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The Aluminum Association

December 28, 2018

Office of Pollution Prevention and Toxics
Mail Code 7401M
ATTN: TSCA Chemical Data Reporting – Partial Exemption Request
U.S. Environmental Protection Agency
1200 Pennsylvania Ave., NW
Washington, DC 20460

RE: Partial Exemption Request for Elemental Aluminum (CASRN 7429-90-5)

Dear Sir or Madam,

The Aluminum Association (the "Association") is submitting this request under the provisions of 40 CFR 711.6(b)(2)(iii)(A) regarding petitions to amend the list of materials partially exempt from Toxic Substances Control Act (TSCA) Chemical Data Reporting (CDR) requirements due to low current interest. We are submitting this request to partially exempt aluminum as a low current interest chemical as we believe that aluminum meets the criteria for the low current interest chemical exemption as outlined in the attached petition package.

Previous Petition

The Association originally submitted a request to EPA to partially exempt aluminum from TSCA Inventory Update Rule (IUR) requirements on December 30, 2003. On January 25, 2011, the Association received a response from EPA denying the request. Copies of those correspondences are provided as attachments for reference.

In the January 25, 2011 denial, EPA indicated its reason for denying the petition for partial exemption of aluminum as follows-

> *EPA is denying your petition to delist aluminum (CASRN 7429-90-5) because the 2011 IUR will mark the first time that processing and use information has been reported. EPA is interested in reviewing the processing and use information for this chemical.*

Following EPA's denial, 2011 IUR (now CDR) reporting was conducted and EPA released the results of that reporting in May 2014. In addition, reporting for the 2015 CDR closed on October 31, 2016 and data from the 2015 CDR was released in May 2017. During both reporting periods information for aluminum was submitted. As such, we believe that the concern raised in the 2011 denial letter has been resolved.

Scope of Partial Exemption Request

Aluminum (CASRN 7429-90-5) is the elemental, metallic form of aluminum and does not represent various aluminum compounds, salts, and other combinations of non-elemental aluminum with other materials. As such, the scope of this partial exclusion request is limited to elemental, metallic aluminum and aluminum alloys, which is the form of aluminum that is commonly used in a variety of packaging (beverage cans, foils), transportation (doors, hoods, trunks, engines, wheels), and building/construction (fascia, curtain wall, cladding) applications.

In addition, the manufacture, importation, processing and use of elemental aluminum (aluminum metal) in the US is already well documented and from a review conducted by the Association the most detailed source of information in this area is the Association's annual *Aluminum Statistical Review (ASR)* which contains extensive information on the production, imports, exports, fabrication steps, markets, and ultimate commercial and consumer uses for the metal. The 2016 ASR is attached for your reference and the Association believes that it presents a much more accurate and in-depth picture of the processing and use of aluminum in the US than that provided by the CDR.

Also, as EPA is aware, under TSCA, 'importation' of a chemical is considered 'manufacturing.' Thus imported chemicals are regulated in the same manner as manufactured chemicals. This extends to CDR reporting obligations. This presents a particular challenge related to aluminum in that much of the aluminum that is imported into the US (primarily from Canada) has already been alloyed with small amounts of other metals to impart specific physical properties to the metal. These alloying agents are other metals that are co-melted with aluminum to produce aluminum alloys that then contain small percentages of alloying metals such as iron, silicon, chromium, copper, manganese, magnesium, titanium, and zinc. Because aluminum alloys are imported in very large quantities, these alloying metals may surpass CDR reporting thresholds when imported as part of alloyed aluminum. Importantly, once alloyed, these metals are not separated back out from the aluminum alloy and significant information already exists regarding their processing and use as part of aluminum alloys. As such, we request that the partial exemption be granted for aluminum and for imported aluminum alloys (to include the aluminum component and other metals making up the alloy).

Issues with Information Reported under CDR

It is noted that the 2011 and 2015 CDR data releases include inaccurate information regarding aluminum, reflecting that reporting entities are sometimes reporting aluminum when an aluminum compound should be reported instead. These inaccuracies make it difficult/impossible to draw sound conclusions from the aluminum-related CDR data.

As stated above, aluminum (CASRN 7429-90-5) is the elemental, zero valence state form of the metal only and does not represent various aluminum compounds. It appears that some entities reported "aluminum" when an aluminum compound should have been reported instead. For example, the 2014 data release of the 2011 CDR data (EPA Publication 740K13003) indicates

that aluminum is commonly utilized in water treatment products. Based on information available to the Association, this is incorrect. Aluminum is a material that is solid at room temperature and is not soluble. Aluminum compounds, on the other hand, may be used in water treatment products. For example, aluminum sulfate (known commonly as "alum") is used in water treatment products. However, aluminum sulfate is reportable with a different CASRN (10043-01-3). Aluminum sulfate and other aluminum compounds would still be subject to reporting even if the partial exemption for elemental aluminum (CASRN 7429-90-5) is granted.

The 2011 CDR data release also indicated that aluminum is the #2 chemical used in children's products. We believe this is also likely to be in error and another example of how it is difficult/impossible to draw sound conclusions regarding aluminum from the CDR data. Aluminum is used in some products that are marketed to children, such as juice box packaging and aluminum baseball bats, but the vast majority of products containing aluminum (e.g., aluminum cans, ladders, wheels) are not specifically intended or marketed for use by children age 14 or younger. EPA's instructions for the 2011 IUR (CDR) include the following instructions regarding reporting of chemicals "intended for use by children":

> *EPA defines "intended for use by children" to mean the chemical substance or mixture is used in or on a product that is specifically intended for use by children age 14 or younger (40 CFR 711.3). Your chemical substance or mixture is intended for use by children if you answer "yes" to at least one of the following questions about the product into which your chemical substance or mixture is incorporated:*
> • *Is the product commonly recognized (i.e., by a reasonable person) as being intended for use by children age 14 or younger?*
> • *Does the manufacturer of the product state through product labeling or other written materials that the product is intended or will be used by children age 14 or younger?*
> • *Is the advertising, promotion, or marketing of the product aimed at children age 14 or younger?*

These examples illustrate how requiring continued reporting for aluminum and imported aluminum alloys can result in inaccurate information and misleading conclusions.

Issues with CDR Reporting

For each chemical being reported under CDR, entities are required to select an Industrial Function Category (IFC) code to describe the industrial function of the chemical being reported. A list of IFC codes is provided in EPA's TSCA CDR reporting instructions and in the eCDR application. The list includes codes such as U001 Abrasives and U011 Flame retardants. As has been noted in previous comments filed by the Association regarding TSCA CDR reporting, the IFC codes provided in the TSCA CDR reporting instructions and software are not well suited to materials like aluminum. Aluminum is generally used as a structural component of an object, such as a wheel, can or airplane wing. The IFC codes included in the CDR instructions are for chemical applications of materials. As such, our member companies often select the "U999 Other" IFC code and add an associated description of the use, such as "structural component of an alloy." We believe that the fact that the IFC code list does not include appropriate choices for materials like aluminum is further evidence that the CDR program is not designed for

materials like aluminum which have very consistent and well known uses. We believe that reporting that aluminum as "U999 Other: structural component of an alloy" is not useful. The general public is well aware that aluminum is used in alloys and that aluminum is used for packaging, transportation and construction applications.

Conclusion

For the above reasons, the Association requests that the EPA reconsider our request to partially exempt aluminum and imported aluminum alloys from the processing and use provisions of the TSCA CDR reporting rule and subsequently add aluminum and aluminum alloys to the list of substances considered to be of 'low current interest' in 40 CFR 711.6(b)(2)(iv) and therefore not subject to the information reporting provisions of 40 CFR 711.15(b)(4).

The Association looks forward to hearing from EPA regarding its determination in this matter and would be happy to provide further information and/or answer any questions regarding this submittal as needed. For this purpose, I can be reached at (703) 358-2976 or cwells@aluminum.org.

Sincerely,

Curt Wells

Curt Wells
Senior Director, Regulatory Affairs
The Aluminum Association

Attachments

- 12/30/03 Partial Exemption Request Letter
- 01/25/11 Denial of Partial Exemption Request Letter
- 2016 Aluminum Statistical Review (ASR)

The Aluminum Association
Incorporated
900 19th Street, N.W., Washington, D.C. 20006

December 30, 2003

OPPT Document Control Officer (DCO)
Mailcode 7407M
ATTN: Inventory Update Rule
Office of Pollution Prevention and Toxics
U.S. Environmental Protection Agency
1200 Pennsylvania Ave., NW
Washington, DC 20460

Re: Petition for Exemption Status for Aluminum (CAS Number 7429-90-5)

Dear Sir or Madam:

The Aluminum Association, Inc. requests the U.S. Environmental Protection Agency (EPA) to exempt aluminum (CAS Number 7429-90-5) from the processing and use reporting requirements in the Toxic Substances Control Act (TSCA) Inventory Update Rule Amendments (IURA), codified at 40 C.F.R. Section 710.52(c)(4)).

In the January 7, 2003, final rule promulgating the IURA, EPA announced that it was exempting certain chemical substances from reporting processing and use information otherwise required under the IURA. In that rulemaking, EPA also noted that its process "allows anyone to submit a written request for EPA to consider revising the list of chemicals substances covered by this partial exemption." This petition is submitted in response to EPA's invitation, and requests that EPA exempt aluminum from the processing and use reporting requirements under Section 710.52(c)(4).

According to EPA's August 27, 2002, *Methodology Used for the Initial Selection of Chemicals Inventory Update Rule Amendments (IURA) "Low Current Interest" Partial Reporting Exemption,* EPA looks to the specific circumstances surrounding a chemical substance and considers six criteria in reviewing a request for a partial reporting exemption. These six considerations are: whether the chemical qualifies or has qualified in past IUR collections for reporting on Process and Use information; the chemical substance's chemical and physical properties; the information needs of EPA, other federal agencies, and related entities, including the public; the availability of other complementary risk screening information; the availability of comparable processing and use information; and whether the potential risks of the chemical substance are adequately managed by EPA or other agency or authority. As explained below, aluminum satisfies these criteria and should be partially exempt from IUR reporting requirements.

Before proceeding, the information presented below is preliminary and is intended to satisfy the regulatory requirement that petitions for partial reporting exemptions in the 2006 reporting cycle must be submitted to EPA by January 4, 2004. EPA has not yet clearly specified the type of information it would find useful for purposes of reviewing such petitions beyond what is noted above. Accordingly, The Aluminum Association will supplement this

petition, as appropriate, as more information becomes available from EPA in this regard, and expressly reserves the right to do so.

Aluminum Qualifies for Reporting on Process and Use Information

Based on information and belief, aluminum qualifies for reporting on process and use information under the IURA because at least one site manufactures or imports 300,000 pounds or more or aluminum.

Aluminum's Chemical and Physical Properties and Its Potential for Persistence, Bioaccumulation, Health Effects, or Environmental Effects Demonstrate That It Is a Low Hazard Chemical and Should Be Considered of Low Current Interest for IUR Purposes

Aluminum is found naturally in the environment, is widely distributed, and constitutes approximately eight percent of the earth's surface.[1] Aluminum also occurs naturally

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[1] Agency for Toxic Substances and Disease Registry (ATSDR), *Toxicological Profile for Aluminum* (July 1999) (Toxicological Profile) at 1, available at http://www.atsdr.cdc.gov/toxprofiles/tp22.pdf; *see also* The Aluminum Association, *Aluminum and Health: A Review of the Issues, the Efforts and the Knowledge* (Aluminum and Health) (Sept. 2003).

in many foods.[2] ATSDR determined that, because of aluminum's prominence as a major constituent of the earth's crust, natural weathering processes far exceed the contribution of releases to air, water, and land associated with human activities.[3] ATSDR also concluded: "Aluminum is not bioaccumulated to a significant extent."[4]

Aluminum Is Well Studied and There Are No Information Needs

In recent years, aluminum as been reviewed by several federal and international regulatory agencies, including ATSDR,[5] Environment Canada and Health Canada,[6] and IPCS,[7] which is a joint venture of the United Nations Environment Programme, the International Labour

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2 Toxicological Profile at 5; Aluminum and Health at 4; International Programme on Chemical Safety (IPCS), *Environmental Health Criteria 194: Aluminum* (1997) (Aluminum Criteria Document) at Section 5.3.2, available at http://www.inchem.org/documents/ehc/ehc/ehc194.htm.

3 Toxicological Profile at 183; Aluminum Criteria Document at Section 1.3.

4 Toxicological Profile at 183.

5 Toxicological Profile.

6 Environment Canada and Health Canada, *Priority Substances List: State of the Science Report for Aluminum Chloride, Aluminum Nitrate and Aluminum Sulfate* (Dec. 2002) (State of the Science Report).

7 Aluminum Criteria Document.

Organization, and the World Health Organization. IPCS stated that "aluminium has not been demonstrated to pose a health risk to healthy, non-occupationally exposed humans."[8] Although some studies have demonstrated a very tenuous link between aluminum exposures and Alzheimer's disease (AD), IPCS concluded:

> There is no evidence to support a primary causative role of aluminium in Alzheimer's disease (AD). Aluminium does not induce AD pathology *in vivo* in any species, including humans.
>
> The hypothesis that exposure of the elderly population in some regions to high levels of aluminium in drinking-water may exacerbate or accelerate AD is not supported by available data.[9]

Complementary Risk Screening Information Is Available for Aluminum

The State of the Science Report prepared by Environment Canada and Health Canada includes a risk characterization for aluminum salts and the environment upon which life

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8 Aluminum Criteria Document at Section 1.10.1.

9 Aluminum Criteria Document at Section 11.1.1.

depends, and states: "Based on available information on releases and their physical and chemical properties, aluminum chloride, aluminum nitrate and aluminum sulfate do not deplete stratospheric ozone, contribute to the formation of ozone in the troposphere or influence climate change."[10]

Comparable Processing and Use Information Already Exists on Aluminum

The U.S. Geological Survey (USGS) provides the following information regarding domestic production and use of aluminum:

> In 2002, 11 companies operated 16 primary aluminum reduction plants; 6 smelters were temporarily idled. The 11 smelters east of the Mississippi River accounted for 75% of the production; whereas the remaining 11 smelters, which included the 9 Pacific Northwest smelters, accounted for only 25%. Based upon published market prices, the value of primary metal production

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10 State of the Science Report at 47. The State of the Science Report states that since it is the dissolved aluminum species formed when aluminum compounds dissociate, and not the compounds themselves, that are bioavailable and can adversely affect organisms, "the environmental part of this report examines risks associated with exposures to dissolved forms of aluminum associated with the use of these aluminum salts." *Id.* at 3.

was $3.9 billion in 2002. Aluminum consumption was centered in the East Central United States. Transportation accounted for an estimated 34% of domestic consumption in 2002; packaging, 25%; building, 17%; consumer durables, 7%; electrical, 7%; and other, 10%.[11]

Risks, If Any, From Aluminum Are Adequately Managed by EPA and Other Authorities

Aluminum is already and adequately regulated by EPA, the Occupational Safety and Health Administration (OSHA), and FDA. EPA has recommended a Secondary Maximum Contaminant Level (SMCL) of 0.05 to 0.2 milligrams per liter (mg/L) for aluminum in drinking water.[12] EPA regulates aluminum and certain aluminum compounds under the Clean Air Act (CAA). They are not, however, designated as hazardous air pollutants (HAP).[13] OSHA has established a permissible exposure limit (PEL) for aluminum dust of 15 milligrams per cubic

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11 USGS, *Mineral Commodity Summaries: Aluminum* (Jan. 2003) at 1, available at http://minerals.usgs.gov/minerals/pubs/commodity/aluminum/050303.pdf.

