

1970

**UNITED STATES TARIFF COMMISSION**

**ELECTROLYTIC CAPACITORS:  
ION CAPACITOR CORPORATION  
Columbia City, Indiana**

**Report to the President on Investigation No. TEA-F-11 Under  
Section 301(c)(1) of the Trade Expansion Act of 1962**



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Note.--The whole of the Commission's report to the President may not be made public since it contains certain information that could result in the disclosure of the operations of an individual concern. This published report is the same as the report to the President, except that the above-mentioned information has been omitted. Such omissions are indicated by asterisks.



REPORT TO THE PRESIDENT

U.S. Tariff Commission  
August 21, 1970

To the President:

In accordance with section 301(f)(1) of the Trade Expansion Act of 1962 (76 Stat. 885), the U.S. Tariff Commission herein reports the results of an investigation made under section 301(c)(1) of the Act in response to a petition filed by a firm.

On June 23, 1970, the Ion Capacitor Corporation of Columbia City, Indiana, filed a petition for a determination of its eligibility to apply for adjustment assistance. The Commission instituted an investigation (TEA-F-11) on June 29, 1970, to determine whether, as a result in major part of concessions granted under trade agreements, certain electrolytic capacitors, like or directly competitive with articles produced by the aforementioned firm, are being imported into the United States in such increased quantities as to cause, or threaten to cause, serious injury to such firm.

Public notice of this investigation was given in the Federal Register (35 F.R. 10877) on July 3, 1970. No public hearing was requested, and none was held.

In the course of its investigation, the Commission obtained information in the field, from its files, and from data submitted by domestic producers and consumers of certain electrolytic capacitors.

## Finding of the Commission

On the basis of its investigation, the Commission, being equally divided, 1/ makes no finding under section 301(c)(1) of the Trade Expansion Act of 1962 with respect to whether articles like or directly competitive with certain electrolytic capacitors produced by the Ion Capacitor Corporation, Columbia City, Indiana, are, as a result in major part of concessions granted under trade agreements, being imported into the United States in such increased quantities as to cause, or threaten to cause, serious injury to that firm.

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1/ Commissioners Sutton and Leonard voted in the negative; Commissioners Clubb and Moore voted in the affirmative.

## Views of Commissioners Sutton and Leonard

This investigation was instituted on petition of the Ion Capacitor Corporation of Columbia City, Indiana, under section 301(c)(1) of the Trade Expansion Act of 1962. In our judgment, all of the criteria established by that section respecting petitions by firms requesting determination of their eligibility to apply for adjustment assistance have not been met. We have, therefore, made a negative determination.

The Ion Capacitor Corporation (hereinafter referred to as Ion) manufactures high-voltage, twist-lug, aluminum electrolytic capacitors. Capacitors of that type are used in a variety of electronic consumer products, such as television receivers, radios, phonographs, and tape recorders. There is little question that Ion is being seriously injured. Its sales have recently declined sharply, and its employment is down materially. \* \* \* There also is little question that U.S. imports of articles like or directly competitive with those produced by Ion have increased greatly in recent years. \* \* \* The evidence, therefore, supports the view that U.S. imports of capacitors competitive with those produced by Ion are being imported in increased quantities. \* \* \* Item 807.00 provides special tariff treatment for articles assembled abroad in whole or in part of fabricated components which are the product of the United States. Such articles are subject to duty upon the value of the imported article less the cost or value of such U.S. components. Although the duty-free entry of the U.S. component is not the result of a trade-agreement concession, the trade-agreement rate of duty applies to the value added abroad. \* \* \*

In this regard, we hold that the like or directly competitive products, for purposes of this investigation, must be limited to capacitors substitutable for those produced by Ion, i.e., high-voltage aluminum capacitors. Section 405(4) of the Trade Expansion Act of 1962, which provides that under specified circumstances an imported article is directly competitive with a domestic article at an earlier or later stage of processing, is not applicable here. The cost of the high-voltage aluminum capacitors in a television receiver--perhaps \$2.50 in a color set and \$0.90 in a monochrome set--is a very small part of the total cost of the receiver. Consequently, it would stretch reason--under the provisions of section 405(4)--to regard television receivers and other electronic consumer products as directly competitive with capacitors, and to take account of imports of such consumer electronic products in the case at hand.

