



THE CORE COALITION
SUPPORTING COMPETITIVE AMERICAN MANUFACTURING

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Submission to
United States Department of Commerce

Public Comments on behalf of
The Core Coalition LLC

Regarding
Notice of Request for Public Comments on Section 232 National Security
Investigation of Imports of Laminations for Stacked Cores for Incorporation into
Transformers, Wound cores for Incorporation into Transformers, Electrical
Transformers and Transformer Regulators

Pursuant to the May 19, 2020 Federal Register Document 2020-10715

July 3, 2020

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Executive Summary

The Core Coalition respectfully submits these comments in response to the Department of Commerce's Notice of Request for Public Comments on Section 232 National Security Investigation of Imports of Laminations for Stacked Cores for Incorporation into Transformers, Stacked Cores for Incorporation into Transformers, Wound Cores for Incorporation into Transformers, Electrical Transformers, and Transformer Regulators. The deadline for submission of public comments, originally scheduled for June 9, 2020 (see 85 Fed. Reg. 29926 (May 19, 2020)), was extended to July 3, 2020. See 85 Fed. Reg. 35899 (June 12, 2020).

The Core Coalition is an alliance of companies active in the transformer industry and those industries that use transformer components in manufacturing, as well as users of transformers. The Coalition was formed to provide information in support of its position that the circumstances and quantity of imports of transformers, cores, laminations, and other transformer inputs do not threaten the national security of the United States (US).

The Coalition provides the following basic facts in support of its position:

-  **Canada and Mexico are by far the leading suppliers of inputs for electric transformers. More than 85% of cores and laminations imported into the US come from Canada and Mexico.** There is no evidence that Canada and Mexico are unsafe, hostile, or unreliable sources of these transformer inputs.
-  **Imports of cores and laminations from Canada and Mexico into the US have increased from 2015 to 2020 YTD, while total apparent consumption of Grain Oriented Electrical Steel (GOES) in North America has remained relatively constant (~375K MT).** The only conclusion that can be drawn is that cores and laminations previously made in the US are being imported, principally from Canada and Mexico.
-  **GOES used to produce cores and laminations in Canada and Mexico comes from many diverse sources; GOES cannot be economically imported because of the steel section 232 tariffs.** Fortunately, there are at least 10 major sources of GOES for manufacturing in Canada and Mexico. This diversity of supply of GOES, which is essential to the viability of manufacturers of cores and laminations, is assured by the multiplicity of supplying countries. Elimination of one or even two steel supply sources would not jeopardize GOES supply; moreover, there is no indication that any GOES source is likely to be cut off any time soon. Thus, there is no threat to national security through disruption of supply of GOES, cores or laminations.
-  **Cores and laminations are solid steel without any potential for introduction of software or remote access mechanisms to influence future performance.** Thus, there can be no threat to national security through foreign control and intervention in the performance of such devices.

-  **The electric transmission grids of the US, Canada and Mexico are linked, assuring mutual security and dependency among the three countries. Imports of cores, laminations or transformers from those countries are no less reliable than domestic production.**
-  **Canada and Mexico have been clearly defined as “reliable” trading partners under the USMCA agreement and through the NATO alliance (Canada).**
-  **The US does not have the production capacity to support total production requirements for inputs for production of Power transformers.**
-  **AK Steel, the only current producer of GOES in North America, prices GOES well above all other global competitors—the current 25 percent tariffs still do not make AK price competitive.** This gap in prices has persisted for years before tariff protection for all steel products under Section 232. Section 232 tariffs are not appropriate to address structural cost disparities. There are other mechanisms to address those concerns.
-  **The main reason for high AK prices is an aberrational cost structure, higher than global competition.** This disparity stems from AK’s failure to modernize its production methods to keep pace with global competition.
-  **Imposing tariffs on transformers or transformer components would be without legal foundation under Section 232. Such trade restrictions would penalize the transformer industry in total.** There would be a disproportionate impact on (loss of) employment in the transformer industry (15,000) compared to (retention of) employment in AK Steel (1,500).

1.0 Introduction

These comments are submitted to the Department of Commerce (“Department”) on behalf of The Core Coalition LLC, a group of companies involved in supplying products included in this investigation of the impact on US national security of imports of laminations for stacked cores and wound cores for incorporation into transformers, electrical transformers and transformer regulators. The Coalition supports the preservation of a competitive market in the US for these products, which depends on continued access for US producers of transformers, and their customers, to fairly traded imports of cores, laminations, transformers and transformer regulators.

This submission responds to the questions propounded in the Department’s notice published on May 19, 2020 (the “initiation notice”).

The Coalition has joined others in requesting a public hearing in this investigation. While the statute does not unconditionally require a public hearing in every case, the breadth of the impact on the US economy of electric energy demands, in the Coalition’s view, a public hearing in this case.

The Coalition believes that imports of stacked and wound cores, laminations, transformer regulators and transformers themselves do not “threaten to impair” the national security and urges the Secretary of Commerce to so find. Our analysis follows.

2.0 Background

Grain Oriented Electrical Steel (GOES) is primarily consumed in the production of transformers. As a result, the impact of imports of downstream products made from GOES necessarily affects the sales of GOES producers. At present, only one GOES producer exists in the US.

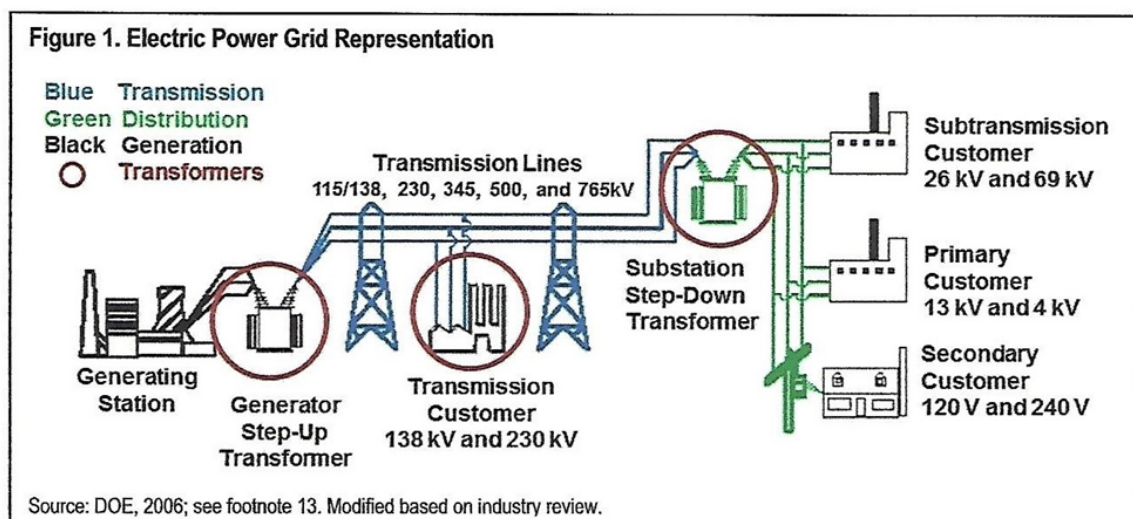
However, the Notice of Initiation did not mention GOES as a subject of this investigation. The Core Coalition notes the fact that GOES is subject to tariffs and quotas under US Presidential Proclamation 9705 and other proclamations, extending steel trade restrictions (quotas and tariffs).

While the Notice is not explicit concerning the products covered by this investigation, it appears to be aimed at transformer components that principally use GOES as a raw material in manufacturing. The notice mentions stacked cores, wound cores, laminations, transformers, and transformer regulators. The importation of the Products could only be actionable under Section 232 if the importation of the Products threatens to impair the national security. Under current and reasonably foreseeable circumstances, however, importation of the Products appears to enhance the global competitiveness of transformer manufacturing in the US rather than threaten it.

By strengthening the competitive position of transformer manufacture in the US, the Core Coalition believes that the national security of the US will be enhanced, not threatened.