12 EPA, "Secondary Drinking Water Regulations: Guidance for Nuisance Chemicals," available at http://www.epa.gov/safewater/consumer/2ndstandards.html (last updated Sept. 20, 2002).

13 Toxicological Profile at 253; EPA, "Original List of Hazardous Air Pollutants," available at http://www.epa.gov/ttn/atw/orig189.html (last updated Aug. 7, 2003).

meter (mg/m^3) of air.[14] FDA has determined that aluminum cooking utensils, aluminum foil, antiperspirants, antacids, and other aluminum products are generally safe,[15] and has designated a number of aluminum compounds used in foods, drugs, and toiletries as generally recognized as safe (GRAS).[16]

For the reasons noted above, The Aluminum Association urges EPA to exempt aluminum from the processing and use reporting requirements in the TSCA IURA.

If you have any questions regarding this request, please call me at (202) 862-5132 or email me at bstriete@aluminum.org. Your consideration is appreciated.

Sincerely,

Robert P. Strieter
Vice President, Environment, Health & Safety

cc: Mark Mazanec, Baker & Hostetler

---

14 29 C.F.R. § 1910.1000, Table Z-1.

15 Toxicological Profile at 9.

16 See 21 C.F.R. §§ 182.1125, 182.1127, 182.1129, 182.1131, and 182.2122.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JAN 25 2011

OFFICE OF CHEMICAL SAFETY
AND POLLUTION PREVENTION

Mr. Robert P. Strieter
Vice President, Environment, Health & Safety
The Aluminum Association Inc.
1525 Wilson Blvd
Suite 600
Arlington, VA 22209

Re: Petitions for Partial Exemption from Inventory Update Reporting Requirements

Dear Mr. Strieter:

Thank you for the reminder, included in your comments on the IUR Modifications proposed rule, of this office's commitment to revisit IUR petitions for partial exemptions on which the Agency deferred action until after the 2006 IUR. We are considering your other comments on the proposed rule, and will respond to them as part of the regulatory process.

EPA has re-evaluated your petitions requesting that aluminum (CASRN 1344-28-1) and aluminum oxide (CASRN 1344-28-1) be exempted from the reporting of processing and use information under the Inventory Update Reporting (IUR) rule (See 40 CFR 710.46(b)(2)(iv)). For the reasons explained below, EPA is denying your petition for both aluminum and aluminum oxide.

In the 2006 letter, the Agency indicated that the manufacturers of chemicals listed at 40 CFR 710.46(b) are exempt from reporting the processing and use information required by 40 CFR 710.52(c)(4). Chemical substances are included on this list only if EPA has determined that there is low current interest in the processing and use information for that substance. As you are aware, in 2006 reporting for inorganic chemicals was limited to manufacturing information only. The 2011 IUR will mark the first time that processing and use information for inorganic chemicals, like aluminum and aluminum oxide, are reported.

EPA is denying your petition to exempt aluminum oxide (CASRN 1344-28-1). Aluminum oxide is one of the chemicals to be the subject of a proposed Section 4(a) test rule. The proposed test rule will require manufacturers (including importers) and processors of certain nanoscale materials, including aluminum oxide, to conduct testing for health effects, ecological

effects, and environmental fate as well as to provide material characterization data. The Agency, therefore, has a current interest in the IUR processing and use information for this chemical.

EPA is denying your petition to exempt aluminum (CASRN 1344-28-1) because the 2011 IUR will mark the first time that processing and use information will be reported. EPA is interested in reviewing the processing and use information for this chemical.

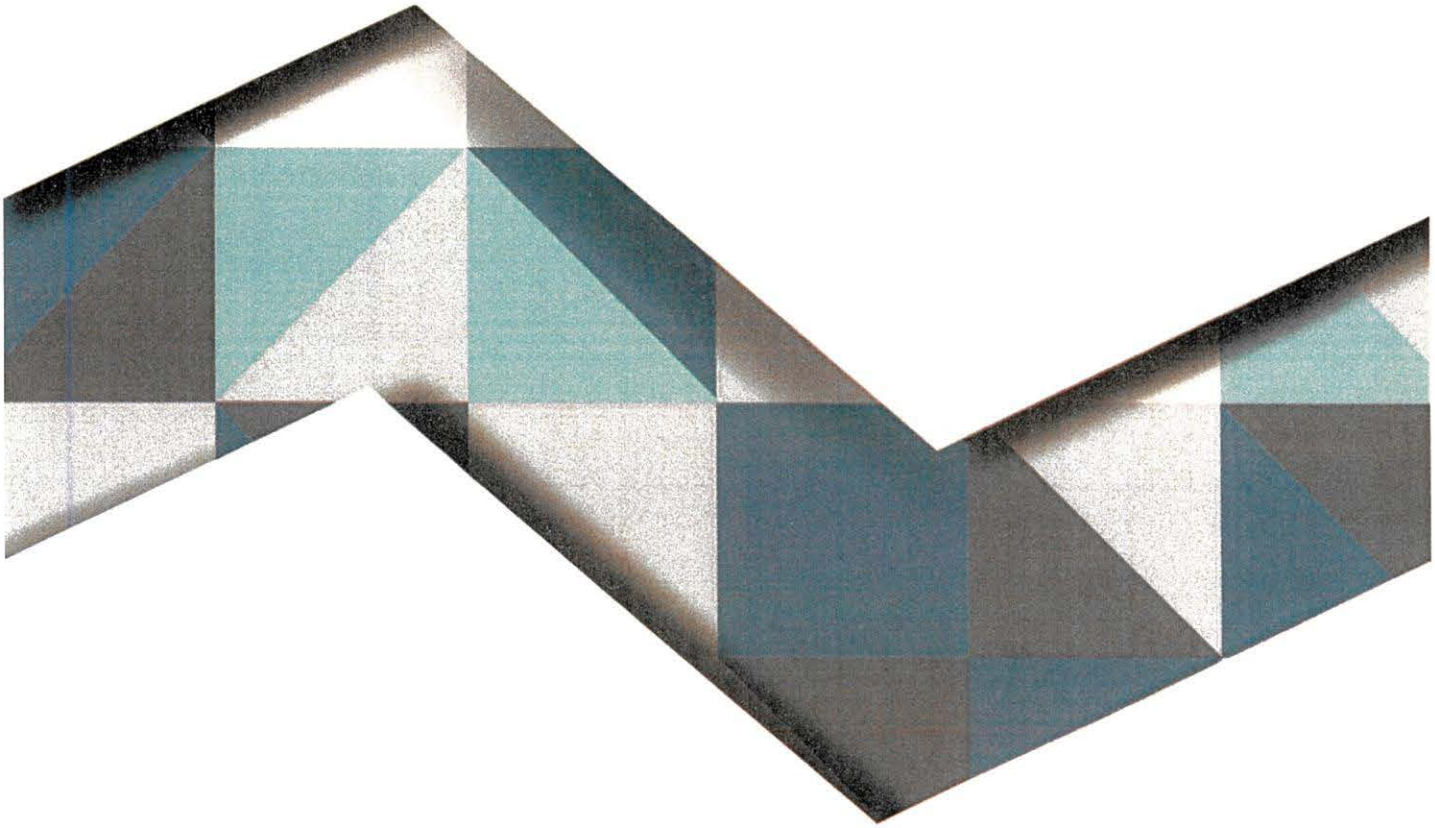
Information concerning your petitions can be found in EPA's docket number EPA-HQ-OPPT-2004-0049 and EPA-HQ-OPPT-2004-0050. Please contact Karen Hoffman at 202-564-8158 or hoffman.karen@epa.gov with any questions.

Sincerely,

Wendy Cleland-Hamnett, Director
Office of Pollution Prevention and Toxics

Enclosures:
Docket number EPA-HQ-OPPT-2004-0049
Docket number EPA-HQ-OPPT-2004-0050

2016
ALUMINUM
STATISTICAL REVIEW



The Aluminum Association

Contents

The Aluminum Association does not warrant the accuracy or completeness of any data in this review. All data contained herein are subject to revision.

The Aluminum Statistical Review is an annual publication of:
The Aluminum Association
1400 Crystal Drive, Suite 430
Arlington, VA 22202 USA
Main: 1 (703) 358-2960

Business Information & Statistics
Direct: 1 (703) 358-2984/2985
Email: statistics@aluminum.org

The Aluminum Association, based in Arlington, Virginia, promotes the production and use of aluminum as the sustainable material of choice.

The Association represents U.S. and foreign-based primary producers of aluminum, aluminum recyclers and producers of semi-fabricated products, as well as industry suppliers and distributors.

Introduction

The Aluminum Association is the only source for basic statistics on the North American aluminum industry. Statistical programs provide industry information on a variety of important topics including primary aluminum, mill products, new orders and shipments, shipments of ingot for castings, end use market estimates, inventories, recycling and secondary recovery and foreign trade.

Surveys and Publications

The Association conducts industry surveys covering U.S. and Canada on behalf of the product divisions and marketing committees with management reports published monthly, quarterly and annually. These reports typically include statistics based on aggregate survey data plus estimated expanded industry totals. Information derived from industry surveys also forms the basis for statistics published in the Association's industry factbook, the *Aluminum Statistical Review*. The Association also produces special custom reports on a for-fee basis as well as handles external and internal inquiries on basic aluminum industry matters from Association members, their customers, government agencies and others.

About the Review

The Aluminum Association's *Aluminum Statistical Review for 2016* assembles in one place the most important statistical data available on the North America aluminum industry. It includes information on every cycle of the aluminum production process from primary aluminum to markets for finished goods to the recovery of aluminum scrap.

The Review is divided into five major sections: supply, shipments, markets, foreign trade, and world statistics. Each section is preceded by an introduction and links to accompanying tables in MS Excel spreadsheets for ease of access.

Acknowledgments

The data for this Review were developed by the Statistical and Market Research Committee of The Aluminum Association, Inc. along with the cooperation of the following organizations: *Aluminum Association of Canada; Aluminum Extruders Council; Can Manufacturers Institute; European Aluminium; Institute of Scrap Recycling Industries; Instituto del Aluminio (Mexico); Bureau of the Census, U.S. Department of Commerce; U.S. Geological Survey, U.S. Department of Interior; Statistics Canada; and Natural Resources Canada.*

Aluminum Association staff members Ryan Olsen and Hank Sattlethight prepared the Review for publication.

Global Economic Review

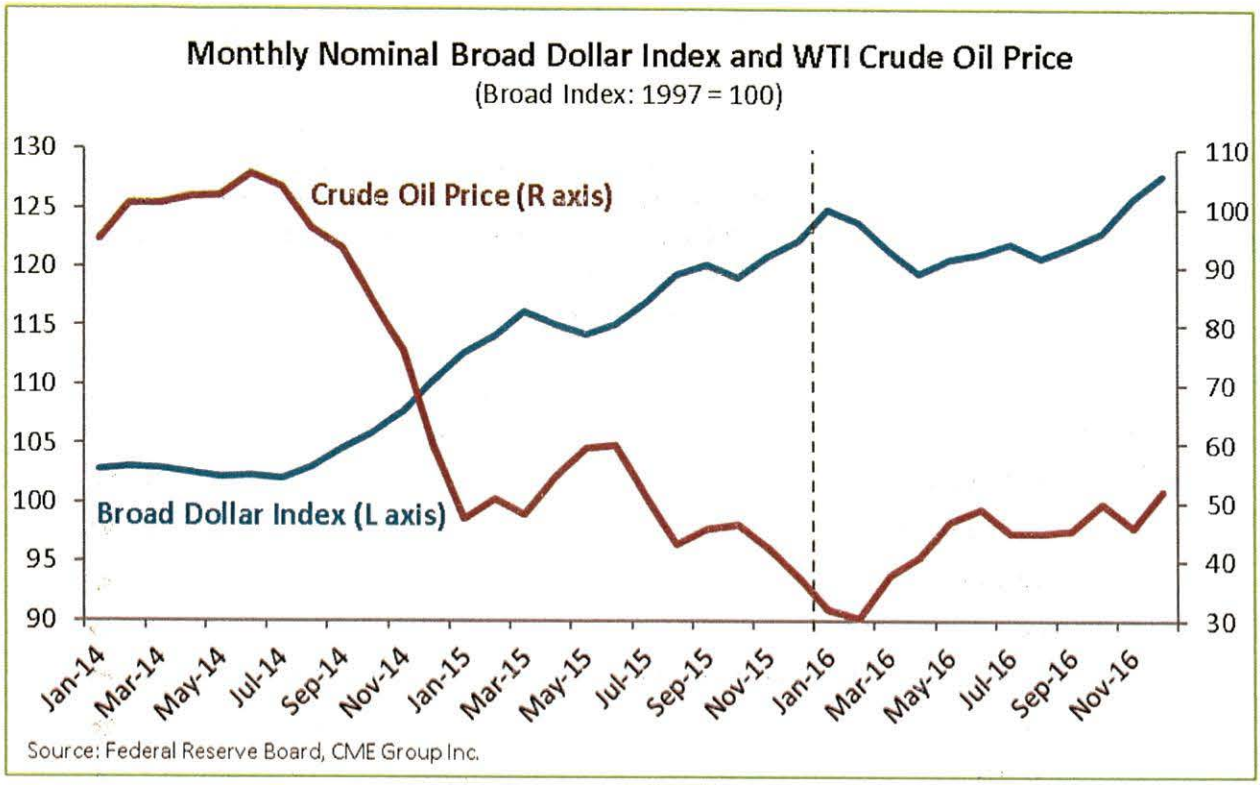
Stagnant global trade, subdued investment, and heightened policy uncertainty marked another difficult year for the world economy in 2016. According to the World Bank, real GDP was estimated to have slowed in 2016 to 2.4 percent, down from 2.7 percent in 2015 (below).[1] Lackluster growth in "advanced economies," including a deceleration in the United States, was accompanied by a further weakening of global trade, which reached a post-recession low of 2.5 percent last year. As a result, growth in "advanced economies" was estimated to have slowed to 1.7 percent in 2016, down from 2.1 percent a year ago. Growth in "emerging and developing economies" reached 3.5 percent in 2016, slightly below the previous year. Among these economies, a rise in the domestic demand of commodity importers accounted for almost the totality of the growth experienced during the year.

