

Supplementary Table 1. Estimated arithmetic mean concentration of lead by industry and process from 1981 to 2018 based on literature

| Ref No. | Year | KSIC code | Industry (KSIC-10) | Process | Type | N | AM_EST | GM | GSD | AM | SD | Min | Max |
|---------|------|-----------|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|----------|----|--------|-------|------|------|------|------|-------|
| 1 | 2003 | 303 | Manufacture of parts and accessories for motor vehicles(new products) | Assembling | Personal | 32 | 0.80 | 0.6 | 2.7 | | | 0.1 | 2.8 |
| 1 | 2003 | 303 | Manufacture of parts and accessories for motor vehicles(new products) | Printing | Personal | 1 | 1.00 | | | | | 1 | 1 |
| 1 | 2003 | 303 | Manufacture of parts and accessories for motor vehicles(new products) | Surface processing | Personal | 1 | 1.80 | | | | | 1.8 | 1.8 |
| 1 | 2003 | 303 | Manufacture of parts and accessories for motor vehicles(new products) | Drying | Personal | 2 | 0.93 | 0.9 | 1.4 | | | 0.7 | 1.1 |
| 1 | 2003 | 303 | Manufacture of parts and accessories for motor vehicles(new products) | Processing | Personal | 1 | 0.50 | | | | | 0.5 | 0.5 |
| 2 | 2004 | 861 | Hospital activities | Radiation oncology department workshop | Area | 2 | 0.30 | | | | | 0.12 | 0.52 |
| 2 | 2004 | 861 | Hospital activities | Radiation oncology department workshop | Area | 2 | 0.45 | | | | | 0.32 | 0.56 |
| 2 | 2004 | 861 | Hospital activities | Radiation oncology department workshop | Area | 2 | 0.40 | | | | | 0.27 | 0.51 |
| 2 | 2004 | 861 | Hospital activities | Radiation oncology department workshop | Area | 2 | 0.46 | | | | | 0.34 | 0.56 |
| 3 | 1981 | 24 | Manufacture of basic metals | Soldering | Area | 3 | 490 | | | 490 | | 130 | 850 |
| 4 | 1994 | 241 | Manufacture of basic iron and steel | Plating | Personal | 5 | 40.8 | 33.2 | | 40.8 | 34.2 | 23 | 92 |
| 4 | 1994 | 319 | Manufacture of other transport equipment | Welding | Personal | 5 | 15 | 14.8 | | 15 | 2.1 | 12.9 | 17 |
| 4 | 1994 | 24213 | Manufacture of steel wire | Plating | Personal | 5 | 19.5 | 19 | | 19.5 | 4.3 | 13 | 25 |
| 4 | 1994 | 301 | Manufacture of motor vehicles and engines for motor vehicles | Welding | Personal | 45 | 29 | 14 | | 29 | 71 | 2 | 449.9 |
| 4 | 1994 | 301 | Manufacture of motor vehicles and engines for motor vehicles | Assembling(brazing) | Personal | 10 | 20.1 | 17.4 | | 20.1 | 14.8 | 11.5 | 58 |
| 4 | 1994 | 291 | Manufacture of general purpose machinery | Assembling(brazing) | Personal | 6 | 66 | 59.8 | | 66 | 28 | 37 | 94 |
| 4 | 1994 | 285 | Manufacture of domestic appliances | Assembling(welding) | Personal | 20 | 18.2 | 10.1 | | 18.2 | 24.6 | 1.5 | 320 |
| 5 | 1996 | 311 | Building of ships and boats | Grand assembling(welding) | Personal | 41 | 13.1 | 8 | 2.7 | | | 1 | 61 |
| 5 | 1996 | 311 | Building of ships and boats | Sub assembling(welding) | Personal | 40 | 10.2 | 8 | 2.5 | | | 1 | 41 |
| 6 | 1994 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Secondary smelting(scrap, furnace) | Personal | 6 | 662.4 | 575.4 | 1.7 | | | | |
| 6 | 1994 | 25121 | Manufacture of industrial heating boilers and radiators | Radiator manufacturing(dipping, soldering, leak test) | Personal | 43 | 25.2 | 19.1 | 2.1 | | | | |
| 6 | 1994 | 282 | Manufacture of batteries and accumulators | Battery manufacturing(remelt, grid production, paste, encapsulation, caste on strap, soldering, grinding) | Personal | 44 | 1175.0 | 354.8 | 4.7 | | | | |
| 6 | 1994 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Litharge manufacturing | Personal | 26 | 802.3 | 117.5 | 7.1 | | | | |
| 7 | 1992 | 2013 | Manufacture of inorganic dyes, pigments, tanning materials and other coloring agents | dyes and pigments manufacturing | Area | 4 | 221.0 | 210 | | | 30 | 180 | 250 |
| 7 | 1992 | 2013 | Manufacture of inorganic dyes, pigments, tanning materials and other coloring agents | dyes and pigments manufacturing | Area | 4 | 215.5 | 200 | | | 30 | 180 | 240 |
| 7 | 1992 | 2013 | Manufacture of inorganic dyes, pigments, tanning materials and other coloring agents | dyes and pigments manufacturing | Area | 4 | 210.9 | 190 | | | 30 | 170 | 240 |
| 7 | 1993 | 2013 | Manufacture of inorganic dyes, pigments, tanning materials and other coloring agents | dyes and pigments manufacturing | Area | 4 | 50.9 | 50 | | | 20 | 30 | 70 |
| 7 | 1993 | 2013 | Manufacture of inorganic dyes, pigments, tanning materials and other coloring agents | dyes and pigments manufacturing | Area | 4 | 50.9 | 40 | | | 20 | 30 | 70 |
