

KUBARA LAMINA SA

Piaseczno, 10.06. 2014

Ambasador Krzysztof Majka

Korea Południowa, Seul, #20-1,
Samcheong-ro, Jongno-Gu, Seul, (Sagan-
Dong), 110-190

Dear Sir,

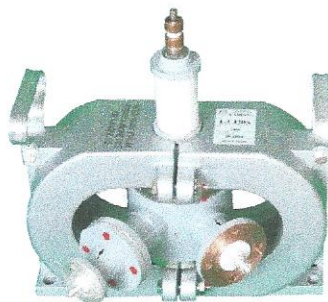
We would like to introduce our company to establish a cooperate with you.

The tradition of KUBARA LAMINA SA dates back to 1957 in which Zakłady Lamp Nadawczych (Transmission Tube Plants) LAMINA (**L**ampy - tubes - **M**ikrofalowe - microwave i **N**adawcze - and transmission) was established. After numerous ownership transformations, the company is now a joint stock company called KUBARA LAMINA.

From the beginning of the company's activity, one of the main areas of our business has been **design and production of microwave products**, above all, microwave tubes used in transmitter modules of radiolocation stations. The main recipient is above all NATO (Polish Ministry of National Defense), which proves high quality of our products. We offer the top quality of services and production, certified by ISO 9001 and licence AQAP 2110: 2009.

Microwave amplifying tubes (crossed-field amplifiers), produced in our company, are used in Polish radiolocation stations of military purpose. They can be adapted to specific requirements of other radiolocation stations, therefore our offer may be interesting for foreign procurement units of the Ministry of Defence.

Photo 1: Microwave lamp of crossed-field amplifier type



KUBARA LAMINA SA
ulica Puławska 34
05-500 Piaseczno

phone: +48 22 756 76 60, +48 22 756 76 61
fax: +48 22 757 07 28

e-mail: sekretariat@kubara-lamina.com
page: www.kubara-lamina.com



Licence no. B-437/2003
AQAP 2110:2009
PN-EN ISO 9001:2009

District Court for the Capital City of Warsaw
14th Commercial Department
Warsaw Czerniakowska 100
KRS 0000101473
Amount of initial capital:
1 504776.00 PLN (paid in full)

NIP (tax identification number): 886-00-22-560
National Official Business Register REGON:
890560994

Table 1: Technical data of crossed-field amplifiers

CROSSED-FIELD AMPLIFIERS												
type	Frequency	RF Band-width (MHz)	RF drive peak power (kW)	Peak output power (kW)	Average output power (W)	Pulse duration (μs)	Peak anode voltage (kV)	Peak anode current (A)	Filament voltage ² (V)	Filament current ² (A)	RF connectors	Cooling ³
LM-112	L band	100	3,5	50	330	10,6	10-12	10-15	4,5-6,5	30	Waveguide M14	L-anode
LM-113	L band	100	40	400	2500	10	24-29	27-32	4,8-6,8	30	Waveguide M14	L-anode
LA-114	L band	100	7	100	800	12-22	12-15	13-18	5,2-6,8	30	Waveguide M14	L-anode
LA-115	L band	100	75	600	4300	20	28-34	30-35	5,2-6,8	30	Waveguide R14	L-anode, FA-RF
LA-115 bis ⁴	L band	100	550	1200	7400	20	34-41	28-35	4,5-7	30	Waveguide R14	L-anode, FA-RF
LA-116	L band	100	40	400	7000	50	27-30	21-31	4,5-7	30	Waveguide R14	L-anode, FA-RF
LA-120	L band	100	8	100	1500	2-12	12-15	13-18	5,2-6,8	30	Coax 7/8-1" 5/8"	L-anode
SA-311	S band	200	6	90	925	10	19-24	9-12	4-6	30	Waveguide R32	L-anode
SA-312	S band	200	75	520	2400	9	36-43	21-28	7-9	32	Waveguide R32	L-anode
SA-313	S band	200	6	105	700	11	19-24	9-12	4-6	30	Waveguide R32	L-anode
SA-314	S band	200	90	700	4400	10	40-46	27-33	7-10	32	Waveguide R32	L-anode
CA-601 ⁵	C band	400	50	550	2000	2,4	29-34	22-30	-	-	Waveguide R48	L-anode

The owned production potential with regard to execution of details and conducting technological processes is used to provide services related to production of details and equipment for external recipients. These are elements of accelerators and other devices applicable in the field of scientific research. In this regard, an important recipient of our services is the National Nuclear Research Centre in Świerk, Poland. Upon the order of the Institute, among others, the following devices have been made: RF Deflector, Compressor coupler CMP00, filters for plasma technologies, proton accelerator, section II.