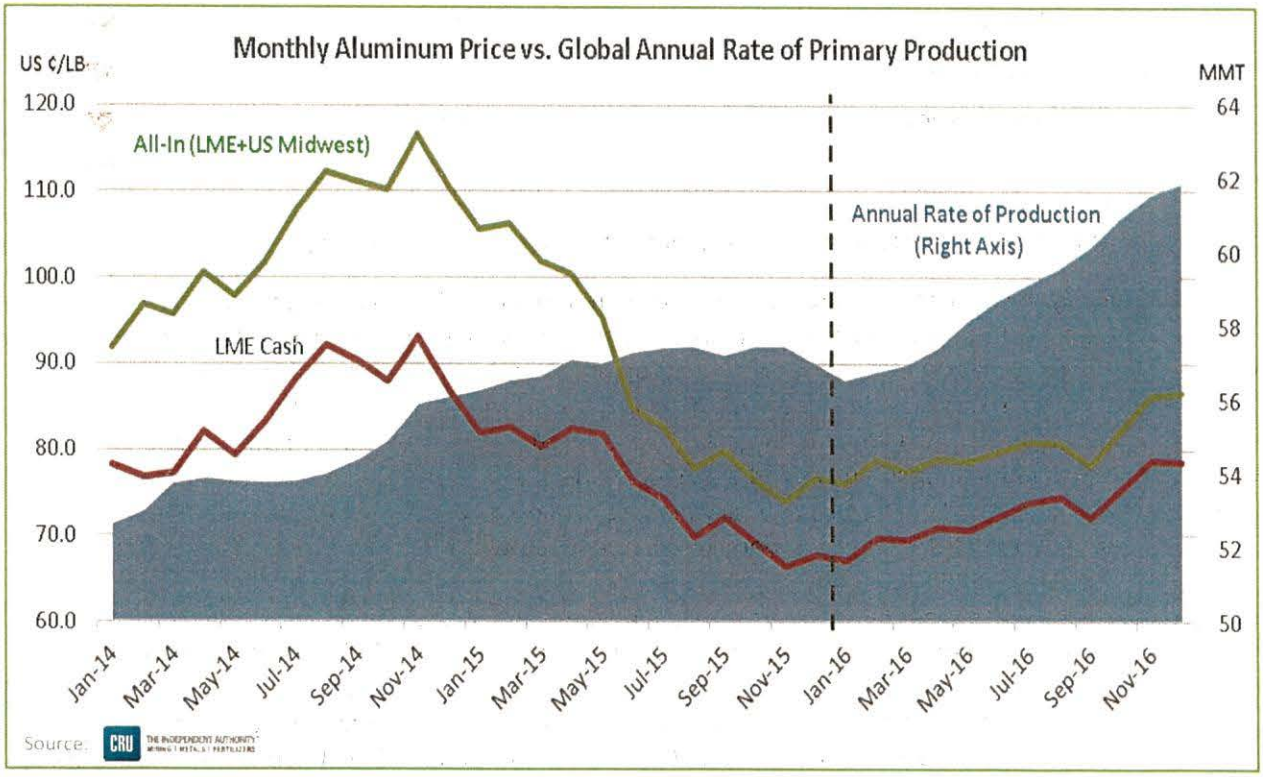
Real GDP* *(percent change from previous year)*	2014	2015	2016e	
World	**2.8**	**2.7**	**2.4**	▼
Advanced Economies	**1.9**	**2.1**	**1.7**	▼
United States	2.4	2.6	1.6	▼
Euro Area	1.2	2.0	1.8	▼
Japan	0.3	1.1	1.0	▼
Select Emerging/Developing Economies	**4.3**	**3.6**	**3.5**	▼
China	7.3	6.9	6.7	▼
Russia	0.7	-2.8	-0.2	▲
Brazil	0.5	-3.8	-3.6	▲
Mexico	2.3	2.6	2.3	▼
Saudi Arabia	3.7	4.1	1.4	▼
South Africa	1.6	1.3	0.3	▼
India	7.2	7.9	6.8	▼

Source: World Bank.
*Aggregate growth rates calculated using constant 2010 U.S. dollars GDP weights.

In the face of a slowing global economy, a further appreciation of the U.S. dollar versus the currencies of other major U.S. trading partners did little to help domestic manufacturers. The average "Nominal Broad Dollar Index" rate in 2016 increased 4.7 percent over the average 2015 rate (Top next page).[2] A stronger dollar can push up the price of domestically produced aluminum in export markets, making it less attractive to foreign buyers. It can also jeopardize the sales of domestically produced aluminum by giving foreign producers a competitive edge in pricing. Conversely, the global price for aluminum is highly correlated with global price for oil. Crude prices increased more than 20 cents over the course of the year, lending support to a rally in the global price for aluminum. Nevertheless, on average over the course of 2016, oil prices were 11.4 percent below the 2015 level.[3]

Finally, in addition to general economic conditions weighing on the industry, an increase in global primary aluminum production in 2016 also placed downward pressure on the price for aluminum. Global production increased 1.4 percent year-over-year, to over 59.0 million metric tons, with the annual rate of production in December roughly 9.4 percent higher than at the start of the year. A combination of the previously mentioned factors resulted in an average all-in price (LME Cash + Regional Premium) that was 9.1 percent lower than it had been the year prior (Bottom next page).[4] The average price in 2016 was 80.5 ¢/LB, just slightly higher than the depths reached in 2009.


Monthly Nominal Broad Dollar Index and WTI Crude Oil Price
(Broad Index: 1997 = 100)
Crude Oil Price (R axis)
Broad Dollar Index (L axis)
130
125
120
115
110
105
100
95
90
110
100
90
80
70
60
50
40
30
Jan-14
Mar-14
May-14
Jul-14
Sep-14
Nov-14
Jan-15
Mar-15
May-15
Jul-15
Sep-15
Nov-15
Jan-16
Mar-16
May-16
Jul-16
Sep-16
Nov-16
Source: Federal Reserve Board, CME Group Inc.


Monthly Aluminum Price vs. Global Annual Rate of Primary Production
US ¢/LB
MMT
120.0
110.0
100.0
90.0
80.0
70.0
60.0
64
62
60
58
56
54
52
50
All-In (LME+US Midwest)
LME Cash
Annual Rate of Production
(Right Axis)
Jan-14
Mar-14
May-14
Jul-14
Sep-14
Nov-14
Jan-15
Mar-15
May-15
Jul-15
Sep-15
Nov-15
Jan-16
Mar-16
May-16
Jul-16
Sep-16
Nov-16
Source:
CRU

Overview – North American Aluminum Supply & Demand

North American demand for aluminum (producer net shipments[5] plus imports) grew for the seventh consecutive year in 2016, reaching an estimated 26,428 million pounds. The 2016 total represented an increase of 2.6 percent over the 2015 total of 25,754 million pounds, and a 41.0 percent increase since the depths of the Global Financial Crises in 2009.

In order to meet that growing demand, domestic U.S. and Canadian producers produced roughly 18,716 million pounds of primary and secondary aluminum in 2016. Primary production, representing approximately 33.6 percent of the total North American aluminum supply, totaled 8,879 million pounds (chart below accounts for additives and melt loss), decreasing 9.8 percent from the 2015 total of 9,847 million pounds. Conversely, the recovery[6] of aluminum from scrap increased 8.4 percent to an estimated 9,837 million pounds, accounting for approximately 37.2 percent of the total North American aluminum supply.

The remaining aluminum needed to satisfy North American demand in 2016 (7,624 million pounds) was met by a combination of imports and the drawing down of inventories. Imports[7] (excluding cross-border trade) of ingot and mill products increased 32.5 percent over 2015 to an estimated 7,266 million pounds, a record level. Finally, an additional 358 million pounds of aluminum made its way into North America from a net reduction in producer inventories and LME warehouse stocks (inventory changes have an inverse relationship with supply). This was 71.4 percent less than the 1,253 million pounds that came out of these inventories and entered the market in 2015.

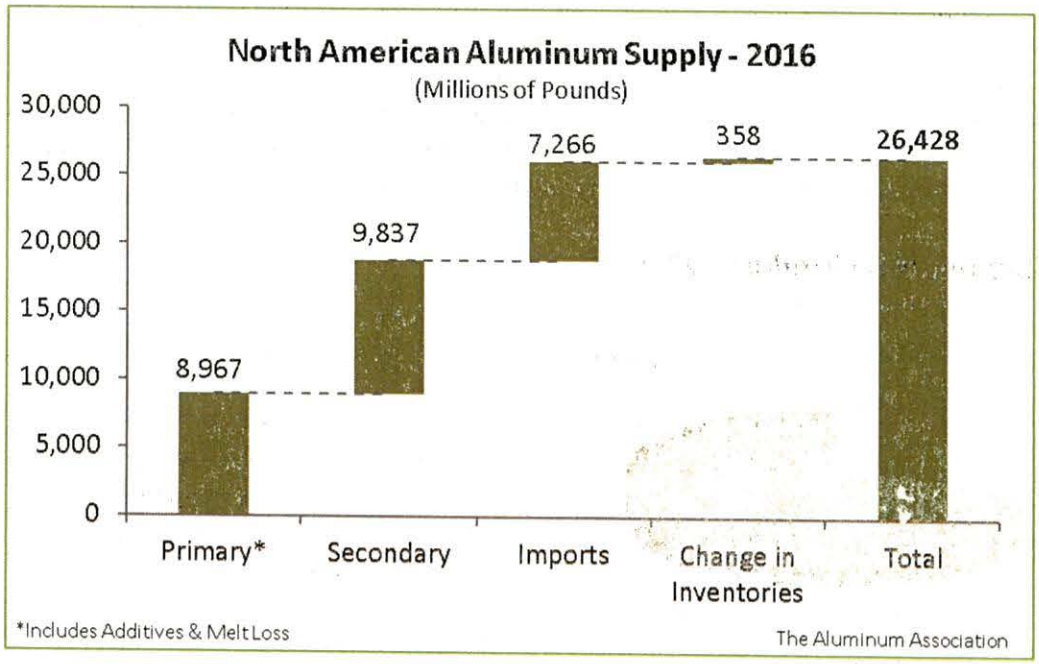
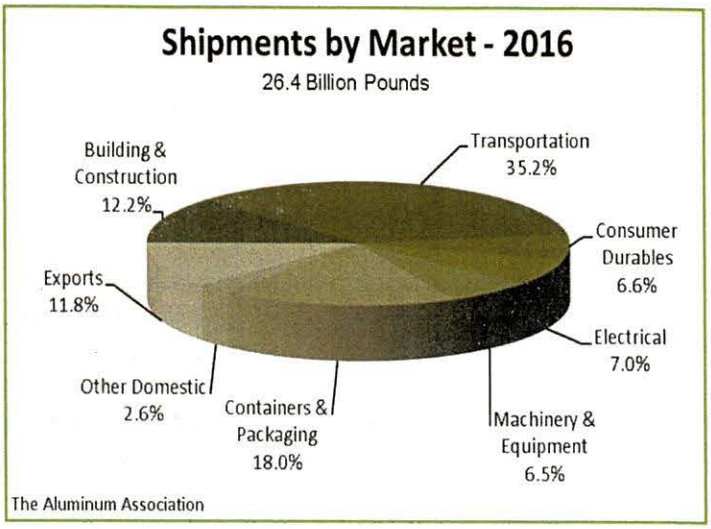


Table 1: Aluminum Supply and Demand 2016

Of the 26,428 million pounds of aluminum demanded in North America in 2016, an estimated 23,311 million pounds were shipped to U.S. and Canadian domestic markets, an increase of 1.9 percent over the revised 2015 total of 22,869 million pounds. Despite ongoing global economic headwinds in 2016, the market for exports[7] of aluminum ingot and semi-fabricated products increased 8.0 percent over the previous year to 3,117 million pounds.

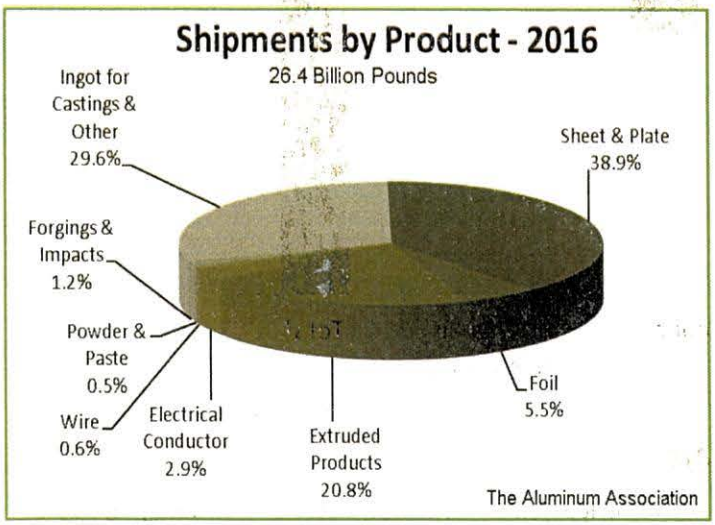
Growth in the U.S. and Canadian domestic markets in 2016 was primarily driven by increases in the transportation, building and construction, and containers and packaging markets. In the North American transportation sector, the increased use of aluminum related to ongoing light-weighting strategies and another year of growth in light vehicle production, more than offset declines in the truck and trailer segments following the recent replenishment cycle.

Aluminum shipments to North American transportation markets totaled 9,311 million pounds (35.2 percent of total net shipments), an increase of 1.0 percent over the 2015 total of 9,217 million pounds. Shipments to automotive and light vehicle OEM and aftermarkets totaled 5,914 million pounds, up 3.2 percent year-over-year. Meanwhile, heavy trucks and buses and trailers and semitrailers declined 9.6 percent and 7.9 percent in 2016, respectively.



Shipments to the containers and packaging sector increased 1.0 percent over 2015 to a total of 4,758 million pounds or 18.0 percent of total North American shipments. Aluminum used in the production of metal cans, the largest subsector within containers and packaging at 78.6 percent, grew three-tenths of one percent to 3,741 million pounds. Semi-rigid food containers, household and institutional foil, caps and closures and flexible packaging are other important components of this market.

The third largest major market in North America in 2016 was building and construction (B&C), accounting for 12.2 prcent of total shipments. Fueled by the ongoing recovery of the residential and nonresidential construction market, shipments to B&C applications have increased each year since 2011. In 2016, shipments totaled 3,234 million pounds, up 3.3 percent over the previous year's total of 3,130 million. Growth occurred in most subsectors, with windows, doors, and screens leading the way. Shipments across North America's other major markets also increased year-over-year, including electrical markets (including wire and cable) increasing 4.5 percent, consumer durables up 7.1 percent, and non-electrical machinery and equipment markets rising 2.0 percent.



In terms of net shipments (including imports) by product form, aluminum semi-fabricated or mill products increased 1.6 percent over the previous year to 18,606 million pounds. Shipments of sheet and plate products reached their highest level since 2005, totaling an estimated 10,275 million pounds in 2016, an increase of 1.6 percent over 2015. Likewise, extruded product (shapes, rod and tube) shipments totaled 5,488 million pounds, their highest level since 2006, up 1.4 percent over the previous year. Shipments of bare foil increased 4.3 percent to 1,464 million pounds in 2016, with shipments to its largest market, containers and packaging, up 2.9 percent over the 2015 level. Electrical conductor product shipments (including ACSR, bare cable, and insulated wire and cable) totaled 761 million pounds, up 10.6 percent year-over-year. Mill product imports increased an estimated 5.4 percent over 2015, and continue to constitute a larger portion of mill product demand in North American markets. In 2016, these imports accounted for 15.3 percent of mill product shipments, up from 14.7 percent in 2015.