The transformer industry for electricity supply and distribution consists of two main parts:

- **Power** transformers, which handle high voltage power typically from generation to a central source of distribution, or sub-station. This is typically known as “the grid”.
- **Distribution** transformers, which handle the distribution of lower voltage power from central points to points of actual usage, such as the pole mount transformers that supply power to our houses.



Transformers are a major part of the electricity grid in the US, which is closely integrated with the grids of both Canada and Mexico to supply reliable and cost-effective power to North American industry.

2.1 Cores

There are two main types of cores used in transformers, and, hence, two types of imported cores. First, cores for Power transformers consist of large assemblies, typically with three “legs” and a height of 5 feet, or more.

Imports of Power transformer cores are lower in quantity (refer to import statistics for stacked cores shown in [Section 2.0](#) and [Appendix 1](#)) because they are very labor intensive. Each of the legs in a stacked core consists of assemblies of stacked GOES strips, precision cut on specialty equipment for maximum efficiency with different strip widths and miter cut joints. It is much more usual for the Power Transformer manufacturers to assemble these cores in-house using special equipment to slit and cut the many specialized dimensions required for the “round” or “cruciform” assemblies on each leg, and the miter cut joints. However, if the cost of labor plus the cost of the GOES raw material makes it economically advantageous, imports of stacked cores can increase.



Thus, it is clear that stacked cores are highly engineered products, not simply a minor conversion of GOES to avoid import tariffs.

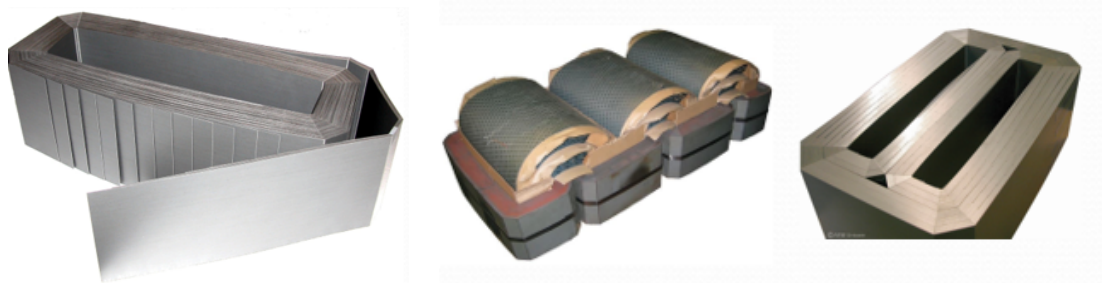


The main volume of GOES consumption (close to 70%) is used in the cores for Distribution transformers (see below). Cores for Distribution transformers are much more numerous because Distribution transformers have a larger share of the transformer market than Power transformers (refer to [Appendix 1](#), Section iii). There are three basic forms of construction for the cores:

- Stamped EI constructions, stacked, and used for smaller transformers
- Cut-to-length constructions, made into a stack
- Distributed Gap (DG) cores, which may be split apart to insert pre-formed copper windings

The advantage of the DG core compared to the other core options is significant. First, the DG core uses GOES that is lower in cost compared to US-produced GOES. In addition, distribution transformers generally make use of lower grades of GOES because Distribution transformers do not require the best grades of GOES. The higher grades are generally used for Power transformers. Second, and perhaps more important, the DG core can be split apart and put back together, which allows transformer manufacturers to make copper coils separately, on automated equipment, not hand wound, and insert them into the steel cores using fast, flexible production cycles.

The cores are called Distributed Gap Cores because the computer controlled cutting of the strips that go into the core distributes the gap inside the core for improved efficiency. Depending on the equipment used to cut and form the core (manufacturing trade names Tranco and Unicore), the final cores are most commonly high temperature annealed for improved performance. Thus, the GOES core assembly is a highly engineered product requiring high capital investment. The biggest element of cost for the typical Distribution transformer (approximately 40%) is the material used for the GOES steel core.



The primary downstream market for Distribution transformers is electric power production. Utility companies that produce and distribute power are tightly regulated by the federal government as well as state public utility commissions. Government regulation of electric utilities keeps their profitability within a relatively narrow range and requires utilities to control costs to an extraordinary degree subject to government oversight. The market for distribution transformers, for this reason, is highly competitive, and is characterized by fixed price contracts for products such as transformers, with cost overruns generally not permitted.

There is also an extensive market for Distribution transformers (primarily dry type) in the private sector, including hospitals, data centers, distribution centers, office buildings, retail



establishments, industrial facilities, oil & gas, and mining operations. Therefore, the market for Distribution transformers and its continuation as a competitive and cost-effective industry has implications for many important sectors of the US economy.

This submission focuses on cores and laminations used to support the Distribution transformer industry.

3.0 Import Data

The BIS Notice did not include the tariff classifications of the Covered Products on which import restrictions might be imposed.

The Coalition received informal notice from government sources about the covered HTSUS classifications in this investigation (which are assumed to be the classifications to be examined for their effects on national security), as follows:

- Laminations for Stacked Cores for Incorporation into Transformers ([8504.90.96.34](#))
- Stacked Cores for Incorporation into Transformers ([8504.90.96.38](#))
- Wound Cores for Incorporation into Transformers ([8504.90.96.42](#))
- Electrical Transformers ([8504.21 – 8504.23](#), [8504.32 – 8504.34](#)) limited to “transformers (liquid and dry), above 1 KVA power handling capacity”
- Transformer Regulators ([9032.89.4000](#))

An annualized summary of values (US\$) for Laminations (8504.90.96.34), Stacked Cores (8504.90.96.38) and Wound Cores (8504.90.96.42) is provided in [Appendix 1](#). Data for the number of units and value per unit is not included since there is a wide range of sizes and values which does not lead to meaningful average data. The volume of GOES included in these Products is a relevant issue for this investigation.

Based on the data in [Appendix 1](#), the Coalition draws these conclusions:

- More than 85% of US imports of Laminations, Stacked cores, and Wound cores, as defined by the HTSUS classifications noted above, (96%, 88% and 98% respectively for 2019) are imported from Mexico and Canada. Imports from other countries account for very small volumes.
- The volume, as measured in US\$, has significantly increased from 2015 to 2020 YTD.

The Coalition used the following assumptions to establish the cost basis for the typical grade of GOES used in an assembly and hence a typical transaction price per MT:

- Laminations are primarily high grade GOES, grade M3 or M3HB
- Stacked cores are primarily M3HB using high precision miter cut assembly processes
- Wound cores are primarily GOES grade M4 using DG core assembly procedures
- Base price of GOES in the value of imports is reflected by the grades assumed above

Using these logical assumptions, the Coalition has been able to estimate the volume, in MT, of GOES imported into the US, by year and Tariff code category, as follows:

Table 1

Estimated Volume of GOES imported into the USA, as cores, stacks and laminations

ESTIMATED TOTAL, metric tons							
	2015 TOTAL	2016 TOTAL	2017 TOTAL	2018 TOTAL	2019 TOTAL	2020 TOT YTD	2020 EST ANN
Laminations	4,525	7,685	5,743	6,664	7,408	1,701	7,156
Stacked cores	349	2,848	5,079	5,241	7,022	1,883	7,755
Wound cores	7,077	22,620	27,447	31,467	53,708	20,372	81,487
TOTAL	11,952	33,153	38,270	43,373	68,137	23,955	96,398

4.0 Apparent Domestic Consumption of GOES in US and North America

AK Steel is the only current producer of GOES in North America. AK Steel, as of 2013, stated its production capacity for GOES at approximately 300K metric tons (MT). Because demand for GOES has moved toward thinner and higher grades than those prevailing in 2013, the capacity of AK Steel to meet current demand is likely to be ~ 12% less, or about 265K MT/yr.

In addition to AK Steel, Allegheny Teledyne Industries (ATI) and Dofasco once produced GOES in North America. ATI ceased production of GOES in 2016. Dofasco ceased production of GOES in 1993. The antiquity of capital equipment, inadequate maintenance, and elimination of production units for GOES at both companies prevents an immediate return to production of GOES at either ATI or Dofasco.

