to the performance of (occupation)?" Further, the survey asks, on a scale from 1 to 7: "What level of (characteristic) is needed to perform (occupation)".¹⁰ In the language measure, I combine the importance and level of each element, whereas in the other measures, I mainly use level (following Deming (2017), among others.)

2.1 Language requirements

I measure occupations' language requirements as the average of the importance and (rescaled) level of "Speaking Skills", "Writing Skills",

⁹For more information, see "Content Model Outline—Detailed including descriptions" found at <http://www.onetcenter.org/content.html>

¹⁰The questionnaires can be found at <http://www.onetcenter.org/questionnaires.html>

"English Language Knowledge", and "Foreign Language Knowledge".¹¹ I include the latter two because I want to capture requirements for *majority language* skills (i.e., English in the U.S., and, correspondingly, Norwegian in Norway), and not just communication skills in general. Requirements for English language knowledge is positively correlated with majority language requirements in the U.S., whereas requirements for foreign language knowledge is negatively correlated. I therefore add speaking and writing skills together with English language knowledge, and subtract foreign language knowledge. I average over the four characteristics and standardize to mean zero and standard deviation of one. This "language index" is then used to order occupations' by their degree of language requirements in Hoen (2018).

2.2 Alternative language indices

For robustness checks in Hoen (2018), alternative language indices instruments for the inflow of migrants into occupations. Two of them are equal to the index described in section 2.1, but without English language knowledge, and without English and foreign language knowledge, respectively. The third is constructed from worker abilities, and is the average of four verbal abilities, similar to the language measures in Peri and Sparber (2009) and Ottaviano et al. (2013), see table 1.

2.3 Cognitive abilities and social skills

In Hoen (2018), I use several measures for cognitive abilities and social skills. In particular, I construct a "cognitive abilities index" of the 21 worker characteristics categorized by the O*NET Content Model as "Cognitive Abilities", and one alternative index without the four verbal abilities discussed in section 2.2. The index is very similar to Peri and Sparber (2009), but with a few more abilities included. Further, I use the "Non-routine abilities" measure, which captures required mathematical competence, and the "Reasoning abilities" measure from Deming (2017), and the "Abstract tasks" (non-routine cognitive) measure

¹¹"Speaking—Talking to others to convey information effectively"; "Writing—Communicating effectively in writing as appropriate for the needs of the audience"; "English (Foreign) Language—Knowledge of the structure and content of the English (a foreign (non-English)) language including the meaning and spelling of words, rules of composition and grammar, and pronunciation)."

Measure	Worker characteristic	Worker requirement	Occupational requirement
Language index	Writing Skills; Speaking Skills; English and foreign language knowledge		
Verbal abilities	Oral and Written Comprehension and Expression;		
Cognitive abilities	Oral and Written Comprehension and Expression; Fluency of Ideas; Originality; Problem Sensitivity; Deductive Reasoning; Inductive Reasoning; Information Ordering; Category Flexibility; Mathematical Reasoning; Number Facility; Memorization; Speed of Closure; Flexibility of Closure; Perceptual Speed; Spatial Orientation; Visualization; Selective Attention; Time Sharing		
Non-routine abilities	Mathematical Reasoning	Mathematics Skills; Mathematics Knowledge	
Reasoning abilities	Written comprehension; Deductive Reasoning; Inductive Reasoning		
Abstract tasks			Analyzing Data or Information; Thinking Creatively; Interpreting the Meaning of Information for Others; Establishing and Maintaining Interpersonal Relationships; Communicating with Peers, Supervisors, or Subordinates; Coaching and Developing Others

Table 1: O*NET characteristics in the measures from Hoen (2018)

from Acemoglu and Autor (2011). The characteristics in each measure is listed in table 1.

3 Occupations in Norwegian register data

In this section, I describe how I improve the quantity of the occupation variable in the Norwegian Employer-Employee Register ("Arbeidstakerregisteret"). Registration of occupation was introduced in 2003, but only for a (non-representative) selection of employers.¹² For several years, occupation was missing or recorded erroneously for a large part of the observations, see table 2. Further, many public and maritime employers were exempted from reporting occupation, and instead reported position codes according to sector-specific position taxonomies. However, all the taxonomies are mixed together and registered as the same seven-digit occupation variable in the register data, making it difficult to disentangle occupations from positions.

To identify occupations from the occupation variable, I look at the first four digits. These digits represent the STYRK code whenever it is recorded as an occupation. The three last digits specify even more detailed occupation. For position codes, the first three digits represent sector (001, 002 and 003, for municipality, state and maritime sector, respectively) and the four last the position code. No STYRK code begins with 001, 002 or 003, hence the first four digits uniquely identifies an occupation whenever they match a STYRK code.¹³

In some instances it is possible to translate sector-specific position codes into occupations. This should however be done with caution as positions are not directly comparable to occupations. Positions are linked to wage payments, tenure and so on, rather than tasks and work content as with occupations. Workers within an occupation have more or less the same formal and informal skills, whereas workers within a position primarily share salary.

I construct the occupation variable in Hoen (2018) in the following way. I primarily keep occupation from the Employer-Employee Register when the first four digits corresponds to a STYRK code. I then exploit that many spells have occupation in the Wage Statistic from

¹²Employers report their employees' occupation.

¹³In the early years, many entries identifies neither an occupation nor a position, possibly due to erroneous registration after the introduction of a complete new system.

Statistics Norway.¹⁴ For the remaining observations without occupation, I translate, whenever possible, positions inferred from the four last digits of the occupation variable from 1) the Employer-Employee Register, and 2) the Wage Statistics. 225 positions in the state position taxonomy ("Statens stillingskoder") are translated into 76 different occupations. I have not been able to find complete mappings for the municipality and maritime sector. These positions are hence left unmapped.

In 2003, the first year of registration, 43.5 percent of the observations in the Employer-Employee Register have a valid occupation identified from the first four digits of the occupation variable. The share increases to 46 percent when I add occupation from the Wage Statistics. Translating state position codes into occupations increases the share further up to 55.1 percent, see table 2. The percentage of spells recorded with a STYRK occupation increases gradually over time, and in 2011, the above algorithm gives 98 percent valid occupations among the employment spells. The number of *workers* with a valid occupation is however higher, as many workers have several employment spells within a year. In Hoen (2018), I end up with occupations for roughly 80 percent of the sample, based on workers' main occupation in 2005, and in addition assigning workers their occupation from another employment spell within the same firm and year. Main occupation is given by the latest full-time job or the part-time job that generated the largest labor earnings that year.