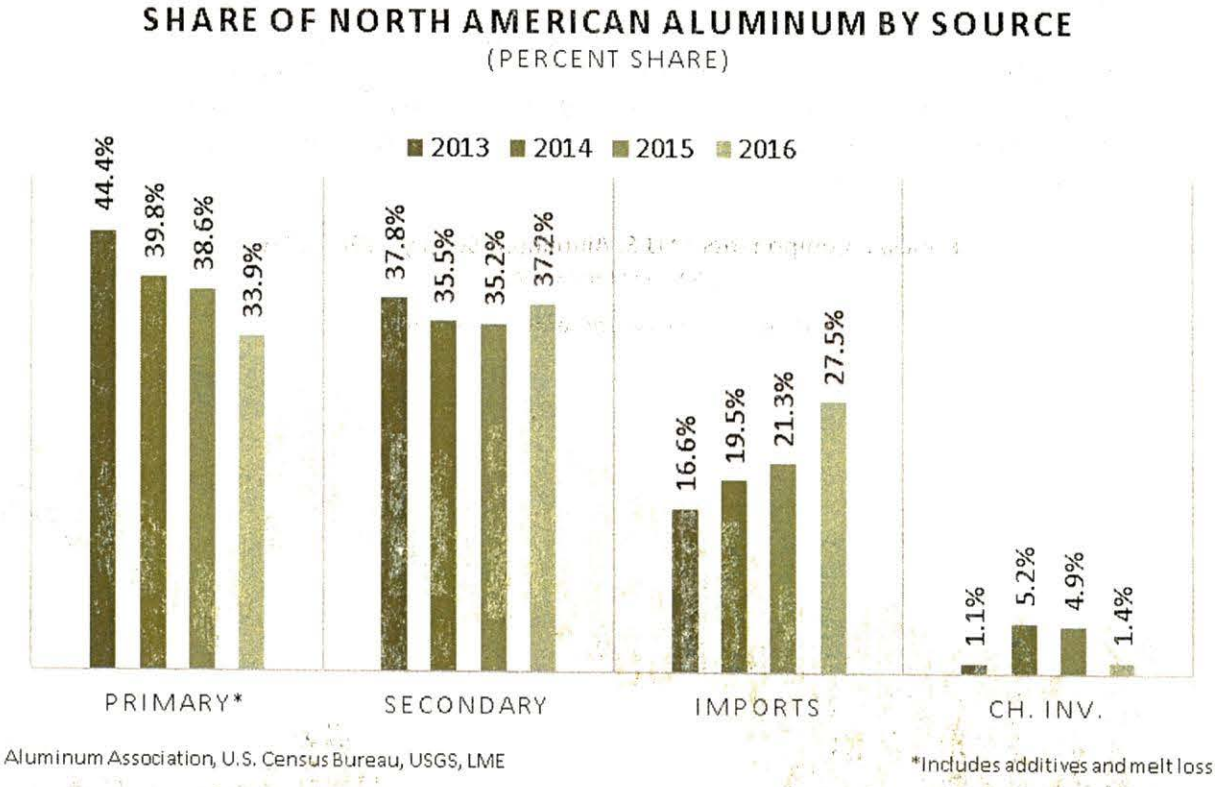
Shipments of primary and secondary ingot for castings, export and other uses were estimated at 7,822 million pounds in 2016, up 5.2 percent over the 2015 total of 7,435 million pounds.

Components of Supply for North America

At an estimated 8,879 million pounds, down 9.8 percent from 2015, primary aluminum production in North America represented roughly 33.6 percent of the total North American aluminum supply in 2016. In fact, after reaching almost 56.5 percent in 2009, primary production has declined as a share of aluminum supplied to North American market in each of the last seven years.

Recovery[6] of aluminum from scrap increased its share of the overall aluminum supply landscape within the region to 37.2 percent, up from an estimated 35.2 percent in 2015. Likewise, the volume of secondary aluminum produced increased 8.4 percent to a total of 9,837 million pounds.

Imports[7] (excluding cross-border trade) of ingot and mill products increased significantly, up 32.5 percent over the 2015 total, reaching levels never before seen. The estimated 7,266 million pounds of aluminum that flowed into the region in 2016 accounted for 27.5 percent of the overall aluminum supply in North America, up from 21.3 percent in 2015 (see below).



Finally, the drawing down of inventories (inventory changes have an inverse relationship with supply) continued for the fifth consecutive year, adding an additional 358 million pounds of aluminum into the region. The 2016 total, derived from the net reduction in producer inventories and London Metal Exchange (LME) warehouse stocks, was well off the 2015 total of 1,253 million pounds. As a result, the introduction of this metal back into the region did not have as notable an impact on the North American market as it did the previous year, rather it accounted for just 1.4 percent of the overall aluminum supply. According to the LME, primary aluminum units stored in USA warehouses totaled 584 million pounds (265 thousand metric tons) at the end of 2016 and experienced an average monthly withdrawal of roughly 36 million pounds over the course of the year.[8] North American producer inventories are covered in more depth later in the report.

United States Aluminum Supply

In the United States, aluminum supply increased 5.6 percent to 10,996 thousand metric tons in 2016. The largest source of aluminum supplied to the U.S. market in 2016, imports (including those from Canada) of primary and recycled ingot, as well as semi-fabricated products, accounted for 54.1 percent of the U.S. supply. The estimated 5,944 thousand metric tons, the most aluminum ever imported into the US, represented an increase of 19.0 percent over the revised 2015 total of 4,994 thousand metric tons. The main driving force behind the surge was a 25.4 percent increase in imports of primary and recycled ingot. These imports accounted for approximately 71.7 percent of aluminum imported in 2016, with mill products responsible for the remaining volume.

Recovery of aluminum from domestic and imported sources of scrap totaled 4,241 thousand metric tons (38.6 percent of the supply), an increase of 8.9 percent over the 2015 level of 3,895 thousand metric tons. Secondary production accounted for roughly 83.7 percent of all aluminum produced domestically in 2016, up from 70.9 percent a year ago. Primary production accounted for just 7.4 percent of the U.S. aluminum supply, totaling 818 thousand metric tons, down 48.4 percent from the previous year, and at its lowest level since 1951.

The increase in the amount of aluminum supplied to the U.S. market in 2016 marks the sixth increase in the last seven years. Nevertheless, the growth rate over the last ten years has declined at an annual rate of about four-tenths of one percent. Much of the decline over the period is a result of the global financial crisis (GFC) in 2007-2009, and a 64.1 percent decline in domestic primary aluminum production over the period. Conversely, imports of ingot and mill products have increased at an annual rate of 1.5 percent over the period, while secondary recovery has increased slightly at a rate of four-tenths of one percent.

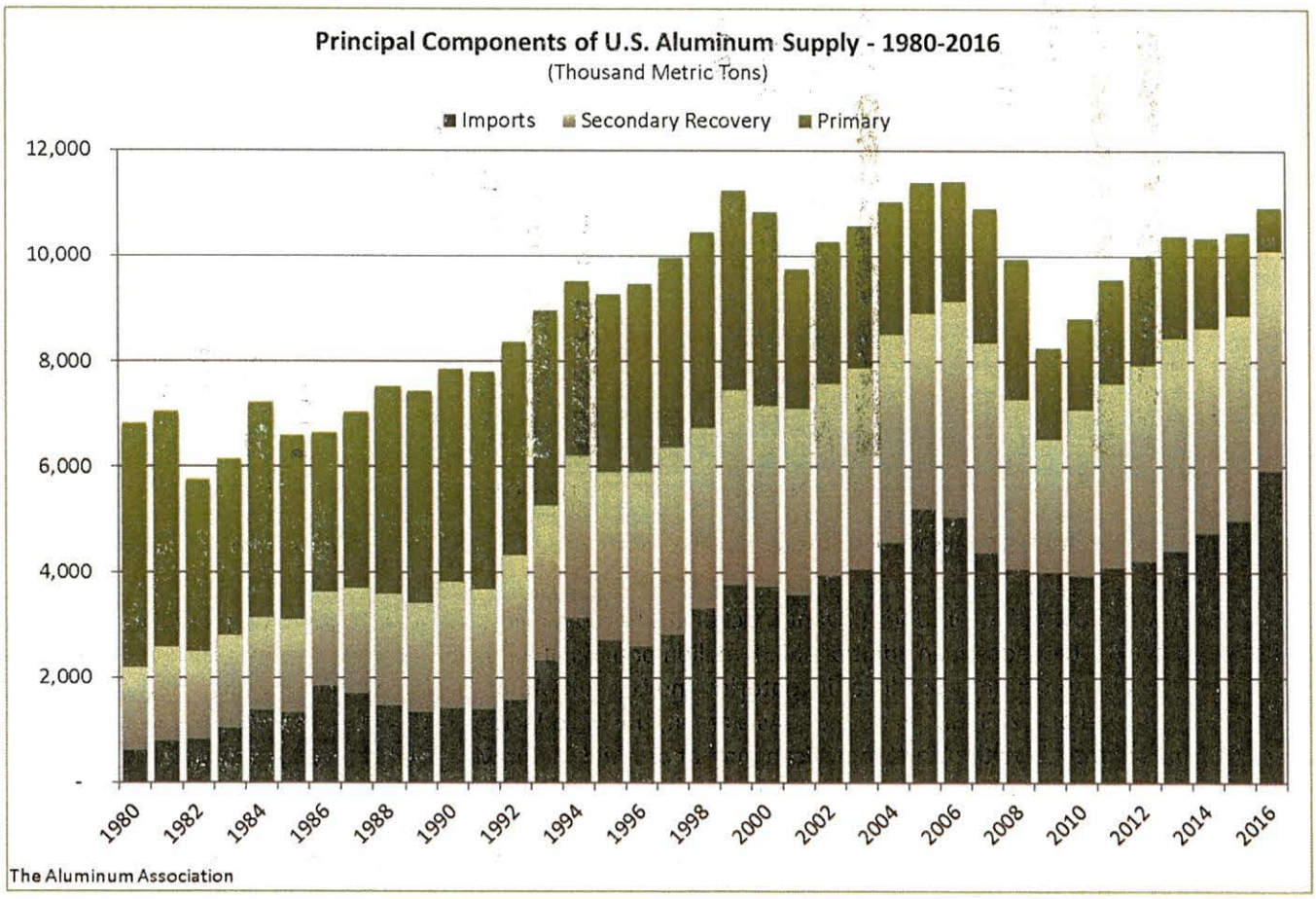


Table 2: US Aluminum Supply 2016

Canadian Aluminum Supply

The aluminum supply in Canada increased 7.9 percent during 2016 to a total of 4,201 thousand metric tons. Primary production totaled 3,209 thousand metric tons, up 11.4 percent over the 2015 total of 2,880 thousand metric tons. In stark contrast to the U.S., imports (including from the United States) of ingot and mill products decreased for the first time since 2009. At an estimated 756 thousand metric tons, the level of imports fell 1.0 percent from the 2015 level of 764 thousand metric tons. Recovery of aluminum from scrap totaled an estimated 221 thousand metric tons, up six-tenths of one percent over the 2015 total of 220 thousand metric tons.

The aluminum supply in Canada has decreased at an annual rate of one-tenth of one percent from 2006-2016. Imports of ingot and mill products have declined at a rate of eight-tenths of one percent per year while secondary recovery is off 3.6 percent. Domestic primary production over this period increased at a rate of five-tenths of one percent.

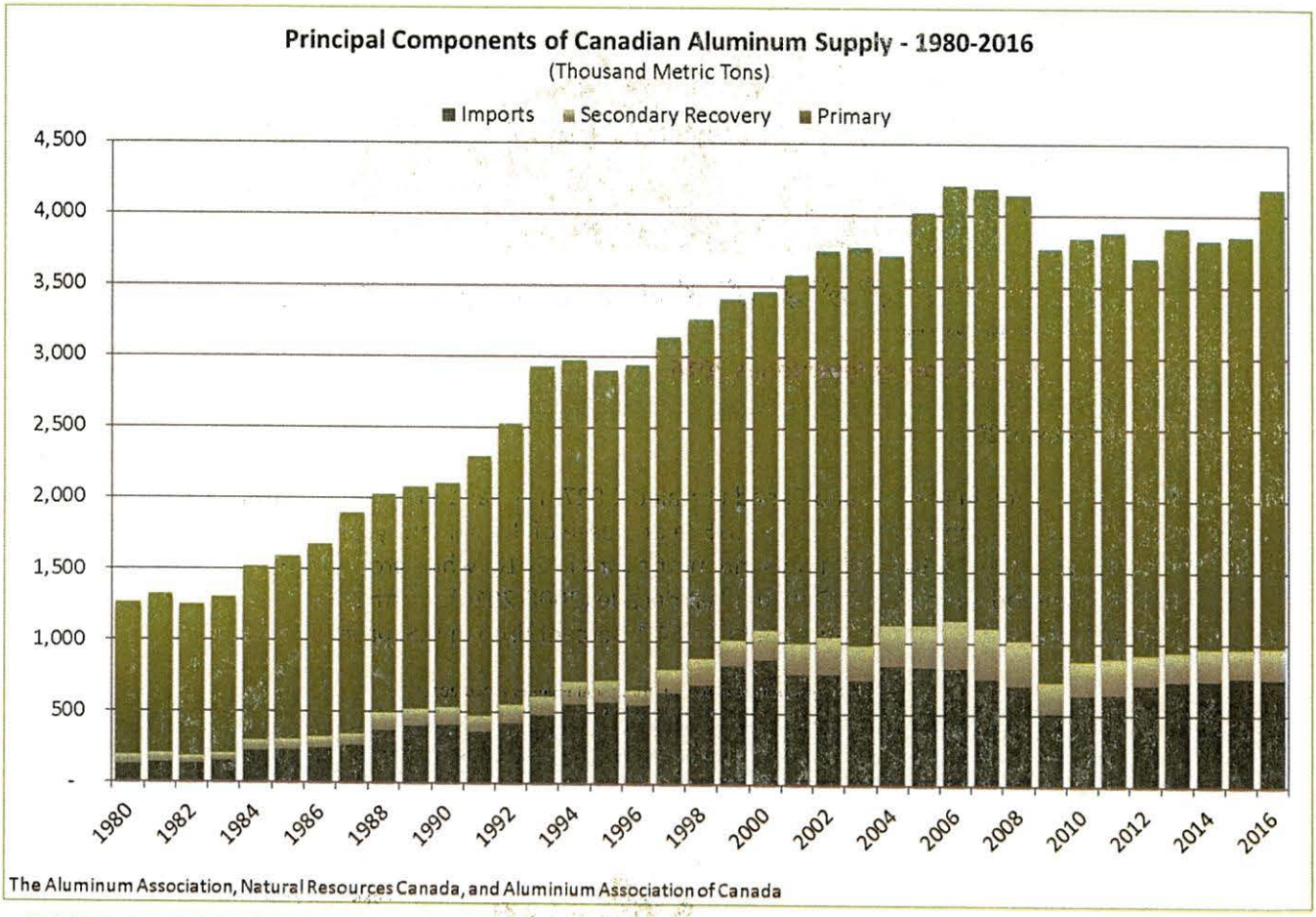


Table 3: Canadian Aluminum Supply 2016

Trade between the United States and Canada is an important facet of the region's aluminum industry. According to the U.S. Bureau of the Census, U.S. imports from Canada totaled 3,152 thousand metric tons in 2016 accounting for approximately 47.9 percent of all imports of aluminum ingot, scrap and mill products. At the same time, Statistics Canada reported imports from the United States totaling 709 thousand metric tons in 2016, accounting for about 79.1 percent of aluminum imports into Canada.

Domestic Producer Inventories

Inventories held by U.S. and Canadian producers include all forms of scrap, ingot, metal in process and finished products. Increasing for a third straight year, inventories reached a year-end level of 3,075 million pounds (or 1,395 thousand metric tons) in 2016, up 2.4 percent over the prior year. Inventories of ingot declined 8.0 percent from 2015 to 885 million pounds, while inventories of scrap dropped 1.5 percent to 558 million pounds. Conversely, inventories of metal in process and finished products increased 10.7 percent over the 2015 level, totaling 1,632 million pounds.