Although \* \* \* imports of capacitors competitive with those produced by Ion have increased, we are unable to find that the increased imports have resulted in major part from trade-agreement concessions. The rate of duty applicable to capacitors in the Tariff Act of 1930 was 35 percent ad valorem. The major trade-agreement concessions thereon were granted in 1939, 1948, and 1951--resulting in duty reductions to 25 percent, 15 percent, and 12-1/2 percent ad valorem, respectively. Although a more recent concession was granted in the Kennedy Round, it has resulted thus far in only a minor reduction in the rate of duty--from 12-1/2 percent to 11 percent ad valorem. As noted earlier, official data on U.S. imports of high-voltage aluminum capacitors are not available. Most of



the increased imports of such capacitors, however, are known to have occurred in recent years. Such recent increases in imports could scarcely have been caused in major part by trade-agreement concessions granted two to three decades earlier, and the recent Kennedy Round concessions were too trifling to have been the major cause. In the light of these circumstances, we have made a negative determination.

Since 1930, the rate of duty applicable to high-voltage aluminum capacitors has been reduced progressively from 35 percent to 11 percent ad valorem, and it is scheduled to be further reduced to 10 percent by 1971. As indicated earlier, Ion Capacitor lost substantial sales in 1969 and 1970 to imports of capacitors which were assembled abroad from U.S. components and imported into the United States under TSUS item 807.00.

\* \* \* \* \*

\* \* \* It is clear \* \* \* that increased imports of high-voltage capacitors which sell for less than those produced by Ion Capacitor Corporation have resulted in major part from trade-agreement concessions.

#### Threat of injury

Without question, this requirement has been met. \* \* \* Average employment was reduced \* \* \* [in 1969-70]. Sales declined from \* \* \* in 1968 to \* \* \* in 1969; \* \* \*.

The company is threatened with serious injury. \* \* \*

#### Major factor

The previous requirements having been met, the final requirement is that the imports resulting in major part from tariff concessions must be the major factor causing or threatening the serious injury.

In order to resolve this issue, we believe the following question should be asked:

Except for increased imports of high-voltage, twist-lug, aluminum electrolytic capacitors under TSUS item 807.00 and in television sets, would Ion Capacitor Corporation be threatened with serious injury?

We think not. We believe the increased imports have been the major factor in threatening to cause serious injury to Ion Capacitor Corporation.

\* \* \* Had there been no tariff concessions and had the 1930 rate applied, \* \* \*. Penetration of the domestic market would probably have been at a lower level, leaving the petitioner a greater share of the market and a longer period of time within which to make necessary adjustments. The resulting increased productivity would, in turn, have lowered the petitioner's unit cost, permitting him to compete more effectively with the imported article.

It is clear, therefore, that for the purposes of this requirement, increased imports have been the major factor in threatening injury to the petitioner.

#### Conclusion

The Ion Capacitor Corporation has petitioned for adjustment assistance to seek means of using its production processes and equipment to enter other markets. We find that the petitioner has met the requirements of the Act, and we believe that the firm is entitled to apply for adjustment assistance.



## INFORMATION OBTAINED IN THE INVESTIGATION

## Description of the Articles Under Investigation

Ion Capacitor Corporation manufactures high voltage aluminum electrolytic capacitors, principally of the twist-lug, multi-section type, used in direct current (DC) circuits. They are used in TV sets, radios, phonographs, and tape recorders to produce a pure DC current for proper function of these electronic devices; they do this by trapping and storing the unwanted currents accompanying the DC current which reaches them.

