

AD 678127

①

TRANSLATION NO. 574

DATE: 28 Mar 1962

DDC AVAILABILITY NOTICE

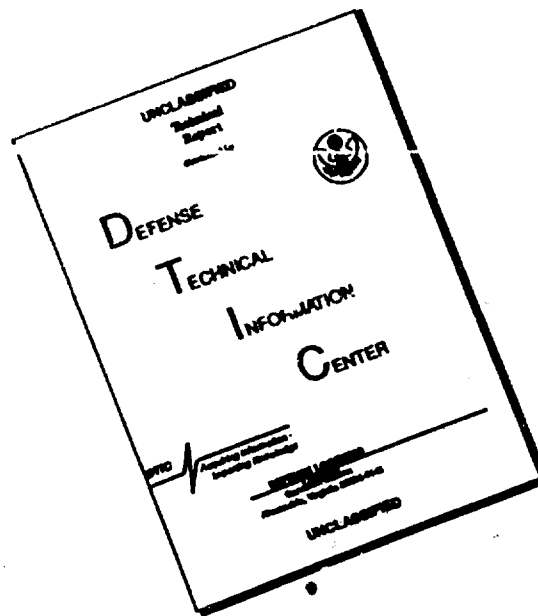
This document has been approved for public release and sale; its distribution is unlimited.

DEPARTMENT OF THE ARMY
Fort Detrick
Frederick, Maryland

Reproduced by the
CLEARINGHOUSE
for Federal Scientific & Technical
Information Springfield Va 22151

247
NOV 27 1968

DISCLAIMER NOTICE



THIS DOCUMENT IS BEST QUALITY AVAILABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.

AD 676127

1. Metal Industry Workers Pledge Higher Output

(Khimicheskoye Mashinostroyeniye [Chemical Machine Building], Moscow,
No 5, Sept-Oct 1961, pp 1-3)

...The output of the individual branches of industry, as compared with the first half of the previous year has increased as follows [during the first half of this year]: ferrous and nonferrous metallurgy, by 10 percent; fuel and power industry, by seven percent; machine building and metal-working, by 16 percent; chemical industry, by 14 percent, etc. During the same period the output of chemical equipment totaled 118 million rubles, which is 113 percent as compared with the first half of 1960 (the newspaper Pravda of 21 July 1961).

The industrial enterprises of chemical machine building, in collaboration with scientific research and project-design organizations, carried out work on the complex mechanization and automation of production processes, introduction of highly productive technological processes, design and development of new machinery, equipment, and instruments, and also the modernization of the existing technological equipment. The production of about 400 various equipments and instruments of obsolete design was discontinued in favor of their improved, modern counterparts. In the past half-year the machine-building enterprises of the sovnoar-khozes modernized more than 35,000 units of various technological equipment to further expand the mechanization and automation of their production and to increase the speeds and productivities of equipment.

...The labor competition in honor of the coming Party Congress has spread throughout chemical machine building, too. The plants, institutes, and design bureaus of the branch are fulfilling their pledges.

At this juncture it should be noted that the pledges adopted pertain not only to the pre-term fulfillment of output and thematic plans, reduction of labor and material expenditures per output unit, savings of ferrous and nonferrous metals, and similar matters, but also, mainly, to the design and development of new types of modern chemical equipment.

Thus, the personnel of the "Bol'shevik" Plant pledged itself to master in 1961 the production of thirteen types of new machines and uni-

tized installations designed for incorporation into automatic continuous-flow lines. A large part of the new machines and apparatuses manufactured will go to equip the rapidly expanding domestic tire and plastics industries: this includes a machine for manufacturing sheets from thermoplastic resins which serves for the continuous-action production of 700 millimeters wide impact-resistant plastic sheets; an 88" vulcanizer-expander for the extra-strong tires of motor trucks with carrying capacities exceeding 40 tons; a three-roll calender with triangular alignment of the rolls, designed for topping cord and cotton fabrics with a layer of a rubber batch, flattening rubber batches, rubberizing fabrics, and doubling rubber sheets or rubberized fabrics (the calender will serve to obtain rubber coatings of a thickness of within ± 0.005 millimeter of the accuracy desired); polystyrene film extrusion presses with a worm diameter of 63 millimeters, and other types of equipment.

Working in the same direction, the "Tambovkhimmash" Plant has pledged itself to master this year the serial production of a number of type-sizes of vulcanizers-expanders, including units for scooter tire casings; and to convert to the continuous-action production of reducers, as well as to master the production of a series of new SNG-300, SNV-200, and SMB-2000 mixers for rubber compounds and plastics.