4 Industry crosswalks

In 2002 and 2007, new versions of the Standard Classification Systems were introduced. In order to use data spanning over these years, a translation between the systems is needed. Statistics of Norway provides such translations where codes from the outgoing system (SIC1994 and SIC2002) are translated into several, more detailed industries of the coming system (SIC2002 and SIC2007). Ambiguity arises regarding which detailed industry in the succeeding system to

¹⁴Annual surveys of all public employers and a fluctuating random sample of private firms, covering roughly half of the labor force. For all included employment spells it contains information on wage, working hours, firm, industry, geographic location, etc., in addition to occupation or position.

Year	Empl.reg.	Wage Stat.	Positions
2003	43.5	46.0	55.1
2004	44.9	52.1	57.1
2005	48.6	58.7	63.2
2006	69.9	73.7	77.4
2007	85.8	88.6	92.0
2008	89.7	91.0	94.5
2009	90.2	93.3	96.6
2010	91.5	94.0	97.3
2011	92.8	94.8	98.0

Table 2: Percentage of spells with occupation data, using three sources successively.

Note. Column (1) is using only the Employer-Employee Register, (2) is with spells from Wage Statistics as well, and (3) are with occupations retrieved from position codes in the public sector in addition.

replace for an old industry. I made two mappings from the old systems to unique codes of the new systems with the steps explained below. Both transitions are available from the author upon request.

4.1 From SIC94 to SIC2002

The transition from SIC94 to SIC2002 was rather limited. Some industries changed codes or names, some were split into more detailed industries, a few new industries was introduced, and some old were deleted. Whenever one SIC94 industry match two or more SIC2002 industries in the translation from Statistics Norway,¹⁵ I keep the SIC2002 with identical title.¹⁶ When all suggested SIC2002 titles are different from the SIC94, I keep the largest industry in the Employer-Employee Register in 2002 (the first year with the new system SIC2002 in place). All matches result in an industry in 2002 that counted for at least 50% of the employment spells in 2002 among the possible SIC2002 industries.

¹⁵<http://stabas.ssb.no/CorrTabFrames.asp?ID=5606001&Language=en>

¹⁶A few minor adjustments of the titles were needed in order for them to match exactly.

4.2 From SIC2002 to SIC2007

The renewal of SIC2002 was more extensive with numerous matches for every SIC2002 in the succeeding system. Several manual adjustments were needed to match similar but not identical industry titles (available upon request). For the rest of the industries, I keep the largest of the matched industries in 2009 (the first year with SIC2007 implemented). Finally I look through all the matched industry codes and check that the mapping is reasonable.

References

- Acemoglu, D. and D. Autor (2011). Chapter 12 - skills, tasks and technologies: Implications for employment and earnings. In D. Card and O. Ashenfelter (Eds.), *Handbook of Labor Economics*, Volume 4 of *Handbook of Labor Economics*, pp. 1043 – 1171. Elsevier.
- Deming, D. J. (2017). The growing importance of social skills in the labor market. *The Quarterly Journal of Economics* 132(4), 1593–1640.
- Hoen, M. F. (2018). Immigration and the tower of babel: Using language barriers to identify individual labor market effects of immigration. Working paper, Ragnar Frisch Centre of Economic Research.
- Ottaviano, G. I. P., G. Peri, and G. C. Wright (2013, August). Immigration, Offshoring, and American Jobs. *American Economic Review* 103(5), 1925–59.
- Peri, G. and C. Sparber (2009). Task specialization, immigration, and wages. *American Economic Journal: Applied Economics* 1(3), 135–69.
- Statistics Norway (1998). Standard classification of occupations. Technical report, Statistics Norway.

Appendix

Table 3: Crosswalk from STYRK (1998) to CEN2000

STYRK title	STYRK	CEN	CEN title
Legislators	1110	1	Chief Executives
Senior government officials	1120	1	Chief Executives
Senior government officials	1120	73	Emergency Management Specialists
Senior officials of political-party organisations	1141	43	Managers, All Other
Senior officials of political-party organisations	1141	186	Misc. Social Scientists and Related workers
Senior officials of employers', workers' and other economic organisations	1142	13	Human Resources Managers
Senior officials of humanitarian and other interest organisations	1143	2	General and Operations Managers
Directors and chief executives	1210	1	Chief Executives
Production/operations dep. managers in unspecified industries	1220	14	Industrial Production Managers
Production/operations dep. managers in agriculture, forestry and fishing	1221	20	Farm, Ranch, and Other Agricultural Managers
Production/operations dep. managers in agriculture, forestry and fishing	1221	600	First-Line Managers of Farming, Fishing, and Forestry workers
Production/operations dep. managers in manufacturing, mining and quarrying, electricity, gas and water supply	1222	14	Industrial Production Managers
Production/operations dep. managers in manufacturing, mining and quarrying, electricity, gas and water supply	1222	770	First-Line Managers of Production and Operating workers
Production/operations dep. managers in construction	1223	22	Construction Managers
Production/operations dep. managers in construction	1223	620	First-Line Managers of Construction Trades and Extraction Workers

Production/operations dep. managers in whole-sale and retail trade, hotels and restaurants	1224	31	Food Service Managers
Production/operations dep. managers in whole-sale and retail trade, hotels and restaurants	1224	34	Lodging Managers
Production/operations dep. managers in whole-sale and retail trade, hotels and restaurants	1224	43	Managers, All Other
Production/operations dep. managers in whole-sale and retail trade, hotels and restaurants	1224	401	First-Line Managers of Food Preparation and Serving workers
Production/operations dep. managers in whole-sale and retail trade, hotels and restaurants	1224	470	First-Line Managers of Retail Sales workers
Production/operations dep. managers in whole-sale and retail trade, hotels and restaurants	1224	471	First-Line Managers of Non-Retail Sales workers
Production/operations dep. managers in transport and communications	1225	16	Transportation, Storage, and Distribution Managers
Production/operations dep. managers in transport and communications	1225	40	Postmasters and Mail Superintendents
Production/operations dep. managers in transport and communications	1225	900	Supervisors, Transportation and Material Moving workers
Production/operations dep. managers in business services	1226	10	Administrative Services Managers
Production/operations dep. managers in public administration	1227	42	Social and Community Service Managers
Production/operations dep. managers in education, health and social security	1228	10	Administrative Services Managers