Capacitors consist of an assemblage of two conductors of electrical energy separated by a nonconducting material--such as air, mica, oil, paper, or mylar--known as a dielectric. In an electrolytic capacitor for DC use, the dielectric consists of an oxide coating on one metal conductor (the anode); the cathode consists of paper impregnated with a wet electrolyte backed by metal. The metal conductors in electrolytic capacitors are generally of aluminum or tantalum foil. A multi-section electrolytic capacitor has two to four anodes in one unit, using a common cathode; this type of capacitor is generally the twist-lug type, permitting ease of attachment to the chassis of the electronic equipment.

Capacitors are used to store electrical energy. Their capacity to do so depends on many factors, including the materials used, and the thickness and surface area of the dielectric. Electrolytic capacitors have a greater capacity for storage than most other types.

Tantalum capacitors--more expensive than aluminum--are highly dependable in low voltage use and are used extensively for military purposes.

The high voltage (150 volts and above) aluminum electrolytic capacitors made by Ion Capacitor Corporation are unique in that one conducting strip, the anode, is made of a fine cotton gauze sprayed with 99.99 percent pure molten aluminum which dries to form a rough coating. The aluminum-coated gauze, or "spray plate," while thicker than the chemically etched aluminum foil that is used by other manufacturers (0.011-0.012 inch as compared with as little as 0.0025 inch for the foil), has a larger surface area because of the deeper troughs. The larger surface area gives the spray plate 30 percent more capacity for a given length and width of conducting strip; additionally, the oxide coating later formed does not fill in the deep troughs as it does the shallow troughs in etched foil.

\* \* \* \* \*

Capacitors range in price from mils for the small nonelectrolytic, low voltage types with lease capacitance to dollars for the special purpose electrolytic types. Aluminum electrolytic capacitors are priced at pennies up to about a quarter for the small, low voltage types, and up to about 60 cents for the low voltage twist-lug type. The high voltage, twist-lug, aluminum electrolytic capacitors for TV and radio use, like those generally made by Ion Capacitor Corporation, range from about 40 cents to \$1.00, depending on capacitance and number of sections; those manufactured for computer use are made to much greater dependability standards and are priced in dollars.

Electrolytic capacitors of the same specifications are essentially equal in performance regardless of manufacturer, and sales, within the limits of the usual buyer-seller relationship, are based on price. A buyer announces his requirements to his suppliers, or would-be suppliers, receives bids in return, and makes his choice.

#### U.S. Tariff Treatment

High voltage, twist-lug, aluminum electrolytic capacitors are dutiable as "electrical capacitors" under item 685.80 of the Tariff Schedules of the United States. The rate of duty is currently 11 percent ad valorem, which is 69 percent less than the statutory rate of 35 percent established under the Tariff Act of 1930. The duties on television receivers and tube-type radio receivers, the principal articles in which high voltage, twist-lug, aluminum electrolytic capacitors are used, have been reduced from a statutory rate of 35 percent to 7 percent and 8-1/2 percent, respectively. The intermediate rates established by various trade agreements, and the

reduction scheduled under the Kennedy Round of the General Agreement on Tariffs and Trade (GATT), are indicated in the following table:

(Rate in percent ad valorem)

Tariff Act or Trade Agreement	Effective date	Capacitors (TSUS item 685.80)	Television receivers (TSUS item: 685.20)	Radio receivers (TSUS item: 685.25)
Tariff Act of 1930	June 1930	35	<u>2</u> /35	35
Bilateral Agreement with United Kingdom	Jan. 1939	25	<u>2</u> /25	25
GATT, Geneva	Jan. 1948	15	15	15
GATT, Torquay	June 1951	12-1/2	12-1/2	12-1/2
GATT, Geneva	June 1956	<u>3</u> /	11-1/2	11-1/2
	June 1957	<u>3</u> /	11	<u>3</u> /
	June 1958	<u>3</u> /	10-1/2	10-1/2
GATT, Geneva	July 1962	<u>3</u> /	10	<u>3</u> /
TSUS	Aug. 1963	12-1/2	10	12-1/2
GATT, Kennedy Round	Jan. 1968	12	9	11
	Jan. 1969	11	8	10
	Jan. 1970	11	7	8-1/2
	Jan. 1971	10	6	7
	Jan. 1972	10	5	6

1/ Except tubeless.