Apparent Consumption, in MT of GOES, is defined as

$$\text{Consumption} = \text{Domestic Production} + \text{Imports} - \text{Exports}$$

Imports and exports are defined by Tariff codes 722511 (coils of a width of 600 mm or more, commonly described as “wide coil”) and 722611 (coils of a width of 600 mm or less, commonly described as “slit coil”).

Consumption data does not capture GOES imported in the form of fully assembled transformers (primarily Power transformers), cores or laminations for transformers. Refer to Table 1, [Section 3.0](#) for the estimated volumes in MT of GOES imported as laminations, stacked cores and wound cores.

Using data from Tariff codes 722511 and 722611 together with estimates of production by AK Steel and ATI (prior to 2016), consumption profiles for the US, Canada, Mexico, and North America may be established as:

Table 2

North America Grain Oriented Consumption, 2000 - 2019

Country/Region		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
USA	Production	285	287	282	287	290	291	304	295	340	338	350	293	302	310	290	305	219	198	213	193
	Consumption	282	252	243	234	215	214	201	173	145	193	233	154	208	269	242	233	193	219	224	175
	Exports	36	62	60	88	112	111	134	152	218	157	149	169	127	72	67	100	62	47	47	46
	Imports	33	27	21	35	37	35	32	30	24	12	32	30	33	31	19	28	36	68	59	28
Canada	Production																				
	Consumption	63	43	44	49	48	46	52	51	44	34	38	43	45	44	53	68	58	88	89	70
	Exports	0	0	0	0	0	1	0	0	2	2	2	2	3	3	3	1	1	1	1	0
	Imports	63	43	44	49	48	47	52	51	46	36	39	45	48	47	56	69	58	88	90	70
Mexico	Production																				
	Consumption	57	45	47	44	51	56	64	70	67	52	41	59	72	80	92	94	97	71	102	120
	Exports	1	1	0	0	2	2	1	1	2	3	9	7	8	10	3	6	5	13	9	7
	Imports	58	45	47	45	53	57	64	71	68	54	50	66	80	89	95	100	102	84	111	127
North America	Production	285	287	282	287	290	291	304	295	340	338	350	293	302	310	290	305	219	198	213	193
	Consumption	402	339	334	327	314	316	317	294	256	279	313	256	325	393	387	395	348	378	416	365
	Exports	37	62	60	88	113	113	136	153	221	161	160	178	138	85	73	107	68	61	57	53
	Imports	154	115	112	128	138	139	149	152	138	102	122	140	162	168	170	197	196	240	260	225

Consumption data for Canada and Mexico is included in addition to the US because, as noted, more than 85% of imported laminations and cores into the US come from Canada and Mexico as direct-pass-throughs, thus influencing total consumption in the US. Comparison of consumption in Tables 1 and 2 permits an estimate of domestic consumption in Canada and Mexico and an overview of consumption in North America.

United States: Consumption of GOES in the US has been erratic over the last 10 years (primarily due to vagaries of the Power transformer industry), averaging about 220K MT/yr. The large drop in 2019 consumption is attributed to replacement of domestic purchases of GOES with imported cores by one major transformer manufacturer. Migration of core manufacturing equipment from the US to Mexico by another supplier had a smaller but significant effect.

AK Steel successfully petitioned to the International Trade Commission (ITC) for anti-dumping and countervailing duties applicable to GOES in 2004, but was unsuccessful in a similar petition in 2014 because the ITC found no material injury by reason of subject imports from Germany, Japan, Poland, China, Korea, the Czech Republic and Russia.

AK Steel lost 50K MT export market to China in 2011 due to Chinese government restrictions. Further reductions in 2012 occurred due to restrictions from Europe and loss of competitiveness in India. Total exports have continued to decrease since 2015, primarily due to an inability to offer competitive pricing (refer to the section on Cost of Production). Thus, under current conditions, AK Steel is not competitive in global markets.

Allegheny Ludlum, a division of ATI, ceased production of regular grain oriented steel (RGO) in early 2016 following loss of export business to China and Europe (2011, 2012) and low prices during 2015, based on high manufacturing costs. As an indication, Allegheny was still ingot casting GOES, a manufacturing process largely viewed as obsolete (with extraordinarily high yield loss) until cessation of production.

Canada and Mexico: Both countries have seen a significant increase in both consumption and imports of GOES since 2015. This is a direct reflection of an increase in core manufacturing in both countries (to take advantage of much lower international prices for GOES).

The country of origin for imports of GOES into Canada and Mexico is shown by:

Table 3

Canada GOES Imports, MT, 2019

	722511	722611	TOTAL
FRANCE	733		733
GERMANY	4,270	174	4,444
ITALY	1	71	72
UNITED KINGDOM	5,824		5,824
SWEDEN	72		72
SWITZERLAND	203		203
CZECH REPUBLIC	300		300
POLAND		81	81
ALBANIA		41	41
RUSSIA	5,986	3,512	9,498
SLOVENIA		93	93
U S A	912	1,698	2,610
BRAZIL	430		430
UAE		9	9
INDIA	2,630		2,630
CHINA	5,105	142	5,247
SOUTH KOREA	16,890		16,890
JAPAN	19,270	1,999	21,269
TOTAL	62,626	7,820	70,446

Mexico GOES Imports, MT, 2019

	722511	722611	TOTAL
FRANCE	79.00		79.00
GERMANY	966.00	45.00	1,011.00
AUSTRIA		11.00	11.00
POLAND	12,604.00	637.00	13,241.00
CZECH REPUBLIC	3,352.00	2.00	3,354.00
RUSSIA	12,139.00	5,233.00	17,372.00
U S A	872.00	111.00	983.00
CANADA	122.00		122.00
BRAZIL	1,472.00	82.00	1,554.00
UAE		1.00	1.00
INDIA	95.00		95.00
CHINA	24,694.00	1,193.00	25,887.00
SOUTH KOREA	5,498.00	118.00	5,616.00
JAPAN	53,980.00	3,542.00	57,522.00
TAIWAN		5.00	5.00
TOTAL	115,873.00	10,980.00	126,853.00

North America While somewhat erratic, consumption of GOES has averaged 375K MT since 2012. It is noted that three new Power transformer manufacturers were established in the US in 2012. Production (at AK Steel) has decreased during this same period, replaced in the main part by imports of GOES rather than imports of transformers.

The Coalition urges the Department to consider the following conclusions from the evidence presented, which we believe are very clear:

- AK Steel might, in theory, have had the capacity to supply additional GOES imported as laminations, stacked and wound cores in 2019 (est. AK production 193K MT, compared with nominal capacity of 265K MT leaves an unused capacity of 72K MT to satisfy estimated import requirements of 68K MT). However, AK does not have the capacity to produce all grades required by the Transformer industry.
- However, the larger estimated import volume for 2020 of 96K MT makes it unlikely that AK has the capacity for both volume and grades to meet all requirements. This also assumes competitive pricing, not injurious to the Transformer industry, which is not the case.
- Average consumption of 375K MT for North America (Table 2) requires imports. AK capacity of 265K MT cannot support all North America requirements.

- Imports of GOES into both Canada and Mexico confirm multiple sources of supply. The elimination of one or even two sources of GOES supply would not jeopardize total GOES availability and therefore does not constitute a threat to supply of cores or laminations to the US. The clear implication is that there is no threat to national security because the market is well-supplied and competitive.
- Unlike telecommunications equipment or other equipment associated with energy and power connections, laminations and cores imported for use in transformers have no potential for threats to US security through such practices as hidden software or remote control algorithms. The US remains the location of final assembly and construction of the transformers. Thus, the potential for a second aspect of a threat to national security, through remote intervention, is essentially invalid.

5.0 Prices for GOES: US, North America, and Global

Average prices, in US \$/MT, for three grades of GOES, by region/country and by year, from 2012 to 2020 YTD, are listed in [Appendix 2 \(Business Confidential Information\)](#). Data for the US is average data for AK Steel (fob) whereas prices for other regions/countries are averages (CFR) for all suppliers within the market region, whether domestic or imported. Data for Imported prices of GOES into the US, including Section 232 tariff at 25%, are not included.

