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UNITED STATES TARIFF COMMISSION

**RADIO FREQUENCY COILS, MOLDED CERAMIC CAPACITORS,
AND FIXED PRECISION METAL FILM RESISTORS:
CERTAIN WORKERS OF THE
DUBOIS, PENNSYLVANIA, PLANT OF THE
AIRCO SPEER ELECTRONIC COMPONENTS
DIVISION OF AIRCO, INC.**

**Report to the President
on Investigation No. TEA-W-157
Under Section 301(c)(2) of the Trade Expansion Act of 1962**



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UNITED STATES TARIFF COMMISSION

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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,
November 28, 1972.

To the President:

In accordance with section 301(f)(1) of the Trade Expansion Act of 1962 (TEA) (76 Stat. 885), the U.S. Tariff Commission herein reports the results of an investigation made under section 301(c)(2) of the act in response to a petition filed by a group of workers.

On September 29, 1972, the Research Director of District 50, International Union, Allied and Technical Workers of the United States and Canada, filed a petition on behalf of the workers of the Du Bois, Pa., plant of Airco Speer Electronic Components, a division of Airco, Inc., for a determination of eligibility to apply for adjustment assistance. The Commission instituted the investigation (TEA-W-157) on October 4, 1972, to determine whether, as a result in major part of concessions granted under trade agreements, articles like or directly competitive with radio frequency coils, molded ceramic capacitors, and fixed precision metal film resistors (of the type provided for in item Nos. 682.60, 685.80, and 686.10 of the Tariff Schedules of the United States (TSUS)) produced by Airco Speer Electronic Components at Du Bois, Pa., are being imported into the United States in such increased quantities as to cause, or threaten to cause, the unemployment or underemployment of a significant number or proportion of the workers of the Du Bois plant.

Public notice of this investigation was given in the Federal Register (37 F.R. 21467) on October 11, 1972. No public hearing

was requested by any party showing a proper interest in the subject matter of the investigation, and none was held.

In the course of its investigation, the Commission obtained information from the petitioner, Airco Speer Electronic Components, domestic producers and consumers of radio frequency coils, molded ceramic capacitors, and fixed precision metal film resistors, and from its files.

Finding of the Commission

On the basis of its investigation, the Commission, being equally divided, 1/ makes no finding under section 301(c)(2) of the Trade Expansion Act of 1962 with respect to whether articles like or directly competitive with the radio frequency coils, molded ceramic capacitors, and fixed precision metal film resistors (of the type provided for in item Nos. 682.60, 685.80, and 686.10 of the Tariff Schedules of the United States) produced by Airco Speer Electronic Components, Du Bois, Pa., 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, unemployment or underemployment of a significant number or proportion of the workers of such firm or an appropriate subdivision thereof.

1/ Chairman Bedell and Commissioners Moore and Ablondi found in the affirmative; Vice Chairman Parker and Commissioners Leonard and Young, in the negative.

Views of Chairman Bedell and Commissioner Moore 1/

This investigation was conducted pursuant to section 301(c)(2) of the Trade Expansion Act of 1962 in response to a petition for a determination of eligibility to apply for adjustment assistance filed on behalf of the workers formerly employed at the Du Bois, Pennsylvania plant of Airco Speer Electronic Components, a division of Airco, Inc. The plant closed in January 1971.

The articles formerly manufactured at the Du Bois plant were RF (radio frequency) coils, fixed molded ceramic capacitors, and fixed precision metal film resistors. The coils and capacitors are used largely in the manufacture of consumer electronic products, and the resistors for aerospace and military purposes. RF coils and capacitors accounted for *** percent of the value of shipments of the plant during 1967-69 but dropped to *** percent in 1970. It is our opinion, therefore, that the impact of imports of coils and capacitors on the operations of this plant is the primary consideration here.

Until 1970, the Du Bois plant was the only one of the firm's four U.S. establishments at which these articles were made. In 1970, production of RF coils was initiated in Nogales, Mexico, utilizing the provisions of item 807.00 of the Tariff Schedules of the United States (TSUS). When the Du Bois plant closed, some equipment was transferred to the firm's plant in Bradford, Pennsylvania, but the firm's domestic production of RF coils and ceramic capacitors was continued there at a reduced rate. Production of precision metal film resistors was completely discontinued by Airco, Inc.