| 7 | 1993 | 2013 | Manufacture of inorganic dyes, pigments, tanning materials and other coloring agents | dyes and pigments manufacturing | Area | 4 | 39.7 | 40 | | | 20 | 20 | 60 |
| 7 | 1994 | 2013 | Manufacture of inorganic dyes, pigments, tanning materials and other coloring agents | dyes and pigments manufacturing | Area | 4 | 50.9 | 40 | | | 20 | 30 | 70 |
| 7 | 1994 | 2013 | Manufacture of inorganic dyes, pigments, tanning materials and other coloring agents | dyes and pigments manufacturing | Area | 4 | 43.8 | 40 | | | 30 | 20 | 70 |
| 7 | 1994 | 2013 | Manufacture of inorganic dyes, pigments, tanning materials and other coloring agents | dyes and pigments manufacturing | Area | 4 | 43.8 | 40 | | | 30 | 20 | 70 |
| 8 | 1988 | 282 | Manufacture of batteries and accumulators | Casting | Area | 26 | 35.6 | 15 | 2.52 | | | 2 | 200 |
| 8 | 1988 | 282 | Manufacture of batteries and accumulators | Lead powder production | Area | 15 | 88.1 | 34 | 4.89 | | | 3 | 670 |

Supplementary Table 1. Continued

| Ref No. | Year | KSIC code | Industry (KSIC-10) | Process | Type | N | AM_EST | GM | GSD | AM | SD | Min | Max |
|---------|------|-----------|---------------------------------------------------------------|--------------------|----------|----|--------|-------|-------|----|----|-----|------|
| 8 | 1988 | 282 | Manufacture of batteries and accumulators | Plate pasting | Area | 9 | 26.8 | 25 | 3.16 | | | 3 | 100 |
| 8 | 1988 | 282 | Manufacture of batteries and accumulators | Hydrosetting | Area | 13 | 60.9 | 28 | 3.63 | | | 10 | 180 |
| 8 | 1988 | 282 | Manufacture of batteries and accumulators | Assembly | Area | 44 | 88.9 | 31 | 3.05 | | | 10 | 330 |
| 8 | 1988 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Dismanting | Area | 6 | 236.3 | 141 | 1.04 | | | 50 | 600 |
| 8 | 1988 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Smelting | Area | 27 | 21.5 | 16 | 1.98 | | | 3 | 70 |
| 8 | 1988 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Refining | Area | 33 | 21.6 | 19 | 2.84 | | | 2 | 90 |
| 9 | 1994 | 232 | Manufacture of refractory and non-refractory ceramic products | Glaze spraying | Personal | 3 | 178.5 | 194 | | | | 79 | 291 |
| 9 | 1994 | 232 | Manufacture of refractory and non-refractory ceramic products | Glaze spraying | Personal | 3 | 7.2 | 7 | | | | 6 | 8 |
| 9 | 1994 | 232 | Manufacture of refractory and non-refractory ceramic products | Glaze spraying | Personal | 2 | 15.9 | 16 | | | | 13 | 18 |
| 9 | 1994 | 232 | Manufacture of refractory and non-refractory ceramic products | Glaze spraying | Personal | 2 | 987.3 | 965 | | | | 845 | 1084 |
| 10 | 1994 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Primary smelting | Area | 14 | 45.3 | 33.8 | 2.05 | | | 11 | 106 |
| 10 | 1995 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Primary smelting | Area | 26 | 102.0 | 39.7 | 2.265 | | | 13 | 351 |
| 10 | 1996 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Primary smelting | Area | 23 | 335.8 | 61.6 | 2.944 | | | 19 | 1881 |
| 10 | 1997 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Primary smelting | Area | 19 | 176.7 | 57.6 | 3.154 | | | 11 | 935 |
| 10 | 1998 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Primary smelting | Area | 22 | 153.9 | 57.8 | 2.376 | | | 18 | 558 |
| 10 | 1999 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Primary smelting | Area | 33 | 55.2 | 48.4 | 2.094 | | | 10 | 154 |
| 10 | 2000 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Primary smelting | Area | 12 | 86.5 | 86.2 | 1.575 | | | 31 | 160 |
| 10 | 2001 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Primary smelting | Area | 11 | 73.0 | 92.6 | 1.703 | | | 23 | 146 |
| 10 | 2002 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Primary smelting | Area | 27 | 10.5 | 7.6 | 3.165 | | | 1 | 43 |
| 10 | 2003 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Primary smelting | Area | 29 | 9.7 | 7.9 | 2.706 | | | 1 | 38 |
| 10 | 2004 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Primary smelting | Area | 13 | 8.2 | 5.9 | 3.241 | | | 1 | 29 |
| 10 | 2005 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Primary smelting | Area | 64 | 15.0 | 10.1 | 3.172 | | | 1 | 76 |
| 10 | 2006 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Primary smelting | Area | 30 | 9.4 | 11.9 | 2.963 | | | 1 | 36 |
| 10 | 2007 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Primary smelting | Area | 30 | 10.5 | 19 | 2.391 | | | 1 | 43 |