Production/operations dep. managers in education, health and social security	1228	23	Education Administrators
Production/operations dep. managers in education, health and social security	1228	35	Medical and Health Services Managers
Production/operations dep. managers in personal care, cleaning and related services	1229	420	First-Line Managers of House-keeping and Janitorial workers
Production/operations dep. managers in personal care, cleaning and related services	1229	432	First-Line Managers of Personal Service workers
Finance and administration department managers	1231	10	Administrative Services Managers
Finance and administration department managers	1231	12	Financial Managers
Personnel department managers	1232	13	Human Resources Managers
Sales department managers	1233	5	Marketing and Sales Managers
Advertising and public relations department managers	1234	4	Advertising and Promotions Managers
Advertising and public relations department managers	1234	6	Public Relations Managers
Supply and distribution department managers	1235	15	Purchasing Managers
Supply and distribution department managers	1235	16	Transportation, Storage, and Distribution Managers
Computing services department managers	1236	11	Computer and Information Systems Managers
Research and development department managers	1237	30	Engineering Managers
Research and development department managers	1237	35	Medical and Health Services Managers
Research and development department managers	1237	36	Natural Sciences Managers
Research and development department managers	1237	43	Managers, All Other
Other department managers n.e.c.	1239	43	Managers, All Other
Other department managers n.e.c.	1239	700	First-Line Managers of Mechanics, Installers, and Repairers

General managers in unspecified industries	1310	2	General and Operations Managers
General managers in agriculture, forestry and fishing	1311	20	Farm, Ranch, and Other Agricultural Managers
General managers in agriculture, forestry and fishing	1311	600	First-Line Managers of Farming, Fishing, and Forestry workers
General managers in manufacturing, mining and quarrying, electricity, gas and water supply	1312	14	Industrial Production Managers
General managers in manufacturing, mining and quarrying, electricity, gas and water supply	1312	770	First-Line Managers of Production and Operating workers
General managers in construction	1313	22	Construction Managers
General managers in construction	1313	620	First-Line Managers of Construction Trades and Extraction Workers
General managers in wholesale and retail trade	1314	470	First-Line Managers of Retail Sales workers
General managers in wholesale and retail trade	1314	471	First-Line Managers of Non-Retail Sales workers
General managers of restaurants and hotels	1315	31	Food Service Managers
General managers of restaurants and hotels	1315	34	Lodging Managers
General managers of restaurants and hotels	1315	401	First-Line Managers of Food Preparation and Serving workers
General managers of restaurants and hotels	1315	432	First-Line Managers of Personal Service workers
General managers in transport and communications	1316	16	Transportation, Storage, and Distribution Managers
General managers in transport and communications	1316	70	Logisticians
General managers in transport and communications	1316	900	Supervisors, Transportation and Material Moving workers
General managers of business services	1317	10	Administrative Services Managers
General managers of business services	1317	41	Property, Real Estate, and Community Association Managers
General managers of business services	1317	43	Managers, All Other

General managers of business services	1317	500	First-Line Managers of Office and Administrative Support Worker
General managers in personal care, cleaning and related services	1318	420	First-Line Managers of House-keeping and Janitorial workers
General managers n.e.c.	1319	2	General and Operations Managers
Physicists and astronomers	2111	170	Astronomers and Physicists
Physicists and astronomers	2111	176	Physical Scientists, All Other
Meteorologists	2112	171	Atmospheric and Space Scientists
Meteorologists	2112	176	Physical Scientists, All Other
Chemists	2113	172	Chemists and Materials Scientists
Chemists	2113	176	Physical Scientists, All Other
Geologists and geophysicists	2114	174	Environmental Scientists and Geoscientists
Geologists and geophysicists	2114	176	Physical Scientists, All Other
Mathematicians and related professionals	2121	120	Actuaries
Mathematicians and related professionals	2121	121	Mathematicians
Mathematicians and related professionals	2121	124	Misc. Mathematical Science Occupations
Statisticians	2122	123	Statisticians
Computer systems designers and computer programmers	2130	100	Computer Scientists and Systems Analysts
Computer systems designers and computer programmers	2130	101	Computer Programmers
Computer systems designers and computer programmers	2130	102	Computer Software engineers
Computer systems designers and computer programmers	2130	111	Network Systems and Data Communications Analysts
Architects, town and traffic planners	2141	130	Architects, Except Naval
Architects, town and traffic planners	2141	184	Urban and Regional Planners
Civil engineers	2142	136	Civil engineers
Electrical engineers	2143	141	Electrical and Electronics engineers

Electronics and telecommunications engineers	2144	102	Computer Software engineers
Electronics and telecommunications engineers	2144	140	Computer Hardware engineers
Electronics and telecommunications engineers	2144	141	Electrical and Electronics engineers
Mechanical engineers	2145	146	Mechanical engineers
Chemical engineers	2146	135	Chemical engineers
Mining engineers, metallurgists and related professionals	2147	145	Materials engineers
Mining engineers, metallurgists and related professionals	2147	150	Mining and Geological engineers, Including Mining Safety engineers
Mining engineers, metallurgists and related professionals	2147	152	Petroleum engineers
Cartographers and surveyors	2148	131	Surveyors, Cartographers, and Photogrammetrists
Other engineers and related professionals n.e.c.	2149	143	Industrial engineers, Including Health and Safety
Biologists, botanists, zoologists, and related professionals	2211	161	Biological Scientists
Agronomists and related professionals	2212	160	Agricultural and Food Scientists
Medical doctors	2221	306	Physicians and Surgeons
Dentists	2222	301	Dentists
Veterinarians	2223	325	Veterinarians
Pharmacists	2224	305	Pharmacists
Nutritionists	2225	303	Dietitians and Nutritionists
Nursing and midwifery professionals	2230	313	Registered Nurses
College, university and higher education teaching professionals	2310	220	Postsecondary Teachers
Secondary education teaching professionals	2320	231	Elementary and Middle School Teachers
Secondary education teaching professionals	2320	232	Secondary School Teachers
Special education teaching professionals	2340	233	Special Education Teachers
Education methods specialists	2351	255	Other Education, Training, and Library workers

School inspectors	2352	255	Other Education, Training, and Library workers
Other teaching professionals n.e.c.	2359	234	Other Teachers and Instructors
Economic and social planning	2411	202	Misc. Community and Social Service Specialists
Juridical deliberation and planning	2412	522	Court, Municipal, and License Clerks
Technical and scientific deliberation and planning	2413	202	Misc. Community and Social Service Specialists
Other public service administrative professionals	2419	42	Social and Community Service Managers
Accountants	2511	80	Accountants and Auditors
Personnel and careers professionals	2512	62	Human Resources, Training, and Labor Relations Specialists
Market analysts and business professionals n.e.c.	2519	82	Budget Analysts
Market analysts and business professionals n.e.c.	2519	83	Credit Analysts
Lawyers	2521	210	Lawyers
Judges	2522	211	Judges, Magistrates, and Other Judicial workers
Prosecuting legal professionals	2523	382	Detectives and Criminal Investigators
Archivists and curators	2531	240	Archivists, Curators, and Museum Technicians
Librarians	2532	243	Librarians
Economists	2541	180	Economists
Sociologists, social anthropologists, human geographers and political scientists	2542	183	Sociologists
Sociologists, social anthropologists, human geographers and political scientists	2542	186	Misc. Social Scientists and Related workers
Historians, archaeologists and philosophers	2543	186	Misc. Social Scientists and Related workers
Philologists, translators and interpreters	2544	286	Misc. Media and Communication workers
Psychologists	2545	182	Psychologists
Authors and other writers	2551	285	Authors and other writers
Sculptors, painters and other figurative artists	2552	260	Artists and Related workers