1/ Commissioner Ablondi concurs in the result.

Under section 301(c)(2) of the Trade Expansion Act of 1962, each of the following requirements must be met before an affirmative finding may be made by the Commission:

- (1) Imports of an article like or directly competitive with an article produced by the petitioning workers must be increasing;
- (2) The increase in imports must be a result in major part of trade-agreement concessions;
- (3) The workers concerned must be unemployed or underemployed, or threatened with unemployment or underemployment; and
- (4) The increased imports in major part the result of concessions granted under trade agreements must be the major factor in causing or threatening to cause the unemployment or underemployment.

In our opinion, each of these requirements has been met in this case. We, therefore, have made an affirmative determination. Our reasoning with respect to the four criteria is discussed below.

Increased imports

As noted earlier, in 1967-69, RF coils and molded ceramic capacitors combined accounted for *** percent of the total value of shipments from the Du Bois plant. In 1970, when shipments of RF coils at Du Bois declined after production began in the Mexican plant, coils and capacitors combined accounted for only *** percent of the total value of shipments from the Du Bois plant.

RF coils--RF coils accounted for the highest proportion of the dollar volume of sales at the Du Bois plant from 1967 until the plant closed. In 1970, the last year of production, shipments of RF coils dropped ***.

Information available to the Commission indicates that the value of imports of RF coils increased in 1967-70, the period immediately preceding the closing of the Du Bois plant and during which there was a reduction in production of such coils at the plant. Data received from some large consumers of RF coils indicated that their imports in that period increased significantly and represented a growing percentage of their total consumption, accounting for about 12 percent of the quantity and about 21 percent of the value in 1970.

In 1970 Airco Speer began to produce RF coils in Mexico and import them into the United States. The quantity of sales of such imports of RF coils by Airco Speer in 1970 was *** as much as the quantity of sales from Du Bois in that year, but the value of sales of such imports was *** percent of the value of sales from the Du Bois plant. In 1971, however, the value of sales from Mexico was *** that of the Du Bois plant in 1970, the last year of its operation.

Molded ceramic capacitors.--Data received from some large consumers of molded ceramic capacitors indicated that their imports of these articles had increased in 1969 to a point where they constituted about 20 percent of the total quantity and about 13 percent of the total value of their consumption of these articles. The following year, Airco Speer made the decision to close the Du Bois plant.

It may also be noted that imports of television receivers, television tuners, radio receivers, and radio-phonograph combinations which contain RF coils and molded ceramic capacitors increased considerably in 1967-71.

We have concluded, therefore, that imports have increased, and that the first requirement of the statute has been met.

In major part

The duties imposed on imports of coils and capacitors have been reduced substantially by various trade-agreement concessions from the 1930 rate of 35 percent ad valorem to levels in 1970 of 10 percent for coils and 11 percent for capacitors; further reductions brought the duties in 1972 to 7.5 percent and 11 percent ad valorem, respectively.

The large reductions have obviously had a significant effect on the prices of imported articles in the United States. For example, a price comparison for a common type of RF coil purchased in 1970 from both domestic and foreign manufacturers shows that if the 1930 rate of duty had not been reduced by trade-agreement concessions, the imported coils, which now undersell the domestic product, would have cost one-fifth more, or about 5 percent higher than the price paid for the domestic product.

A price comparison for a common type of molded ceramic capacitor shows that the capacitors imported in 1970 at lower than domestic prices would have cost about one-fifth more at the 1930 rate of duty, or 17 percent more than the domestic price.

It is evident, therefore, that the impact of imports would have been substantially reduced if there had been no reductions in the rates of duty as a result of tariff concessions. It is unlikely that

imports of coils and capacitors would have increased in such quantities had the reduced rates of duty not provided the incentive for importation. In that respect, it is noteworthy that the value added portion in Mexico of imports under item 807.00 of the TSUS by Airco Speer does, of course, benefit from concession rates of duty.

We conclude, therefore, that the increased imports of RF coils and molded ceramic capacitors, the articles which accounted for most of the total value of shipments from the Du Bois plant, have resulted in major part from trade-agreement concessions.

