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SECURITY INFORMATION

REPORT [redacted]

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COUNTRY Czechoslovakia

DATE DISTR. 26 Feb. 54

SUBJECT Tesla Vrsovice Production of Medium and High-Power Transmitter Tubes and Medium-Power Special Tubes

NO. OF PAGES 15

DATE OF INFORMATION [redacted]

REFERENCES: 50X1

PLACE ACQUIRED [redacted]

THIS IS UNEVALUATED INFORMATION

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1. Tubes in the categories of medium and high-power transmitter electronic tubes and medium-power special electronic tubes were produced during World War II in small series by Radioslavia A.S., Prague-Vysocany (I do not know the street address). This plant was demolished in the second bombing of Prague in 1944. The production of these tubes was resumed in 1947 in a new Radioslavia factory in Prague-Vrsovice, at SNB Allee #55. From 1944 to 1947 these tubes were not produced in Czechoslovakia at all. Only so-called "repairs" were carried on during this period. Defective tubes were disassembled, the good parts being used to produce a new tube. When sufficient parts were lacking to produce a new tube, these parts were produced in the factory. This repair operation took place in Philips A.S. in Prague-Hloubetin (later the Tesla Hloubetin II plant). The only exception was DET-3; this tube was actually produced during this period in the Philips plant. The Radioslavia firm in Prague-Vrsovice was nationalized in 1948 and renamed Tesla. The present name of this plant is Tesla National Enterprise, Vrsovice Plant. The factory was subordinated in the second half of 1951 to Tesla National Enterprise, Julius Fucik Plant, in Prague-Hloubetin, at #186 Podebradska Street. The Tesla Vrsovice factory is the only plant in Czechoslovakia for the production of medium and high-power transmitter electronic tubes and of medium power special electronic tubes. The tubes were actually produced in this plant, almost all of the component parts being produced and assembled there.

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2. These types of tubes were not imported into Czechoslovakia after 1945. I believe that they were also not imported before 1945. In general, these Czechoslovak tubes conformed to the products of the English firm, Marconi Wireless Telegraph Company, London. (The initial Czechoslovak production in this field, during the last years before World War II, was licensed production of this English firm. The Czechoslovak tubes of this type still carry Marconi's designation, and electronic tubes later developed were marked with similar designations.) The production output of these tubes for 1947 was about one tenth of the 1951 output. The first increase in output was after the Radioslavia factory was nationalized in 1948; the second increase was in 1953. Production figures for individual tubes are given below for 1951, 1952, and 1953. The production figures for 1951 and 1952 are planned figures which, if not stated otherwise, were actually achieved, while the production figures for 1953 are planned figures, but are here accompanied with production figures which I believe could be achieved (when the two figures differ).

3. Prices are given for individual tubes. These are pre-currency-reform prices and the present price equals that price divided by five. There were rumors in the Tesla Vrsovice plant that the price of some types of tubes would be lowered in 1953, but as of summer 1953, the prices had not changed. Further, the percentages of rejects are given for individual tubes. The percentage represents the average for 1952 and the first half of 1953.

4. Prior to the nationalization in 1948 the quality of these Czechoslovak tubes reached about 90% of the quality of the Marconi products. Since that date the quality of tubes has been deteriorating steadily, as reflected in the actual life of individual tubes. In general, the actual life of the tubes was 200% of the guarantee in 1948, 170% in 1949, 145% in 1950, 125% in 1951, 95% in 1952, and in 1953, I believe, only 80% of the guarantee. The guarantee is given below for the individual tubes. When not stated otherwise, the actual life of the tube may be judged from the percentages of the guarantee as given above. The continuous decrease in the quality of tubes was for the most part a direct result of Communist production and personnel policies. These policies, along with the general political and economic situation, resulted in deteriorating labor morale, which was reflected in negligence and lack of interest, and from 1951 unorganized sabotage. The decrease in the quality of tubes was further caused by deteriorating quality of both foreign and domestic raw materials. Because the imports from the West were, in general, limited, the plant was obliged from 1949 to purchase often from new foreign suppliers and therefore was unfamiliar with the materials. Further, the foreign materials which arrived in Czechoslovakia by devious ways, mainly beginning in 1951, were very often of a poor quality. The materials in question were mainly tungsten and molybdenum. The growing lack of foreign materials forced the Vrsovice plant to use domestic material where it was available. This domestic material was of poor quality because Czechoslovak suppliers were not experienced enough to produce materials for vacuum tube production.