The "Metallist" Plant of the Leningradskiy Sovnarkhoz will organize the production of a new automatic installation for assembling the casings of passenger-car tires; initiate the mass production of all-purpose stitching and flattening machines for tire repair work; master the production of a series of the latest instruments for determining the rising property [vskhozhest'] of sponge rubbers and plastics and testing rubber for tackiness, and also the production of several type-sizes of thermostats for the artificial aging of rubber at temperatures of up to 250°C.

The providing of the rubber-processing and tire industry with new equipment is also being accomplished with the participation of the "Kuzkhimmash" Plant of the Penzenskiy Sovnarkhoz, the "Leninskaya Kuznitsa" [Lenin's Forge] Plant of the Kiyevskiy Sovnarkhoz, and certain enterprises enlisted for this purpose from the allied branches of industry, which also pledged themselves to master in 1961 the production of a series of new types of machinery and apparatus.

The personnel of the "Progress" Plant pledged itself to design and develop models of new machines for serial production: FPAK-5-30K, FPAK-10-30K, FPAK-25-30K, and FPAK-50-30K stainless-steel automatic filter presses; LV-50T leaf-type vertical filter made from titanium; LGA30-15 leaf-type filter, and a number of other types of equipment.

The collectives of the "Komsomolets," "Korosten'khimmash," "Penzkhimmash," Morshansk "Khimmash," and other [chemical-machinery] plants

are working to design and develop tens of new types of chemical machines and equipments, including: an installation for separating hydrocarbon-free gas; an installation for separating natural gas for the purpose of extracting helium from it; experimental installations for obtaining "laval" [synthetic wool] fiber, with an interesterification autoclave; installations for desalting sea water; mobile dusting-type drying installations; installations for preparing degassed water, etc.

The personnel of the "Krasnyy Oktyabr'" [Red October] Plant of the Kiyevskiy Sevmarkhoz has developed, and is mastering the production of, a series of new designs of enameled chemical apparatus: enameled steel reaction vessels coated with heat-resistant enamel, centrifugal enameled pumps, pressure filters, and other types of enameled equipment accommodating as much as 2,000 liters.

Appropriate articles published elsewhere in this issue describe how the collectives of the "Uralkhimmash" [Ural Chemical Machinery] and imeni Frunze Plants are working to fulfill their socialist pledges in honor of the 22nd Party Congress.

...No less fruitful is the work of scientific research institutes and design bureaus of the branch to design new equipment: they too are successfully fulfilling their socialist pledges. In addition to the new designs of chemical equipment which they already have made available to industry, the institutes and design bureaus pledged themselves to develop other, still newer designs for the good of the [chemical machine-building] branch as a whole. Thus, for example, the NIIKhIMMASH [Scientific Research Institute of the Chemical Machinery Industry] and its Leningrad, Penza, and Severodvinsk branches pledged themselves to complete this year a number of scientific-research projects oriented toward the introduction of plastics and graphitic carbons in chemical machine building; to save ferrous and nonferrous metals by using corrosion- and heat-resistant structural metals (titanium, molybdenum, tantalum, etc.) and their alloys as well as steels with high mechanical strength; and to culminate these studies with [issuing] technological guide materials and production instructions.

In fulfilling these pledges, the staffs of the institutes already have made available for industrial mastering a number of designs of new machines, including the blueprints of an angular compressor with a productivity of 20 cubic meters per minute, pressure of eight atmospheres, and graphite packings. The mastering of the production of such a compressor will make it possible to carry out many technological processes in the chemical and other industries in which the contamination by oil of the gas being compressed is undesirable.

Blueprints have been drafted for the design of a worm press for de-

hydrating butyl rubber with a productivity of 1,800 to 2,000 kilograms per hour; the mastering of the production of such a press will considerably simplify the technological scheme of obtaining butyl rubber by excluding individual machines and equipment units from this scheme. This will serve to cut equipment cost approximately two to two and one-half times, reduce production area to one-third the present size, and cut servicing personnel in half.

The first experimental film evaporation installation for concentrating urea solutions has been developed and tested. The industrial mastering of this installation will serve to increase the steam yield per square meter two to two and one-half times as compared with the currently used installations, and to increase the concentration of the product being evaporated.

Extensive work is in progress to investigate the possibilities for expanding the use of fluidized-bed-type dryers in processing the products of organic synthesis.

To intensify the processes of chemical technology, the Severodnetskiy Branch of the NIIKhimMASH has developed an improved design of an experimental continuous-action reaction vessel for permanganate cleaning in the production of methanol, and currently it is developing an ultrasonic sprayer for the drying of the suspensions of vat dyes.

In addition to the scientific research institutes of chemical machine building, a number of institutes of the State Committee on Chemistry under the Council of Ministers USSR also are working to develop new types of chemical equipment. Thus, the "Giprokhim" [State Institute for the Design and Planning of Chemical Industry] is drafting the designs of new absorption apparatus assuring a higher degree of the absorption of sulfuric anhydride and water vapors and thus improving the technological indexes and sanitary conditions in sulfuric acid plants; and developing more powerful and compact contact apparatus for the purpose of increasing the percentage of conversion and coefficient of heat transfer in heat-exchanger elements....