Unemployment and underemployment

Employment at the Du Bois plant declined each year in 1967-70. The Du Bois plant closed in January 1971.

We conclude, therefore, that the third requirement is satisfied--the workers concerned were unemployed as a result of the plant closure.

Major factor

Imports of RF coils, which in 1967 supplied 5 percent of the value of domestic consumption of such articles, had increased to 15.6 percent in 1969. The share of the domestic market supplied by imports of capacitors, although increasing less rapidly than that of coils, reached 13.1 percent in 1969. In our opinion, Airco, Inc. decided to close the Du Bois plant in 1970 because of its inability to compete with lower priced imports which had taken such an increasing share of the domestic market, and to obtain thereafter, most of its

requirements of RF coils from a newly established Mexican plant. Thus, the major factor causing the closing of the Du Bois plant and the resultant unemployment of its workers was the increased volume of concession-generated imports of coils and capacitors.

Conclusion

We find, therefore, that all requirements of the Trade Expansion Act have been met, and that the former workers of the Du Bois plant meet the requirements of the Act to apply to the U.S. Department of Labor for adjustment assistance.

Views of Vice Chairman Parker and Commissioners Leonard
and Young

This statement is in support of our negative determination under section 301(c)(2) of the Trade Expansion Act of 1962 (TEA) made respecting a petition for a determination of eligibility to apply for adjustment assistance submitted on behalf of the former workers of Airco Speer Electronic Components, Du Bois, Pa. These workers were engaged in the production of precision metal film resistors, molded ceramic capacitors, and radio frequency (RF) coils before the Du Bois plant closed in January 1971. RF coils and molded ceramic capacitors constituted by far the principal share of the total value of shipments from the Du Bois plant.

Although precise and complete data are not available on U.S. imports of RF coils and molded ceramic capacitors of the types produced at the Du Bois plant, official statistics for import categories which include these articles show that imports of all types of coils and capacitors did increase in the 1960's. Data obtained by the Commission from some large consumers of these articles for the 1967-71 period shows that imports of RF coils increased through 1969 and then declined, and imports of molded ceramic capacitors showed no definite trend. Moreover, data from consumers also indicate that substantial imports of precision metal film resistors did not occur until 1972, more than a year after the Du Bois plant closed.

With respect to RF coils, molded ceramic capacitors, and precision metal film resistors, the largest reductions in duty occurred

long before there was any evidence of increased imports. The rates of duty applicable to imported coils, capacitors, and resistors have been reduced considerably by various trade-agreement concessions from the rate of 35 percent ad valorem set by the Tariff Act of 1930. They were reduced to 25 percent ad valorem in 1939, and to 15 percent in 1948. No further decreases were made until the implementation of the first of the Kennedy Round reductions in 1968, when duties on coils, capacitors, and resistors were reduced to 13 percent, 12 percent, and 11 percent ad valorem, respectively. Subsequent reductions brought the respective rates to 10 percent, 11 percent, and 8.5 percent ad valorem in 1970 and to 7.5 percent, 10 percent, and 6 percent ad valorem in 1972. Thus, the major reductions in the rates of duty took place between 1930 and 1948, long before substantial increases in imports began.

Airco Speer imports RF coils from Mexico under item 807.00 of the Tariff Schedules of the United States, which provides for the imposition of duty on the value added portion only of imports of articles which are made wholly or partly of U.S. parts assembled abroad. This tariff provision has never been the subject of a trade-agreement concession; thus, imports entered pursuant to that provision are not directly concession generated. In certain circumstances, however, 807.00 imports begun in order to compete with concession-generated imports can be considered to be a result in major part of trade-agreement concessions; but we do not find such circumstances prevalent in this case.

In connection with imports from Mexico, as well as from other countries, it was noted in a previous Tariff Commission report, 1/ that since 1965 the governments of Mexico and the Republic of China have provided special money-saving incentives to foreign enterprises which produce for export--this is in addition to the availability of low-wage labor; it was also noted that the Government of Japan granted various incentives to manufacturers to increase the volume of exports.