The 3 grades selected are:

- M4 regular grain oriented, otherwise 27G110/105, representative of DG cores for Distribution transformers
- M3 regular grain oriented, otherwise 23G100, representative of large distribution and small Power transformers
- M3 HB grain oriented, otherwise 23GDR080, representative of medium and large Power transformers

The prices provided are estimates, being adjusted averages of noted transactions. In addition to variations between different suppliers, prices vary by quarter and have different adjustment mechanisms based on volume etc.

Chinese prices include domestic VAT at 13%. Of note, VAT for exports from China is 4%. Because this is not a standard trade remedy investigation, whether Chinese or any other foreign production is subsidized or sold at less than “fair value” is not relevant.

AK Steel prices consist of a negotiated annual base plus a monthly variable surcharge (to cover variations in metallics, energy, and labor). An example of the AK Steel monthly surcharge (source: AK Steel Web site) is shown in [Appendix 3](#). AK Steel does not disclose the formula or indices used to establish the surcharge. No other company in the world sells GOES using such a surcharge mechanism.

There are some very clear conclusions from [Appendix 2](#):

- AK prices for all GOES grades in the US are 25% higher or more than prices for similar grades from different suppliers in other parts of the world, including Canada and Mexico. This gap has persisted since long before the 2018 Section 232 tariffs on imported steel, including GOES. AK prices are therefore not globally competitive.
- It is possible for other suppliers with old equipment and high labor costs (TKES in Germany) to reduce costs and be close to competitive with imports of GOES into Europe. Antidumping and countervailing duties in Europe restrict GOES imports. GOES is not included in European safeguard measures imposed in 2019.
- Prices for GOES in China are the lowest observed in the world, indicative of (1) high demand in China, (2) modern production equipment, high efficiencies, (3) low labor costs and (4) favorable currency valuation. The Coalition acknowledges that capital investment follows different “rules” in China, but this does not explain the pricing success of GOES companies in Korea and Japan. Raw material prices, including scrap and alloying elements are similar globally.

6.0 Cost of Production of GOES: US and Global

The Core Coalition has access to a proprietary model which permits comparison of the cash costs of steel production from different suppliers around the world. The model has been used successfully for Cold Rolled steel as well as Non-Oriented Electrical steel (NOES). The model is based on metallurgical knowledge of the individual process steps supported by knowledge from plant visits to individual suppliers. Variable inputs include:

- the cost of the raw materials by region;
- the cost and use of labor;
- the cost of electricity;
- the cost of natural gas;
- the utilization of various elements based on the process flow for various producers;
- the process step yields, and
- the mill operating rates

The costs for the various routing steps were developed based on known costs, and include certain adjustments based on estimates of cost elements where precise data is not available. While we believe that the cost model provides an accurate comparison of the various mills’ performances, the costs are estimates, are not based on any inside information, and were developed independent of producer input. Experience using this model for different types of steel has been that, while not absolute, the model provides relatively accurate comparative data. Thus, reasonably accurate conclusions can be drawn from the use of this model.

Results of the cash cost analysis model, using input data for April 2020, are provided in [Appendix 4. \(Business Confidential Information\)](#). Data are presented for Regular Grain Oriented (RGO) hot rolled coils (HRC) and for finished 0.27 mm (M4) Regular Grain Oriented (RGO) coils (being the primary grade used for Distribution transformers).

Cash costs of production of GOES by AK Steel are significantly higher than most other producers in the world. This is unfortunate, because the quality of GOES from AK is widely regarded as equal to high quality steel from global suppliers. In this market, however, unequal costs for AK are major obstacles to the company supplying GOES in a competitive market.

The reasons for the high costs by AK are:

- AK has an obsolete two-stage high temperature slab reheat process with high yield losses. By comparison, all other producers use a single step slab re-heat and a low temperature slab process, with much lower yield losses.
- AK has an abnormally small slab size, reducing production efficiency
- An obsolete hot strip mill (HSM), dating to the 1950's, with minor upgrades
- A 3-stand tandem cold mill dating to the 1960's, rugged, but with minor upgrades
- 2-stage process for cold reduction of regular grain oriented (RGO) and continuous annealing. By comparison, most other "new" producers use a single stage process, capable of producing higher grade high permeability (HB) grades directly and eliminating production of lower grade RGO.

We are able to draw clear conclusions from the review of AK's cash costs of production and prices:

- The main cause of the high prices for GOES from AK is the company's extraordinarily high cost of production.
- If significant tariffs or other trade restrictions are imposed on cores, laminations and other components to compel transformer producers to buy AK GOES, this will increase transformer producers' domestic costs and lock the US consumers of GOES to a single producer and single source supply chain. This is totally contrary to the maintenance of high levels of national security.
- Based on a review of public information, the only capital investment in GOES during the last 10 years by AK has been installation of a 300-ton electric arc furnace (EAF) to replace 3 much older, smaller EAF's.
- From the Price data, other companies, notably TKES in Germany, have been able to reduce costs (and prices) even with relatively old equipment and high labor costs.
- Imposition of significant tariffs on imported transformers, simultaneous with trade restrictions on cores, laminations, and other components, will deflect the problem of high steel prices to the electric utilities, who have fixed budgets. The imposition of trade restrictions on GOES has already incentivized the movement of transformer components and some transformer production out of the US. Expanding the restrictions will shift the burden to regulated electric utilities and consumers in the US.
- While the Core Coalition realizes that AK is unable to rectify its situation without any (government) assistance, protection against international competition is clearly not the answer. AK must use any assistance to improve its competitive position so that it can survive and thrive in the global market. Section 232, which permits "adjustment" of imports as its sole action, is not suited to the problem at hand.
- The national security of the US is not threatened by imports of transformer components. The market has not been seriously affected by importation of transformer components or completed transformers for a period of more than five years. If unfair trade practices are an issue with respect to these products, the appropriate remedy does not lie in Section 232.

7.0 Properties of GOES from Different Suppliers

We note the following points regarding GOES properties from different producers. These points will be clearly understood and recognized by those experienced in the use and application of GOES:

- AK does not make so-called intermediate MOH grades which are readily available from most Asian suppliers. MOH grades typically exceed 1.86 Tesla B8 magnetic induction and have lower core losses than an RGO GOES grade of similar thickness. By comparison and for reference, RGO grades must exceed 1.80 Tesla B8 magnetic induction, and high permeability HB (or HiB) grades must exceed 1.88 Tesla. AK would argue that substitution of higher grade HB (Hi-B) would provide similar if not better properties, albeit at a much higher price. However, the small performance differences are not sufficient to justify the higher cost for customers, especially not in Distribution and small Power transformers.
- AK does not make mechanically scribed GOES which is uniquely available from Nippon Steel in Japan and used within the US. If significant trade restrictions are imposed under Section 232 for transformers and components, an exemption should be provided for mechanically scribed GOES. Other producers are developing annealable grades specifically for DG core production and similar exclusions would be necessary.
- The current practice by the Chinese and Korean producers is to make and sell a single step HB grade, bypassing two-step production of RGO. This practice means that OEM's can obtain lower grade GOES but receive higher level performance (MOH or HB). Designs have been developed throughout the industry to reflect the advantages of using higher grade but lower cost steels that AK does not offer. The reason that the Chinese and Koreans can do this is because of their significantly lower costs of production. AK's production of RGO would represent a substantial cost increase for transformer producers. Trade protection will never provide AK with the ability to make the major changes necessary for the company to compete in these market segments for transformer manufacture. Section 232 trade restrictions, if imposed on imported cores and laminations, will harm the transformer industry without solving AK's problems.

8.0 Impact on Employment

AK Steel has publicly commented that total employment at Butler, PA and Zanesville, OH plants, responsible for production of GOES and other electrical steel, is 1,500. The Coalition notes that Butler, PA is also responsible for production of stainless steel in volumes almost double that of GOES.