Following is a complete list of medium and high-power transmitter electronic tubes and medium-power special electronic tubes:

5. Electronic tubes with internal anode and natural cooling:

a. NT electronic tubes:

N designates the tube as tube with tungsten cathode and natural cooling; T designates the tube as triode.

		Planned Output for 1951	for 1952	for 1953
(1)	MT 9	7 units	14 units	62 units
(2)	MT 9A	8 units	15 units	10 units
(3)	MT 9F	13 units	34 units	26 units
(4)	MT 9L	36 units	33 units	22 units
(5)	MT 12	7 units	16 units	4 units
(6)	MT 12A	0 units	8 units	9 units
(7)	MT 14-	65 units	250 units	132 units

The actual output of the MT 14 was 30 units for 1951 and 120 units for 1952.

All of the MT electronic tubes were of a similar design. They differed only in electric performance characteristics, which however, were within the range given below.

Heater voltage	15-20 v.
Anode voltage	2,000-6,000 v. with one exception, which was 10,000 v. for MT 9 or MT 12, I do not remember which.
Anode dissipation	200-600 watts
Cathode	Tungsten, directly heated
Anode	Molybdenum
Glass	Lead glass. Molybdenum glass was used for the MT 14 type from the second half of 1951.
Grid	Molybdenum
Guarantee	2,000 hours
Rejects in production	40%
Returned by customer as defective (hereafter called "returned")	15%
Price	About 10,000 crowns

The vacuum of MT tubes became imperfect when the tube was in operation. This was caused by inadequate cooling. The MT 14 rejects, for this cause, amounted in 1951 to 80% of the total MT 14 output; therefore in 1952 the tube was equipped with molybdenum glass envelope instead of lead glass. The MT 14 type was the most used of these tubes. It was used for various purposes in recent types of transmitters (transmitters set in operation in Czechoslovakia after 1945) and for transmitters which were being constructed. Six per cent of the total yearly output of this tube were shipped for use in the Warsaw Transmitter. This transmitter was built in 1949 by the then Tesla Vrsovice Transmitter Department and, I believe, had about 100 kw. of power. The remaining MT tubes were used for various purposes in old transmitters (transmitters which were in operation in Czechoslovakia before 1945). These were of lower power (about 20 kw.) and were located at Jihlava, Ceske Budejovice, and Podebrady /N 50-09, E 15-08/.

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b. MR electronic tubes:

M designates the tube as tube with tungsten cathode and natural cooling.

R designates the tube as rectifier diode (vacuum).

		Planned Output 1951	1952	1953
(8)	MR 4	-0-units	60 units	17 units
		Actual 1952 output was 30 units. Price 3,300 crowns		
(9)	MR 6	7 units	4 units	8 units
		Price 3,700 crowns		
(10)	MR 7A	55 units	96 units	69 units

MR 4 and MR 6:	
Heater voltage	Up to 15 v.
Anode voltage	4,000 v.
Anode dissipation	200 watts
Cathode	Tungsten, directly heated
Anode	Molybdenum
Rejects	30%
Returned	5%
MR 4 guarantee	1,500 hours
MR 6 guarantee	2,000 hours

MR 4 and MR 6 tubes were used for old transmitters of lower power.

MR 7A	
Heater voltage	15 v.
Anode voltage	About 6,000 v.
Anode dissipation	400 watts
Anode	Molybdenum
Cathode	Tungsten, directly heated
Glass	Lead glass
Guarantee	2,000 hours
Rejects	25%
Returns	5%
Price	5,500 crowns

This tube was used for both old transmitters of lower power (more frequently used than the MR 4 and MR 6 types) and for transmitters constructed betweeen 1945 and 1948.