According to officials of Airco Speer, the Du Bois plant was expanded and modernized in the midsixties--entailing a sizeable capital investment--in order to concentrate on the production of precision metal film resistors in response to a then high demand for such products for aerospace and military uses. It was anticipated that RF coils and molded ceramic capacitors would be produced as auxiliary products. Shortly after the production of precision metal film resistors was begun, the market for such articles began to decline. Management stated * * * and a decision was made to close the plant, cease production of precision metal film resistors, and transfer the production of RF coils and molded ceramic capacitors to other facilities * * *.

As in past investigations, there is in the instant case the question of whether imports of the finished articles are "directly

1/ Television Receivers and Certain Parts Thereof, . . . Investigation No. TEA-I-21 . . . TC Publication 436, November 1971.

competitive with" the domestically produced components. The RF coils and molded ceramic capacitors produced by Airco Speer were used largely in the production of television receivers and tuners. Whether or not imports of television receivers and tuners are held to be competitive with domestically produced RF coils and molded ceramic capacitors is immaterial in this case in view of our decision in the previously cited industry case that the increased imports of television receivers and certain parts thereof (including tuners) were not in major part the result of trade-agreement concessions. 1/

In view of the foregoing evidence, it is clear that articles like or directly competitive with those produced by the former workers of Airco Speer Electronic Components are not, as a result in major part of concessions granted under trade agreements, being imported in such increased quantities as to be the major factor in causing, or threatening to cause, the unemployment or underemployment of the petitioning workers.

1/ Commissioners Leonard and Young find electronic components of the types produced at Du Bois not to be "directly competitive with" imported consumer electronic products containing such components or such components themselves contained in imported consumer electronic products. See Tariff Commission reports on Certain Variable Electrical Capacitors, . . . Investigation No. TEA-F-32 . . . TC Publication 423, October 1971, and Loudspeakers . . . Investigation No. TEA-W-158 . . . TC Publication 522, November 1972.

INFORMATION OBTAINED IN THE INVESTIGATION

Description of Articles Under Investigation

The articles formerly produced by the workers of the Du Bois plant of Airco Speer Electronic Components were fixed precision metal film resistors, fixed tubular molded ceramic capacitors, and radio frequency (RF) coils. Production of fixed precision metal film resistors was the most important activity at the plant.

Resistors

Resistors are electrical conducting devices which resist the flow of electricity to a specific degree, providing necessary resistance in an electrical circuit to achieve specific circuit values with respect to current and voltage. Since resistance generates heat, a resistor may also be used for that purpose alone, as in an electric toaster (the heating elements are resistors). The measure of the resistor's resistance (its ability to impede the free passage of an electric current) is expressed in ohms. Various factors affect resistance, including the type of conducting material, its thickness, and its length. Resistance increases inversely with the thickness of the conducting material; thus resistors of very high values of resistance may utilize very thin films of conducting material. Resistors may be variable or fixed; that is, there may or may not be provision for altering the resistance values at will by a small adjustment. Most resistors are fixed.

Basically, a resistor is composed of a conducting material and leads to connect it to other components of an electrical circuit. Environmental and operating factors, such as temperature, humidity, and voltage, can affect the value of the resistance; therefore when specific resistance values are required at all times, guaranteed to tolerances no higher than ± 2 percent (Airco Speer tolerances were as low as ± 0.01 percent), precision metal film resistors are utilized. Those produced by Airco Speer were made of thin films of tin oxide vacuum-deposited on a tubular ceramic base, both ends of which had been coated with metallic gold to serve as electrical contacts. Resistance in a film resistor is increased greatly by spiraling (cutting a helical path in) the film; this has the effect of lengthening the conductor. Wire leads are soldered to the gold, and the resistor is encapsulated to protect the film. The precision metal film resistors made by Airco Speer were used by manufacturers of aerospace and military equipment.

Capacitors

A capacitor is a device used in an electrical circuit to store an electrical charge. This function has many applications throughout electrical circuits, and the capacitors are made of various materials to various design specifications to be most effective in specific applications. Ceramic capacitors, for instance, have very low values of capacitance (the measure of a capacitor's ability to store an electrical charge) and are therefore used at high radio frequencies for coupling and bypass purposes.