Conductors, composers, musicians and singers	2553	275	Musicians, Singers, and Related workers
Choreographers and dancers	2554	274	Dancers and Choreographers
Actors and directors	2555	270	Actors
Actors and directors	2555	271	Producers and Directors
Religious professionals	2560	204	Clergy
Civil engineering technicians	3111	155	Engineering Technicians, Except Drafters
Electrical engineering technicians	3112	155	Engineering Technicians, Except Drafters
Electronics and telecommunications engineering technicians	3113	155	Engineering Technicians, Except Drafters
Mechanical engineering technicians	3114	155	Engineering Technicians, Except Drafters
Chemical engineering technicians	3115	155	Engineering Technicians, Except Drafters
Oil, mining and metallurgical technicians	3116	155	Engineering Technicians, Except Drafters
Engineering technicians n.e.c.	3119	155	Engineering Technicians, Except Drafters
Computer associate professionals	3120	580	Computer Operators
Photographers and image and sound recording equipment operators	3131	291	Photographers
Photographers and image and sound recording equipment operators	3131	292	Television, Video, and Motion Picture Camera Operators and Editors
Photographers and image and sound recording equipment operators	3131	296	Media and Communication Equipment workers, All Other
Broadcasting and telecommunications equipment operators	3132	290	Broadcast and Sound Engineering Technicians and Radio Operators
Broadcasting and telecommunications equipment operators	3132	296	Media and Communication Equipment workers, All Other
Broadcasting and telecommunications equipment operators	3132	441	Motion Picture Projectionists
Optical and electronic equipment operators n.e.c.	3139	876	Medical, Dental, and Ophthalmic Laboratory Technicians
Ship engineers	3141	933	Ship engineers

Ships' deck officers and pilots	3142	931	Ship and Boat Captains and Operators
Aircraft pilots	3143	903	Aircraft Pilots and Flight engineers
Air traffic controllers	3144	904	Air Traffic Controllers and Air-field Operations Specialists
Fire inspectors	3151	375	Fire inspectors
Safety inspectors	3152	874	Inspectors, Testers, Sorters, Samplers, and Weighers
Safety inspectors	3152	941	Transportation inspectors
Life science technicians	3211	196	Other Life, Physical, and Social Science Technicians
Agronomy and forestry technicians	3212	190	Agricultural and Food Science Technicians
Agronomy and forestry technicians	3212	191	Biological Technicians
Farming and forestry advisers	3213	190	Agricultural and Food Science Technicians
Farming and forestry advisers	3213	196	Other Life, Physical, and Social Science Technicians
Radiographers and audiology associate professionals	3221	314	Audiologists
Sanitarians	3222	202	Misc. Community and Social Service Specialists
Dieticians	3223	303	Dietitians and Nutritionists
Opticians	3224	304	Optometrists
Opticians	3224	352	Opticians, Dispensing
Dental assistants	3225	364	Dental assistants
Physiotherapists and related associate professionals	3226	300	Chiropractors
Physiotherapists and related associate professionals	3226	316	Physical Therapists
Veterinary assistants	3227	341	Health Diagnosing and Treating Practitioner Support Technicians
Veterinary assistants	3227	365	Medical assistants and Other Healthcare Support Occupations
Pharmaceutical assistants	3228	341	Health Diagnosing and Treating Practitioner Support Technicians

Pharmaceutical assistants	3228	365	Medical assistants and Other Healthcare Support Occupations
Modern health associate professionals (except nursing) n.e.c.	3229	365	Medical assistants and Other Healthcare Support Occupations
Nurses	3231	313	Registered Nurses
Nurses	3231	350	Licensed Practical and Licensed Vocational Nurses
RNMS	3232	313	Registered Nurses
RNMS	3232	350	Licensed Practical and Licensed Vocational Nurses
Primary education teaching professionals	3310	230	Preschool and Kindergarten Teachers
Primary education teaching professionals	3310	231	Elementary and Middle School Teachers
Preprimary education teaching professionals	3320	230	Preschool and Kindergarten Teachers
Technical and subject teaching associate professionals (secondary education)	3341	254	Teacher assistants
Other teaching associate and pedagogical professionals n.e.c.	3349	254	Teacher assistants
Finance dealers and brokers	3411	86	Insurance Underwriters
Finance dealers and brokers	3411	482	Securities, Commodities, and Financial Services Sales Agents
Insurance representatives	3412	86	Insurance Underwriters
Insurance representatives	3412	481	Insurance Sales Agents
Estate agents	3413	41	Property, Real Estate, and Community Association Managers
Estate agents	3413	492	Real Estate Brokers and Sales Agents
Travel consultants	3414	483	Travel Agents
Technical and commercial sales representatives	3415	485	Sales Representatives, Wholesale and Manufacturing
Technical and commercial sales representatives	3415	493	Sales engineers
Buyers	3416	51	Purchasing Agents and Buyers, Farm Products
Buyers	3416	52	Wholesale and Retail Buyers, Except Farm Products

Buyers	3416	53	Purchasing Agents, Except Wholesale, Retail, and Farm Products
Appraisers, valuers and auctioneers	3417	54	Claims Adjusters, Appraisers, Examiners, and Investigators
Appraisers, valuers and auctioneers	3417	60	Cost Estimators
Appraisers, valuers and auctioneers	3417	81	Appraisers and Assessors of Real Estate
Appraisers, valuers and auctioneers	3417	496	Sales and Related workers, All Other
Bank associate professionals	3418	85	Personal Financial Advisors
Bank associate professionals	3418	91	Loan Counselors and Officers
Bank associate professionals	3418	534	New Accounts Clerks
Marketing and advertising advisers	3419	480	Advertising Sales Agents
Trade and shipbrokers	3421	84	Financial Analysts
Trade and shipbrokers	3421	482	Securities, Commodities, and Financial Services Sales Agents
Clearing and forwarding agents	3422	16	Transportation, Storage, and Distribution Managers
Employment agents and labour contractors	3423	62	Human Resources, Training, and Labor Relations Specialists
Business services agents n.e.c.	3429	73	Emergency Management Specialists
Administrative secretaries and related associate professionals	3431	570	Secretaries and Administrative assistants
Accountant associate professionals and bookkeepers	3432	512	Bookkeeping, Accounting, and Auditing Clerks
Chief housekeepers	3433	512	Bookkeeping, Accounting, and Auditing Clerks
Customs and border inspectors	3441	56	Compliance Officers, Except Agriculture, Construction, Health and Safety, and Transportation
Government tax and excise officials	3442	93	Tax Examiners, Collectors, and Revenue Agents
Government social benefits officials	3443	56	Compliance Officers, Except Agriculture, Construction, Health and Safety, and Transportation