| 10 | 1994 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Secondary smelting | Area | 9 | 141.6 | 45.8 | 3.455 | | | 11 | 656 |
| 10 | 1995 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Secondary smelting | Area | 26 | 391.9 | 250.1 | 2.91 | | | 35 | 1670 |
| 10 | 1996 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Secondary smelting | Area | 21 | 277.3 | 191.1 | 3.544 | | | 15 | 1596 |
| 10 | 1997 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Secondary smelting | Area | 29 | 399.8 | 245.6 | 3.582 | | | 21 | 2342 |
| 10 | 1998 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Secondary smelting | Area | 24 | 506.6 | 231 | 3.218 | | | 24 | 3157 |
| 10 | 1999 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Secondary smelting | Area | 27 | 188.6 | 165.5 | 3.279 | | | 12 | 985 |
| 10 | 2000 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Secondary smelting | Area | 21 | 469.4 | 317.5 | 3.016 | | | 50 | 1799 |
| 10 | 2001 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Secondary smelting | Area | 31 | 66.9 | 69.9 | 1.868 | | | 18 | 147 |
| 10 | 2002 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Secondary smelting | Area | 22 | 37.4 | 57.1 | 2.346 | | | 4 | 143 |
| 10 | 2003 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Secondary smelting | Area | 28 | 59.2 | 41.2 | 1.826 | | | 15 | 135 |

Supplementary Table 1. Continued

| Ref No. | Year | KSIC code | Industry (KSIC-10) | Process | Type | N | AM_EST | GM | GSD | AM | SD | Min | Max |
|---------|------|-----------|---------------------------------------------------------------|----------------------------------------|----------|-----|--------|--------|-------|--------|-------|-------|--------|
| 10 | 2004 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Secondary smelting | Area | 27 | 16.6 | 36.7 | 2.648 | | | 1 | 90 |
| 10 | 2005 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Secondary smelting | Area | 32 | 16.4 | 30.4 | 2.605 | | | 1 | 88 |
| 10 | 2006 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Secondary smelting | Area | 33 | 29.5 | 27 | 1.846 | | | 4 | 98 |
| 10 | 2007 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Secondary smelting | Area | 27 | 29.2 | 37.3 | 2.056 | | | 5 | 84 |
| 10 | 1994 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Litharge manufacturing | Area | 54 | 1060.0 | 265.6 | 3.312 | | | 29 | 9185 |
| 10 | 1995 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Litharge manufacturing | Area | 52 | 601.9 | 582.6 | 4.565 | | | 9 | 7493 |
| 10 | 1996 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Litharge manufacturing | Area | 39 | 1125.4 | 1085.5 | 4.137 | | | 64 | 6286 |
| 10 | 1997 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Litharge manufacturing | Area | 42 | 999.6 | 722.2 | 3.19 | | | 34 | 7600 |
| 10 | 1998 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Litharge manufacturing | Area | 32 | 495.0 | 307 | 3.551 | | | 19 | 3500 |
| 10 | 1999 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Litharge manufacturing | Area | 14 | 43.0 | 90.8 | 4.306 | | | 1 | 411 |
| 10 | 2000 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Litharge manufacturing | Area | 14 | 41.0 | 36.2 | 3.028 | | | 6 | 130 |
| 10 | 2001 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Litharge manufacturing | Area | 25 | 55.2 | 77.3 | 2.66 | | | 5 | 233 |
| 10 | 2002 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Litharge manufacturing | Area | 28 | 39.8 | 85.3 | 2.24 | | | 3 | 188 |
| 10 | 2003 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Litharge manufacturing | Area | 29 | 34.2 | 69.8 | 2.639 | | | 3 | 147 |
| 10 | 2004 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Litharge manufacturing | Area | 13 | 24.9 | 52.5 | 2.802 | | | 2 | 113 |
| 10 | 2005 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Litharge manufacturing | Area | 33 | 174.3 | 46.9 | 2.663 | | | 3 | 1994 |
| 10 | 2006 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Litharge manufacturing | Area | 29 | 17.7 | 27 | 2.959 | | | 1 | 99 |
| 10 | 2007 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Litharge manufacturing | Area | 26 | 16.3 | 26.1 | 3.517 | | | 1 | 87 |
| 11 | 2018 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Preparation | Area | 6 | 26.3 | 25.12 | 1.37 | 26.25 | 7.06 | 14.44 | 33.59 |
| 11 | 2018 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Refining | Area | 6 | 121.1 | 108.57 | 1.57 | 121.12 | 62.51 | 59.02 | 252.88 |