2/ Included as radio apparatus.

3/ No change.

Other products (radio-phonograph and radio-television-phonograph combinations, phonographs, and tape recorders) which use capacitors like or directly competitive with Ion's, dutiable in the Tariff Act of 1930 at 27-1/2 percent to 35 percent ad valorem, are currently dutiable at ad valorem rates of 8 percent to 9.5 percent.



## U.S. Shipments

Aluminum electrolytic capacitors of all types

Shipments of all types of aluminum electrolytic capacitors by domestic manufacturers fluctuated between a low of 179 million units and a high of 237 million units a year in 1965-69, and averaged 200 million units in that period. The value of shipments in 1965-69 ranged from \$77 million to \$97 million per year. The average unit value increased from 39 cents in 1965 to 45 cents in 1969. Annual data, as reported by BDSA, U.S. Department of Commerce, are as follows:

	<u>Quantity</u> (1,000 units)	<u>Value</u> (1,000 dollars)	<u>Unit value</u> (dollars)
1965	210,006	82,200	\$0.39
1966	237,240	97,204	.41
1967	178,889	76,950	.43
1968	188,241	78,577	.42
	*	*	*

High voltage, twist-lug, aluminum electrolytic capacitors

Factory shipments to domestic customers of high voltage, twist-lug, aluminum electrolytic capacitors, which are like or directly competitive with the type manufactured by Ion Capacitor Corporation, until 1968 consisted of units made wholly in the United States. Shipments of such capacitors made partly in the United States and partly abroad were begun in 1968.

Shipments of capacitors made wholly in the United States---Shipments of wholly U.S.-made capacitors declined from an estimated 26.7 million units in 1967 to 23.1 million units in 1969; shipments in

January-June 1970 were about one-third lower than the same period of the previous year. Estimated shipments are indicated on the following table: 1/

<u>Year</u>	<u>Wholly U.S. Product</u>		<u>Average unit value</u>
	<u>Quantity</u> (1,000 units)	<u>Value</u> (1,000 dollars)	
1967	26,696	18,658	.70
1968	26,447	18,218	.69
1969	23,136	15,475	.67
Jan.-June:			
1969	12,351	8,164	.66
1970	8,233	5,611	.68

Shipments of capacitors made partly in the United States and partly abroad.--Shipments of high voltage twist-lug aluminum electrolytic capacitors that are produced partly in the United States and partly outside the United States (under provisions of TSUS items 806.30-807.00) were initiated in 1968. They tripled in 1969, and continued to increase in January-June 1970, \* \* \*.

#### U.S. Imports

Capacitors are imported into the United States separately, and are also imported already installed in electronic products.

#### Imports of capacitors entered separately

Total imports of capacitors have increased almost without interruption in each year since 1965. As compared with \$15.5 million in 1965, they were valued at \$23.3 million in 1967 and \$31.8 million in 1969. They were valued at \$15.3 million in the first 6 months of

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1/ \* \* \* \*

1970, when they were about the same as in the corresponding months of the previous year. Most of the increase since 1967, as shown in table 1, has taken place in U.S. articles returned after processing or assembly abroad.

Imports consist predominantly of capacitors designed for use at low voltage, unlike those made by Ion, and selling for a few cents each. This is evident from data for January-June 1970, when, for the first time, fixed capacitors (which include the kind here under consideration) were classified separately and both quantity and value were given. In the 6 month period, the average value of total imports of fixed capacitors was only 4 cents apiece, and, with minor exceptions, the average value by principal source ranged only from 2 cents to 13 cents, whether for articles wholly of foreign origin, or for U.S. articles returned after processing or assembly abroad (see table 2).

