
FERTILIZER UREA

LETTER FROM THE CHAIRMAN OF THE UNITED STATES TARIFF COMMISSION TRANSMITTING, IN RESPONSE TO SENATE RESOLUTION NO. 228, A REPORT OF A PRELIMINARY STUDY OF THE PRODUCTION OF FERTILIZER UREA IN THE UNITED STATES AND IN GERMANY

DECEMBER 5, 1928.—Referred to the Committee on Finance and ordered to be printed

UNITED STATES TARIFF COMMISSION,
Washington, October 11, 1928.

THE PRESIDENT OF THE SENATE,
Washington, D. C.

SIR: In response to Senate Resolution No. 228, passed by the Senate on May 28, 1928, requesting the tariff commission, under the provisions of section 315 of the tariff act of 1922, to investigate the costs of production of fertilizer urea in the United States and in the country from which principal exports are made to the United States, the commission has made a preliminary study of the production of fertilizer urea in the United States and in Germany.

The preliminary investigation discloses that there is no commercial production of urea in the United States, consequently an investigation for the purposes of section 315 appears not to be feasible. The information compiled by the commission concerning fertilizer urea is summarized in the inclosed report.

Sincerely yours,

THOMAS O. MARVIN, *Chairman.*

FERTILIZER UREA

The United States Tariff Commission respectfully submits the following report of its preliminary investigation with respect to fertilizer urea made with the view to an investigation for the purposes of section 315 of the tariff act of 1922, pursuant to Senate Resolution 228, passed by the Senate on May 28, 1928. Said resolution reads as follows:

Resolved, That the United States Tariff Commission is requested, under provisions of section 315 of the tariff act of 1922, to investigate the cost of production

of fertilizer urea in the country, from which the principal exports of fertilizer urea are made to the United States, and the facts with respect to the quantities of fertilizer urea being imported and used in the United States, and to report its findings to the President of the United States.

Rates of duty.—Fertilizer urea has been dutiable under the last three general tariff acts as follows:

Act of 1922.....	35 per cent ad valorem.
Act of 1913.....	25 per cent ad valorem.
Act of 1909.....	25 per cent ad valorem.

DESCRIPTION AND USES

Pure urea is an odorless, transparent crystalline compound of nitrogen, carbon, hydrogen, and oxygen. The percentage of nitrogen in urea, 46.6, is the maximum found in any commercial organic product used as plant food.

Formerly, the chief use of urea was as a stabilizer in the manufacture of pyroxylin plastics and in certain military powders. To-day, urea is used primarily as a highly concentrated fertilizer. Its high price restricts its use largely to a fertilizer for golf greens and truck gardens. Minor uses that it serves are in the production of pharmaceuticals and synthetic organic chemicals. The imported product used in synthetic organic chemicals is about 99.9 per cent pure; that for fertilizer runs about 98 per cent. The German Interessen Gemeinschaft has recently put on the market a product known as calurea prepared from calcium nitrate and urea, which is also used as a fertilizer. Calurea is duty free under the provision in paragraph 1583 for "all other substances used chiefly for fertilizer, * * *."

PROCESS OF MANUFACTURE

Urea is produced commercially by two processes. In the first process ammonia and carbon dioxide gases are mixed in the presence of water vapor and then cooled. Carbamate crystallizes out and is later converted to urea by heating, under high pressure, in an atmosphere of ammonia and carbon dioxide.

In the second process urea is made by acidulating calcium cyanamide. This yields free cyanamide which is hydrolyzed to urea. In the Lüdholm process ground calcium cyanamide, suspended in water, is treated with carbon dioxide, forming free cyanamide. After filtering off the calcium carbonate, the cyanamide is treated with sulphuric acid and the solution warmed. The excess acid is neutralized with calcium carbonate and filtered off, leaving a clear solution of urea which is evaporated to dryness. This process was operated by a domestic firm in a pilot plant at Niagara Falls.

RAW MATERIALS

In the production of urea the raw materials used in the two commercial processes of manufacture are (1) ammonia and carbon dioxide; (2) calcium cyanamide.

(1) Ammonia is obtained from by-product coke ovens or produced synthetically from nitrogen and hydrogen. The nitrogen is derived from the air and the hydrogen from coke oven and water gas. Carbon dioxide is a by-product of several processes. It is formed with

hydrogen in water gas in the production of ammonia by the Haber process.

(2) Calcium cyanamid is produced from coke, limestone, and nitrogen from the air.

DOMESTIC PRODUCTION

Initial production of urea in the United States was in 1916, when our supply from Germany was cut off; in 1920 the domestic output was estimated to be more than 200,000 pounds. In 1921 two domestic firms were engaged in the manufacture of urea; in 1922, however, domestic production ceased, with the exception of an experimental output for a few months at Niagara Falls.

EXPORTS

There are no exports of urea.

IMPORTS

Imports were not reported separately prior to the act of 1913, when urea first received specific mention. They were less than 36,000 pounds until 1922, when they exceeded 260,000 pounds. In 1923 they declined to 46,000 pounds and have since steadily increased, reaching a maximum of over 800,000 pounds in 1927. The recent increase is due chiefly to a decline in price, and to its use as a fertilizer.