| 11 | 2018 | 24213 | Manufacture of smelting, refining and alloys of lead and zinc | Casting | Area | 6 | 75.1 | 60.37 | 2.12 | 75.13 | 40.02 | 13.89 | 128.88 |
| 12 | 2012 | 24112 | Manufacture of basic steel | Melting | Personal | 40 | 58.9 | 28 | 2.23 | | | 9 | 182 |
| 12 | 2012 | 24112 | Manufacture of basic steel | Melting | Area | 45 | 60.4 | 37 | 2.21 | | | 7 | 220 |
| 12 | 2012 | 24112 | Manufacture of basic steel | Melting | Area | 15 | 86.4 | 49 | 2.37 | | | 5 | 478 |
| 13 | 1989 | 282 | Manufacture of batteries and accumulators | Grid type(total) | Personal | 118 | 574.7 | 241 | 3.34 | | | 11 | 6170 |
| 13 | 1989 | 282 | Manufacture of batteries and accumulators | Grid type(casting) | Personal | 24 | 109.1 | 91 | 2.49 | | | 12 | 410 |
| 13 | 1989 | 282 | Manufacture of batteries and accumulators | Grid type (lead powder and pasting) | Personal | 20 | 230.5 | 234 | 2.82 | | | 11 | 1430 |
| 13 | 1989 | 282 | Manufacture of batteries and accumulators | Grid type(assembly) | Personal | 56 | 314.3 | 296 | 2.63 | | | 15 | 1950 |
| 13 | 1990 | 282 | Manufacture of batteries and accumulators | Grid type(total) | Personal | 273 | 289.4 | 155 | 3.64 | | | 7 | 2700 |
| 13 | 1990 | 282 | Manufacture of batteries and accumulators | Grid type(casting) | Personal | 51 | 163.6 | 66 | 2.91 | | | 8 | 1000 |
| 13 | 1990 | 282 | Manufacture of batteries and accumulators | Grid type (lead powder and pasting) | Personal | 67 | 305.7 | 176 | 3.39 | | | 10 | 2380 |
| 13 | 1990 | 282 | Manufacture of batteries and accumulators | Grid type(assembly) | Personal | 112 | 239.9 | 153 | 3.32 | | | 7 | 2000 |
| 13 | 1991 | 282 | Manufacture of batteries and accumulators | Grid type(total) | Personal | 386 | 457.4 | 109 | 3.7 | | | 6 | 6160 |
| 13 | 1991 | 282 | Manufacture of batteries and accumulators | Grid type(casting) | Personal | 60 | 97.9 | 48 | 2.13 | | | 8 | 440 |
| 13 | 1991 | 282 | Manufacture of batteries and accumulators | Grid type (lead powder and pasting) | Personal | 78 | 300.1 | 92 | 3.55 | | | 10 | 2310 |
| 13 | 1991 | 282 | Manufacture of batteries and accumulators | Grid type(assembly) | Personal | 188 | 439.6 | 121 | 3.62 | | | 6 | 5780 |
| 13 | 1992 | 282 | Manufacture of batteries and accumulators | Grid type(total) | Personal | 366 | 224.6 | 64 | 3.72 | | | 6 | 1974 |
| 13 | 1992 | 282 | Manufacture of batteries and accumulators | Grid type(casting) | Personal | 64 | 56.2 | 23 | 2.37 | | | 6 | 215 |
| 13 | 1992 | 282 | Manufacture of batteries and accumulators | Grid type (lead powder and pasting) | Personal | 75 | 238.0 | 92 | 3.41 | | | 7 | 1974 |

Supplementary Table 1. Continued

| Ref No. | Year | KSIC code | Industry (KSIC-10) | Process | Type | N | AM_EST | GM | GSD | AM | SD | Min | Max |
|---------|------|-----------|-------------------------------------------|----------------------------------------|----------|-----|--------|-----|------|----|----|-----|------|
| 13 | 1992 | 282 | Manufacture of batteries and accumulators | Grid type(assembly) | Personal | 153 | 177.2 | 73 | 3.46 | | | 6 | 1351 |
| 13 | 1993 | 282 | Manufacture of batteries and accumulators | Grid type(total) | Personal | 448 | 255.7 | 90 | 3.73 | | | 6 | 2430 |
| 13 | 1993 | 282 | Manufacture of batteries and accumulators | Grid type(casting) | Personal | 70 | 52.7 | 31 | 2.26 | | | 6 | 194 |
| 13 | 1993 | 282 | Manufacture of batteries and accumulators | Grid type (lead powder and pasting) | Personal | 103 | 227.6 | 120 | 3.14 | | | 10 | 1484 |
| 13 | 1993 | 282 | Manufacture of batteries and accumulators | Grid type(assembly) | Personal | 190 | 230.2 | 86 | 3.56 | | | 6 | 2054 |
| 13 | 1994 | 282 | Manufacture of batteries and accumulators | Grid type(total) | Personal | 404 | 443.7 | 89 | 3.98 | | | 6 | 5867 |
| 13 | 1994 | 282 | Manufacture of batteries and accumulators | Grid type(casting) | Personal | 62 | 163.6 | 32 | 2.50 | | | 8 | 1000 |
| 13 | 1994 | 282 | Manufacture of batteries and accumulators | Grid type (lead powder and pasting) | Personal | 101 | 309.1 | 108 | 3.33 | | | 9 | 2580 |
| 13 | 1994 | 282 | Manufacture of batteries and accumulators | Grid type(assembly) | Personal | 152 | 312.1 | 93 | 3.55 | | | 6 | 3341 |
| 13 | 1995 | 282 | Manufacture of batteries and accumulators | Grid type(total) | Personal | 405 | 366.4 | 92 | 3.65 | | | 6 | 4319 |
| 13 | 1995 | 282 | Manufacture of batteries and accumulators | Grid type(casting) | Personal | 61 | 50.6 | 26 | 2.14 | | | 7 | 166 |