Data from the National Electrical Manufacturers Association (NEMA) indicate direct employment in the transformer industry within the US at approximately 15,000, across nine (9) states.

Thus, it is likely that imposition of trade remedies on imported cores and laminations would have a disproportionate effect on (loss of) employment within the US transformer industry compared to the (retention of) employment within AK Steel.

9.0 Imports of Transformers into the US, 2015 to 2019

9.1 Import Data

Data for Imports of transformers into the US for the years 2015 to 2019 are shown in [Appendices 5.1 – 5.5](#) for the following HTS Tariff Codes:

- 8504.21 Liquid Dielectric Transformers having a power handling capacity not exceeding 650 kVA
- 8504.23 Liquid Dielectric Transformers having a power handling capacity exceeding 10,000 kVA
- 8504.32 Electrical Transformers (NESOI), having a power handling capacity exceeding 1 kVA but not exceeding 16 kVA
- 8504.33 Electrical Transformers (NESOI), having a power handling capacity exceeding 16kVA but not exceeding 500 kVA
- 8504.34 Electrical Transformers (NESOI), having a power handling capacity exceeding 500 kVA

9.2 8504.21 Liquid Dielectric Transformers having a power handling capacity not exceeding 650 kVA

This classification of transformers covers the general classification for liquid filled, small residential pole mount distribution transformers.

The total value of imports for 2019 was \$294M. The highest imports came from Mexico (68.9%) while the combined total imports from Canada and Mexico were 91.9%. Imports from the top 10 countries (of 42 importing countries) provided 94.6% of all imported transformers in this classification.

9.3 8504.23 Liquid Dielectric Transformers having a power handling capacity exceeding 10,000 kVA

This classification of transformers covers the general classification for liquid filled, small, medium, and large power transformers.

The total value of imports for 2019 was \$829M, strongly indicating that the US does not have adequate capacity to produce (large) Power transformers.

The highest imports came from Mexico (29.1%) while the combined total imports from Canada and Mexico were 35.9%. Imports from the top 10 countries (of 23 importing countries) provided 94.6% of all imported transformers in this classification.

9.4 8504.32 Electrical Transformers (NESOI), having a power handling capacity exceeding 1 kVA but not exceeding 16 kVA

This classification of transformers covers the general classification for small, typically dry type transformers, often of standard design.

The total value of imports for 2019 was \$113M, considered low volume. The highest imports came from Mexico (43.0%) while the combined total imports from Canada and Mexico were 52.3%. It is noteworthy that imports from China were 19.2% of the total (indicative of a price sensitive, standard design).

Imports from the top 10 countries (of 42 importing countries) provided 94.7% of all imported transformers in this classification.

9.5 8504.33 Electrical Transformers (NESOI), having a power handling capacity exceeding 16kVA but not exceeding 500 kVA

This classification of transformers covers the general classification for dry type small distribution transformers, often for commercial applications.

The total value of imports for 2019 was \$365M. The highest imports came from Mexico (68.9%) while the combined total imports from Canada and Mexico were 80.0%. Imports from the top 10 countries (of 42 importing countries) provided 98.1% of all imported transformers in this classification.

9.6 8504.34 Electrical Transformers (NESOI), having a power handling capacity exceeding 500 kVA

This classification of transformers covers the general classification for dry type medium and large distribution transformers, often for commercial applications and pad-mounts.

The total value of imports for 2019 was \$135M, considered low volume. The highest imports came from Mexico (38.2%) while the combined total imports from Canada and Mexico were 67.7%. Imports from the top 10 countries (of 36 importing countries) provided 97.7% of all imported transformers in this classification.

9.7 General Comments

Some of the import data includes imports (especially from Mexico) of transformers manufactured by US companies with production divisions in Mexico. While significant in volume, the Coalition has not been able to quantify this from public records. Nevertheless, it is clear that this importation is not a threat to national security.

In addition to confirmation that the US does not have the capacity to supply (large) Power transformers, there is a diversity of supply, notably through NATO alliance countries (Austria, Netherlands, Canada) in addition to countries with strong established trade agreements with the US (Mexico, Taiwan). Thus, the importation of Power transformers does not threaten to impair national security.

10.0 Legal Framework

Section 232 of the Trade Expansion Act of 1962, as amended, needs to be followed closely in order for the President to obtain the authority delegated by Congress to “adjust” imports. The power to impose tariffs belongs to Congress in the first instance. The power delegated in Section 232 is conditioned on compliance with conditions in the statute.

These comments focus on the responsibilities of the Secretary of Commerce under the Statute. First, the circumstances surrounding imports of the products concerned must have a clear nexus to the national security of the US. Second, the circumstances under which the national security of the US would be “impaired” must be identified. Such impairment cannot be merely theoretical: it must be real and it must be significant. Third, the circumstances and/or quantities of imports must “threaten” to impair the national security of the US. The word “threaten” inherently means that the circumstances must be likely to occur and in the near future.

10.1.1 Importation of Covered Products has no nexus to US National Security

Based on the evidence provided in these comments, the nexus to national security from importation of cores, laminations and transformers is non-existent. The Notice of Investigation notes that there is import dependence with respect to electrical steel and the products covered by this investigation. This import dependence has increased recently. The principal reason for that increase is the imposition of 25% tariffs on electrical steel from all major sources (except Korea, which is under a strict quota, again imposed by the US).

The US cannot possibly produce every product needed by the military for defense readiness. Even less plausible is the notion that the US can produce domestically significant volumes and specifications (and consistent quality) to meet the commercial needs of every major steel-consuming industry in the US, such as the industry producing electric transformers and their components. Fortunately, self-sufficiency in those products is not necessary to meet any likely proximate danger to the ability of the country to meet defense needs or vital commercial needs, which, at a minimum, is required to find that imports pose a “threat” to impair national security.

10.1.2 The Coalition finds no plausible circumstance in the foreseeable future that threatens to impair national security.

The Secretary of Commerce must determine, based on the facts before him, that the circumstances that pose a likely and proximate risk of materially impairing the national security. As these comments and others in the record make clear, increased imports of transformer components come principally from Canada and Mexico. There is no plausible scenario where Canada and Mexico will become “unreliable” or “unsafe” sources on which the US cannot depend for vital supplies. In order to make an affirmative finding, the Secretary would have to determine that Canada, a NATO member and approved export destination for nearly all approved products from the US, is likely soon to become “unreliable”. There is no known evidence of this possibility, let alone likelihood. Mexico, while not a NATO ally, is a trusted trading partner which just ratified a major new trade agreement (USMCA) making it one of the most trusted trading partners in the world. Japan, Korea and other countries are also trusted trading partners. None of these countries in the near future is likely to become unreliable, either. The fact that some companies have

shifted production of transformer components to the countries next door is explained completely by the tariffs imposed in 2018 on electrical steel (in combination with already existing high domestic prices).

10.1.3 There is no “threat” to impair national security

The ordinary meaning of “threat” is “something impending”. That ordinary meaning is presumed to be the meaning intended by Congress in Section 232.

The one threat to impair national security is the threat by the one shareholder of the only producer of GOES in the US to cease that production if their demands are not met. The cessation of production of electrical steel is not, by itself, a “threat” to impair national security. Electrical Steel production in the US has no connection to the military or economic health of the US economy. Such a threat could only occur if imports of electrical steel were insufficient to meet US needs for that product. There is no evidence of that circumstance nor, based on the evidence which we have gathered for this proceeding, could there be.

10.1.4 If there were a threat to impair national security, the recommended remedy must include exclusions and exemptions to permit adequate service of the market.

The Coalition has noted one example of an exemption that would be needed for mechanically scribed GOES. In addition, even if a plausible threat to impair national security were identified, a remedy that adjusts imports cannot boost domestic production sufficiently to serve the existing market. Restricting imports through tariffs and quotas would not succeed. A host of American industries would become non-competitive if electricity rates increased sufficiently to cover the costs of tariffs and quotas. Significant exclusions and exemptions from import restrictions would be required.