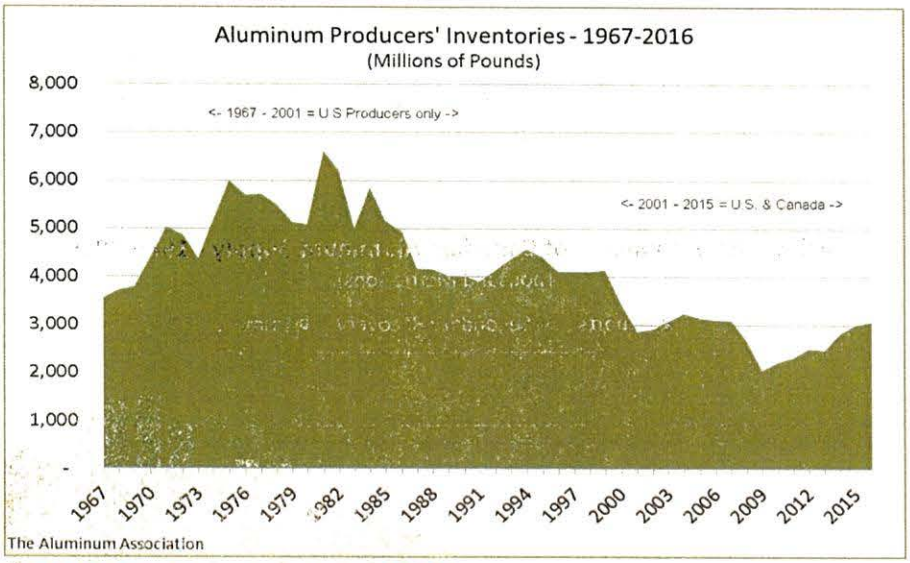


Table 4: Producer Inventories 2016

Primary Aluminum Production

Primary aluminum production in the U.S. and Canada totaled 4,027 thousand metric tons during 2016, compared to a production level of 4,467 thousand metric tons in 2015, a decrease of 9.8 percent year-over-year. Canadian production increased 11.4 percent to 3,209 thousand metric tons in 2016, while production in the United States fell 48.4 percent to 818 thousand metric tons. Over the last decade (2006-2016), North American production has declined at an annual rate of 2.5 percent, the result of a 64.1 percent drop in U.S. production over the period.

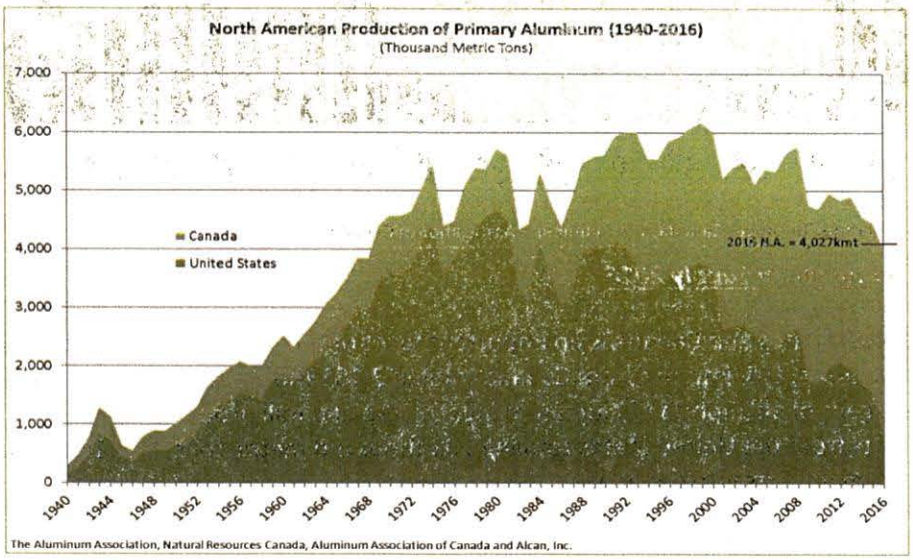


Table 5: North American Production of Primary Aluminum 2016

Primary Aluminum Installed Capacity

Total annual primary aluminum installed capacity as of December 31, 2016 was 4,924 thousand metric tons, down 4.8 percent from the previous year.

Primary capacity in the U.S. totaled 1,750 thousand metric tons, off 13.0 percent from 2015. The percentage distribution of U.S. capacity by company at year-end was: Alcoa Inc., 44.8%; Century Aluminum Corp., 40.0%; and Noranda, Inc., 15.2%. Primary capacity in Canada totaled 3,174 thousand metric tons, up four-tenths of one percent from 2015. The percent distribution in Canada was: Rio Tinto, 61.7%; Alcoa Inc., 26.8%; and Aluminerie Alouette, Inc., 11.6%. *Note: Capacity includes both operating plants and plants temporarily closed that can be brought into production within a short period of time with minimal capital expenditure.*

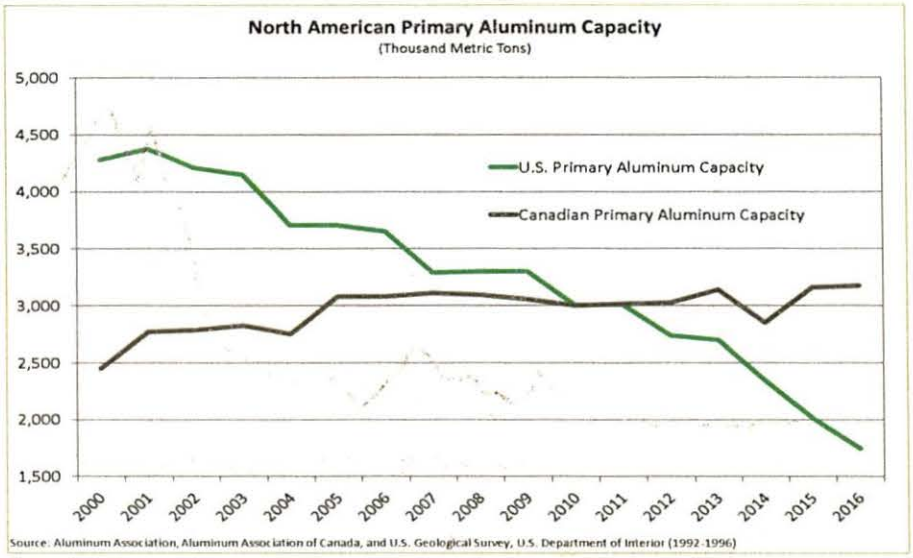


Table 6: US and Canada Primary Aluminum Capacity 2016

U.S. Aluminum Scrap Consumption and Recovery

According to statistics published by the U.S. Geological Survey, the aluminum industry purchased an estimated 3,943 thousand metric tons of aluminum scrap in 2016 from all sources (including imports), decreasing nine-tenths of one percent from the 2015 volume of 3,977 thousand metric tons.[9]

The metallic recovery from all sources of scrap consumption in 2016 totaled an estimated 3,584 thousand metric tons, an increase of six-tenths of one percent over 2015. Manufacturing or process related scrap (i.e. new) accounted for roughly 56.1 percent of the total, with post-consumer scrap (i.e. old) responsible for the remaining portion.

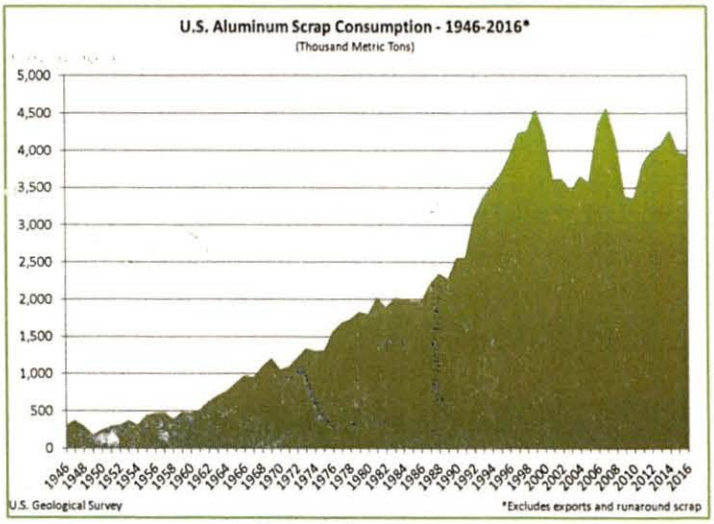


Table 7: US Aluminum Recycling 2016

U.S. exports of scrap, which are included as a component of recycled metal but are not included in government statistics on scrap consumption, declined 12.1 percent to a total of 1,344 thousand metric tons. Scrap exports have declined in each of the last five years and were off 35.2 percent since the record level of 2,076 thousand tons set in 2011. Over that same period, U.S. scrap exports to China, its largest export market for scrap at 51.5 percent in 2015, have declined 52.3 percent.

Based on the preliminary government statistics, the United States recycled an estimated 4,658 thousand metric tons of domestically generated aluminum scrap during 2016, a decrease of 6.0 percent from the previous year's total of 4,955 thousand metric tons. These figures include both manufacturing scrap and post-consumer scrap purchased by U.S. aluminum companies (less imports) as well as scrap exports. Figures do not include in-plant runaround.

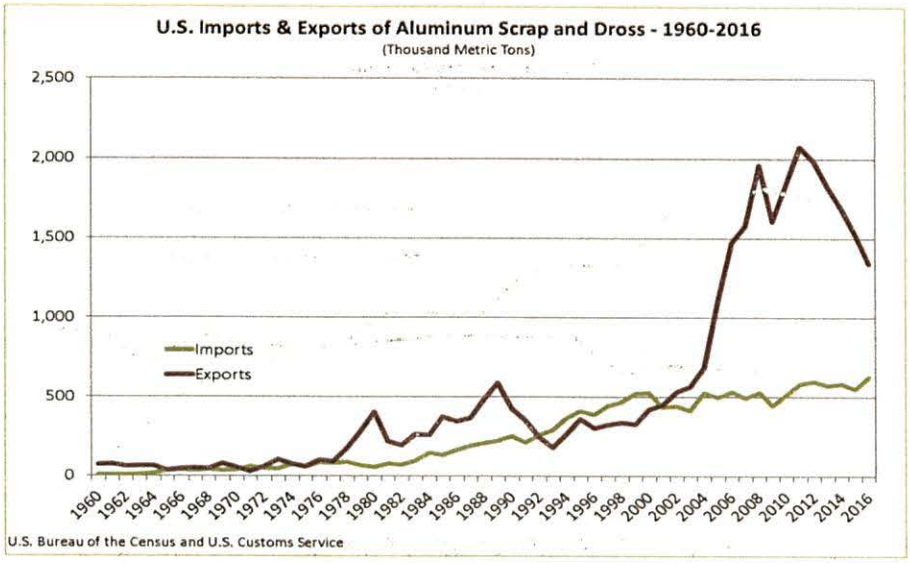


Table 7: US Aluminum Recycling 2016

Reclamation of used aluminum beverage cans is a major source of supply for the U.S. aluminum industry. During 2016, the aluminum industry melted an estimated 733 thousand metric tons of used beverage cans (1.6 billion pounds), down six-tenths of one percent from 2015. In 2016, UBC recycling accounted for 63.9 percent of beverage can shipments.

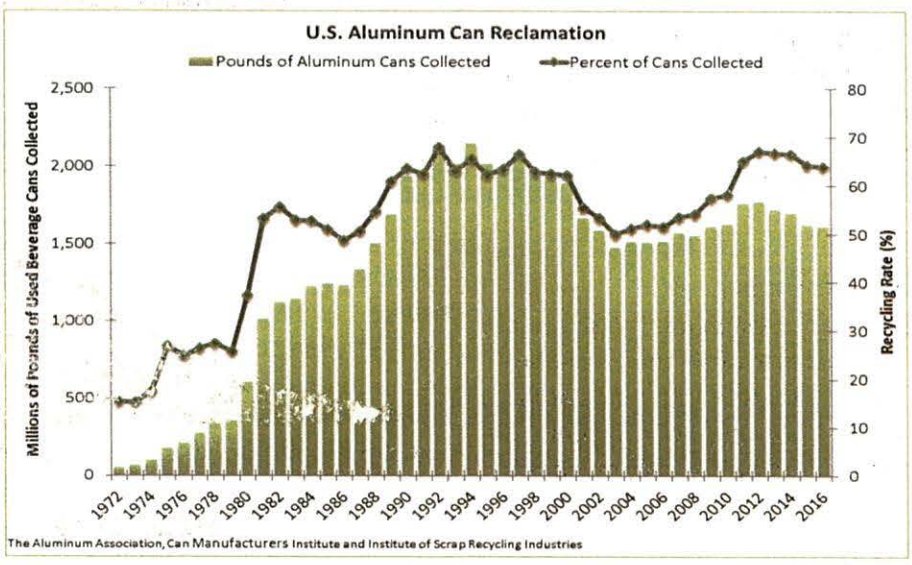


Table 8: US Used Beverage Can Recycling 2016

Aluminum Industry Shipments

Demand for aluminum in North American (total net shipments [5] including imports) reached 26,428 million pounds in 2016, increasing 2.6 percent over the 25,754 million pounds shipped in 2015. Shipments of mill products represented 70.4 percent of the total, slightly off from 71.1 percent it accounted for in 2015. Imports have captured an increasing share of mill product shipments in each of the last four years. In 2016, imports captured their largest ever share of mill product shipments at 15.3 percent, up from 14.7 percent in 2015.

At 38.9 percent, sheet and plate products accounted for the largest segment of mill product shipments in 2016, totaling an estimated 10,275 million pounds. Sheet and plate shipments have increased every year since 2009 and the 2016 total represented an increase of 1.6 percent over the estimated total of 10,113 millions pounds in 2015. Similarly, extruded product (shapes, rod, and tube) shipments have also increased each year since 2009. In 2016, extrusion shipments totaled 5,488 million pounds, representing 20.8 percent of total North American aluminum shipments and an increase of 1.4 percent over 2015. After a decline the previous year, net ingot for castings, exports and destructive uses increased 5.2 percent in 2016 to a total of 7,822 million pounds.

Total shipments to domestic consumers (U.S. and Canadian), at 23,311 million pounds, rose 1.9 percent over the 2015 total of 22,869 million pounds. Net exports [7] increased 8.0 percent in 2016 to an estimated 3,117 million pounds.

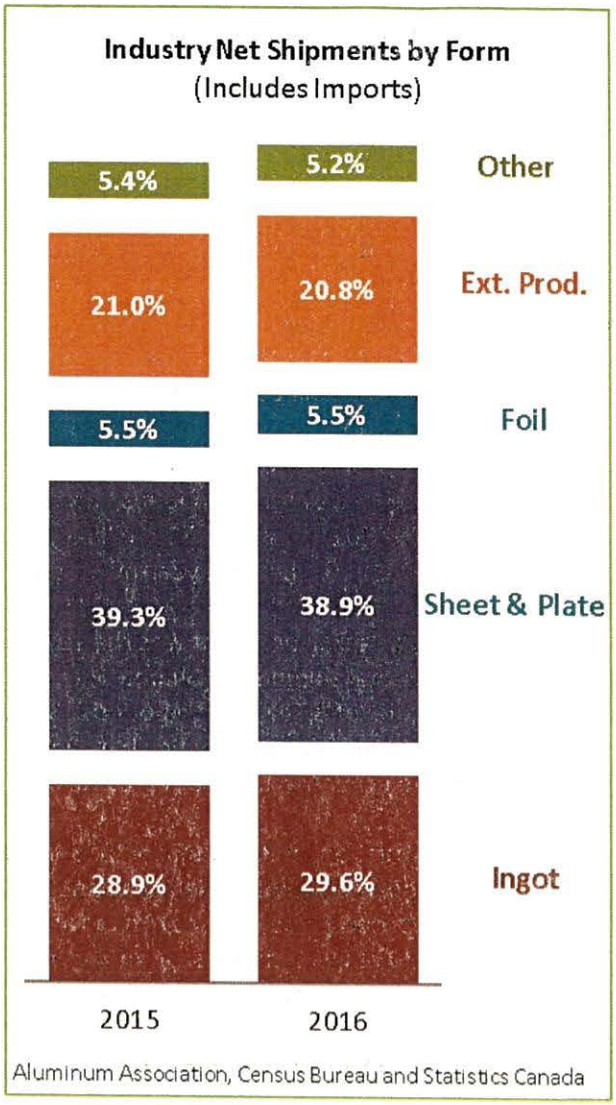


Table 9: Industry Net Shipments including Imports 2016

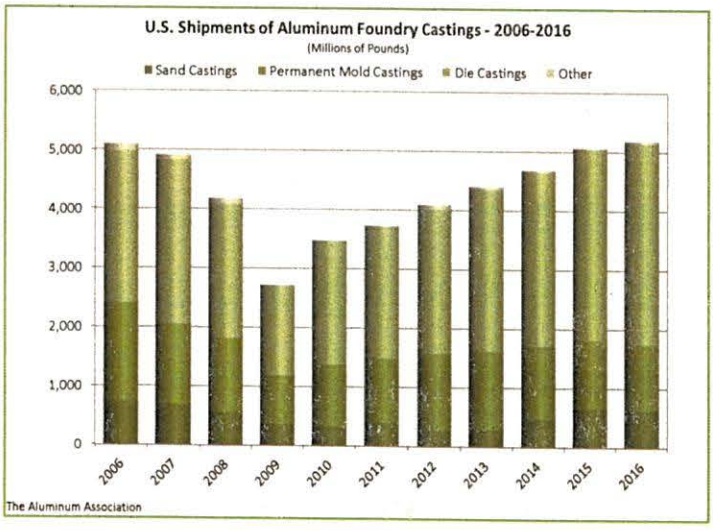


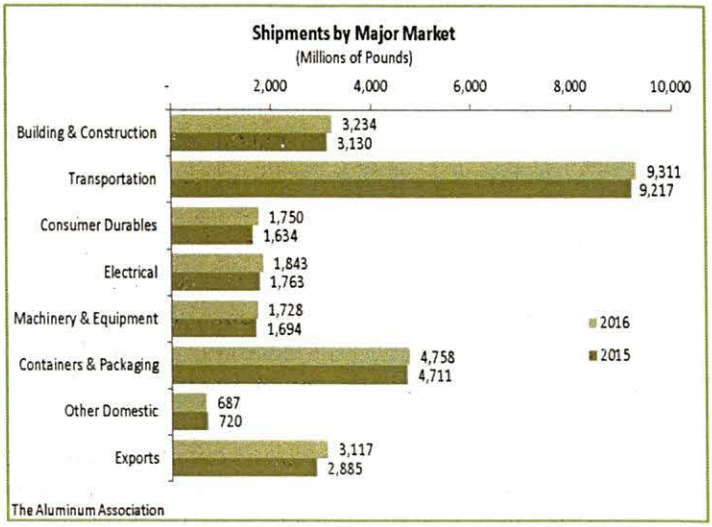
Table 10: US Foundry Castings Shipments 2016