A basic capacitor consists of two conductors of an electric current (plates) separated by a nonconducting material (dielectric). When a voltage is applied between the two plates, passage of electrons through the dielectric is impeded and they collect at one dielectric-electrode interface. Capacitance, expressed in microfarads and picofarads (millionths of a microfarad), increases as the ratio of plate area to dielectric increases; thus, the thinner the dielectric, the higher the capacitance. A capacitor is designed to a specific voltage rating, indicating the maximum voltage it can withstand without being destroyed. Capacitors may be fixed or variable, most being fixed--that is, the capacitance cannot be altered by an adjustment.

Molded ceramic capacitors utilize a ceramic substance as the dielectric. The tubular ceramic capacitors made at Airco Speer's Du Bois plant were made of a mix of sand, resin, and a dielectric material which was pressed and baked within an encapsulating non-conducting tube, to the ends of which metal plates and leads were attached. Other types of molded ceramic capacitors (such as disc and eyelet feed-through) are used for most of the same purposes, the specific type used depending on the physical engineering requirements; the disc type is the most popular.

Molded ceramic capacitors produced at the Du Bois plant were used largely by television and radio manufacturers.

Coils

Coils, also called inductors, are devices used in electrical circuits to resist changes in the current; in some applications this has the effect of smoothing out the current (as in a DC power circuit), and in others, of separating the components of the current (as in a tuning circuit). Coils are of numerous types and are used for many purposes. RF coils are used chiefly in the radio frequency tuning sections of electronic equipment.

A coil is composed of a spool of insulated wire with or without a core; the core may be made of a magnetic or a nonmagnetic substance, depending on the inductance required (a magnetic core increases the inductance of a coil). When current passes through a coil, a magnetic field is created around the coil. The effect of this magnetic field on the current is known as the inductance of the coil, measured in fractions of a henry, such as millihenries and microhenries.

The RF coils made by Airco Speer at the Du Bois plant were wound on magnetic (iron or ferrite) and nonmagnetic (phenolic) cores; both shielded (with iron shields) and unshielded coils were made. The shields keep out interference and contain the magnetic field of the coil. The coils produced by Airco Speer at the Du Bois plant were used primarily in TV tuners.

Other articles with similar uses

Wire-wound resistors may be used in place of some precision metal-film resistors, but they are larger and heavier, are less

effective in high frequency applications, and are costlier. Wire-wound resistors are now used mainly for power purposes for which precision metal film resistors are not suitable.

Mica, glass, and vitreous enamel capacitors can be used for the same purposes as ceramic capacitors but are more expensive.

RF coils are created for their specific applications--applications for which no other types of coils are suitable.

Some semiconductor devices, such as some integrated circuits, include the functions of resistors, capacitors, and coils. Such semiconductor devices are used in circuits designed for them. In a circuit designed for resistors, capacitors, and coils, semiconductor devices cannot be substituted.

U.S. Tariff Treatment

Under the Tariff Act of 1930, all resistors, capacitors, and coils were classified in a group under paragraph 353 and were dutiable at 35 percent ad valorem from June 18, 1930, through December 31, 1938. In accordance with tariff concessions made in various trade agreements, the rates for the articles here considered have been reduced to 6 percent ad valorem for resistors, 10 percent for capacitors, and 7.5 percent for coils.

The duties on television receivers, as well as television tuners (both in item 685.20), radios (items 685.23 and 685.25), and radio-phonographs (item 685.30), the principal articles in which molded ceramic capacitors and RF coils of the type produced by the

petitioner's company are used, have been reduced as a result of trade agreements from a statutory rate of 35 percent ad valorem to 5 percent for television receivers and to 10.4 percent and 6 percent for solid-state and tube-type radio receivers, respectively; the duty on radio-phonographs has been reduced to 6.5 percent ad valorem.

The intermediate rates established by various trade agreements and reductions which took place under the Kennedy Round of the General Agreement on Tariffs and Trade (GATT) are indicated in the following table, which also shows rates established as a result of the adoption of the TSUS.