The MR tubes developed the same defect as the MT tubes.

c. DE electronic tubes:

DE designates the tube as tube with internal anode, natural cooling, and tungsten-thorium cathode.

M designates the tube as modulator triode.

designates the tube as oscillator triode.

		Planned Output 1951	1952	1953
(11)	DEM 2	-0-units	7 units	6 units
(12)	DET 2	8 units	6 units	16 units
(13)	DET 3	45 units	130 units	100 units
		The actual output for 1952 was 100 units.		

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DEM 2 and DET 2:	Heater	15 v.
	Anode voltage	2,000 v.
	Anode dissipation	100 watts
	Rejects	65%
	Returned	10%
	Price	I do not remember

The DEM 2 and DET 2 were used in old transmitters which were operating in Czechoslovakia.

DET 3:	Heater	15 v.
	Anode voltage	3,000 v.
	Anode dissipation	150 watts
	Rejects	55%
	Returned	8%
	Price	10,500 crowns

This tube was used for old transmitters and for transmitters built between 1945 and 1948.

The DEM 2, DET 2, and DET 3 types were equipped with tungsten-thorium directly heated cathode, molybdenum anode, and molybdenum grid; the envelope was of lead glass. The guarantee for all these tubes was 2,000 hours; the actual life was 2,500 hours for 1948, 2,000 hours for 1949, 1,700 hours for 1950; 1,500 hours for 1951, 1,200 hours for 1952, and 1,000 hours, I believe, for 1953. The DE tubes developed the same defect as the MT and MR tubes mentioned above. In addition, the DE tubes developed an unsteady emission. (The emission was singing.)

6. Electronic tubes with external anode and air cooling:

	Planned Output 1951	1952	1953
(14) ACM 1S	93 units	165 units	224 units

This tube was a triode modulator.

Heater voltage	18-19 v.
Heater current	20 ampheres
Anode voltage	6,000 v.
Anode dissipation	1.2 kilowatts
Anode	Copper
Cathode	Tungsten, directly heated
Grid	Molybdenum
Glass	Lead glass
Rejects	25%
Returned	5%
Guarantee	2,000 hours

This tube was used as a modulator for broadcast transmitters of medium and low power (up to 50 kw.) which were put in operation in Czechoslovakia mainly after 1945.

5) ACM 3 Triode modulator of an older design (the radiator was of an older design also).

The tube was used, probably, for one old broadcast transmitter.

Heater voltage	18-19 v.
Heater current	20 ampheres
Anode voltage	6,000 v.

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Anode dissipation	1.2 kilowatts
Anode	Copper
Cathode	Wolfram
Grid	Molybdenum
Glass	Lead glass
Guarantee	Not stipulated. If it were stipulated, it might be 2,000 hours.
Rejects	35%
Returned	Not known
Price	I believe about 10,000 crowns

Mass production started in early 1953. It was planned to produce 72 units during 1953. I believe that this goal could be met.

(16) ACR 2 — Diode rectifier (vacuum)

Heater voltage	15-20 v.
Anode voltage	about 6,000 v.
Anode dissipation	about 1,000 watts
Anode	Copper
Cathode	Tungsten
Glass	Lead glass
Rejects	25%
Returned	5%
Price	7,500 crowns
Guarantee	Not stipulated. If it were stipulated, I believe it would be 2,000 hours.

This tube was most probably used for a pre-World War II broadcast transmitter.

Plant output for 1951 unknown; 1952-12 units, 1953-10 units.

(17) ACS 2 — Tetrode. The production of this tube started in 1953. The planned output for 1953 was 20 units.

Heater voltage	15-20 v.
Anode voltage	6,000 v.
Anode dissipation	about 1,000 watts
Anode	Copper
Cathode	Tungsten-thorium
Grid	Molybdenum
Glass	Lead glass

This tube was used for pre-World War II transmitters.

(18) ACT 9 — Oscillator triode

Heater voltage	16.5 v.
Heater current	24 amperes
Anode voltage	6,000 v.
Anode dissipation	1.2 kilowatts
Anode	Copper
Cathode	Tungsten
Grid	Molybdenum

Planned output for 1951, 540 units; for 1952, 540 units; for 1953, 740 units. I believe this output could be achieved.