Imports of capacitors similar to Ion's.--Two of eight principal domestic consumers <sup>1/</sup> of capacitors similar to Ion's reported purchases of such capacitors from a foreign source (exclusive of purchases from domestic producers which might include imports under 806.30-807.00). Such imports increased \* \* \* in 1967-69. Additional imports under TSUS items 806.30 and 807.00 (partly foreign) reported \* \* \* as shipments to domestic customers during the same period, brought total imports in 1969 to \* \* \*, as shown in the following table (in thousands of units):

\* \* \* \* \*

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<sup>1/</sup> \* \* \*

Imports of articles containing capacitors

Imports of all television receivers, the principal articles in which high voltage, twist-lug, aluminum electrolytic capacitors are used, increased from 1.6 million units in 1967 to 4 million units in 1969. Imports of color television receivers, totaling 0.3 million units in 1967, tripled in quantity by 1969, when they equalled 14 percent of consumption; such imports equalled 17 percent of consumption in January-May 1970. Imports of black and white television receivers increased from 1.3 million units in 1967 to 3.1 million units in 1969, when they were equal to 41 percent of consumption; in January-May 1970, they were equal to 48 percent of consumption (see table 3). Imports under TSUS item 807.00 increased considerably in 1967-69 and amounted to almost a quarter of the total in 1969 (table 4).

Imports of other significant articles which utilize capacitors similar to Ion's, including tube-type radios, phonographs and radio-phonograph combinations, declined from 1967-69 (see table 4).

Color television receivers use an average of 4 high voltage, twist-lug aluminum electrolytic capacitors, black and white television receivers use an average of 1-1/2, tube-type stereo radios an average of 2, and tube-type monaural radios, one.

**U.S. Exports**

As indicated on the table below, exports in 1965-69 of fixed electrolytic capacitors, including aluminum electrolytic capacitors,

ranged between 6.6 million units, valued at \$7 million in 1967, and 25 million units, valued at \$13 million in 1969. The average unit values in 1965-69 ranged between \$1.07 and 43 cents, indicating a widely variable annual mix in the types of capacitors exported.

	<u>Quantity</u> (1,000 units)	<u>Value</u> (1,000 dollars)	<u>Unit</u> <u>value</u>
1965	15,655	6,893	\$.44
1966	20,577	8,913	.43
1967	6,607	7,055	1.07
1968	12,701	8,498	.67
1969	24,992	12,872	.52

#### Prices

\* \* \* \* \*

#### Ion Capacitor Corporation

Ion Capacitor Corporation was incorporated October 2, 1950, to manufacture high voltage, twist-lug, multisection aluminum electrolytic capacitors utilizing a unique process invented by the father of the current president of the company.

The headquarters and plant are located in Columbia City, Indiana, about 15 miles west of Fort Wayne. The facilities are housed in two buildings, the main one containing offices, library, research laboratory, and most production equipment. The smaller building contains a special induction furnace for melting aluminum and holding it in a molten state, and auxiliary equipment which sprays the aluminum onto cotton gauze.

\* \* \* \* \*

**TABLES**

Table 1.--Capacitors: U.S. imports for consumption, total and U.S. articles processed or assembled abroad, 1965-69 and January-June 1969-70

(In thousands of dollars)

Year	Total imports	U.S. articles processed or assembled abroad		
		Total value	Dutiable value	U.S. value
1965-----	15,541	38	25	13
1966-----	24,500	324	174	150
1967-----	23,314	849	557	291
1968-----	26,693	3,301	1,944	1,447
1969-----	31,801	6,608	3,651	2,957
Jan.-June 1969--	15,190	2,766	1,596	1,170
Jan.-June 1970--	15,285	3,909	<u>1/</u>	<u>1/</u>

1/ Not available.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 2.--Fixed capacitors: U.S. imports for consumption, total and under item 807.00, 1/ by country, January-June 1970