Coils, capacitors, resistors, and certain consumer electronic products:
U.S. rates of duty, 1930-72

(In percent ad valorem)

Month and year rate became effective	Rate of duty on--							
	Coils (item 682.60)	Capaci- tors (item 685.80)	Resis- tors (item 686.10)	TV receiv- ers (item 685.20)	Radio receivers Solid- state (item 685.23)	Tube- type (item 685.25)	Radio- phono- graphs (item 685.30)	
June 1930-----	35	35	35	35	35	35	35	
Jan. 1939-----	25	25	1/	25	25	25	25	
Jan. 1948-----	15	15	1/	15	15	15	15	
June 1951-----	2/	12.5	1/	12.5	12.5	12.5	13.75	
June 1956-----	2/	2/	1/	11.5	2/	2/	2/	
June 1957-----	2/	2/	1/	11	2/	2/	2/	
June 1958-----	2/	2/	1/	10.5	2/	2/	2/	
July 1962-----	2/	2/	1/	10	2/	2/	2/	
July 1963-----	2/	2/	1/	2/	2/	2/	2/	
Aug. 1963-----	2/	2/	12.5	2/	2/	2/	2/	
Jan. 1968-----	13	12	11	9	12	11	12	
Jan. 1969-----	12	11	10	8	11.5	10	11	
Jan. 1970-----	10	2/	8.5	7	11	8.5	9.5	
Jan. 1971 <u>3/</u> -----	9	10	7	6	10.4	7	8	
Jan. 1972-----	7.5	2/	6	5	2/	6	6.5	

1/ Prior to Aug. 31, 1963, resistors were classified as parts of articles in which they were used, chiefly as radio apparatus, par. 353 of the Tariff Act of 1930. If chief use of a resistor was indeterminable, the resistor was classified as to chief value in par. 216 (carbon), 353 (metal), or 212 (ceramic). The rates of duty applicable to imported resistors were many and varied until the implementation of the TSUS.

2/ No change.

3/ An additional 10-percent duty was imposed on all items for the period Aug. 16, 1971, to Dec. 19, 1971 (Presidential Proclamations 4074 and 4098).

Some electronic products have been entered under item 807.00, which provides that for imported articles assembled in whole or in part of U.S.-fabricated components the duty may be assessed only on the value added abroad, thus permitting the U.S. components to be entered duty free. Some of these articles have also been entered under item 806.30, which provides that imports of U.S.-made articles of metal exported for processing abroad and returned for further processing are duty free except for the value of processing outside the United States. (If of Canadian origin and intended for use as original equipment in the manufacture in the United States of a motor vehicle, all the articles covered by this investigation may be entered free of duty under various other TSUS item numbers.)

U.S. Producers

Producers of precision metal film resistors number about 10; of RF coils, about 30; and of molded ceramic capacitors of the commercial type, about 20. Manufacturing establishments are scattered through the country.

In addition to the firms that manufacture the subject articles for resale, some consumers of capacitors and coils manufacture part or all of their own requirements. This is particularly true of RF coils.

U.S. Consumption and Imports

In an attempt to obtain data on U.S. consumption, production, and imports of articles like those produced by Airco Speer, questionnaires were sent to 23 companies known to be important consumers of one, two, or all of the articles concerned. Of the 23 concerns receiving questionnaires, 14 forwarded usable data. It is not known what percentage of total U.S. consumption of each of the three types of articles is accounted for by the respondents.

Fixed precision metal film resistors

Data supplied by six consumers of fixed precision metal film resistors of 2-percent tolerance or less indicate a reduction in the quantity of domestic purchases after 1967, a slight rise in 1970, a sharp drop in 1971, and a continued decline in January-September 1972, as shown in the following table. No imports are reported until 1972, and then by consumers that do not require very high precision products.

Precision metal film resistors: Domestic purchases of 6 U.S. consumers, and their imports and apparent consumption, 1967-71 and January-September 1972 ^{1/}

(Quantity in thousands of units; value in thousands of dollars)

Period	Domestic purchases	Imports	Consumption	Ratio (percent) of imports to consumption
Quantity				
1967-----	26,209	-	26,209	-
1968-----	21,219	-	21,219	-
1969-----	20,549	-	20,549	-
1970-----	22,898	-	22,898	-
1971-----	13,567	-	13,567	-
1972 (January-September)-----	7,074	1,304	8,378	15.6
Value				
1967-----	2,020	-	2,020	-
1968-----	1,697	-	1,697	-
1969-----	1,561	-	1,561	-
1970-----	1,430	-	1,430	-
1971-----	1,010	-	1,010	-
1972 (January-September)-----	1,059	37	1,096	3.4

^{1/} There was no captive production of precision metal film resistors in the period covered.