Government social benefits officials	3443	525	Eligibility Interviewers, Government Programs
Government employment service officials	3444	42	Social and Community Service Managers
Other public service administrative associate professionals	3449	56	Compliance Officers, Except Agriculture, Construction, Health and Safety, and Transportation
Police officers	3450	385	Police and Sheriff's Patrol Officers
Police officers	3450	386	Transit and Railroad Police
Social workers (college-trained), child care officers, etc.	3460	201	Social workers
Social workers (college-trained), child care officers, etc.	3460	460	Child-care workers
Decorators and commercial designers	3471	263	Designers
Singers and musicians in the entertainment industry	3472	275	Musicians, Singers, and Related workers
Clowns, magicians, acrobats and related associate professionals	3473	443	Misc. Entertainment Attendants and Related workers
Inspicients, etc.	3474	443	Misc. Entertainment Attendants and Related workers
Athletes, sportspersons and coaches	3475	272	Athletes, Coaches, Umpires, and Related workers
Athletes, sportspersons and coaches	3475	462	Recreation and Fitness workers
Religious associate professionals	3480	205	Directors, Religious Activities and Education
Religious associate professionals	3480	206	Religious workers, All Other
Journalists and information associate professionals	3491	281	News Analysts, Reporters and Correspondents
Journalists and information associate professionals	3491	286	Misc. Media and Communication workers
Radio and television announcers	3492	280	Announcers
Radio and television announcers	3492	281	News Analysts, Reporters and Correspondents
Librarians	3493	244	Library Technicians
Stenographers and typists	4111	582	Word Processors and Typists

Data processors, data entry operators and related operators	4112	581	Data Entry Keyers
Data processors, data entry operators and related operators	4112	582	Word Processors and Typists
Data processors, data entry operators and related operators	4112	583	Desktop Publishers
Secretaries	4113	570	Secretaries and Administrative assistants
Clerical officers	4114	586	Office Clerks, General
Clerical officers	4114	590	Office Machine Operators, Except Computer
Accounting and bookkeeping clerks	4121	511	Billing and Posting Clerks and Machine Operators
Accounting and bookkeeping clerks	4121	512	Bookkeeping, Accounting, and Auditing Clerks
Accounting and bookkeeping clerks	4121	514	Payroll and Timekeeping Clerks
Other numerical clerks	4129	586	Office Clerks, General
Stock clerks	4131	562	Stock Clerks and Order Fillers
Stock clerks	4131	563	Weighers, Measurers, Checkers, and Samplers, Recordkeeping
Logistical clerks	4132	560	Production, Planning, and Expediting Clerks
Transport clerks	4133	561	Shipping, Receiving, and Traffic Clerks
Library and filing clerks	4141	526	File Clerks
Library and filing clerks	4141	532	Library assistants, Clerical
Mail carriers and sorting clerks	4142	555	Postal Service Mail Carriers
Mail carriers and sorting clerks	4142	556	Postal Service Mail Sorters, Processors, and Processing Machine Operators
Cashiers and ticket clerks	4211	472	Cashiers
Tellers and other counter clerks	4212	516	Tellers
Bookmakers and croupiers	4213	440	Gaming Services workers
Pawnbrokers	4214	513	Gaming Cage workers
Debt-collectors	4215	510	Bill and Account Collectors
Travel agency and related clerks	4221	483	Travel Agents
Travel agency and related clerks	4221	541	Reservation and Transportation Ticket Agents and Travel Clerks

Receptionists and information clerks	4222	540	Receptionists and information clerks
Telephone switchboard operators	4223	501	Switchboard Operators, Including Answering Service
Telephone switchboard operators	4223	502	Telephone Operators
Telephone switchboard operators	4223	503	Communications Equipment Operators, All Other
Travel attendants and travel stewards	5111	455	Transportation Attendants
Transport conductors	5112	455	Transportation Attendants
Travel guides	5113	454	Tour and Travel Guides
Housekeepers and related workers	5121	464	Residential Advisors
Cooks	5122	402	Cooks
Head waiters, waiters, waitresses and bartenders	5123	404	Bartenders
Head waiters, waiters, waitresses and bartenders	5123	405	Combined Food Preparation and Serving workers, Including Fast Food
Head waiters, waiters, waitresses and bartenders	5123	411	Waiters and Waitresses
Head waiters, waiters, waitresses and bartenders	5123	412	Food Servers, Nonrestaurant
Head waiters, waiters, waitresses and bartenders	5123	416	Food Preparation and Serving Related workers, All Other
Child-care workers	5131	460	Child-care workers
Nursing assistants and care assistants	5132	360	Nursing, Psychiatric, and Home Health Aides
Home helpers	5133	461	Personal and Home Care Aides
Dentist's secretaries	5134	364	Dental assistants
Doctor's secretaries	5135	311	Physician assistants
Trainees, nursemaids, etc.	5136	461	Personal and Home Care Aides
Pharmacy technicians	5137	341	Health Diagnosing and Treating Practitioner Support Technicians
Personal care and related workers n.e.c.	5139	365	Medical assistants and Other Healthcare Support Occupations
Hairdressers, barbers, beauticians and related workers	5141	450	Barbers
Hairdressers, barbers, beauticians and related workers	5141	451	Hairdressers, Hairstylists, and Cosmetologists

Undertakers and crematorium workers	5142	32	Funeral Directors
Undertakers and crematorium workers	5142	446	Funeral Service workers
Reducing treatment hosts/-tesses and related workers	5143	462	Recreation and Fitness workers
Other personal services workers n.e.c.	5149	452	Misc. Personal Appearance workers
Fire-fighters	5161	374	Fire-fighters
Prison guards	5162	370	First-Line Managers of Correctional Officers
Prison guards	5162	380	Bailiffs, Correctional Officers, and Jailers
Caretakers	5163	422	Janitors and Building Cleaners
Security guards	5164	392	Security Guards and Gaming Surveillance Officers
Protective services workers n.e.c.	5169	395	Lifeguards and Other Protective Service workers
Fashion and other models	5210	490	Models, Demonstrators, and Product Promoters
Shop salespersons and other salespersons (retail)	5221	472	Cashiers
Shop salespersons and other salespersons (retail)	5221	476	Retail Salespersons
Flower decorators	5222	472	Cashiers
Door-to door salesmen and related workers	5223	495	Door-To-Door Sales workers, News and Street Vendors, and Related workers
Salespersons (wholesale)	5224	485	Sales Representatives, Wholesale and Manufacturing
Interviewers	5225	531	Interviewers, Except Eligibility and Loan
Field crop and vegetable growers	6111	21	Farmers and Ranchers
Market gardeners	6112	425	Grounds Maintenance workers
Dairy and livestock producers	6121	21	Farmers and Ranchers
Dairy and livestock producers	6121	602	Animal Breeders
Poultry producers	6122	21	Farmers and Ranchers
Animal producers and related workers n.e.c.	6129	434	Animal Trainers
Animal producers and related workers n.e.c.	6129	435	Nonfarm Animal Caretakers
Crop and animal producers	6130	21	Farmers and Ranchers