Price	8,000 crowns
Guarantee	2,500 hours

This tube was frequently used for both old and new middle-wave transmitters in operation. About six per cent of the total yearly output of this tube was sent to the Vrsovice Transmitter. The Tesla Vrsovice plant used this tube for generators for high-frequency heating in the plant itself.

(19) ACT 16 50X1 Short-wave triode, bottom limit-12 m., with radial cooling fence of new Czechoslovak design. About two thirds of the total output of this tube were used as oscillator and one third as modulator.

Heater voltage	20 v.
Heater current	100 amp eres
Anode voltage	15,000 v.
Anode dissipation	15,000 watts
Anode	Copper
Cathode	Tungsten
Grid	Molybdenum
Rejects	35%
Returned	15%
Damaged in transit	15%
Guarantee	Not stipulated. I believe that the actual life was 1,000 hours in 1951, 1,500 in 1952, and 1,600 in 1953.

The planned output for 1951 was 74 units; for 1952, 215 units; for 1953, 842 units. I believe that 50 tubes were produced in 1951, 180 in 1952, and 600 in 1953.

Price 50X1 20,300 crowns

(20) ACT 201 Oscillator triode. This tube was usually for middle-wave broadcast, exceptionally for short-wave, bottom limit-20 m.

It was planned to use this tube in a new type of transmitter which was under construction in the Tesla Hloubetin plant in 1952. (I believe that it was planned to use this transmitter as a jamming transmitter.) This transmitter had 100 kilowatts and was for middle-wave. In spring 1952, representatives of Tesla Hloubetin asked for urgent delivery of a few units of this tube for summer 1952. The planned output for 1952 was 53 units, but only about five units were manufactured during that year. It was planned to produce 180 units in 1953; however, I believe that only 150 units at the most could be produced.

Heater voltage	32 v.
Heater current	220 amp eres
Anode voltage	20,000 v.
Anode dissipation	50 kw. (tested for 60 kw.)
Anode	Copper
Cathode	Tungsten
Grid	Molybdenum
Price	Unknown
Guarantee	Not yet established.

(21) ACT 14

Oscillator triode equipped with radial cooling fence of new Czechoslovak design. This tube was developed from the CAT 6 type /see below/.

The planned output for 1952 was 24 units, but I believe that none were produced that year. Planned output for 1953 was 46 units. I believe that this number could be produced. It was planned to use this tube for a new type of transmitter, serial production of which was in preparation.

Heater voltage	20 v.
Anode voltage	12,000 v.
Anode dissipation	about 8,000 watts
Anode	Copper
Cathode	Tungsten
Grid	Molybdenum

Price not stipulated. Probable price is 22,000 crowns.

7. Transmitter electronic tubes with external anode and water cooling:

Designation for this type is "CA".

(22) CAT 3

Oscillator triode

Heater voltage	from 18-20 v.
Anode voltage	12,000 v.
Anode dissipation	10,000 watts
Anode	Copper
Cathode	Tungsten
Grid	Molybdenum
Price	15,000 crowns
Guarantee	1,400 hours

The planned output for 1951 was 3 units; for 1952, 30 units; for 1953, 15 units.

Rejects	40%
Returned	4%

This tube was not frequently used and was for an old transmitter in operation (for middle waves).

(23) CAT 6

Oscillator triode

Heater voltage	20 v.
Anode voltage	12,000 v.
Anode dissipation	12,000 watts
Anode	Copper
Cathode	Tungsten
Grid	Molybdenum
Price	17,500 crowns
Guarantee	2,500 hours

Planned output for 1951 was 24 units; for 1952, 74 units; for 1953, 96 units.

Rejects	35%
Returned	5%

This tube was used both for old and new types of broadcast transmitters for middle waves of low power (under 20,000 watts).

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(24) CAT 6K Oscillator triode

The tube had the same electric performance characteristics as CAT 6, but was designed for short wave (the grid outlet was of a different design); bottom limit, 20 m. I believe it was used for an old transmitter only. There was no planned output for 1951 and 1952. Planned output for 1953 was 43 units.