Source: Compiled from data submitted to the U.S. Tariff Commission by 6 consumers.

Fixed molded ceramic capacitors

Data supplied by nine purchasers of domestic fixed molded ceramic capacitors for 1967-72 indicate that their domestic purchases reached a peak in 1968, declined to the lowest point of the period in 1970, then rose slightly in 1971 and continued rising at a greater pace in January-September 1972, as shown in the following table. One firm reported production of capacitors for its own use, but this production dropped sharply in 1971. Imports, reported by eight firms, trended downward.

Molded ceramic capacitors: Domestic purchases of 9 U.S. consumers, and their captive production, imports, and apparent consumption, 1967-71 and January-September 1972

(Quantity in thousands of units; value in thousands of dollars)

Period	Domestic purchases	Captive production	Imports	Consumption	Ratio (percent) of imports to consumption
Quantity					
1967-----	* * *	* * *	162,666	839,775	19.4
1968-----	* * *	* * *	137,905	897,810	15.4
1969-----	* * *	* * *	170,039	851,807	20.0
1970-----	* * *	* * *	122,262	657,683	18.6
1971-----	* * *	* * *	157,026	769,435	20.4
1972 (January-September)---	* * *	* * *	98,416	698,378	14.1
Value					
1967-----	* * *	* * *	2,334	18,052	12.9
1968-----	* * *	* * *	1,911	18,664	10.2
1969-----	* * *	* * *	2,234	17,012	13.1
1970-----	* * *	* * *	1,480	12,373	12.0
1971-----	* * *	* * *	1,896	14,350	9.0
1972 (January-September)---	* * *	* * *	1,249	13,269	9.4

Source: Compiled from data submitted to the U.S. Tariff Commission by 9 consumers of fixed molded ceramic capacitors, representing an indeterminate percentage of total U.S. consumption.

RF coils

Seven firms indicated domestic purchases of RF coils in 1967-72. Such purchases were at a peak in 1968, then declined each year thereafter. Three firms reported manufacture of RF coils for their own use; such coils exceeded the value of purchased coils in January-September 1972. A number of concerns not reporting to the Commission are known to have manufactured RF coils for their own use. Three firms reported imports of RF coils; the value of such imports rose in 1967-70, declined in 1971, and increased sharply in January-September 1972, as shown in the following table.

RF coils: Domestic purchases of 7 U.S. consumers, and their captive production, imports, and apparent consumption, 1967-71 and January-September 1972

(Quantity in thousands of units; value in thousands of dollars)

Period	Domestic purchases	Captive production	Imports	Consumption	Ratio (percent) of imports to consumption
Quantity					
1967-----	* * *	* * *	2,195	172,457	1.3
1968-----	* * *	* * *	15,231	196,125	7.8
1969-----	* * *	* * *	20,502	183,334	11.1
1970-----	* * *	* * *	19,124	153,434	12.5
1971-----	* * *	* * *	12,632	158,760	8.0
1972 (January- September)---	* * *	* * *	26,273	149,389	17.6
Value					
1967-----	* * *	* * *	483	9,573	5.0
1968-----	* * *	* * *	1,013	10,939	9.3
1969-----	* * *	* * *	1,720	11,055	15.6
1970-----	* * *	* * *	1,888	9,161	20.6
1971-----	* * *	* * *	561	7,494	7.5
1972 (January- September)---	* * *	* * *	903	7,132	12.7

Source: Compiled from data submitted to the U.S. Tariff Commission by 7 consumers of RF coils, representing an indeterminate percentage of total U.S. consumption.

Note.--Import data do not agree with the tabular information on pg. A-27 (shipments from Airco Speer's Mexican plant) because purchasers do not always know whether the product source is domestic or foreign when the product is sold under domestic label.

Articles containing molded ceramic capacitors and RF coils

U.S. shipments and imports of radio receivers, radio-phonograph combinations, television receivers, and television tuners in 1967-71 are shown in table 1. These data indicate a general decline in U.S. shipments in that period, and a general rise in imports.