Forestry workers, etc.	6210	612	Forest and Conservation workers
Forestry workers, etc.	6210	613	Logging workers
Fish farmers, etc.	6310	610	Fishers and Related Fishing workers
Fishery workers	6411	610	Fishers and Related Fishing workers
Hunters	6412	611	Hunters and Trappers
Stone cutters and related workers	7110	684	Mining Machine Operators
Stone cutters and related workers	7110	694	Other Extraction workers
Bricklayers and stonemasons	7121	622	Brickmasons, Blockmasons, and Stonemasons
Concrete workers and site labourers	7122	625	Cement Masons, Concrete Finishers, and Terrazzo workers
Iron fixers	7123	653	Structural Iron and Steel workers
Shutterers	7124	626	Construction Laborers
Carpenters and joiners	7125	623	Carpenters
Road workers and construction workers	7126	626	Construction Laborers
Tunnel, mountain and blasting workers	7127	683	Explosives workers, Ordnance Handling Experts, and Blasters
Scaffolding builders	7128	756	Riggers
Landscape gardeners	7129	425	Grounds Maintenance workers
Roofers	7131	651	Roofers
Insulation workers	7132	640	Insulation workers
Glaziers	7133	636	Glaziers
Plumbers	7134	644	Pipelayers, Plumbers, Pipefitters, and Steamfitters
Painters and related workers	7141	642	Painters, Construction and Maintenance
Painters and related workers	7141	881	Painting workers
Building structure cleaners and varnishers	7142	642	Painters, Construction and Maintenance
Sandblasters	7143	422	Janitors and Building Cleaners
Sandblasters	7143	675	Septic Tank Servicers and Sewer Pipe Cleaners
Chimney sweepers	7144	422	Janitors and Building Cleaners

Founders	7211	810	Molders and Molding Machine Setters, Operators, and Tenders, Metal and Plastic
Welders	7212	814	Welding, Soldering, and Brazing workers
Tinsmiths, etc.	7213	816	Lay-Out workers, Metal and Plastic
Sheet-metal workers	7214	652	Sheet-metal workers
Riggers and cable splicers	7215	756	Riggers
Underwater workers	7216	752	Commercial Divers
Panelbeaters	7217	715	Automotive Body and Related Repairers
Blacksmiths	7221	762	Other Installation, Maintenance, and Repair workers
Gunsmiths, locksmiths and related trades workers	7222	754	Locksmiths and Safe Repairers
Gunsmiths, locksmiths and related trades workers	7222	821	Tool Grinders, Filers, and Sharpeners
Motor vehicle mechanics and fitters	7231	720	Automotive Service Technicians and Mechanics
Motor vehicle mechanics and fitters	7231	721	Bus and Truck Mechanics and Diesel Engine Specialists
Aircraft engine mechanics and fitters	7232	714	Aircraft Mechanics and Service Technicians
Agricultural- or industrial-machinery mechanics and fitters	7233	722	Heavy Vehicle and Mobile Equipment Service Technicians and Mechanics
Agricultural- or industrial-machinery mechanics and fitters	7233	733	Industrial and Refractory Machinery Mechanics
Agricultural- or industrial-machinery mechanics and fitters	7233	734	Maintenance and Repair workers, General
Motor mechanics and fitters	7234	724	Small Engine Mechanics
Automatic controls mechanics and fitters	7235	735	Maintenance workers, Machinery
Precision mechanics and fitters	7236	743	Precision Instrument and Equipment Repairers
Industrial mechanics and fitters	7237	733	Industrial and Refractory Machinery Mechanics

Electricians, electrical and electronic equipment mechanics and fitters	7241	635	Electricians
Electricians, electrical and electronic equipment mechanics and fitters	7241	703	Avionics Technicians
Electricians, electrical and electronic equipment mechanics and fitters	7241	705	Electrical and Electronics Installers and Repairers, Transportation Equipment
Electricians, electrical and electronic equipment mechanics and fitters	7241	710	Electrical and Electronics Repairers, Industrial and Utility
Electricians, electrical and electronic equipment mechanics and fitters	7241	711	Electronic Equipment Installers and Repairers, Motor Vehicles
Telegraph and telephone installers and servicers	7242	702	Radio and Telecommunications Equipment Installers and Repairers
Telegraph and telephone installers and servicers	7242	742	Telecommunications Line Installers and Repairers
Electronics mechanics and servicers	7243	710	Electrical and Electronics Repairers, Industrial and Utility
Electronics mechanics and servicers	7243	732	Home Appliance Repairers
Electrical line installers, repairers and cable jointers	7244	741	Electrical Power-Line Installers and Repairers
Precision-instrument makers and repairers	7311	743	Precision Instrument and Equipment Repairers
Musical instrument makers and tuners	7312	743	Precision Instrument and Equipment Repairers
Jewellery and precious-metal workers	7313	875	Jewelers and Precious Stone and Metal workers
Potters and ceramists	7321	892	Molders, Shapers, and Casters, Except Metal and Plastic
Glass-makers	7322	871	Cutting workers
Glass-makers	7322	892	Molders, Shapers, and Casters, Except Metal and Plastic
Handicraft workers in wood and related materials	7331	850	Cabinetmakers and Bench Carpenters
Handicraft workers in wood and related materials	7331	852	Model Makers and Patternmakers, Wood

Handicraft workers in textile, leather and related materials	7332	833	Shoe and Leather workers and Repairers
Handicraft workers in textile, leather and related materials	7332	835	Tailors, Dressmakers, and Sewers
Graphic artists	7341	825	Prepress Technicians and workers
Photographers	7342	291	Photographers
Technical illustrators	7350	154	Drafters
Butchers, fishmongers and related food preparers	7411	781	Butchers and Other Meat, Poultry, and Fish Processing workers
Bakers and confectionery makers	7412	780	Bakers
Food and beverage tasters and graders	7413	604	Graders and Sorters, Agricultural Products
Other craft and related trades workers in manufacture of food products	7419	784	Food Batchmakers
Cabinet-makers	7421	850	Cabinetmakers and Bench Carpenters
Boat builders	7422	852	Model Makers and Patternmakers, Wood
Basketry weavers, brush makers and related workers	7423	775	Misc. Assemblers and Fabricators
Basketry weavers, brush makers and related workers	7423	896	Production workers, All Other
Weavers, knitters and related workers	7431	835	Tailors, Dressmakers, and Sewers
Tailors, dressmakers and hatters	7432	835	Tailors, Dressmakers, and Sewers
Furriers and related workers	7433	263	Designers
Textile, leather and related pattern-makers and cutters	7434	844	Fabric and Apparel Patternmakers
Textile, leather and related pattern-makers and cutters	7434	871	Cutting workers
Wig makers	7435	844	Fabric and Apparel Patternmakers
Upholsterers and related workers	7436	845	Upholsterers
Pelt dressers, tanners and felle-mongers	7441	833	Shoe and Leather workers and Repairers
Shoe-makers	7442	833	Shoe and Leather workers and Repairers