The Coalition strongly believes that if appropriate exclusions and exemptions were provided, the net result would be a market that strongly resembles the current mix of domestic production and import competition. In short, the only remedy available under Section 232—import restrictions—will not remove any threat to national security that the Department might find.

We therefore urge the Department to conclude that imports of the Covered products do not threaten to impair the national security of the United States.

Appendices

Appendix 1.0

i. Laminations for Stacked Cores for Incorporation into Transformers [\(8504.90.96.34\)](#)

Value (USD)							
Country of origin	2015 TOTAL	2016 TOTAL	2017 TOTAL	2018 TOTAL	2019 TOTAL	2020 TOT YTD	2020 EST ANN
Canada	\$ 163,790	\$ 8,042,853	\$ 8,922,364	\$ 15,327,173	\$ 22,593,352	\$ 5,187,832	\$ 20,751,328
China	\$ 33,983	\$ 31,827	\$ 109,567	\$ 138,242	\$ 38,384	\$ 19,627	\$ 78,508
Czech Republic	\$ -	\$ -	\$ 77,930	\$ -	\$ -	\$ -	\$ -
France	\$ 13,650	\$ -	\$ 269,488	\$ -	\$ -	\$ -	\$ -
Germany	\$ 2,452	\$ 21,557	\$ -	\$ 49,468	\$ 114,886	\$ 33,965	\$ 135,860
India	\$ -	\$ -	\$ 25,219	\$ -	\$ -	\$ -	\$ -
Italy	\$ 311,156	\$ 555,119	\$ 80,520	\$ -	\$ 844,104	\$ -	\$ -
Japan	\$ -	\$ 11,324	\$ 158,240	\$ -	\$ -	\$ -	\$ -
Mexico	\$ 13,867,315	\$ 15,209,600	\$ 8,104,975	\$ 5,275,169	\$ 9,554,616	\$ 1,983,913	\$ 7,935,652
Norway	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Philippines	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 12,262	\$ 49,048
Russia	\$ -	\$ -	\$ -	\$ 29,513	\$ -	\$ -	\$ -
South Korea	\$ 730,486	\$ 703,067	\$ 292,989	\$ 172,895	\$ 130,903	\$ 17,434	\$ 69,736
Taiwan	\$ 8,481	\$ 16,219	\$ 50,131	\$ -	\$ -	\$ -	\$ -
United Kingdom	\$ 28,187	\$ -	\$ -	\$ -	\$ 3,000	\$ -	\$ -
TOTAL \$	\$ 15,159,500	\$ 24,591,566	\$ 18,091,423	\$ 20,992,460	\$ 33,279,245	\$ 7,255,033	\$ 29,020,132
EST TOTAL mTons	4,525	7,685	5,743	6,664	7,408	1,701	7,156

ii. Stacked Cores for Incorporation into Transformers [\(8504.90.96.38\)](#)

Value (USD)							
Country of origin	2015 TOTAL	2016 TOTAL	2017 TOTAL	2018 TOTAL	2019 TOTAL	2020 TOT YTD	2020 EST ANN
Bulgaria	\$ -	\$ 7,819	\$ 105,726	\$ 1,439,464	\$ 1,629,874	\$ 509,968	\$ 2,039,872
Canada	\$ 75,684	\$ 9,022,003	\$ 10,624,193	\$ 7,320,220	\$ 10,909,228	\$ 2,679,082	\$ 10,716,328
China	\$ 181,596	\$ 258,336	\$ 196,063	\$ 193,662	\$ 181,757	\$ 30,736	\$ 122,944
France	\$ -	\$ 18,609	\$ 72,869	\$ 74,022	\$ 74,985	\$ 21,114	\$ 84,456
Germany	\$ -	\$ 20,676	\$ 27,111	\$ -	\$ 35,073	\$ -	\$ -
Hungary	\$ -	\$ 47,197	\$ 122,270	\$ 30,945	\$ -	\$ -	\$ -
India	\$ -	\$ -	\$ 8,261	\$ -	\$ 305,462	\$ -	\$ -
Italy	\$ -	\$ 13,468	\$ 30,410	\$ 144,517	\$ 255,746	\$ 13,628	\$ 54,512
Japan	\$ 90,184	\$ 71,630	\$ 120,747	\$ 185,204	\$ 30,582	\$ 55,116	\$ 220,464
Mexico	\$ 699,871	\$ 247,762	\$ 5,796,218	\$ 8,320,559	\$ 10,342,018	\$ 3,118,110	\$ 12,472,440
Norway	\$ -	\$ 3,062	\$ -	\$ -	\$ -	\$ -	\$ -
Turkey	\$ 228,234	\$ 185,218	\$ 454,294	\$ 373,525	\$ 402,778	\$ 66,886	\$ 267,544
United Arab Em	\$ -	\$ 213,160	\$ 472,433	\$ -	\$ -	\$ -	\$ -
United Kingdom	\$ -	\$ -	\$ -	\$ -	\$ 56,903	\$ -	\$ -
TOTAL	\$ 1,275,569	\$ 10,108,940	\$ 18,030,595	\$ 18,082,118	\$ 24,224,406	\$ 6,494,640	\$ 25,978,560
EST TOTAL mTons	349	2,848	5,079	5,241	7,022	1,883	7,755

iii. Wound Cores for Incorporation into Transformers [\(8504.90.96.42\)](#)

Value (USD)							
Country of origin	2015 TOTAL	2016 TOTAL	2017 TOTAL	2018 TOTAL	2019 TOTAL	2020 TOT YTD	2020 EST ANN
Bulgaria	\$ -	\$ -			\$ 224,524	\$ 12,991	\$ 51,964
Canada	\$ 1,120,090	\$ 45,387,860	\$ 59,081,724	\$ 63,660,356	\$ 75,764,327	\$ 26,763,821	\$ 107,055,284
China	\$ 1,379,431	\$ 1,287,760	\$ 1,656,628	\$ 582,658	\$ 280,726	\$ 53,525	\$ 214,100
France	\$ 5,707	\$ 8,692	\$ 218,400	\$ 65,138	\$ 67,592	\$ 8,821	\$ 35,284
Germany	\$ 40,641	\$ 46,654	\$ 124,191	\$ 72,879	\$ 106,937	\$ 94,456	\$ 377,824
India	\$ 156,641	\$ 84,570	\$ 163,397	\$ 419,161	\$ 320,938	\$ 27,606	\$ 110,424
Italy	\$ 19,106	\$ -	\$ 470,560	\$ 20,500	\$ 13,482	\$ 17,041	\$ 68,164
Japan	\$ 342,968	\$ 373,242	\$ 243,960	\$ 349,755	\$ 1,018,647	\$ 200,099	\$ 800,396
Mexico	\$ 17,087,483	\$ 17,099,142	\$ 11,208,891	\$ 20,512,802	\$ 64,259,215	\$ 26,621,873	\$ 106,487,492
Norway	\$ 317,440	\$ 25,179	\$ -	\$ -	\$ 82,378	\$ -	\$ -
Poland	\$ 287,156	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Spain	\$ 9,317	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
South Korea	\$ -	\$ 9,521	\$ 776,009	\$ 714,691	\$ -	\$ 179,625	\$ 718,500
Taiwan	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,850	\$ 11,400
Thailand	\$ 111,306	\$ 144,623	\$ 163,606	\$ 137,607	\$ 68,053	\$ 2,576	\$ 10,304
United Kingdom	\$ -	\$ -	\$ -	\$ -	\$ 119,051	\$ -	\$ -
TOTAL \$\$	\$ 20,877,286	\$ 64,467,243	\$ 74,107,366	\$ 86,535,547	\$ 142,325,870	\$ 53,985,284	\$ 215,941,136
EST TOTAL mTONS	7,077	22,620	27,447	31,467	53,708	20,372	81,487

Appendix 2.0

BUSINESS CONFIDENTIAL INFORMATION

[The information in this Appendix is not publicly available and its public release would damage the competitive position of companies supplying products and information to the Core Coalition, its members, and affiliates. Confidential treatment is requested. See 15 CFR § 705.6.]