U.S. Shipments

Fixed precision metal film resistors

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Fixed ceramic capacitors

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RF coils

Data on U.S. shipments of RF coils is not available. As far as is known, no survey has been made by any public or private agency. Data for purchases of domestically produced RF coils in the section on consumption are probably adequate for providing a trend.

Price Comparisons

Comparative prices paid or bids received for articles of the same specifications from domestic and foreign manufacturers are given in the following tables for molded ceramic capacitors and RF coils. No comparative data are available on precision metal film resistors. These data have been reported by U.S. consumers of these articles.

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Airco Speer Electronic Components Division

History

Airco Speer Electronic Components, a division of Airco, Inc. (formerly Air Reduction Co., Inc.), was created when Airco acquired the Speer Carbon Co. in 1961. The division currently produces fixed composition resistors, molded ceramic capacitors, and radio frequency coils at Bradford, Pa.; carbon rods for flashlight batteries at Punxsutawney, Pa.; and furnace electrodes, brushes, and other carbon and graphite products at St. Marys, Pa. In addition, a plant at Nogales, Mexico, acquired in 1969, produces unshielded RF coils, and a plant in Singapore, also acquired in 1969, produces fixed composition resistors.

The Du Bois, Pa., plant, originally owned by the Jeffers Electronics Co., was purchased by Speer Carbon Co. in the late 1940's; the products of the plant bore the Jeffers name until the plant closed in January 1971. * * *, Airco, about 1965, expanded and modernized the plant and facilities, including installing expensive special spiraling equipment for the production of precision metal film resistors, which were expected to be the plant's principal product. RF coils and molded tubular ceramic capacitors, also made at Du Bois, were considered auxiliary products.

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According to officials of Airco Speer, when the expected market for their precision product did not develop because of cuts in military and aerospace appropriations, the decision was finally made in 1970 to close the Du Bois plant.

When the Du Bois plant was closed, the equipment for producing tubular ceramic capacitors and RF coils was transferred to the Bradford plant, and manufacturing operations were continued there.

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Airco Speer's markets

Precision metal film resistors.--When aerospace activity was at its peak in the midsixties, there was a large demand for precision metal film resistors, inspiring Airco Speer and others to enter the field. During 1967-71, however, the capacity to supply the market exceeded demand--a demand which decreased because of curtailed aerospace activity. The use of semiconductor integrated circuits tended to further shrink demand by replacing individual circuit components such as precision metal film resistors. A number of firms ceased production in that period because of low profitability. Demand in 1970 was reported to be particularly poor. 1/

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Tubular ceramic capacitors.--Producers of radio and television receivers and auxiliary equipment are Airco Speer's principal market for tubular ceramic capacitors. This market has fallen considerably below the level of the midsixties because of increased low-priced imports of competitive molded ceramic capacitors, transfer of some of the market offshore, and technological advances which have caused the replacement of separate electronic components to a certain extent.

RF coils.--Television-tuner manufacturers were reported to constitute Airco Speer's principal market for RF coils. This market is one that suffers competition from radio, television, and tuner manufacturers who produce RF coils for their own use, both in the United States and abroad, as well as from imports of tuners and other articles which use RF coils.

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APPENDIX A
STATISTICAL TABLES

Table 1.--Radio receivers, ^{1/} radio-phonograph combinations, television receivers, and television tuners: U.S. shipments and imports, 1967-71

(In thousands of units)

Item	Shipments	Imports
Radio receivers:		
1967-----	17,527	24,200
1968-----	17,510	30,161
1969-----	15,760	36,468
1970-----	11,998	33,383
1971-----	12,307	34,138
Radio-phonographs:		
1967-----	1,730	1,315
1968-----	1,982	1,611
1969-----	1,842	1,658
1970-----	1,660	1,579
1971-----	1,761	1,531
Television receivers:		
1967-----	9,701	1,608
1968-----	10,346	2,708
1969-----	8,721	4,034
1970-----	8,298	4,509
1971-----	8,664	5,447
Television tuners:		
1967-----	4,459	1,740
1968-----	6,194	2,926
1969-----	5,560	4,479
1970-----	3,526	4,942
1971-----	2,211	7,689

^{1/} Covers all types of radio receivers.

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

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