I do not remember the price, but I believe it was 17,500 crowns. Guarantee was not stipulated but I believe it might be 2,500 hours if there were one.

(25) CAT 9

Short-wave triode, bottom limit - 12 m., also suitable for middle waves. This tube was used for transmitters up to 50 kilowatts as oscillator (two thirds of the output) and as modulator, mostly for recent broadcast transmitters in operation, but also for old transmitters. I know that it was used for the Liblice Transmitter (Prague I transmitter) which was a middle-wave transmitter, a Standard Electric product, and also most probably for the Warsaw Transmitter. In both cases it was for auxiliary transmitter equipment. Further, this tube was used in the Tesla Roznov plant in generators for high-frequency heating to replace TA 12/20, a Philips product. The CAT 9 type was popular and often used. The tube was well designed and the tube was easy to produce.

Heater voltage	20 v.
Heater current	100 amperes
Anode voltage	15,000 v.
Anode dissipation	20,000 watts
Anode	Copper
Cathode	Tungsten
Grid	Molybdenum
Rejects	20%
Returned	5%
Damaged in transit	20%
Price	20,300 crowns
Guarantee	2,500 hours

Planned output for 1951, 130 units; for 1952, 132 units; however, 180 units were produced during 1952 and the planned output decreased for 1953 to 83 units. This decrease in the planned output for 1953 proves that this tube was still destined only for transmitters in operation and not for transmitters under construction.

(26) CAT 10 Oscillator triode

Heater voltage	30 v.
Anode voltage	20,000 v.
Anode dissipation	about 50 kilowatts
Anode	Copper
Cathode	Tungsten
Grid	Molybdenum
Glass	Lead glass
Price	Unknown; I believe about 25,000 crowns
Guarantee	2,500 hours

The planned output for 1952 was 5 units, and for 1953 also 5 units (none was produced in 1951). This tube was used for

an old transmitter only. The design of this tube was old. The tube was equipped with water-cooled cathode feeder.

(27) CAT 12A

Triode

Heater voltage	30 v.
Heater current	220 amperes
Anode voltage	20,000 v.
Anode dissipation	about 80 kw.
Anode	Copper
Cathode	Tungsten
Grid	Molybdenum
Rejects	20%
Returned	5%
Price	32,200 crowns
Guarantee	2,500 hours

The planned output for 1951 was 5 units; for 1952, 11 units; and for 1953, 10 units. The total output of this tube was exported to Rumania for a transmitter, I believe a long-wave one, built by the Marconi Firm. I do not know the location or any other details. (This tube was not used at all in Czechoslovakia.)

(28) CAT 14C

Oscillator triode for middle and long waves.

Heater voltage	32 volts
Heater current	450 amperes
Anode voltage	25,000 v.
Anode dissipation	150 kilowatts
Emission	100 amperes
Anode	Copper
Cathode	Tungsten
Grid	Molybdenum
Reje[illegible]	25%
Returned	10%
Damaged in transit	25%
Price	71,150 crowns
Guarantee	3,000 hours

The tube had two water-cooled cathode feeders. This tube was used mostly for transmitters built in Czechoslovakia after 1945. It was used for the transmitter at Velke Kostolany /N 48-30, E 17-37 and for a new transmitter named "Czechoslovakia" which was installed in the first half of 1952 somewhere in the Gottwaldov region. This transmitter had about 150 kilowatts power. This tube was also used for the Warsaw Transmitter. The planned output for 1951 was 80 units; for 1952, 42 units; and for 1953, 80 units. The increase of output in 1953 was destined for transmitters under construction.

(29) CAT 17C

Short-wave oscillator, triode, bottom limit-12 m. The electric performance characteristics conformed to those of the CAT 14C type, but the design was for short-wave.

Rejects	28%
Returned	10%
Damaged in transit	10%
Price	116,600 crowns
Guarantee	2,500 hours

Cathode feeders were air cooled.
Grid outlet was ring-shaped.

The planned output for 1951 was 21 units; for 1952, 44 units; and for 1953, 73 units. I believe that the increase in 1953 was for a short-wave high-power transmitter under construction.