Appendix 3.0

 Electrical Steel Raw Material Surcharge 2020 Surcharges Quoted in \$/Net Ton												
<u>Electrical Steels</u>	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug</u>	<u>Sept</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
Grain Oriented	\$105	\$140	\$180	\$165	\$180	\$140	\$195	\$195				
TRAN-COR® H	\$105	\$140	\$180	\$165	\$180	\$140	\$195	\$195				
Nonoriented	\$105	\$140	\$180	\$165	\$180	\$140	\$195	\$195				
www.aksteel.com ©2020 AK Steel Corporation. All rights reserved												

Source: AK Steel web-site

Appendix 4.0

BUSINESS CONFIDENTIAL INFORMATION

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Appendix 5.0

Appendix 5.1

Import Statistics (sorted based on 2019 data)

HTS 8504.21 Liquid Dielectric Transformers having a power handling capacity not exceeding 650 kVA

Customs Value, \$US

Country of Origin	Year 2015	Year 2016	Year 2017	Year 2018	Year 2019	% of Total
Mexico	182,030,388	157,691,490	168,425,867	188,687,748	202,671,177	68.9%
Canada	76,596,272	73,073,832	68,575,455	72,283,181	67,658,923	23.0%
Taiwan	1,913,436	3,544,144	8,113,958	3,319,580	7,389,427	2.5%
Spain	6,970	31,508	8,389	1,099,830	2,390,298	0.8%
China	1,536,780	1,031,710	2,762,364	3,613,628	2,138,268	0.7%
Brazil	360,290	64,592	232,349	2,420,672	2,125,731	0.7%
Croatia	-	37,869	168,108	557,741	1,981,373	0.7%
Germany	787,075	959,972	1,701,738	1,151,210	1,534,535	0.5%
Sweden	667,106	159,081	18,852	366,348	1,532,384	0.5%
Austria	31,218	297,310	283,153	669,761	1,286,934	0.4%
Indonesia	-	-	-	422,337	734,112	0.2%
Japan	1,063,603	234,602	435,933	444,725	639,735	
Italy	750,168	154,884	60,690	157,808	433,367	
Colombia	696,958	606,151	423,960	583,754	347,930	
Switzerland	62,540	93,845	493,310	479,361	243,046	
Poland	-	-	25,635	43,790	196,771	
India	442,674	17,600	251,628	534,821	151,157	
Czech Republic	48,210	62,976	157,046	215,554	132,236	
Israel	3,300	-	433,633	237,387	111,456	
Thailand	136,659	38,995	45,095	78,960	102,027	
France	869,185	1,665,279	311,358	324,875	96,115	
United Kingdom	588,176	27,671	48,307	97,952	46,212	
Philippines	673,181	909,234	1,315,753	872,716	41,117	
Finland	-	-	41,394	21,726	39,708	
Denmark	939,042	-	24,900	27,541	18,504	
Norway	28,936	43,292	10,887	18,607	14,557	
Netherlands	3,433	118,000	10,641	17,976	13,461	
Hungary	-	-	276,078	720,824	10,143	
Singapore	14,173	-	-	12,153	8,000	
Malaysia	-	3,525	26,898	2,870	6,986	
Portugal	-	-	18,900	-	5,855	
Ukraine	-	23,632	-	2,600	3,800	
Australia	7,372	9,055	-	-	2,018	
Belgium	72,050	-	-	-	-	
Chile	-	6,087	-	-	-	
Greece	-	-	81,500	-	-	
Hong Kong	10,299	96,228	2,531	225,302	-	
Ireland	-	3,367	5,655	-	-	
Slovakia	40,841	-	9,664	-	-	
Slovenia	3,320	2,745	-	-	-	
Turkey	-	10,400	-	-	-	
United Arab Em	30,000	-	-	-	-	
TOTAL	270,413,655	241,019,076	254,801,629	279,713,338	294,107,363	

Appendix 5.2

Import Statistics (sorted based on 2019 data)

HTS 8504.23, Liquid Dielectric Transformers having a power handling capacity exceeding 10,000 KVA

Customs Value, \$US

Country	Year 2015	Year 2016	Year 2017	Year 2018	Year 2019	% of Total
Mexico	265,233,586	197,402,490	170,796,799	195,371,628	241,559,712	29.1%
Austria	88,877,056	128,140,688	104,864,802	114,157,411	216,319,791	26.1%
Netherlands	90,469,239	124,618,079	98,751,258	123,191,897	89,375,068	10.8%
Canada	99,162,089	72,635,540	54,180,193	50,164,378	56,040,700	6.8%
Taiwan	36,181,348	34,179,191	17,868,550	32,687,519	43,235,180	5.2%
Germany	20,494,087	42,629,096	51,619,104	64,528,785	38,162,798	4.6%
Portugal	14,672,154	8,534,928	14,355,901	6,513,174	30,320,005	3.7%
Brazil	10,834,753	18,119,102	30,932,975	11,152,882	22,387,381	2.7%
Poland	7,028,820	14,915,325	15,990,707	14,732,772	17,189,755	2.1%
China	50,722,982	29,637,697	18,864,854	25,908,236	15,338,607	1.9%
Croatia	6,808,990	8,730,624	-	11,855,211	14,562,153	1.8%
Japan	3,775,497	4,319,881	2,495,258	-	8,034,929	
Italy	26,687,762	3,677,073	3,501,300	2,596,630	7,929,785	
Colombia	3,428,929	7,066,167	2,891,391	13,851,079	7,002,625	
Turkey	-	490,500	977,000	1,857,528	6,575,499	
Finland	-	4,230,440	1,408,700	2,841,126	6,112,096	
Belgium	5,561,483	1,812,172	7,024,311	-	3,911,671	
India	-	5,633,078	-	1,620,539	3,065,827	
Spain	38,133,942	40,463,041	18,679,867	31,632,443	1,765,159	
France	350,112	-	-	-	-	
Israel	2,944,100	12,355,261	-	-	-	
Sweden	42,592,668	1,188,721	-	-	-	
Switzerland	1,294,420	-	-	-	-	
TOTAL	815,254,017	760,779,094	615,202,970	704,663,238	828,888,741	

Appendix 5.3

Import Statistics (sorted based on 2019 data)

**HTS 8504.32, Electrical Transformers NESOI*, having a power handling capacity exceeding 1kVA
but not exceeding 16kVA, Customs Value \$US**