U.S. Foundry Castings

There were an estimated 5,187 million pounds of aluminum foundry castings shipped by U.S. producers during 2016, an increase of 2.4 percent over the previous year. Shipments of die castings accounted for approximately 65.7 percent of shipments, totaling 3,409 million pounds, up 5.3 percent over the 2015 total of 3,238 million pounds.

Shipments of permanent mold castings totaled 1,114 million pounds, decreasing 3.9 percent from the 2015 total of 1,159 million pounds. Shipments of sand castings totaled 627 million pounds, off 3.7 percent.

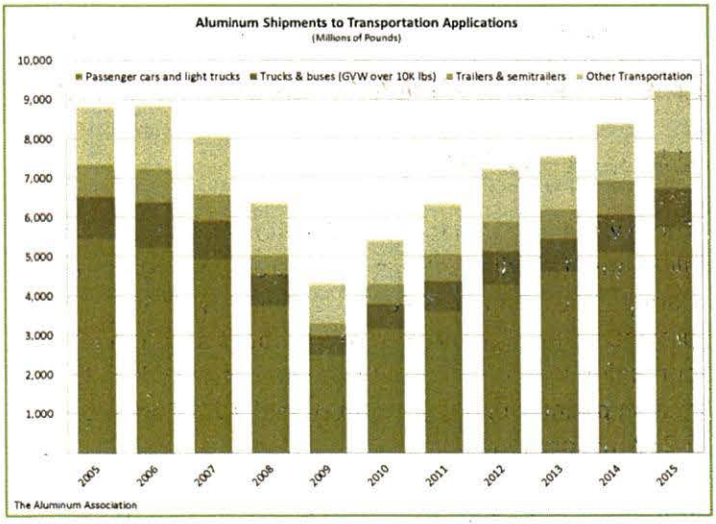
In 2016, the North American aluminum industry experienced an increase in demand across all seven major market segments. As has been historically the case, demand was primarily driven by the transportation, building and construction, and containers and packaging markets.



Increasing 1.0 percent over 2015 levels, the largest market for aluminum in North America in 2016 (at 35.2 percent), was transportation. Shipments of aluminum to transportation related applications achieved record setting levels for the second consecutive year in 2016, reaching an estimated 9,311 million pounds. Shipments to the largest subsector, passenger cars and light trucks, totaled an estimated 5,914 million pounds, increasing 3.2 percent over the 2015 total of 5,729 million pounds. Extruded shapes and sheet and plate shipments to this subsector grew 9.2 and 6.3 percent year-over-year, respectively.

The Containers and Packaging sector was the second largest market in 2016 with a volume of 4,758 million pounds, or 18.0 percent of total shipments. Shipments for metal cans (beverage and non-beverage) increased three-tenths of one percent to a total of 3,741 million pounds. Semi-rigid food containers, household and institutional foil, caps & closures, collapsible tubes and many flexible packaging uses are other important components in this market. In total, shipments to these other markets during 2016 increased 3.8 percent over the previous year.

Building and Construction, at 3,234 million pounds, grew 3.3 percent over the previous year. Included in this market are residential, industrial, commercial, farm and highway applications, as well as manufactured housing. Shipments for use in windows, doors and screens totaled an estimated 742 million pounds in 2016, increasing 5.2 percent over the 2014 total of 705 million pounds. Aluminum shipments to curtain wall, storefronts and entrances have increased each year since 2010, reaching 683 million pounds in 2016, an increase of 3.0 percent over the previous year.



Electrical market applications increased 4.5 percent to an estimated 1,843 million pounds in 2016. Shipments of ACSR, bare cable and insulated wire and cable products totaled 761 million pounds, a growth of 10.6 percent over last year.

Shipments to the non-electrical Machinery and Equipment market totaled 1,728 million pounds, an increase of 6.6 percent compared to 2015, and accounting for 6.5 percent of the total shipments. Uses include agricultural, construction and industrial machinery, irrigation pipe, ladders, fasteners and other general industrial equipment.

Shipments to the Consumer Durable goods market rose 7.1 percent to a volume of 1,750 million pounds. After declining the year before, the volume of aluminum shipped for use in major appliances such as air conditioners, increased 6.4 percent to a total of 684 million pounds.

Table 11: Shipments by Major Market 2016
Table 12: Trends in Selected Markets 2016

Aluminum Foreign Trade Statistics

According to reports published by the U.S. Department of Commerce, Bureau of the Census, U.S. imports of aluminum ingot and mill (semi-fabricated) products reached a record high 13,105 million pounds in 2016, accounting for 54.1 percent of the U.S. aluminum supply.[10] Total imports, including aluminum scrap, increased 18.5 percent to 14,492 million pounds while total U.S. exports decreased 8.6 percent to 6,317 million pounds.

Imports of aluminum (primary and secondary) ingot increased significantly in 2016, reaching 9,390 million pounds. The 2016 result was 25.4 percent over the 7,489 million pounds imported into the U.S. the previous year. While not at the same rate, imports of semi-fabricated products also increased in 2016, up 5.5 percent to a total of 3,714 million pounds. Imports of aluminum scrap grew 14.3 percent to 1,387 million pounds.

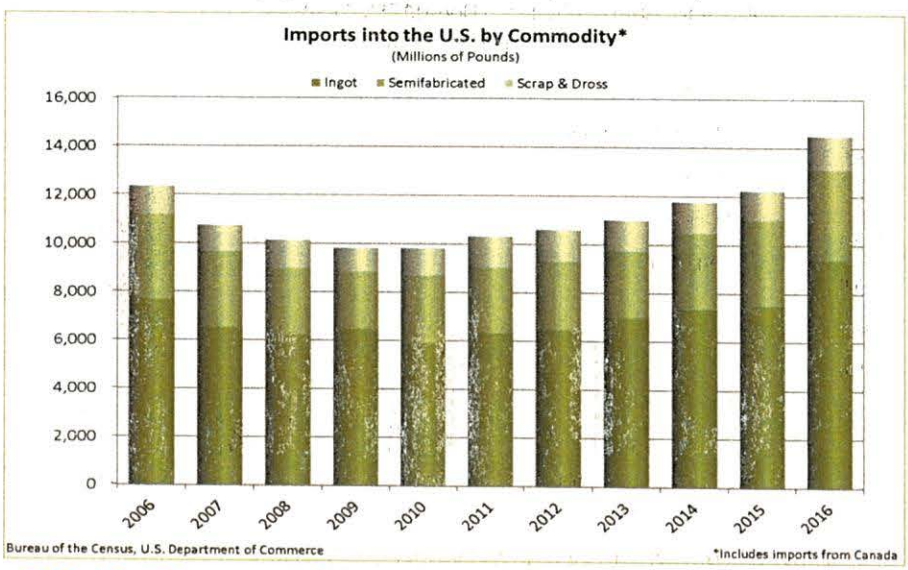


Table 13: US Imports and Exports by Commodity 2016

Exports of aluminum ingot declined for the fourth straight year, totaling 667 million pounds in 2016, off 16.4 percent from the reported 2015 total of 798 million pounds. Exports of semi-fabricated products decreased 2.1 percent to 2,687 million pounds, while exports of aluminum scrap declined 12.1 percent to 2,963 million pounds. Net imports (imports less exports) totaled a record level of 8,175 million pounds in 2016, increasing 53.9 percent over the previous year. During the period 2005-2015, net imports have increased at an overall annual rate of 3.3 percent.

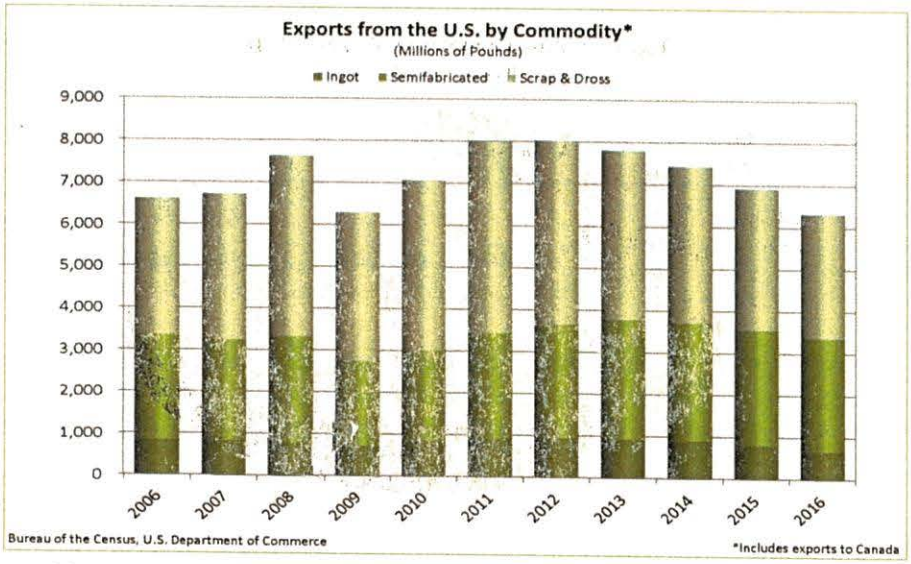


Table 13: US Imports and Exports by Commodity 2016

Of the 14,492 million pounds of aluminum imported into the U.S. in 2016, North American Free Trade Agreement (NAFTA) partners were responsible for 50.9 percent or 7,382 million pounds. Aluminum imports originating from Canada increased 4.0 percent year-over-year, with ingot accounting for 73.2 percent of the total. Despite the increase, Canada's market share declined from 54.7 percent to 47.9 percent. Imports from the rest of the world (non-NAFTA) increased 37.6 percent year-over-year. The top five non-NAFTA aluminum import partners in 2016 included Russia (11.5 percent), United Arab Emirates (8.5 percent), China (7.9 percent), Bahrain (2.9 percent) and Argentina (2.9 percent). With the exception of China, the majority of imports from these countries came in the form of ingot (primary and secondary). In fact, ingot imports from these four countries accounted for 80.3 percent of all imported ingot in 2016. China, on the other hand, accounted for 43.6 percent of non-NAFTA semi-fabricated product imports into the U.S., including almost 50 percent of sheet imports and 71.5 percent of foil imports in 2016.

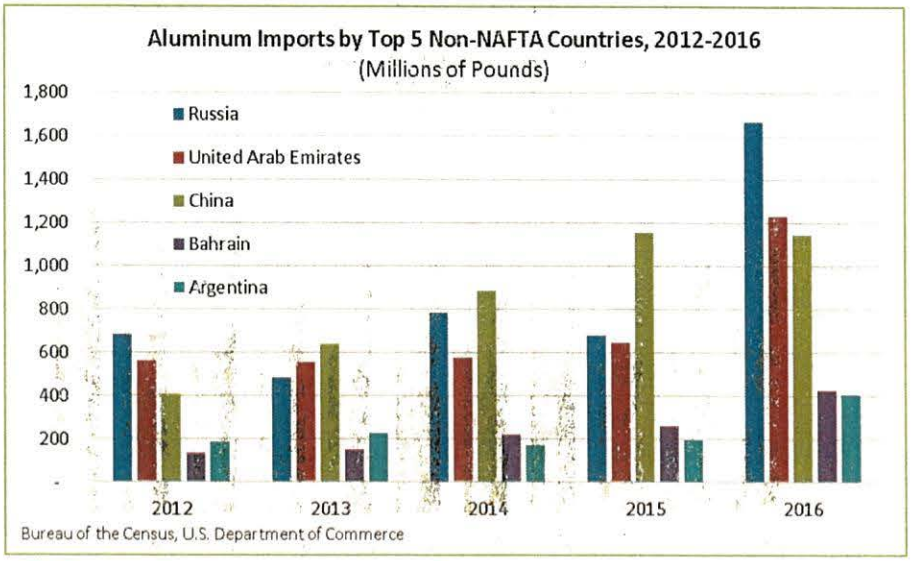


Table 14: US Imports and Exports by Country 2016

The U.S. exported 6,317 million pounds of aluminum in 2016, with Mexico (ranked first) and Canada (ranked third) accounting for 26.6 percent and 24.1 percent of aluminum exports, respectively. Together, exports to NAFTA partners totaled 3,206 million pounds, 65.4 percent of which were semi-fabricated products. Exports to the second largest export market, China, declined for the fifth consecutive year to 1,613 million pounds. The majority of the export volume to China, 94.5 percent, was in the form of aluminum scrap. South Korea and India round out the top five export partners at 6.3 percent and 2.1 percent, respectively.