| 13 | 1995 | 282 | Manufacture of batteries and accumulators | Grid type (lead powder and pasting) | Personal | 114 | 376.9 | 133 | 3.62 | | | 10 | 3326 |
| 13 | 1995 | 282 | Manufacture of batteries and accumulators | Grid type(assembly) | Personal | 141 | 366.4 | 92 | 3.32 | | | 6 | 4319 |
| 13 | 1996 | 282 | Manufacture of batteries and accumulators | Grid type(total) | Personal | 348 | 568.7 | 105 | 3.45 | | | 7 | 7956 |
| 13 | 1996 | 282 | Manufacture of batteries and accumulators | Grid type(casting) | Personal | 60 | 121.1 | 37 | 2.24 | | | 9 | 576 |
| 13 | 1996 | 282 | Manufacture of batteries and accumulators | Grid type (lead powder and pasting) | Personal | 83 | 212.0 | 141 | 2.49 | | | 7 | 1641 |
| 13 | 1996 | 282 | Manufacture of batteries and accumulators | Grid type(assembly) | Personal | 125 | 624.8 | 114 | 3.83 | | | 9 | 7956 |
| 13 | 1997 | 282 | Manufacture of batteries and accumulators | Grid type(total) | Personal | 433 | 501.8 | 120 | 3.34 | | | 6 | 7145 |
| 13 | 1997 | 282 | Manufacture of batteries and accumulators | Grid type(casting) | Personal | 72 | 45.2 | 34 | 2.11 | | | 6 | 152 |
| 13 | 1997 | 282 | Manufacture of batteries and accumulators | Grid type(lead powder and pasting) | Personal | 101 | 650.8 | 150 | 2.96 | | | 12 | 7145 |
| 13 | 1997 | 282 | Manufacture of batteries and accumulators | Grid type(assembly) | Personal | 155 | 160.7 | 133 | 3.12 | | | 6 | 1155 |
| 13 | 1998 | 282 | Manufacture of batteries and accumulators | Grid type(total) | Personal | 420 | 219.4 | 138 | 3.64 | | | 6 | 1902 |
| 13 | 1998 | 282 | Manufacture of batteries and accumulators | Grid type(casting) | Personal | 62 | 79.8 | 41 | 2.25 | | | 7 | 344 |
| 13 | 1998 | 282 | Manufacture of batteries and accumulators | Grid type (lead powder and pasting) | Personal | 74 | 216.7 | 129 | 2.59 | | | 12 | 1230 |
| 13 | 1998 | 282 | Manufacture of batteries and accumulators | Grid type(assembly) | Personal | 202 | 219.4 | 174 | 3.83 | | | 6 | 1902 |
| 13 | 1999 | 282 | Manufacture of batteries and accumulators | Grid type(total) | Personal | 326 | 211.6 | 74 | 2.94 | | | 6 | 1794 |
| 13 | 1999 | 282 | Manufacture of batteries and accumulators | Grid type(casting) | Personal | 54 | 40.2 | 27 | 2.02 | | | 6 | 126 |
| 13 | 1999 | 282 | Manufacture of batteries and accumulators | Grid type (lead powder and pasting) | Personal | 74 | 211.6 | 115 | 2.80 | | | 6 | 1794 |
| 13 | 1999 | 282 | Manufacture of batteries and accumulators | Grid type(assembly) | Personal | 124 | 121.4 | 66 | 2.73 | | | 8 | 621 |
| 13 | 2000 | 282 | Manufacture of batteries and accumulators | Grid type(total) | Personal | 214 | 101.5 | 52 | 2.57 | | | 6 | 554 |
| 13 | 2000 | 282 | Manufacture of batteries and accumulators | Grid type(casting) | Personal | 32 | 25.7 | 21 | 1.64 | | | 7 | 56 |
| 13 | 2000 | 282 | Manufacture of batteries and accumulators | Grid type (lead powder and pasting) | Personal | 42 | 98.4 | 74 | 2.14 | | | 15 | 304 |
| 13 | 2000 | 282 | Manufacture of batteries and accumulators | Grid type(assembly) | Personal | 86 | 101.5 | 47 | 2.76 | | | 6 | 554 |
| 13 | 2001 | 282 | Manufacture of batteries and accumulators | Grid type(total) | Personal | 116 | 48.9 | 46 | 2.13 | | | 8 | 145 |
| 13 | 2001 | 282 | Manufacture of batteries and accumulators | Grid type(casting) | Personal | 18 | 24.2 | 23 | 1.68 | | | 8 | 47 |
| 13 | 2001 | 282 | Manufacture of batteries and accumulators | Grid type (lead powder and pasting) | Personal | 25 | 55.1 | 54 | 2.36 | | | 11 | 145 |
| 13 | 2001 | 282 | Manufacture of batteries and accumulators | Grid type(assembly) | Personal | 45 | 46.8 | 47 | 2.01 | | | 8 | 135 |
| 13 | 2002 | 282 | Manufacture of batteries and accumulators | Grid type(total) | Personal | 184 | 146.8 | 37 | 2.45 | | | 6 | 1000 |
| 13 | 2002 | 282 | Manufacture of batteries and accumulators | Grid type(casting) | Personal | 17 | 34.4 | 15 | 2.00 | | | 6 | 98 |
| 13 | 2002 | 282 | Manufacture of batteries and accumulators | Grid type (lead powder and pasting) | Personal | 29 | 47.3 | 44 | 2.39 | | | 7 | 149 |
| 13 | 2002 | 282 | Manufacture of batteries and accumulators | Grid type(assembly) | Personal | 88 | 41.8 | 35 | 2.09 | | | 6 | 134 |
| 13 | 2003 | 282 | Manufacture of batteries and accumulators | Grid type(total) | Personal | 170 | 43.5 | 31 | 2.3 | | | 6 | 143 |
| 13 | 2003 | 282 | Manufacture of batteries and accumulators | Grid type(casting) | Personal | 27 | 33.9 | 21 | 1.97 | | | 6 | 96 |