Country	Quantity		Value		Unit value	
	(1,000 units)		(1,000 dollars)			
	Total	Under item 807.00	Total	Under item 807.00	Total	Under item 807.00
Japan-----	118,737	86	3,244	8	\$0.02	\$0.09
Mexico-----	27,676	23,134	2,356	2,032	.08	.09
Taiwan-----	26,152	14,564	889	555	.04	.04
Netherlands-----	18,419	-	470	-	.03	-
West Germany-----	14,868	-	1,126	-	.08	-
Portugal-----	10,261	10,259	526	525	.05	.05
Canada-----	7,917	7,216	309	126	.04	.02
Italy-----	3,468	23	453	15	.13	.65
France-----	1,420	-	81	-	.06	-
Brazil-----	1,418	-	62	-	.04	-
Hong Kong-----	1,338	89	96	23	.07	.26
All other-----	4,863	-	379	-	.08	-
Total-----	236,537	55,371	9,991	3,284	.04	.06

1/ Containing U.S. articles returned after assembly abroad.

Source: Compiled from official statistics of the U.S. Department of Commerce.



Table 3.--Television receivers: Quantity of U.S. shipments, exports of domestic merchandise, imports for consumption, apparent consumption, and ratio of imports to consumption, 1967-69 and January-May 1969 and 1970

(Quantity in 1,000 units)					
Year	Shipments	Exports	Imports	Apparent consumption	Ratio of imports to consumption (percent)
Color television receivers					
1967-----	<u>1/</u> 5,578	<u>2/</u>	<u>3/</u> 318	<u>4/</u> 5,896	<u>5/</u> 5.4
1968-----	<u>1/</u> 6,018	<u>2/</u>	<u>3/</u> 666	<u>4/</u> 6,684	<u>5/</u> 10.0
1969-----	<u>1/</u> 5,789	58	<u>3/</u> 912	6,643	13.7
Jan.-May 1969----	<u>1/</u> 2,122	19	<u>3/</u> 285	2,388	11.9
Jan.-May 1970----	<u>1/</u> 1,535	15	<u>3/</u> 304	1,824	16.7
Black and white television receivers					
1967-----	<u>1/</u> 4,815	<u>2/</u>	<u>3/</u> 1,290	<u>4/</u> 6,105	<u>5/</u> 21.1
1968-----	<u>1/</u> 5,017	<u>2/</u>	<u>3/</u> 2,043	<u>4/</u> 7,060	<u>5/</u> 28.9
1969-----	<u>1/</u> 4,560	99	<u>3/</u> 3,121	7,582	41.2
Jan.-May 1969----	<u>1/</u> 1,817	35	<u>3/</u> 1,027	2,809	36.6
Jan.-May 1970----	<u>1/</u> 1,315	27	<u>3/</u> 1,192	2,480	48.1

1/ Estimated on the basis of data supplied to the U.S. Tariff Commission by 8 of the 9 largest U.S. producers of television receivers, \*\*\*. Data do not include shipments of domestic label receivers manufactured outside the United States.

2/ Not available, separately. Exports of all TV receivers amounted to 139,000 units in 1967, and 144,000 units in 1968.

3/ Figures represent imports by domestic manufacturers of television receivers built by or for their domestic label (U.S. label receivers) and all imports of other television receivers (foreign label receivers). Imports of television receivers incorporated in radio-television-phonograph combination units are not included in these data.

4/ Overstated by the amount of exports, which are probably not large in relation to consumption.

5/ Understated because of the inclusion of export data in the figures on consumption. The actual percentage of understatement is very small in relation to the whole.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Table 4.--Television receivers, tube-type radios, phonographs and radio-phonograph combinations: U.S. imports for consumption, total and under item 807.00, 1/ 1967-69

(Number, in thousands)

Commodity	1967	1968	1969
Television receivers			
Total imports-----	1,608	2,708	4,034
Item 807.00 imports-----	70	444	939
Radios, tube-type			
Total imports-----	2,395	709	240
Item 807.00 imports-----	298	209	18
Phonographs and radio-phonograph combinations			
Total imports-----	4,135	2,129	2,063
Item 807.00 imports-----	46	100	83

1/ Containing U.S. articles returned after assembly abroad.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Note.--Data for television receivers include radio-television-phonograph combinations (the number is small). Data for radios include only tube-type radios. Data for phonographs include only those units which are complete with amplifiers and speakers.