Country of Origin	Year 2015	Year 2016	Year 2017	Year 2018	Year 2019	% of Total
Mexico	36,723,218	40,314,631	35,728,232	46,934,114	48,677,240	43.0%
China	31,081,500	33,641,788	32,117,330	23,983,750	21,674,753	19.2%
Canada	8,161,201	8,358,407	8,641,135	8,958,689	10,528,202	9.3%
Germany	6,461,612	6,577,849	4,796,960	6,978,310	6,258,155	5.5%
Philippines	4,710,567	3,597,229	3,572,991	4,376,617	4,894,959	4.3%
Taiwan	4,202,972	3,740,118	2,822,616	3,406,499	3,674,355	3.2%
Japan	6,821,026	5,625,421	6,975,394	2,960,354	3,355,630	3.0%
India	1,403,075	1,470,739	1,757,443	1,976,806	2,436,782	2.2%
France	1,613,484	3,236,533	2,165,206	1,577,117	2,292,256	2.0%
United Kingdom	2,770,793	1,907,723	2,767,527	2,930,343	2,098,462	1.9%
Israel	98,268	70,550	740,486	567,801	1,293,564	1.1%
Russia	511,353	553,264	927,978	461,463	789,767	
Poland	210,798	15,423	29,943	93,476	714,127	
Denmark	1,445,444	807,633	861,217	635,760	602,369	
Italy	320,402	148,521	667,589	441,161	563,970	
Indonesia	618,467	548,625	691,648	508,496	481,058	
Malaysia	1,603,922	1,797,734	1,950,489	1,945,739	479,599	
Switzerland	1,268,094	386,937	258,632	748,308	411,300	
Turkey	8,275	70,000	16,899	-	403,277	
Netherlands	341,762	258,958	302,382	652,095	378,411	
Sweden	101,830	153,805	256,290	44,848	299,091	
Czech Republic	242,920	85,989	367,514	320,254	181,079	
Finland	65,766	46,323	608,404	66,330	161,769	
Singapore	345,503	72,129	9,450	32,407	151,485	
Thailand	17,152	15,949	2,507	41,730	70,440	
Austria	186,549	32,432	88,592	50,577	68,871	
Spain	329,035	160,741	74,304	340,224	65,175	
Romania	72,614	28,820	58,545	64,378	37,412	
Slovakia	-	33,278	182,932	58,524	32,764	
Australia	-	3,620	-	3,495	19,042	
Brazil	-	3,186	30,027	12,515	16,808	
Hungary	-	27,710	-	11,727	8,434	
Belgium	15,200	40,238	26,547	44,401	8,414	
United Arab Em	-	-	-	-	5,506	
Norway	32,274	109,732	54,337	28,189	5,338	
Hong Kong	78,452	117,475	85,831	153,168	4,257	
Egypt	-	-	-	4,000	-	
Greece	5,560	-	-	-	-	
Ireland	36,450	-	-	-	-	
Luxembourg	11,971	6,308	-	-	-	
Slovenia	-	3,171	-	-	-	
TOTAL	111,917,509	114,068,989	109,637,377	111,413,665	113,144,121	

* = Not Elsewhere Specified or Included or Not Elsewhere

Appendix 5.4

Import Statistics (sorted based on 2019 data)

**HTS 8504.33, Electrical Transformers NESOI*, having a power handling capacity exceeding 16 kVA
but not exceeding 500kVA, Customs Value \$US**

Country of Origin	Year 2015	Year 2016	Year 2017	Year 2018	Year 2019	% of Total
Mexico	219,410,672	220,477,132	241,517,663	253,032,838	251,182,056	68.9%
Canada	36,810,354	34,877,803	43,449,455	36,863,454	40,613,544	11.1%
France	16,183,187	16,248,182	16,955,556	16,516,402	15,539,799	4.3%
India	5,165,771	17,533,651	15,808,237	15,191,541	14,703,213	4.0%
Germany	9,411,731	8,761,646	9,276,625	9,834,474	7,155,521	2.0%
Israel	72,939	20,993	2,608,727	9,112,261	6,801,895	1.9%
Denmark	2,884,309	4,450,835	1,788,963	3,250,672	6,173,677	1.7%
China	5,129,773	5,794,007	6,232,833	6,637,833	4,885,186	1.3%
Japan	3,238,061	1,829,328	10,903,122	9,481,373	4,733,196	1.3%
Italy	2,847,502	2,619,019	2,055,358	1,670,833	4,220,046	1.2%
Switzerland	687,401	862,198	1,210,452	1,486,070	1,684,741	0.5%
United Kingdom	1,265,113	768,265	1,375,222	1,094,725	1,325,318	
Spain	649,877	1,385,343	2,386,156	2,156,884	1,052,729	
Hungary	97,211	8,622	145,367	845,902	1,047,672	
Austria	231,566	79,108	713,741	419,811	875,198	
Singapore	-	93,733	540,741	1,677,107	371,673	
Philippines	629,986	305,133	155,209	305,248	320,610	
Taiwan	1,479,215	1,199,852	615,599	2,183,607	316,643	
Brazil	-	-	28,618	94,078	315,078	
Turkey	55,456	35,639	1,848,251	77,872	292,126	
Finland	325,183	137,100	14,126	97,092	217,945	
Poland	38,261	69,112	4,718	21,977	135,491	
Australia	18,040	55,399	25,936	166,940	120,365	
Sweden	243,184	77,626	151,037	205,542	119,065	
Netherlands	341,064	198,512	110,794	362,893	85,660	
Ireland	-	262,230	17,500	177,517	64,418	
Slovenia	183,859	136,194	138,919	118,045	43,845	
Malaysia	97,385	130,647	91,029	2,424	31,919	
Norway	309,055	117,876	170,526	16,233	31,594	
Belgium	5,050	3,000	8,753	-	28,453	
Czech Republic	950,969	1,312,040	1,647,334	1,442,877	24,544	
Indonesia	-	19,545	-	-	10,036	
Romania	24,772	4,728	5,477	12,400	10,016	
Ukraine	-	-	15,300	-	4,850	
Russia	-	-	-	-	3,903	
Hong Kong	175,053	61,779	300,000	197,425	3,789	
Argentina	-	8,000	-	-	-	
Colombia	251,166	20,000	-	-	-	
Egypt	-	-	-	40,000	-	
Portugal	-	39,050	-	-	-	
Thailand	9,490	520,000	237,002	15,562	-	
United Arab Em	-	-	5,322	-	-	
TOTAL	309,222,655	320,523,327	362,559,668	374,809,912	364,545,814	

* = Not Elsewhere Specified or Included or Not Elsewhere

Appendix 5.5

Import Statistics (sorted based on 2019 data)

HTS 8504.34, Electrical Transformers NESOI*, having a power handling capacity exceeding 500 kVA

Customs Value \$US

Country of Origin	Year 2015	Year 2016	Year 2017	Year 2018	Year 2019	% of Total
Mexico	32,975,425	21,095,279	25,896,326	30,859,623	51,566,150	38.2%
Canada	33,436,347	31,418,155	36,055,474	37,106,238	39,801,205	29.5%
China	11,215,788	8,611,086	10,412,523	16,801,956	16,572,659	12.3%
Germany	5,699,552	8,725,265	2,947,459	3,746,433	6,595,275	4.9%
Japan	23,040,936	23,052,360	8,559,363	10,372,194	3,655,484	2.7%
Spain	1,900,852	222,256	2,619,817	3,491,933	3,598,265	2.7%
Israel	6,800	3,098,632	11,738,577	6,207,526	3,198,767	2.4%
Finland	888,996	1,858,555	820,143	244,222	2,324,206	1.7%
Colombia	-	-	1,881,135	150,053	1,778,336	1.3%
Malaysia	26,113	59,975	304,519	144,844	1,600,638	1.2%
India	1,550,699	205,319	128,950	1,419,718	1,175,938	0.9%
Turkey	493,400	546,530	488,938	1,770,714	999,014	
Switzerland	17,453,435	1,997,831	808,763	3,411	602,732	
France	629,176	536,929	1,988,037	102,391	472,370	
Norway	14,435,602	28,050	148,771	74,953	257,829	
Denmark	350,764	149,058	157,570	579,305	131,128	
Sweden	141,663	330,545	52,517	35,732	127,512	
Austria	24,937	35,127	255,556	-	126,919	
Italy	3,947,567	2,111,868	513,447	496,701	120,980	
Brazil	-	1,050,043	24,065	2,721,244	52,117	
United Kingdom	27,101	306,178	168,680	498,138	43,862	
Hong Kong	61,766	23,208	115,024	532,264	43,561	
Poland	86,009	45,611	110,314	110,312	35,503	
Taiwan	94,864	29,217	46,212	34,323	17,208	
Romania	3,616	-	24,382	-	16,580	
Netherlands	12,625	9,264	7,129	-	7,656	
Singapore	1,556,279	-	29,000	8,000	4,000	
Ireland	-	-	-	-	3,975	
Australia	651,671	-	-	2,500	-	
Belgium	-	482,960	-	-	-	
Chile	-	-	-	111,842	-	
Czech Republic	7,794	-	2,034	-	-	
Hungary	-	-	115,491	28,016	-	
Philippines	-	-	-	4,045	-	
Slovenia	8,470	-	-	-	-	
Thailand	-	4,952	2,442	-	-	
TOTAL	150,728,247	106,034,253	106,422,658	117,658,631	134,929,869	

* = Not Elsewhere Specified or Included or Not Elsewhere