KUBARA LAMINA SA

ulica Puławska 34
05-500 Piaseczno

phone: +48 22 756 76 60, +48 22 756 76 61
fax: +48 22 757 07 28

e-mail: sekretariat@kubara-lamina.com
page: www.kubara-lamina.com



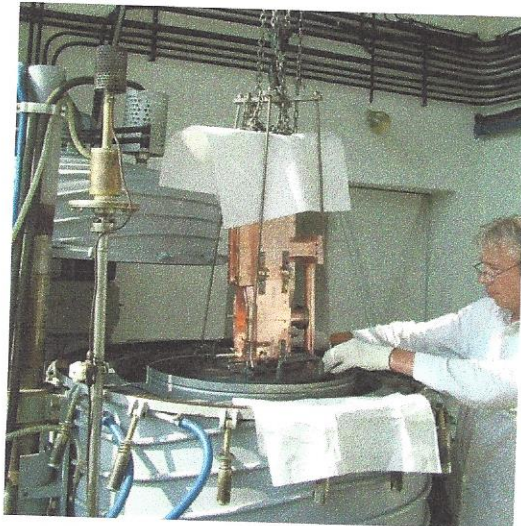
Licence no. B-437/2003
AQAP 2110:2009
PN-EN ISO 9001:2009

District Court for the Capital City of Warsaw
14th Commercial Department
Warsaw Czerniakowska 100
KRS 0000101473
Amount of initial capital:
1 504776.00 PLN (paid in full)

NIP (tax identification number): 886-00-22-560

National Official Business Register REGON:
890560994

Photo 2: Proton accelerator, section II



Another technologically advanced product of our company are **HOM absorbers** for suppression of higher modules of parasitic vibrations in an X-ray laser on free electrons (project XFEL). The device is in the phase of installation within the DESY research centre in Hamburg (Germany). The Polish party is represented, among others, by the National Nuclear Research Centre. We are interested in exchange of experience with other scientific and production units, participating in this project.

Photo 3: HOM absorber



KUBARA LAMINA SA

ulica Puławska 34
05-500 Piaseczno

phone: +48 22 756 76 60, +48 22 756 76 61
fax : +48 22 757 07 28

e-mail: sekretariat@kubara-lamina.com
page: www.kubara-lamina.com



Licence no. B-437/2003
AQAP 2110:2009
PN-EN ISO 9001:2009

District Court for the Capital City of Warsaw
14th Commercial Department
Warsaw Czerniakowska 100
KRS 0000101473
Amount of initial capital:
1 504776.00 PLN (paid in full)

NIP (tax identification number): 886-00-22-560

National Official Business Register REGON:
890560994

Under the development works conducted on microwave tubes in KUBARA LAMINA S.A., solutions and preparations of new products are developed.

Highly advanced research-development works are conducted on start-up of microwave tubes of **magnetron** type for continuous wave with the power of 1kW, 5kW and 30 kW. This type of microwave lamps is used in many industrial branches:

- in the food industry - for drying food in production plants;
- in timber industry – for acceleration of wood drying processes;
- in chemical industry – in order to accelerate chemical reactions and for temperature stabilization and reduction in stresses e.g. in the production of glass (panes).

Photo 4: Magnetron for continuous wave of 30 kW



Works are being completed on the prototype of a **vacuum extinguishing chamber** for the voltage of 24 kV. It is a kind of a breaker designed for distribution systems of electrical low and high voltage network. Interest in this product is reported by energy transmission companies.

Photo 5: Vacuum extinguishing chamber



KUBARA LAMINA SA

ulica Puławska 34
05-500 Piaseczno

phone: +48 22 756 76 60, +48 22 756 76 61
fax: +48 22 757 07 28

e-mail: sekretariat@kubara-lamina.com
page: www.kubara-lamina.com



Licence no. B-437/2003
AQAP 2110:2009
PN-EN ISO 9001:2009

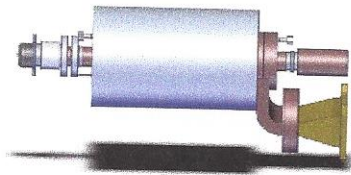
District Court for the Capital City of Warsaw
14th Commercial Department
Warsaw Czerniakowska 100
KRS 0000101473
Amount of initial capital:
1 504776.00 PLN (paid in full)

NIP (tax identification number): 886-00-22-560

National Official Business Register REGON:
890560994

Works are underway to develop a new type of a **high-power traveling wave tubes (TWT)**. At the present stage of works we are interested in lossy materials in the frequency range of 1-10 GHz. We will gladly establish contacts with institutions (institutes, industrial plants) in order to cooperate on technology of lossy materials.

Photo 6: Visualisation of TWT tube



We are also interested in **cooperation** with foreign companies. As a manufacturer of vacuum products we have **experience in technological processes** with regard to:

- soldering in protective atmospheres (hydrogen, brown gas) and in vacuum;
- ceramics-metal and metal-glass connections;
- technology of sintered tungsten and molybdenum powders;
- generation of high vacuum (10^{-8} Tr);
- treatment of hardly treated materials, such as copper, molybdenum, tungsten;
- precise welding (arc TIG, heli TIG);
- technology of galvanic application of very thin copper and nickel coatings for application in vacuum technology.