Taxidermists	7443	161	Biological Scientists
Laboratory assistants	7450	192	Chemical Technicians
Mining-plant operators	8111	680	Derrick, Rotary Drill, and Service Unit Operators, Oil, Gas, and Mining
Mining-plant operators	8111	684	Mining Machine Operators
Mineral-ore- and stone-processing-plant operators	8112	682	Earth Drillers, Except Oil and Gas
Mineral-ore- and stone-processing-plant operators	8112	694	Other Extraction workers
Mineral-ore- and stone-processing-plant operators	8112	865	Crushing, Grinding, Polishing, Mixing, and Blending workers
Oil- and gas-processing-plant operators	8113	680	Derrick, Rotary Drill, and Service Unit Operators, Oil, Gas, and Mining
Oil- and gas-processing-plant operators	8113	692	Roustabouts, Oil and Gas
Oil- and gas-processing-plant operators	8113	965	Pumping Station Operators
Well service operators	8114	680	Derrick, Rotary Drill, and Service Unit Operators, Oil, Gas, and Mining
Ore and metal furnace operators	8121	873	Furnace, Kiln, Oven, Drier, and Kettle Operators and Tenders
Metal moulders	8122	794	Rolling Machine Setters, Operators, and Tenders, Metal and Plastic
Metal moulders	8122	804	Metal Furnace and Kiln Operators and Tenders
Metal moulders	8122	810	Molders and Molding Machine Setters, Operators, and Tenders, Metal and Plastic
Ceramics moulders and decorators	8131	843	Extruding and Forming Machine Setters, Operators, and Tenders, Synthetic and Glass Fibers
Ceramics moulders and decorators	8131	892	Molders, Shapers, and Casters, Except Metal and Plastic
Glass production plant operators	8132	843	Extruding and Forming Machine Setters, Operators, and Tenders, Synthetic and Glass Fibers

Glass production plant operators	8132	892	Molders, Shapers, and Casters, Except Metal and Plastic
Glass, ceramics and related plant operators n.e.c.	8139	843	Extruding and Forming Machine Setters, Operators, and Tenders, Synthetic and Glass Fibers
Glass, ceramics and related plant operators n.e.c.	8139	872	Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders
Wood-processing-plant operators	8141	853	Sawing Machine Setters, Operators, and Tenders, Wood
Wood-processing-plant operators	8141	854	Woodworking Machine Setters, Operators, and Tenders, Except Sawing
Paper-pulp and papermaking-plant operators	8142	886	Cleaning, Washing, and Metal Pickling Equipment Operators and Tenders
Paper-pulp and papermaking-plant operators	8142	893	Paper Goods Machine Setters, Operators, and Tenders
Particle- and fibreboard-plant operators	8143	893	Paper Goods Machine Setters, Operators, and Tenders
Petroleum- and natural-gas-refining-plant operators	8151	863	Misc. Plant and System Operators
Petroleum- and natural-gas-refining-plant operators	8151	965	Pumping Station Operators
Chemical-processing-plant operators n.e.c.	8159	863	Misc. Plant and System Operators
Power-production plant operators	8161	860	Power Plant Operators, Distributors, and Dispatchers
Power-production plant operators	8161	861	Stationary engineers and Boiler Operators
Combustion-, refrigeration- and watercleaning plant operators	8162	862	Water and Liquid Waste Treatment Plant and System Operators
Metal-products machine operators	8211	792	Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic
Metal-products machine operators	8211	793	Forging Machine Setters, Operators, and Tenders, Metal and Plastic

Metal-products machine operators	8211	794	Rolling Machine Setters, Operators, and Tenders, Metal and Plastic
Metal-products machine operators	8211	795	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic
Metal-products machine operators	8211	796	Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic
Metal-products machine operators	8211	800	Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic
Metal-products machine operators	8211	801	Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic
Metal-products machine operators	8211	802	Milling and Planing Machine Setters, Operators, and Tenders, Metal and Plastic
Metal-products machine operators	8211	812	Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic
Metal-products machine operators	8211	822	Metalworkers and Plastic workers, All Other
Machine-tool operators	8212	796	Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic
Machine-tool operators	8212	800	Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic
Machine-tool operators	8212	801	Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic
Machinists	8213	803	Machinists
Cement and other mineral products machine operators	8214	885	Cementing and Gluing Machine Operators and Tenders
Pharmaceutical- and toiletry-products machine operators	8221	864	Chemical Processing Machine Setters, Operators, and Tenders
Ammunition- and explosive-products machine operators	8222	683	Explosives workers, Ordnance Handling Experts, and Blasters

Rubber-products machine operators	8223	894	Tire Builders
Plastic-products machine operators	8224	792	Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic
Plastic-products machine operators	8224	793	Forging Machine Setters, Operators, and Tenders, Metal and Plastic
Plastic-products machine operators	8224	794	Rolling Machine Setters, Operators, and Tenders, Metal and Plastic
Plastic-products machine operators	8224	795	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic
Plastic-products machine operators	8224	796	Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic
Plastic-products machine operators	8224	800	Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic
Plastic-products machine operators	8224	801	Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic
Plastic-products machine operators	8224	802	Milling and Planing Machine Setters, Operators, and Tenders, Metal and Plastic
Plastic-products machine operators	8224	812	Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic
Plastic-products machine operators	8224	822	Metalworkers and Plastic workers, All Other
Paint and varnishes-products machine operators	8225	864	Chemical Processing Machine Setters, Operators, and Tenders
Chemical-products machine operators n.e.c.	8229	863	Misc. Plant and System Operators
Graphic printing-machine operators	8251	824	Job Printers
Graphic printing-machine operators	8251	826	Printing Machine Operators
Bookbinding-machine operators	8252	823	Bookbinders and Bindery workers