| 13 | 2003 | 282 | Manufacture of batteries and accumulators | Grid type (lead powder and pasting) | Personal | 36 | 45.7 | 45 | 2.18 | | | 7 | 141 |
| 13 | 2003 | 282 | Manufacture of batteries and accumulators | Grid type(assembly) | Personal | 62 | 37.2 | 26 | 2.18 | | | 6 | 111 |
| 13 | 2004 | 282 | Manufacture of batteries and accumulators | Grid type(total) | Personal | 149 | 146.8 | 35 | 2.25 | | | 6 | 1000 |
| 13 | 2004 | 282 | Manufacture of batteries and accumulators | Grid type(casting) | Personal | 22 | 33.1 | 15 | 1.93 | | | 7 | 84 |
| 13 | 2004 | 282 | Manufacture of batteries and accumulators | Grid type (lead powder and pasting) | Personal | 31 | 36.2 | 44 | 2.02 | | | 7 | 97 |
| 13 | 2004 | 282 | Manufacture of batteries and accumulators | Grid type(assembly) | Personal | 60 | 155.6 | 34 | 2.21 | | | 7 | 1000 |

Supplementary Table 1. Continued

| Ref No. | Year | KSIC code | Industry (KSIC-10) | Process | Type | N | AM_EST | GM | GSD | AM | SD | Min | Max |
|---------|------|-----------|-------------------------------------------|--------------------------------------------|----------|-----|--------|-----|-------|----|----|-----|-------|
| 13 | 2005 | 282 | Manufacture of batteries and accumulators | Grid type(total) | Personal | 129 | 34.6 | 35 | 2.25 | | | 6 | 99 |
| 13 | 2005 | 282 | Manufacture of batteries and accumulators | Grid type(casting) | Personal | 15 | 31.9 | 17 | 2.34 | | | 6 | 87 |
| 13 | 2005 | 282 | Manufacture of batteries and accumulators | Grid type (lead powder and pasting) | Personal | 34 | 38.5 | 41 | 1.99 | | | 8 | 99 |
| 13 | 2005 | 282 | Manufacture of batteries and accumulators | Grid type(assembling) | Personal | 49 | 34.6 | 31 | 2.39 | | | 6 | 99 |
| 13 | 2006 | 282 | Manufacture of batteries and accumulators | Grid type(total) | Personal | 99 | 146.8 | 27 | 2.05 | | | 6 | 1000 |
| 13 | 2006 | 282 | Manufacture of batteries and accumulators | Grid type(casting) | Personal | 11 | 20.8 | 14 | 1.84 | | | 7 | 40 |
| 13 | 2006 | 282 | Manufacture of batteries and accumulators | Grid type (lead powder and pasting) | Personal | 21 | 31.9 | 1 | 1.70 | | | 8 | 73 |
| 13 | 2006 | 282 | Manufacture of batteries and accumulators | Grid type(assembling) | Personal | 37 | 25.0 | 25 | 1.82 | | | 6 | 59 |
| 13 | 1989 | 282 | Manufacture of batteries and accumulators | Expander type(total) | Personal | 30 | 53.2 | 24 | 2.35 | | | 6 | 197 |
| 13 | 1989 | 282 | Manufacture of batteries and accumulators | Expander type(casting) | Personal | 3 | 7.2 | 7 | 1.16 | | | 6 | 8 |
| 13 | 1989 | 282 | Manufacture of batteries and accumulators | Expander type (lead powder and pasting) | Personal | 11 | 66.8 | 41 | 2.40 | | | 11 | 197 |
| 13 | 1989 | 282 | Manufacture of batteries and accumulators | Expander type(assembling) | Personal | 15 | 24.5 | 22 | 1.66 | | | 8 | 48 |
| 13 | 1990 | 282 | Manufacture of batteries and accumulators | Expander type(total) | Personal | 29 | 177.8 | 48 | 3.38 | | | 10 | 1000 |
| 13 | 1990 | 282 | Manufacture of batteries and accumulators | Expander type(casting) | Personal | 3 | 30.6 | 26 | 1.87 | | | 14 | 49 |
| 13 | 1990 | 282 | Manufacture of batteries and accumulators | Expander type (lead powder and pasting) | Personal | 7 | 33.4 | 35 | 1.88 | | | 10 | 69 |
| 13 | 1990 | 282 | Manufacture of batteries and accumulators | Expander type(assembling) | Personal | 17 | 177.8 | 64 | 4.32 | | | 10 | 1000 |
| 13 | 1991 | 282 | Manufacture of batteries and accumulators | Expander type(total) | Personal | 42 | 61.7 | 29 | 2.42 | | | 8 | 210 |
| 13 | 1991 | 282 | Manufacture of batteries and accumulators | Expander type(casting) | Personal | 26 | 61.7 | 27 | 2.35 | | | 8 | 210 |
| 13 | 1991 | 282 | Manufacture of batteries and accumulators | Expander type (lead powder and pasting) | Personal | 7 | 33.7 | 21 | 2.26 | | | 10 | 70 |
| 13 | 1991 | 282 | Manufacture of batteries and accumulators | Expander type(assembling) | Personal | 7 | 87.5 | 72 | 1.57 | | | 40 | 140 |
| 13 | 1992 | 282 | Manufacture of batteries and accumulators | Expander type(total) | Personal | 29 | 146.8 | 32 | 3.89 | | | 6 | 1000 |
| 13 | 1992 | 282 | Manufacture of batteries and accumulators | Expander type(casting) | Personal | 2 | 8.6 | 8 | 1.09 | | | 8 | 9 |
| 13 | 1992 | 282 | Manufacture of batteries and accumulators | Expander type (lead powder and pasting) | Personal | 10 | 146.8 | 22 | 4.16 | | | 6 | 1000 |
| 13 | 1992 | 282 | Manufacture of batteries and accumulators | Expander type(assembling) | Personal | 17 | 170.9 | 45 | 3.63 | | | 9 | 1000 |