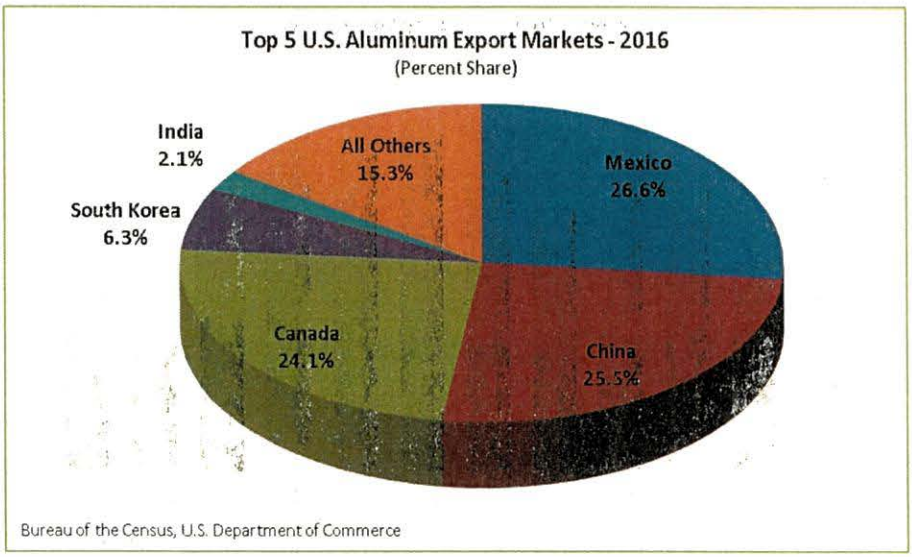


Table 14: US Imports and Exports by Country 2016

Canada is a net exporter of aluminum. According to reports published by Statistics Canada, Canadian exports exceeded imports by 6,273 million pounds in 2016.[11] Exports of aluminum ingot, mill products and scrap totaled 8,249 million pounds in 2016, an increase of 8.5 percent over the previous year. Canadian imports declined nine-tenths of one percent to 1,976 million pounds.

Canadian imports of aluminum ingot and mill (semi-fabricated) products totaled 1,667 million pounds in 2016, accounting for 18.0 percent of the country's aluminum supply. Imports of (primary and secondary) ingot decreased 14.8 percent to 253 million pounds, while imports of semi-fabricated products increased 1.9 percent to a total of 1,414 million pounds. Imports of aluminum scrap were unchanged from 2015, totaling 310 million pounds.

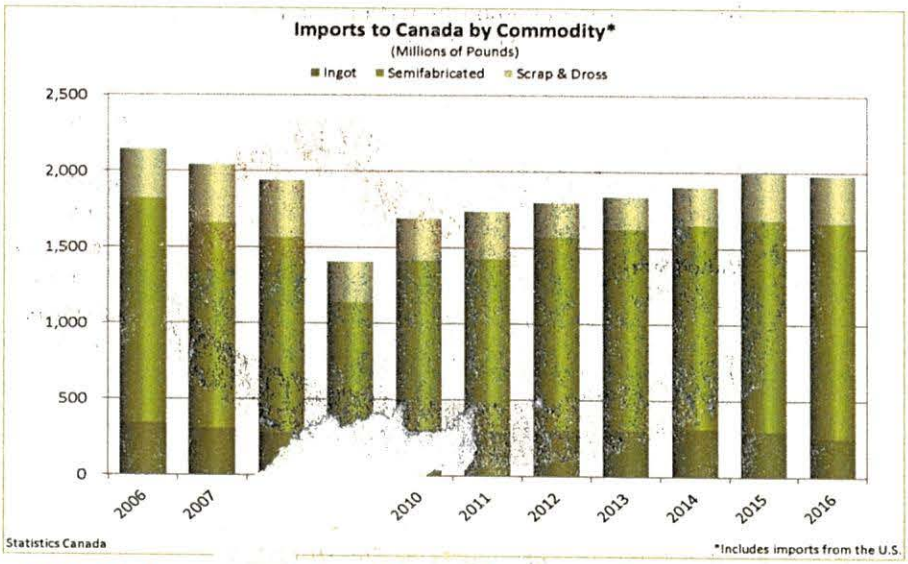


Table 15: Canad[illegible]ports and Exports by Commodity 2016

Canadian exports of aluminum ingot totaled 6,041 million pounds in 2016, an increase of 11.0 percent over the reported 2015 total of 5,443 million pounds. Exports of semi-fabricated products increased 4.7 percent to 1,016 million pounds, while exports of aluminum scrap were up two-tenths of one percent to 1,193 million pounds. Net exports (exports less imports) totaled 6,273 million pounds in 2016, up 11.8 percent over the previous year. During the period 2006-2016, net exports have increased at an overall annual rate of six-tenths of one percent.

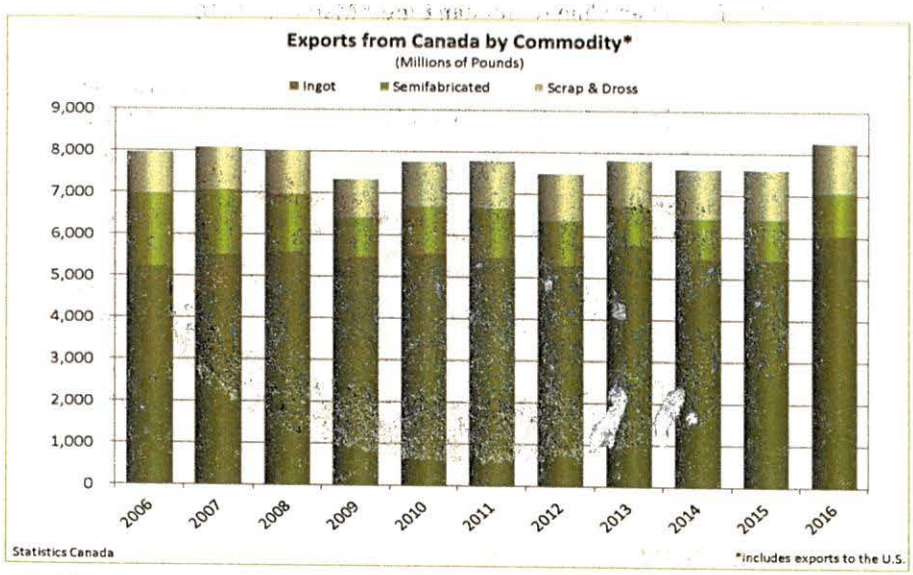


Table 15: Canada Imports and Exports by Commodity 2016

Of the 1,976 million pounds of aluminum imported into Canada in 2016, the United States was responsible for 79.1 percent or 1,563 million pounds. Aluminum imports originating from the U.S. decreased 1.4 percent year-over-year, with sheet products accounting for 52.4 percent of the volume. As a result of the decline, the U.S. market share declined slightly, down to 79.1 percent. Imports from the rest of the world increased 1.2 percent year-over-year, with China again leading the way. Chinese imports of aluminum totaled 196.9 million pounds, increasing 8.5 percent over the 2015 total. China now accounts for roughly 10.0 percent of all Canadian aluminum imports, up from 9.1 percent in 2015. Following the U.S. and China, the top five aluminum import partners include Germany (2.3 percent), Russia (0.8 percent), and Malaysia (0.6 percent).

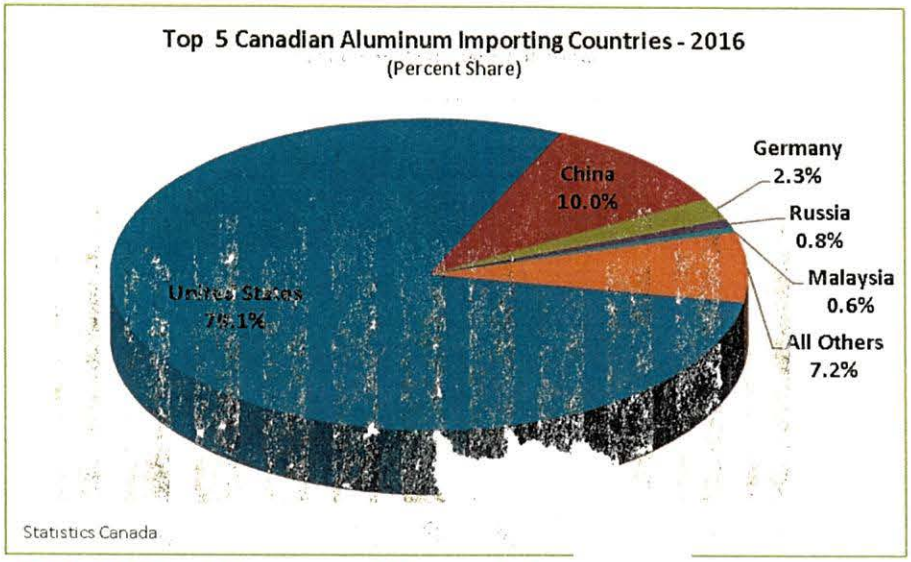


Table 16: Canada Imports and Exports by Country

Canada exported 8,249 million pounds of aluminum in 2016, with the majority (1.1 percent) destined for the United States. In fact, 73.0 percent of the 6,937 million pounds exported to the U.S. wa: the form of ingot. Export volumes to the U.S. were up 4.5 percent year-over-year. Following the U.S., the top five aluminum export partners for Canada included South Korea (4.0 percent), Mexico (3.5 percent), China (2.8 percent), and Japan (2.4 percent).

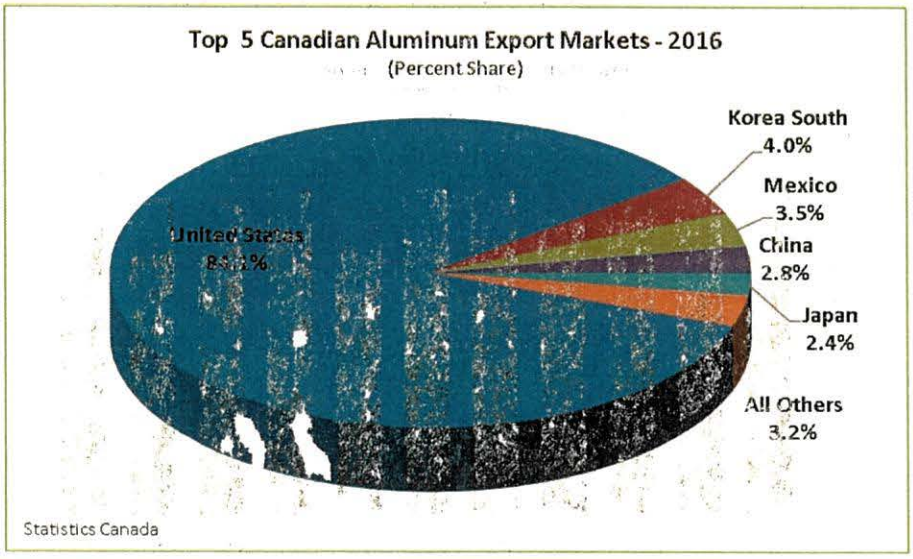


Table 16: Canada Imports and Exports by Country 2016

According to reports published by the National Institute of Statistics, Geography, and Informatics (INEGI), Mexican imports of aluminum ingot and mill (semi-fabricated) products totaled 3,366 million pounds in 2016, down 5.3 percent year-over-year.[12] Total imports, including aluminum scrap, decreased 7.0 percent to 3,617 million pounds while total exports increased 185.2 percent to 1,669 million pounds. The United States once again led the way as Mexico's largest trading partner in 2016, accounting for 48.3 percent of imports, but just 25.8 percent of exports.

Imports of aluminum (primary and secondary) ingot declined 17.1 percent to 1,867 million pounds in 2016, as compared with 2,252 million pounds the previous year. Imports of semi-fabricated products increased in 2016, up 15.0 percent, to a total of 1,499 million pounds. Imports of aluminum scrap were off 25.1 percent to 251 million pounds.

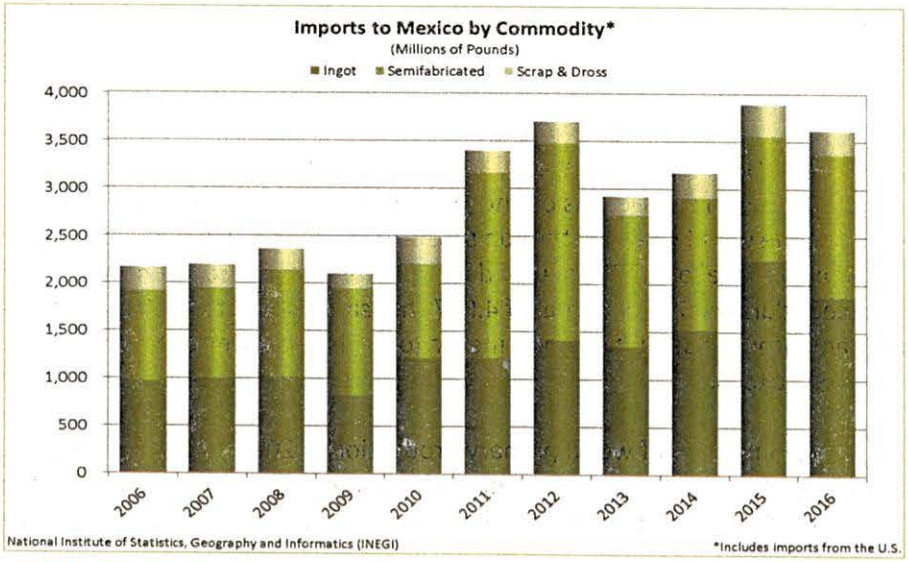


Table 17: Mexico Imports and Exports by Commodity 2016

Mexican exports of aluminum ingot totaled 51 million pounds in 2016, a decrease of 55.1 percent from the reported 2015 total of 113 million pounds. Exports of semi-fabricated products increased significantly year-over-year, up 852.1 percent to 1,220 million pounds. The growth was almost entirely driven by the export of extruded shapes to Vietnam. After reporting no export volume to Vietnam the year prior, Vietnamese exports accounted for 65.7 percent of all Mexican aluminum exports in 2016. Exports of aluminum scrap increased 15.8 percent to 398 million pounds, while overall net imports (imports less exports) totaled 1,948 million pounds, decreasing 41.1 percent from 2015.

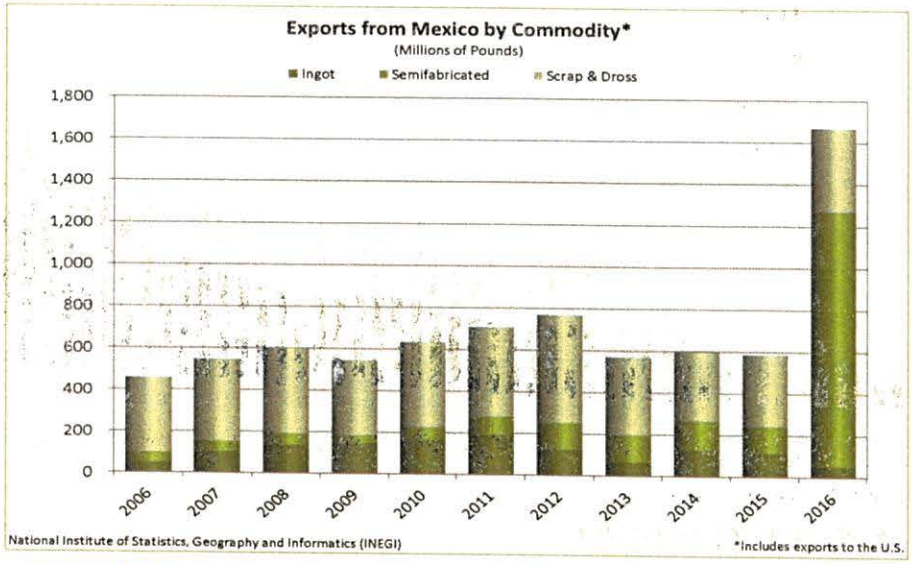


Table 17: Mexico Imports and Exports by Commodity 2016

World Aluminum Statistics

The aluminum industry is international by its very nature. From the extraction of its basic source material at bauxite sites located in a number of countries throughout the world, to its fabrication and distribution in every nation on earth. This section provides data on two of the key aspects of the global aluminum industry, world primary aluminum production and the apparent per capita consumption of aluminum for selected countries.

World Primary Production

Estimated world production of primary aluminum (see Table 20 for sources) totaled 59,034 thousand metric tons in 2016, up 1.4 percent over the 2015 revised estimate of 58,218 thousand metric tons. Over the past decade 2006-2016, world primary production increased at an annual growth rate of 5.1 percent.