Paper-products machine operators	8253	893	Paper Goods Machine Setters, Operators, and Tenders
Photo laboratory assistants	8254	883	Photographic Process workers and Processing Machine Operators
Fibre-preparing-, spinning- and winding machine operators	8261	840	Textile Cutting Machine Setters, Operators, and Tenders
Fibre-preparing-, spinning- and winding machine operators	8261	842	Textile Winding, Twisting, and Drawing Out Machine Setters, Operators, and Tenders
Weaving- and knitting-machine operators	8262	841	Textile Knitting and Weaving Machine Setters, Operators, and Tenders
Sewing-machine operators	8263	832	Sewing-machine operators
Fishing tackles-machine operators	8264	841	Textile Knitting and Weaving Machine Setters, Operators, and Tenders
Textile cutters	8265	871	Cutting workers
Bleaching-, dyeing- and cleaning-machine operators	8266	830	Laundry and Dry-Cleaning workers
Bleaching-, dyeing- and cleaning-machine operators	8266	836	Textile Bleaching and Dyeing Machine Operators and Tenders
Shoemaking- and related machine operators	8267	834	Shoe Machine Operators and Tenders
Textile-, fur- and leather-products machine operators n.e.c.	8269	831	Pressers, Textile, Garment, and Related Materials
Textile-, fur- and leather-products machine operators n.e.c.	8269	846	Textile, Apparel, and Furnishings workers, All Other
Fish-processing-machine operators	8271	781	Butchers and Other Meat, Poultry, and Fish Processing workers
Fish-processing-machine operators	8271	785	Food Cooking Machine Operators and Tenders
Meat-processing-machine operators	8272	781	Butchers and Other Meat, Poultry, and Fish Processing workers
Meat-processing-machine operators	8272	785	Food Cooking Machine Operators and Tenders
Dairy-products machine operators	8273	864	Chemical Processing Machine Setters, Operators, and Tenders

Grain- and spice-milling-machine operators	8274	963	Machine Feeders and Offbearers
Baked-goods, cereal and chocolate-products machine operators	8275	783	Food and Tobacco Roasting, Baking, and Drying Machine Operators and Tenders
Baked-goods, cereal and chocolate-products machine operators	8275	784	Food Batchmakers
Fruit-, vegetable- and nut processing-machine operators	8276	784	Food Batchmakers
Brewers-, and other beverage machine operators	8277	864	Chemical Processing Machine Setters, Operators, and Tenders
Food- and related products machine operators n.e.c.	8279	783	Food and Tobacco Roasting, Baking, and Drying Machine Operators and Tenders
Mechanical-machinery assemblers	8281	726	Misc. Vehicle and Mobile Equipment Mechanics, Installers, and Repairers
Mechanical-machinery assemblers	8281	772	Electrical, Electronics, and Electromechanical Assemblers
Mechanical-machinery assemblers	8281	773	Engine and Other Machine Assemblers
Electronic-equipment assemblers	8282	772	Electrical, Electronics, and Electromechanical Assemblers
Electronic-equipment assemblers	8282	775	Misc. Assemblers and Fabricators
Locomotive-engine drivers and locomotive-inspectors	8311	920	Locomotive engineers and Operators
Railway brakemen, signallers and shunters	8312	923	Railroad Brake, Signal, and Switch Operators
Car, taxi and van drivers	8321	914	Taxi Drivers and Chauffeurs
Car, taxi and van drivers	8321	915	Motor Vehicle Operators, All Other
Bus- and tram drivers	8322	912	Bus Drivers
Bus- and tram drivers	8322	926	Subway, Streetcar, and Other Rail Transportation workers
Heavy truck and lorry drivers	8323	913	Driver/Sales workers and Truck Drivers
Heavy truck and lorry drivers	8323	960	Industrial Truck and Tractor Operators
Earth-moving and related plant operators	8331	630	Paving, Surfacing, and Tamping Equipment Operators

Earth-moving and related plant operators	8331	631	Pile-Driver Operators
Earth-moving and related plant operators	8331	952	Dredge, Excavating, and Loading Machine Operators
Crane, hoist and related plant operators	8332	934	Bridge and Lock Tenders
Crane, hoist and related plant operators	8332	951	Crane and Tower Operators
Lifting-truck operators	8333	956	Hoist and Winch Operators
Ships' deck crews	8341	930	Sailors and Marine Oilers
Ships' deck crews	8341	931	Ship and Boat Captains and Operators
Ships' machine crews	8342	735	Maintenance workers, Machinery
Odd jobs for private persons and households	9120	452	Misc. Personal Appearance workers
Domestic helpers and cleaners	9131	423	Maids and Housekeeping Cleaners
Helpers and cleaners in offices and other establishments	9132	423	Maids and Housekeeping Cleaners
Kitchen helps and related workers	9133	413	Dining Room and Cafeteria Attendants and Bartender Helpers
Kitchen helps and related workers	9133	414	Dishwashers
Window cleaners	9141	422	Janitors and Building Cleaners
Car and related cleaners	9142	961	Cleaners of Vehicles and Equipment
Messengers, package and luggage porters and deliverers	9151	551	Couriers and Messengers
Doorkeepers, watchpersons and related workers	9152	392	Security Guards and Gaming Surveillance Officers
Doorkeepers, watchpersons and related workers	9152	442	Ushers, Lobby Attendants, and Ticket Takers
Doorkeepers, watchpersons and related workers	9152	453	Baggage Porters, Bellhops, and Concierges
Meter readers and related workers	9153	384	Parking Enforcement workers
Meter readers and related workers	9153	751	Coin, Vending, and Amusement Machine Servicers and Repairers
Garbage collectors and related labourers	9160	672	Hazardous Materials Removal workers

Garbage collectors and related labourers	9160	972	Refuse and Recyclable Material Collectors
Agricultural, fishery and related labourers	9210	605	Misc. Agricultural workers
Agricultural, fishery and related labourers	9210	610	Fishers and Related Fishing workers
Labourers in construction and maintenance, etc.	9310	626	Construction Laborers
Labourers in construction and maintenance, etc.	9310	673	Highway Maintenance workers
Labourers in construction and maintenance, etc.	9310	674	Rail-Track Laying and Maintenance Equipment Operators
Labourers in manufacturing	9320	895	Helpers–Production workers
Labourers in manufacturing	9320	964	Packers and Packagers, Hand
Storing and goods handling labourers	9330	962	Laborers and Freight, Stock, and Material Movers, Hand



The Frisch Centre

The Ragnar Frisch Centre for Economic Research is an independent research institution founded by the University of Oslo. The Frisch Centre conducts economic research in co-operation with the Department of Economics, University of Oslo. The research projects are mostly financed by the Research Council of Norway, government ministries and international organisations. Most projects are co-operative work involving the Frisch Centre and researchers in other domestic and foreign institutions.

**Ragnar Frisch Centre for Economic Research
Gaustadalléen 21
NO-0349 Oslo, Norway
T + 47 22 95 88 10
frisch@frisch.uio.no
www.frisch.uio.no**