One of the main activities of our company include manufacturing of semiconductor devices, technically and technologically based on the license from Westinghouse Electric Corp. and own developments. Our products are characterized by high reliability, long periods of operation and attractive prices.

We manufacture diodes, thyristors, insulated modules and modular blocks. Our products may also be used as replacements for semiconductor elements of global manufacturers, such as SEMIKRON, IR, VISHAY, INFINEON, WESTCODE, POWEREX. We continuously cooperate with scientific and research entities, so that we can develop and implement new products, such as the new diode for 8000 A and 1200 V.

KUBARA LAMINA SA

ulica Puławska 34
05-500 Piaseczno

phone: +48 22 756 76 60, +48 22 756 76 61
fax :+48 22 757 07 28

e-mail: sekretariat@kubara-lamina.com
page: www.kubara-lamina.com



Licence no. B-437/2003
AQAP 2110:2009
PN-EN ISO 9001:2009

District Court for the Capital City of Warsaw
14th Commercial Department
Warsaw Czerniakowska 100
KRS 0000101473
Amount of initial capital:
1 504776.00 PLN (paid in full)

NIP (tax identification number): 886-00-22-560

National Official Business Register REGON:
890560994

Photo 7: Diodes and thyristors



The assortment of semiconductor devices offered by KUBARA LAMINA SA includes:

- Rectifier diodes, medium and high power, standard and fast, 10-8000A, 100-5500V;
- Medium power thyristors, standard and fast, 16-25A, 100-1400V;
- High power thyristors, standard, fast and pulsed, 60-1900, 400-2400V;
- Insulated modules, single- and double-element, 150-1000A, 400-1600V;
- Modular blocks (diode, thyristor and mixed), air and liquid cooled.

Photo 8: Insulated modules and modular blocks



The semiconductor elements of KUBARA LAMINA SA are manufactured and tested in accordance with the IEC requirements, Polish and European norms. For many years, we have been exporting a significant part of our products to the NAFTA countries, Western Europe, Near and Far East. Highest quality and reliability of the products is confirmed by ISO 9001:2000 Certificate and appreciated by our customers, which include such companies as POWEREX Inc. (established as a result of merger of Westinghouse Electric Corp and Mitsubishi Electric), BOMBARDIER and ABB. We are proud that turnover with the American

KUBARA LAMINA SA
ulica Puławska 34
05-500 Piaseczno

phone: +48 22 756 76 60,+48 22 756 76 61
fax :+48 22 757 07 28

e-mail: sekretariat@kubara-lamina.com
page: www.kubara-lamina.com



Licence no. B-437/2003
AQAP 2110:2009
PN-EN ISO 9001:2009

District Court for the Capital City of Warsaw
14th Commercial Department
Warsaw Czerniakowska 100
KRS 0000101473
Amount of initial capital:
1 504776.00 PLN (paid in full)

NIP (tax identification number): 886-00-22-560
National Official Business Register REGON:
890560994

KUBARA LAMINA SA

Offer, page 7

POWEREX company constitutes a significant part of all revenues of KUBARA LAMINA SA on sale of semiconductors.

Our semiconductor elements are used in power electronic devices, among others in converters for energy engineering (e. g. electric traction, wind and solar farms).

In particular, they can be used in such finished products as:

- rectifiers and power supplies;
- electronic AC and DC steering systems (converters, inverters, power controllers);
- semiconductor power relays;

usually used in:

- induction heaters and welding;
- regulating systems for electric heating, lighting and ventilation devices;
- electric drive systems used in mining (lifts, belt conveyors), iron and steel or petrochemical industry, machinery (shaping and milling machines).

On request of our Customers, we can design and manufacture insulated modules and modular blocks in accordance with specific wishes of the Customers.

We look forward to working with you.

On our website www.kubara-lamina.com you will find more information and catalogues of our products with specifications. We will be pleased to answer your questions that can be sent to:

- microwave line – Mariusz Błażejewicz, MSc,
e-mail: mariusz.blazejewicz@kubara-lamina.com
phone + 48 500 004 488;
- semiconductors power line – Monika Ponikły, MBA,
e-mail: monika.ponikly@kubara-lamina.com
phone +48 22 398 94 09.

You are welcome to cooperate with us.

Yours sincerely,

Zbigniew Sitek
President of the Board

KUBARA LAMINA SA
ulica Puławska 34
05-500 Piaseczno

phone: +48 22 756 76 60, +48 22 756 76 61
fax: +48 22 757 07 28

e-mail: sekretariat@kubara-lamina.com
page: www.kubara-lamina.com



Licence no. B-437/2003
AQAP 2110:2009
PN-EN ISO 9001:2009

District Court for the Capital City of Warsaw
14th Commercial Department
Warsaw Czerniakowska 100
KRS 0000101473
Amount of initial capital:
1 504776.00 PLN (paid in full)

NIP (tax identification number): 886-00-22-560
National Official Business Register REGON:
890560994