China, the largest producer of primary aluminum in 2016, accounted for 54.0 percent of global output. At 31,870 thousand metric tons, China's 2016 output increased 1.1 percent over the previous year and is up 240.9 percent since 2006. Production in Russia increased nine-tenths of one percent year over year to 3,561 thousand metric tons and accounted for 6.0 percent of the world total. Of the top ten, primary production in India grew the fastest in 2016, up 15.0 percent year-over-year to a total of 2,729 thousand metric tons. Production of primary aluminum in North America declined 9.8 percent during 2016 to a total of 4,027 thousand metric tons. Canada ranked third in global primary production with an output of 3,209 thousand metric tons while the United States dropped to eleventh, producing 818 thousand metric tons.

In total, Asia accounted for 70.5 percent of world primary production in 2016, while Europe (including Russia) made up 14.2 percent of global output. North America, including the United States and Canada, were responsible for 6.8 percent of the total, down from 7.7 percent in 2015. The remaining production included Oceania (3.3 percent), Africa (2.8 percent), and Latin America (2.3 percent).

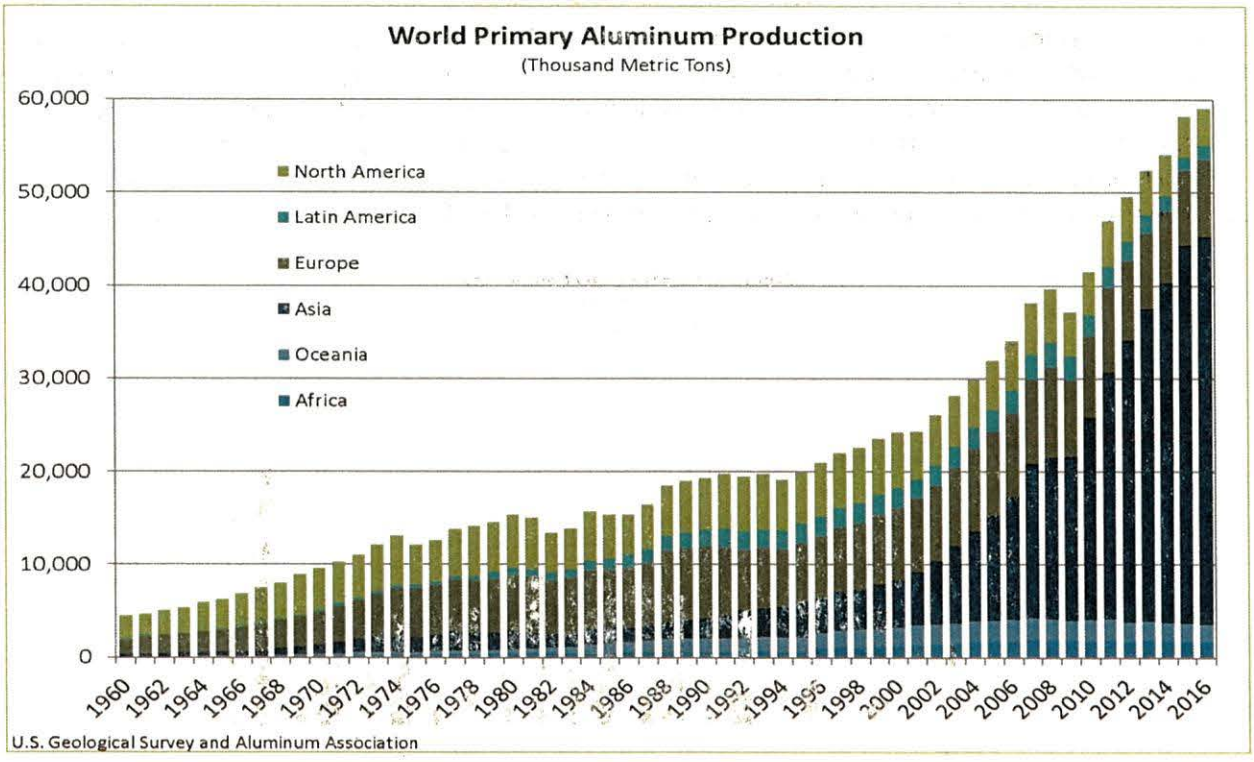


Table 19: World Primary Production 2016

Per Capita Consumption – Selected Countries

The Aluminum Association, in conjunction with industry associations in foreign countries and, in some instances, appropriate government agencies, conducts a voluntary survey to compile uniform statistical data showing total supply and apparent consumption. Total supply for an individual country consists of primary production, imports, and secondary recovery. Apparent consumption is equal to the sum of these sources of total supply less exports and inventory changes.

Per Capita Aluminum Consumption Formula

The format for compiling total supply and apparent consumption data is shown below:

1.	+	Primary aluminum production
2.	±	Government stockpile adjustment
3.	+	Imports of ingot
4.	+	Imports of mill products (aluminum alloy weight)
5.	+	Recovery of secondary aluminum alloys (from domestic or imported scrap)
6.	-	Exports of ingot
7.	-	Exports of mill products (aluminum alloy weight)
8.	=	Apparent aluminum consumption
9.	+	Beginning year inventory
10.	±	Ending year inventory
11.	±	Inventory change
12.	=	Aluminum consumption (with inventory change)
13.	□	Mid-year population
14.	=	Per capita consumption (kg.) (without inventory change)
15.	=	Per capita consumption (kg.) (with inventory change)

Per capita consumption data by country in 2016 are provided in table 18 for the countries listed below (data for some countries not available) :

Argentina	France	Mexico	South Africa, Rep
Australia	Germany	Netherlands	Spain
Austria	Greece	New Zealand	Sweden
Belgium	Hungary	Norway	Switzerland
Bosnia-Herzegovina	Iceland	Panama	Taiwan
Brazil	India	Philippines, Rep	Thailand
Bulgaria	Indonesia	Poland	Turkey, Rep
Canada	Iran	Portugal	Ukraine
China	Ireland	Romania	United Kingdom
Czech Republic	Italy	Russia	United States
Denmark	Japan	Saudi Arabia, King. of	Venezuela
Egypt	Korea, Rep	Serbia	
Estonia	Latvia	Slovakia, Rep	
Finland	Lithuania	Slovenia	

Table 20: World Aluminum Consumption 2016

Glossary

ACSR AND ALUMINUM CABLE, BARE – Aluminum stranded conductor reinforced by a core of steel (ACSR), or aluminum (ACAR); or any other bare stranded aluminum conductor.

ATOMIZED POWDER – Powder produced by blowing or aspirating molten metal through an orifice.

CASTING – A product made by pouring molten metal into a mold of a desired shape and letting it solidify.

CONDUCTOR REDRAW ROD (CONTINUOUS-CAST OR ROLLED) – A solid round product that is long in relation to cross section, 0.375" or greater in diameter, produced by continuous casting followed by size-rolling, or by rolling from D.C. cast ingot, suitable for drawing into electrical conductor wire.

DIRECT MILL USES – Finished product applications supplied for the most part directly from mills rather than from distributors or jobber warehouses.

DISTRIBUTOR – Warehouses and sells a number of mill products to a wide variety of customers.

DRAWING STOCK – (Redraw Rod) See Conductor or Nonconductor Redraw Rod.

DRAWN TUBE – A hollow product that is long in relation to its cross section, which is round, square, rectangular, hexagonal, octagonal, or elliptical in shape, and brought to final dimensions by drawing.

DROSS AND SKIMMINGS – The mixture of oxides and other impurities which float to the surface of molten aluminum and is skimmed off.

EXTRUDED PIPE AND TUBE – A hollow product, formed by extruding, that is long in relation to its cross section, which is round, square, rectangular, hexagonal, octagonal, or elliptical in shape.

EXTRUDED ROD AND BAR – A solid product, produced by extruding (sometimes brought to final dimensions by drawing), that is long in relation to its cross section, which is round, square, rectangular, hexagonal, or octagonal in shape and 0.375" or greater in diameter or in at least one perpendicular distance between parallel faces.

EXTRUSION INGOT (BILLET) – A solid or hollow cast form, usually cylindrical, suitable for extruding.

FLAKED POWDER – Powder consisting of flat or scale-like particles of a thickness small compared with other dimensions, produced by milling in the presence of a lubricant.

EXTRUDED SHAPES – A product produced by extruding, that is long in relation to its cross-sectional dimensions and has a cross section other than that of rod and bar and pipe and tube.

FOIL – A flat rolled product, rectangular in cross section, of thickness less than 0.0079".

FORGINGS (EXCLUDING IMPACT EXTRUSIONS) – A product worked to a predetermined shape by one or more processes such as hammering, upsetting, pressing, etc.

IMPACTS (EXCLUDING COLLAPSIBLE TUBES AND CANS) – A product formed in a confining die from metal slug, usually cold, by rapid single stroke application of force through a punch, causing the metal to flow around the punch and/or through an opening in the punch or die.

INTEGRATED PRODUCER (OR SUPPLIER) – For statistical reporting, a company which produces primary aluminum ingot in the United States and produces mill products from it.

METALLURGICAL/DESTRUCTIVE USES – Applications wherein, because of the way it is used, aluminum either loses its identity or is lost and cannot be recovered. Major uses include the deoxidizing of steel and reduction of ferroalloys; steel and other nonferrous metal alloys; steel coating; and such other applications as chemicals and catalysts.

MILL (SEMI-FABRICATED) PRODUCTS – Metal that has been fashioned into an intermediate or semi-fabricated form in preparation for making a finished product. Example: sheet, a mill product, is used to make residential siding, a finished product.

NET SHIPMENTS – Excludes intra-industry shipments for further fabrication. It is the most accurate measure of industry output to markets because it eliminates duplication. Reported receipts of aluminum for further processing are subtracted.

NONCONDUCTOR REDRAW ROD (CONTINUOUS-CAST OR ROLLED) – A solid round product that is long in relation to its cross section, 0.376" or greater in diameter, produced by continuous casting followed by size-rolling, or by rolling from D.C. cast ingot, suitable for drawing into nonconductor wire.

NONINTEGRATED FABRICATOR (OR SUPPLIER) – For statistical reporting, a U.S. mill product fabricator which is not affiliated with a domestic primary ingot producer.

OTHER INGOT AND MOLTEN METAL, PRIMARY – For statistical purposes, a cast form other than extrusion ingot (or molten metal), shipped by an integrated producer or nonintegrated fabricator from a company-owned facility not exclusively devoted to producing secondary ingot.

OTHER INGOT AND MOLTEN METAL, SECONDARY – For statistical purposes, a cast form other than extrusion ingot (or molten metal), principally produced from aluminum scrap to specification by secondary smelters (or others at a facility exclusively devoted to producing ingot from scrap for sale); excludes remelt scrap ingot (RSI) which is considered scrap until remelted and cast into specification ingot.

OTHER ROD AND BAR (CONTINUOUS-CAST OR ROLLED) – A solid, round, square, rectangular, hexagonal, or octagonal in shape produced by continuous casting or rolling, that is long in relation to its cross section, 0.375" or greater in diameter or in at least one perpendicular distance between parallel faces; other than redraw rod and D.C. cast ingot.

PASTE – A blend of powder or flake with a thinner or plasticizer.

PLATE, NONHEAT-TREATABLE – A flat rolled product, rectangular in cross section, 0.250" or greater in thickness, which can be strengthened only by cold work.

PLATE, HEAT-TREATABLE – A flat rolled product, in 2000, 6000, or 7000 alloy series (except 7072), rectangular in cross section, 0.250" or greater in thickness, which can be strengthened by a suitable thermal treatment.

POWDER – An aggregate of discrete particles of aluminum, substantially all of which are finer than 1,000 microns (minus 18 mesh).

RECEIPTS – The metal physically received by a company for further processing.

REIMPORTS – Mill products that have been exported, partially processed outside the United States, and imported back to the United States while still in a mill product stage.

SCRAP – Includes: New (prompt industrial) scrap, purchased, imported, or treated on toll, in all forms; and Old (post consumer or obsolete) scrap, including sweated pig; also remelt scrap ingot (RSI) which is considered scrap until remelted and cast into specification ingot.

SECONDARY SMELTER – A company whose facilities are exclusively devoted to producing ingot or molten aluminum from scrap.

SEMI-FABRICATED PRODUCTS – See Mill Products.

SHEET, NONHEAT-TREATABLE – A rolled product, flat or coiled, rectangular in cross section, of 0.0079" thickness but under 0.250" thickness, which can be strengthened only by cold work.

SHEET, HEAT-TREATABLE – A rolled product, in 2000, 6000, or 7000 alloy series (except 7072), flat or coiled, rectangular in its cross section, of 0.0079" thickness but under 0.250" thickness, which can be strengthened by a suitable thermal treatment.

WELDED TUBE – A hollow product that is long in relation to its cross section, which is round, square, rectangular, hexagonal, octagonal, or elliptical in shape, produced by forming and seam-welding sheet longitudinally. Included with aluminum sheet.

WIRE, BARE, CONDUCTOR AND NONCONDUCTOR – A solid wrought product that is long in relation to its cross section, which is square, round, rectangular, hexagonal, or octagonal in shape, whose diameter or greatest perpendicular distance between parallel faces (except for flattened wire) is less than 0.375".

WIRE AND CABLE, INSULATED OR COVERED – Aluminum electrical conductor wire or stranded conductors that are insulated or covered.

End Notes

1) World Bank. "Global Economic Prospects: A Fragile Recovery." June 2017. http://www.worldbank.org/en/publication/global-economic-prospects.
2) Federal Reserve Board. Foreign Exchange Rates – G.5. Nominal Broad Dollar Index. http://www.federalreserve.gov/releases/h10/current/.
3) CME Group. Crude Oil Futures Settlements. http://www.cmegroup.com/.
4) CRU International Ltd. http://www.crugroup.com/
5) U.S. and Canadian producer net shipments of aluminum ingot and mill products plus imports. Net shipments exclude intra-industry shipments for further fabrication.
6) Scrap reclaimed within the U.S. or Canada. Statistics derived from government sources and association estimates. Figures include imports of scrap processed in domestic facilities but exclude scrap that has been exported.
7) Based on published government statistics derived from Customs documentation. Figures contain estimated adjustments to account for apparent misclassifications. North America statistics exclude U.S./Canada cross-border trade.
8) The London Metal Exchange, Stocks Break Down Report. "Metals Reports 30 Dec 2016.xls." https://www.lme.com/en-GB/Market-Data/Reports-and-data/Warehouse-and-stocks-reports/Stock-breakdown-report.
9) United States Geological Service. Minerals Information: Aluminum Statistics and Information. http://minerals.usgs.gov/minerals/pubs/commodity/aluminum/.
10) United States Department of Commerce. United States Census Bureau. Foreign Trade: U.S. International Trade Data. http://www.census.gov/foreign-trade/data/index.html.
11) Statistics Canada. http://www.statcan.gc.ca/eng/start.
12) National Institute of Statistics, Geography, and Informatics. http://www.inegi.org.mx/.

Publications & Reports

The Aluminum Association's **statistical programs** provide industry information on primary aluminum production, new orders of mill products, industry shipments, end use market estimates, inventories, recycling and foreign trade on a monthly, quarterly and annual basis. Special surveys provide data on specific subjects such as primary capacity, flat roll capacity, inventories and castings shipments. Custom reports are available on a for-fee basis. Web briefings are also available upon request.

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Foreign Trade (based on government customs data)
Summary of U.S., Canada and Mexico Imports and Exports (by Commodity), Monthly
Foreign Trade Online Database - US/Canada/Mexico Exports & Imports of Aluminum (By Commodity & Country)

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JAN 30 2019

CDR

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