| 13 | 1993 | 282 | Manufacture of batteries and accumulators | Expander type(total) | Personal | 40 | 146.8 | 19 | 3.15 | | | 6 | 1000 |
| 13 | 1993 | 282 | Manufacture of batteries and accumulators | Expander type(casting) | Personal | 8 | 9.7 | 9 | 1.29 | | | 6 | 13 |
| 13 | 1993 | 282 | Manufacture of batteries and accumulators | Expander type (lead powder and pasting) | Personal | 19 | 30.0 | 15 | 1.79 | | | 7 | 72 |
| 13 | 1993 | 282 | Manufacture of batteries and accumulators | Expander type(assembling) | Personal | 12 | 177.8 | 54 | 4.53 | | | 10 | 1000 |
| 13 | 1994 | 282 | Manufacture of batteries and accumulators | Expander type(total) | Personal | 44 | 146.8 | 46 | 5.93 | | | 6 | 1000 |
| 13 | 1994 | 282 | Manufacture of batteries and accumulators | Expander type(casting) | Personal | 6 | 146.8 | 99 | 12.79 | | | 6 | 1000 |
| 13 | 1994 | 282 | Manufacture of batteries and accumulators | Expander type (lead powder and pasting) | Personal | 18 | 146.8 | 34 | 3.91 | | | 6 | 1000 |
| 13 | 1994 | 282 | Manufacture of batteries and accumulators | Expander type(assembling) | Personal | 6 | 146.8 | 40 | 5.22 | | | 6 | 1000 |
| 13 | 1995 | 282 | Manufacture of batteries and accumulators | Expander type(total) | Personal | 499 | 282.5 | 46 | 4.52 | | | 6 | 2849 |
| 13 | 1995 | 282 | Manufacture of batteries and accumulators | Expander type(casting) | Personal | 9 | 11.7 | 10 | 1.34 | | | 7 | 16 |
| 13 | 1995 | 282 | Manufacture of batteries and accumulators | Expander type (lead powder and pasting) | Personal | 18 | 282.5 | 51 | 4.49 | | | 6 | 2849 |
| 13 | 1995 | 282 | Manufacture of batteries and accumulators | Expander type(assembling) | Personal | 17 | 135.8 | 103 | 3.21 | | | 9 | 692 |
| 13 | 1996 | 282 | Manufacture of batteries and accumulators | Expander type(total) | Personal | 62 | 696.2 | 54 | 3.98 | | | 7 | 10998 |
| 13 | 1996 | 282 | Manufacture of batteries and accumulators | Expander type(casting) | Personal | 8 | 23.6 | 15 | 2.09 | | | 7 | 49 |
| 13 | 1996 | 282 | Manufacture of batteries and accumulators | Expander type (lead powder and pasting) | Personal | 25 | 163.6 | 50 | 3.74 | | | 8 | 1000 |
| 13 | 1996 | 282 | Manufacture of batteries and accumulators | Expander type(assembling) | Personal | 25 | 173.4 | 113 | 3.33 | | | 8 | 1098 |
| 13 | 1997 | 282 | Manufacture of batteries and accumulators | Expander type(total) | Personal | 76 | 182.3 | 74 | 4.19 | | | 6 | 1414 |
| 13 | 1997 | 282 | Manufacture of batteries and accumulators | Expander type(casting) | Personal | 9 | 31.8 | 19 | 1.65 | | | 12 | 57 |
| 13 | 1997 | 282 | Manufacture of batteries and accumulators | Expander type (lead powder and pasting) | Personal | 29 | 146.8 | 40 | 3.22 | | | 6 | 1000 |
| 13 | 1997 | 282 | Manufacture of batteries and accumulators | Expander type(assembling) | Personal | 37 | 212.3 | 179 | 3.28 | | | 9 | 1414 |
| 13 | 1998 | 282 | Manufacture of batteries and accumulators | Expander type(total) | Personal | 89 | 79.8 | 51 | 2.47 | | | 7 | 344 |
| 13 | 1998 | 282 | Manufacture of batteries and accumulators | Expander type(casting) | Personal | 6 | 41.2 | 28 | 2.09 | | | 11 | 91 |
| 13 | 1998 | 282 | Manufacture of batteries and accumulators | Expander type (lead powder and pasting) | Personal | 32 | 45.3 | 42 | 2.43 | | | 7 | 139 |
| 13 | 1998 | 282 | Manufacture of batteries and accumulators | Expander type(assembling) | Personal | 48 | 97.7 | 68 | 2.30 | | | 12 | 344 |

Supplementary Table 1. Continued

| Ref No. | Year | KSIC code | Industry (KSIC-10) | Process | Type | N | AM_EST | GM | GSD | AM | SD | Min | Max |
|---------|------|-----------|-------------------------------------------|--------------------------------------------|----------|----|--------|----|------|----|----|-----|------|
| 13 | 1999 | 282 | Manufacture of batteries and accumulators | Expander type(total) | Personal | 84 | 146.8 | 46 | 2.34 | | | 6 | 1000 |
| 13 | 1999 | 282 | Manufacture of batteries and accumulators | Expander type(casting) | Personal | 6 | 26.2 | 28 | 1.50 | | | 13 | 40 |
| 13 | 1999 | 282 | Manufacture of batteries and accumulators | Expander type (lead powder and pasting) | Personal | 31 | 170.9 | 43 | 2.77 | | | 9 | 1000 |
| 13 | 1999 | 282 | Manufacture of batteries and accumulators | Expander type(assembling) | Personal | 47 | 60.8 | 52 | 2.11 | | | 6 | 244 |
| 13 | 2000 | 282 | Manufacture of batteries and accumulators | Expander type(total) | Personal | 82 | 66.2 | 44 | 2.32 | | | 9 | 219 |