This tube was used for recent short-wave broadcast transmitters of medium and high power.

(30) CAT 20 — Modulator triode

Heater voltage	32 v.
Heater current	220 amperes
Anode voltage	20,000 v.
Anode dissipation	From 80-100 kilowatts
Anode	Copper
Cathode	Tungsten
Grid	Molybdenum
Rejects	20%
Returned	50%
Price	32,200 crowns
Guarantee	3,000 hours

This tube was used for recent Czechoslovak transmitters of medium and high power.

(31) CAT 201 — Oscillator triode, mainly for middle waves but suitable also for short waves, bottom limit about 20 m.

Heater voltage	32 v.
Heater current	220 amperes
Anode voltage	20,000 v.
Anode dissipation	From 80-100 kilowatts
Rejects	25%
Returned	10%
Damage in transit	20%
Guarantee	3,000 hours
Price	33,900 crowns

The planned output for 1951 was 17 units; for 1952, 52 units; for 1953, 147 units. The increase for 1953, I believe, was for two new transmitters of medium power which were probably under construction.

This tube was used for recent broadcast transmitters of medium power (around 100 kilowatts).

(32) CAM 3 — Modulator triode

Heater voltage	18-20 v.
Anode voltage	12,000 v.
Anode dissipation	12 kilowatts
Rejects	30%
Returned	4%
Price	16,300 crowns
Guarantee	2,500 hours

Planned output for 1951 was 31 units; for 1952, 0 units; and for 1953, 96 units.

This tube was used both in old and in recent transmitters of low power (under 20 kilowatts) for middle waves in operation. This tube was used as modulator in those transmitters where CAT [illegible] was used as oscillator.

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(33) CAR 2 — Rectifier diode, vacuum

Heater voltage	Up to 20 v.
Anode voltage	12,000 v.
Maximum rectified current	1 ampere
Anode	Copper
Cathode	Tungsten
Glass	Lead glass
Rejects	20%
Returned	3%
Guarantee	2,500 hours
Price	15,600 crowns

This tube was used for old transmitters of medium and low power in operation.

The planned output for 1951 was 7 units; for 1952, 0 units; and for 1953, 29 units.

(34) CAR 4 — Diode rectifier, vacuum

Same specifications as CAR 2 (slight difference in dimensions only)

The planned output for 1951 was 7 units; for 1952, 0 units; and for 1953, 10 units.

(35) CAR 6 — Diode rectifier, vacuum

Heater voltage	Up to 20 v.
Anode voltage	25,000 v.
Maximum rectified current	2.5 amperes
Rejects	15%
Returned	5%
Guarantee	2,500 hours
Price	23,600 crowns

The planned output for 1951 was 59 units; for 1952, 134 units; and for 1953, 125 units.

This tube was used for medium and high-powered transmitters of post-World War II Czechoslovak construction (mainly for the Velke Kostolany and Czechoslovakia transmitters) and it was to be used for transmitters under construction. This tube was more frequently used than the CAR 4 and CAR 2 types. However, efforts were made to replace all these three vacuum rectifiers by mercury rectifiers. /See below./

8. Medium power special electronic tubes with heater cathode and natural cooling:

(36) GU 14 — Diode, used in various types of high voltage rectifiers both for transmitters of low power and for industrial purposes.

Heater voltage	2.5 v.
Anode voltage	10,000 v.
Maximum rectified current	1 ampere
Anode	Molybdenum
Cathode	Nickel coated with barium oxide
Glass	Molybdenum
Rejects	20%
Returned	5%
Guarantee	1,200 hours
Actual life	2,000 hours for 1948

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The actual life did not decrease after 1948 as rapidly as for most tubes, but equaled the guarantee as of 1953.

Price 1,750 crowns

The planned output for 1951 was 1,000 units; for 1952, 2,700 units; and for 1953, 7,551 units. However, I believe that only about 5,000 units could be produced during 1953. The increase for 1953 was occasioned, I believe, by a plan to use these tubes in rectifiers for new transmitters (jamming transmitters) under construction in the Tesla Hloubetin plant

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(37) GU 11

Diode

Heater voltage	2.5 v. or 5 v.
Anode voltage	15,000 v.
Maximum rectified current	2 amperes
Anode	Molybdenum
Cathode	Nickel, coated with barium oxide
Glass	Molybdenum
Rejects	30%
Returned	20%
Guarantee	Not stipulated; the actual life was 800 hours from 1950 through 1953.