2. The "Uralkhimash" Plant Increases Output of Chemical Equipment

By A. V. Kuramzhin

(Khimicheskoye Mashinostroyeniye, Moscow, No 5, Sept-Oct 1961, pp 4-6)

The Ural Order of Labor Red Banner Plant of Chemical Machine Building ["Vostochnykhimash"] is one of the largest plants of its kind, and its importance has especially increased after the adoption by our Party of certain decisions on expediting the development of the chemical industry.

Fulfilling the socialist pledges which it adopted in the competition for a pre-term fulfillment of the Seven-Year Plan, the personnel of the plant has increased the output of chemical equipment by 29 percent as compared with 1956, through improved utilization of existing facilities, mechanization of technological processes, and raising of labor productivity.

Emphasis was placed on increasing the output of machinery and apparatus for the principal branches of chemical industry whose development was envisaged in the decisions of the 21st Party Congress. In the last three and one-half years the plant has produced twice as much equipment for the plastics industry as it did in the 14 years preceeding the May (1956) Plenum of the CC CPSU. In addition, also in the last three and one-half years, the plant has produced 5.5 times as much equipment for the enterprises producing the raw materials for artificial fibers as it did in the period between 1954 and 1958.

Fulfilling the plan of new equipment, the plant produced the basic technological equipment for the principal new chemical plants under construction as well as for plants under modernization. This equipment includes: high- and low-pressure ethylene polymerizing installations; an activator with a capacity of 36 cubic meters; high pressure reaction vessels coated with acid-resistent steel, with a shielded electric motor, for the production of caprolactam from benzol; quartz and frame filters for spin-baths; drums for tempering and advance maturing of alkyl cellulose; models of electrolyzers with a load of 100,000 amperes and mercury-cathode cells; installations for accelerated advance maturing of alkyl cellulose at artificial fiber enterprises. For the soda industry the plant has developed a black-ash kiln with a productivity of 215 tons per day as well as a lime shaft furnace with a productivity of 300 tons per day and with automatic charging and discharging.

The plant has also built bimetal cookers accommodating 250 cubic meters, for the pulp and paper industry, as well as fluidized-bed pyrite roasting furnaces with a capacity of as much as 100 tons per day, for sulfuric acid plants. For the synthetic rubber enterprises the plant has begun to produce AIK-4000 evaporating-condensing installations with a refrigerating capacity of 4,000,000 kilocalories per hour (weight per installation: 59,680 kilograms); plate columns; polymerizers, and other equipment.

Altogether in the last three and one-half years the plant has de-

signed and developed 39 new models of machines and installations, including 67 different types of apparatus.

The introduction of this equipment enables the customer enterprises to reduce their operating expenditures by 10.8 million new rubles and to trim their servicing personnel by 453 persons.

A characteristic feature of all equipment, not just the experimental models, produced in the last few years is the development and production of devices for the automatic control and guidance of the course of technological processes.

Likewise, the production of vacuum filters, electrolyzers, and rotary-drum equipment, in which the plant specializes most of all, has increased considerably.

The "Uralkhimmash" Plant, as the principal plant manufacturing rotary-drum vacuum filters with external and internal filtration surfaces, currently produces 25 different type-sizes of filters, including 10 type-sizes in acid-resistant execution. In addition to its regular manufacture of standard rotary-drum vacuum filters with filtration surfaces measuring 5, 10, and 20 square meters in area, a three-cubic-meter acid-resistant filter, a 10 square-meter rubber-coated filter, and several models of special filters for the pulp and paper industry, the plant has during the 1959-1961 period developed and mastered six new models of vacuum filters: rubber-coated, with filtration surfaces measuring 3 and 20 square meters in area; a filter made from acid-resistant steel with a surface area of one square meter; a filter made from plastic, with a surface area of one square meter; a filter made from carbon steel, with an internal filtration surface area of 10 square meters; and a plate filter with a surface area of 10 square meters.

This year four additional new models have been developed and are being mastered: a 20-square-meter rubber-coated vacuum gravity filter; 40-square-meter rubber-coated filters with gravity bed and dismountable roller; and a vertical [karussel'nyy] filter with a filtration area of 50 square meters, made from acid-resistant steels. Also, a tightly sealed vacuum filter with an area of 75 square meters has been developed and will be produced in 1962.

The production of rotary-drum vacuum filters has been modernized, with the operating qualities of a number of their components being improved, and this has made it possible to prolong the repair-free period; in this connection, the number of normalized and unified components of standard filters has been raised to 87 to 95 percent, and the weight of the machines was cut by 5.7 percent.