| 13 | 2000 | 282 | Manufacture of batteries and accumulators | Expander type(casting) | Personal | 12 | 54.1 | 29 | 2.37 | | | 10 | 149 |
| 13 | 2000 | 282 | Manufacture of batteries and accumulators | Expander type (lead powder and pasting) | Personal | 26 | 55.1 | 36 | 1.94 | | | 11 | 145 |
| 13 | 2000 | 282 | Manufacture of batteries and accumulators | Expander type(assembling) | Personal | 44 | 66.2 | 55 | 2.41 | | | 9 | 219 |
| 13 | 2001 | 282 | Manufacture of batteries and accumulators | Expander type(total) | Personal | 63 | 60.8 | 29 | 2.06 | | | 6 | 244 |
| 13 | 2001 | 282 | Manufacture of batteries and accumulators | Expander type(casting) | Personal | 6 | 26.8 | 23 | 1.46 | | | 15 | 38 |
| 13 | 2001 | 282 | Manufacture of batteries and accumulators | Expander type (lead powder and pasting) | Personal | 17 | 41.6 | 28 | 2.09 | | | 8 | 112 |
| 13 | 2001 | 282 | Manufacture of batteries and accumulators | Expander type(assembling) | Personal | 40 | 60.8 | 30 | 2.14 | | | 6 | 244 |
| 13 | 2002 | 282 | Manufacture of batteries and accumulators | Expander type(total) | Personal | 78 | 155.6 | 29 | 2.11 | | | 7 | 1000 |
| 13 | 2002 | 282 | Manufacture of batteries and accumulators | Expander type(casting) | Personal | 8 | 221.7 | 43 | 3.68 | | | 18 | 1000 |
| 13 | 2002 | 282 | Manufacture of batteries and accumulators | Expander type (lead powder and pasting) | Personal | 23 | 38.5 | 31 | 1.98 | | | 8 | 99 |
| 13 | 2002 | 282 | Manufacture of batteries and accumulators | Expander type(assembling) | Personal | 44 | 44.5 | 25 | 1.92 | | | 7 | 135 |
| 13 | 2003 | 282 | Manufacture of batteries and accumulators | Expander type(total) | Personal | 77 | 30.3 | 24 | 1.71 | | | 6 | 80 |
| 13 | 2003 | 282 | Manufacture of batteries and accumulators | Expander type(casting) | Personal | 5 | 21.0 | 20 | 1.32 | | | 13 | 28 |
| 13 | 2003 | 282 | Manufacture of batteries and accumulators | Expander type (lead powder and pasting) | Personal | 19 | 41.6 | 29 | 1.53 | | | 14 | 80 |
| 13 | 2003 | 282 | Manufacture of batteries and accumulators | Expander type(assembling) | Personal | 53 | 28.6 | 22 | 1.79 | | | 6 | 73 |
| 13 | 2004 | 282 | Manufacture of batteries and accumulators | Expander type(total) | Personal | 59 | 146.8 | 24 | 2.02 | | | 6 | 1000 |
| 13 | 2004 | 282 | Manufacture of batteries and accumulators | Expander type(casting) | Personal | 9 | 19.1 | 16 | 1.48 | | | 9 | 30 |
| 13 | 2004 | 282 | Manufacture of batteries and accumulators | Expander type (lead powder and pasting) | Personal | 24 | 146.8 | 26 | 2.56 | | | 6 | 1000 |
| 13 | 2004 | 282 | Manufacture of batteries and accumulators | Expander type(assembling) | Personal | 20 | 27.0 | 28 | 1.56 | | | 10 | 49 |
| 13 | 2005 | 282 | Manufacture of batteries and accumulators | Expander type(total) | Personal | 64 | 65.1 | 32 | 1.95 | | | 6 | 272 |
| 13 | 2005 | 282 | Manufacture of batteries and accumulators | Expander type(casting) | Personal | 4 | 22.8 | 21 | 1.46 | | | 13 | 32 |
| 13 | 2005 | 282 | Manufacture of batteries and accumulators | Expander type (lead powder and pasting) | Personal | 20 | 27.4 | 29 | 1.72 | | | 7 | 62 |
| 13 | 2005 | 282 | Manufacture of batteries and accumulators | Expander type(assembling) | Personal | 40 | 66.6 | 36 | 2.07 | | | 6 | 282 |
| 13 | 2006 | 282 | Manufacture of batteries and accumulators | Expander type(total) | Personal | 40 | 34.8 | 21 | 2.38 | | | 6 | 100 |
| 13 | 2006 | 282 | Manufacture of batteries and accumulators | Expander type(casting) | Personal | 3 | 246.9 | 93 | 7.85 | | | 24 | 1000 |
| 13 | 2006 | 282 | Manufacture of batteries and accumulators | Expander type (lead powder and pasting) | Personal | 13 | 25.1 | 20 | 2.02 | | | 7 | 54 |
| 13 | 2006 | 282 | Manufacture of batteries and accumulators | Expander type(assembling) | Personal | 24 | 24.0 | 18 | 1.79 | | | 6 | 55 |
| 14 | 1987 | 282 | Manufacture of batteries and accumulators | Lead battery manufacturing | Personal | 2 | 308.0 | | | | | 232 | 365 |
| 14 | 1988 | 282 | Manufacture of batteries and accumulators | Lead battery manufacturing | Personal | 7 | 149.5 | | | | | 81 | 216 |

KSIC-10: Korea Standard Industrial Classification 10th revision, N: number of samples, AM_EST: estimated arithmetic mean, GM: geometric mean, GSD: geometric standard deviation, AM: arithmetic mean, SD: standard deviation, Min: minimum, Max: maximum

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