Beginning with 1925, imports of urea have been largely of the fertilizer grade.

Table 1 shows imports for consumption in the United States, 1914-1927, inclusive.

TABLE 1.—Urea: Imports for consumption in the United States

[Source: Foreign Commerce and Navigation of the United States]

Year and act	Quantity	Value	Unit value	Duty	Ad valorem rate	Equivalent specific rate
Fiscal, net of 1913:	<i>Pounds</i>				<i>Per cent</i>	
1911.....	17,981	\$8,708	\$0.489	\$2,199	25	\$0.122
Calendar:						
Act of 1913--						
1919.....	14,290	9,741	.682	2,435	25	.171
1920.....	23,693	14,085	.594	3,521	25	.148
1921.....	35,339	8,906	.252	2,226	25	.063
1922 (9 months).....	182,257	43,891	.241	10,973	25	.060
Act of 1922--						
1922 (3 months).....	78,379	17,670	.225	6,185	35	.078
1923.....	45,711	5,890	.129	2,064	35	.045
1924.....	91,307	12,891	.137	4,512	35	.048
1925.....	146,438	15,886	.108	5,560	35	.038
1926.....	377,729	30,346	.080	10,621	35	.028
1927.....	813,120	51,799	.064	17,130	35	.021

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SOURCE OF IMPORTS

Imports of urea have been almost entirely from Germany. Table 2 shows the imports, by countries, since 1923.

TABLE 2.—Urea: Imports into the United States, by countries

[Source: Foreign Commerce and Navigation of the United States]

Country of origin	1924		1925		1926		1927	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
Germany.....	87,007	\$11,442	142,718	\$15,463	376,296	\$30,265	812,876	\$51,799
United Kingdom.....			220	41				
Netherlands.....			3,500	382				
Belgium ¹					1,433	81	1,433	81
Warehouse.....	7,300	1,449						
Total.....	94,307	12,891	146,438	15,886	377,729	30,346	814,309	51,880

¹ Including Luxemburg.

DOMESTIC CONSUMPTION

Domestic consumption may be considered as equal to imports, since there is neither domestic production nor exports of urea.

PRODUCTION AND EXPORTS—FOREIGN COUNTRIES

The Interessen Gemeinschaft in Germany is the only known foreign producer of fertilizer urea. No exports are given in German official statistics, and the quantity of production is not known.

PRICES

The pre-war price of urea was approximately 30 cents per pound. During the war period the price advanced to \$2 per pound, and from 1925 to 1928 the pure product was quoted at 18-20 cents. The fertilizer grade of urea is not quoted in the trade journals. The foreign unit value of imports of this grade in 1927, however, was \$0.064 per pound.

COMPETITIVE CONDITIONS

Germany is the only known country producing urea on a commercial scale for fertilizer. Production is by the ammonia process.

Germany has the advantage of a relatively long experience in the production of ammonia and other nitrogen compounds, the ammonia being made synthetically on a large scale. The basic raw material is coal, which is available at a low cost. The economic production of urea by the cyanamide process requires primarily cheap electric power. Although a large producer of cyanamide, Germany does not have cheap electric power, and this is undoubtedly one reason for producing urea by the ammonia process. It is not clear that a country possessing cheap electric power and an ample supply of coke and lime can make urea in competition with Germany. The American Cyanamid Co., produces cyanamide in Canada and ships it to the United States. In

the cost of electric power, both Canada and the United States have the advantage over Germany.

In 1926 about 70 per cent of the world's production of synthetic nitrogen was by the direct ammonia process—using coal as the basic raw material—entirely independent of water power. About 24 per cent was made by the cyanamide and 6 per cent by the arc process.

The cyanamide process requires about one-fourth of the electrical energy used in the arc process, and is a "cheap water-power industry." The direct synthetic ammonia process requires only one-sixteenth of the power used in the arc process and one-fourth of that in the cyanamid process. All available information seems to indicate a cost favorable to the ammonia process.

COSTS OF PRODUCTION

There is no production of urea in the United States. Consequently, there are no domestic costs of production with which foreign costs may be compared.

TARIFF CONSIDERATIONS

In the classification of chemicals for tariff purposes, fertilizer materials—almost without exception—have been included in the free list. At the time of the passage of the tariff act of 1922, urea was not used as a fertilizer. Within the past few years, however, the use of urea for fertilizer has greatly exceeded that for technical purposes.

CONCLUSION

Section 315 authorizes the President, after investigation and report by the tariff commission, to proclaim a rate of duty which shall equalize ascertained differences in costs of production in the United States and in the principal competing foreign country. Urea has not been manufactured on a commercial scale in the United States since 1922. Domestic cost of production data are consequently not available for subsequent years. Information in the possession of the commission leads it to believe that there is little likelihood that cost of production data could be obtained in Germany, the principal source of our imports.

In view of the foregoing, the commission is of opinion that an investigation of fertilizer urea for the purposes of section 315 of the tariff act of 1922 is not feasible.

Respectfully,

THOMAS O. MARVIN,
Chairman.
ALFRED P. DENNIS,
Vice Chairman.
EDGAR B. BROSSARD,
S. J. LOWELL,
LINCOLN DIXON,
FRANK CLARK,
Commissioners.