This tube was developed in 1948. The planned output for 1951 was 370 units; for 1952, 750 units; and for 1953, 3,519 units. However, I believe that only 2,500 units could be produced in 1953. The reason for the increase for 1953 is the same as for the GU 14.

The tube was used for various types of high-voltage rectifiers both for transmitters of low power and for industrial purposes. The GU 11 with five volts heater voltage was used for the Podebrady Transmitter only.

This tube was smaller in size than it should be for its power. The surface of the envelope was not large enough and therefore caused insufficient cooling which resulted in lower inversion voltage.

(38) GT 14

Thyratron (mercury rectifier with control grid).

Heater voltage	2.5 or 5 v.
Anode voltage	10,000 v.
Rectified current	1 ampere
Rejects	25%
Returned	5%
Cathode	Nickel coated with barium oxide
Anode	Molybdenum
Glass	Molybdenum

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There was no guarantee. The actual life was about 2,000 hours for 1948 and decreased to some 1,200 hours in 1953.

Price	I do not remember the exact price but I believe it was 3,500 crowns.

The tube was used in two Czechoslovak transmitters, one of which was probably the Jihlava Transmitter, and for various purposes, such as for rectifiers for industrial purposes and in other industrial equipment.

(39) GT 15 Thyratron

Heater voltage	5 v.
Heater current	About 20 amperes
Anode voltage	20,000 v. (tested up to 25,000 v.)
Maximum rectified current	6 amperes
Cathode	Nickel, coated with barium oxide
Anode	Molybdenum or carbon
Glass	Molybdenum
Rejects	40%
Returned	25%

There was no guarantee; the actual life was about 1,000 hours from 1950-1953.

Price	9,000 crowns

The planned output for 1951 was 140 units; for 1952, 500 units; and for 1953, 1,169 units. The total 1951 output was solely for the Warsaw Transmitter. The 1952 output was also for the Warsaw Transmitter but the increase in the output in this year was, I believe, for new transmitters under construction, as mentioned above under CAT 17C, CAT 201, and ACT 201. The increase in the output for 1953 was, I believe, for new transmitters (jamming transmitters) under construction at that time.

The GT 15 type showed the same defect as the GU 11. At the beginning of 1951 there was equipment under development in the then Tesla Vrsovice Transmitter Department which was intended to keep the temperature of this tube at the desired level, which was from 30 to 40°C. A mild air current was blown into a cover which was arranged around the tube. The temperature of the air current was kept at the desired level by an electric spiral. It was planned to send this equipment for use with the Warsaw Transmitter and, if it proved satisfactory, to use it with all the future GT 15 tubes. I do not know the results of this development.

9. Development

(40) The development of a new transmitter air-cooled tube started in the Tesla Vrsovice plant in the second half of 1952. The first unit was manufactured in early 1953. This was the first Czechoslovak attempt to develop transmitter tubes of modern types. The tube was designed according to the ATL 2-1 type, a Brown Boveri, Switzerland, product. Some samples of this tube were under study in the Tesla Vrsovice plant. The Czechoslovak tube was also called ATL-2, but no official designation had been given the tube as of summer 1953. The tube was still under development in 1953, and I believe that the tube might have been set into mass production at the beginning of 1954. The tube was an oscillator triode for low-power broadcast transmitters.

Heater voltage	12 v.
Heater current	50 amperes
Anode voltage	5,000 v.
Anode dissipation	2 kilowatts
Cathode	Tungsten, directly heated
Anode	Copper
Grid	Molybdenum
Glass	Kovarglass of Czechoslovak origin
Conduits	Kovar metal

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1. [redacted] Comment: The expression "transmitter tubes" includes oscillators, modulators, and vacuum rectifiers; "special tubes" mean mercury tubes in this report. 50X1