To eliminate the multiple-step regulation of the rotating speed of filter drums, the plant has developed and built a completely new type of stepless transmission weighing 5.5 times less than the currently used reduction-gear transmission. This stepless transmission has undergone bench tests at the plant and, after it will undergo industrial tests this year, its mass production will begin. For filters with a large filtration area the plant has developed and built an experimental model of a more powerful hydraulic stepless transmission.

The output of vacuum filters by the plant in 1961 will be doubled as compared with the actual 1958 output. In the next few years, in accordance with its specialization, the entire production of rotary-drum, plate, and vertical vacuum filters should be concentrated at the "Uralkhimmash." To accomplish this goal, the specialized design bureau of filter building is being expanded and strengthened, the organization of a filtration laboratory is nearing completion, and a project for modernizing the filter shop has been drafted and will be carried out during 1962 and 1963.

In connection with the broad introduction of plastics in filter building, the plant has established its own design and experimental bureau of plastics together with a production sector.

Specializing in the field of the production of liquid-separation equipment, the "Uralkhimmash" is switching to the production of more intricate equipment of this kind, and as of 1961 it began to master and organize the production of high-speed centrifugal separators on the basis of the O/RT-EM-LE separator with a capacity of 10 cubic meters per hour and a RPM of 4,777, developed by the NIKHIMMASH.

Work to improve the designs of electrolytic diaphragm cells has been carried out; in particular, the frame design of SEU-4 type cells has been modified and a new design of the SEU-8 cell has been developed, thereby eliminating fully the corrosion disintegration of welded seams and increasing current density as well as making it possible to operate at maximum designed capacity; this, moreover, has also made it possible to automate the process of the control and guidance of electrolyzer departments.

On the basis of the operational results of equipment with rotary drums, the plant is consistently working to improve their design. Improvements in the fastening of rims as well as in the design of bearings, drives, and packings, have increased the operational reliability of this equipment.

As convened by the plant in July 1961, the Conference on the Quality and Technical Level of Vacuum Filters, Diaphragm Cells, and Rotary-

Plant Equipment, attended by representatives of customer and design organizations, has pointed out the considerable improvement in the quality of these types of equipment and outlined a number of measures to further improve chemical machinery and apparatus.

On the basis of its previous labors, to prolong the service life of machinery and apparatus and to reduce the expenditures on repair as well as on the acquisition of new equipment, the personnel of the plant pledged itself (on the condition that the customers observe the rules of maintenance and operation pursuant to technical requirements) to prolong three times the guaranteed operating period of B3, B5, B10, and B20 rotary-drum vacuum filters as well as filters with a fibrous sub-base; two times, SEU-4, SEU-8, EF 24/12, and EFM2/6 electrolytic diaphragm cells; one and one-half times, rotary-drum equipment in the 2.8x14, 2.8x20, and 2x44 sizes; and two times, equipment of the reservoir-tank type, operating under pressure and produced from carbon steel....

3. New Chemical Machinery in Honor of the 22nd Party Congress

By I. I. Nikitin and V. D. Vasil'yev

(Khimicheskoye Mashinostroyeniye, Moscow, No 5, Sept-Oct 1961, pp 6-8)

The Sverdlov Order of Lenin Machine Building Plant imeni Frunze provides the chemical industry with various types and sizes of centrifuges, compressors, vacuum pumps, chemical apparatus, and automatic continuous-action installations.

Translating into reality the decisions of the May (1958) Plenum of the CC CPSU on accelerating the development of the chemical industry, the Plant imeni Frunze is increasing with every year its production of chemical equipment.

In the light of the decision of the July (1960) Plenum of the CC CPSU on mastering and increasing the production of improved types of machinery and apparatus, the Plant imeni Frunze this year has modernized obsolete designs and mastered the production of more than 20 types of improved machinery and apparatus.

The personnel of the plant pledged itself in 1961 to master and produce ahead of schedule 15 new types of machines prior to the 22nd

Party Congress.

The plant has built and is currently testing the new 50T-130/200 rigid-acting gas compressor. This compressor is based on a new scheme with the so-called opposite alignment of cylinders, developed by the Plant imeni Frunze in collaboration with the Leningrad Branch of the VASKHIMMASH. The compressor's cylinders are laid out on both sides of the main shaft and the pistons move in opposite directions, which makes it possible to reduce the imbalanced forces of inertia active in the system and to increase the rotational speed.

The 50T-130/200 compressor is a five-stage one, designed for a pressure of 200 atmospheres, and it has six cylinders and a 400 millimeter piston stroke. The capacity of the compressor is 6,000 cubic meters per hour, its shaft power rating is 1,800 kilowatts, and its weight (without the electric motor) is 85 tons. The compressor is actuated by a 2,000-kilowatt, 6-kilovolt, and 300-RPM synchronous electric motor. The motor weighs 13.4 tons.

Compared with its older counterpart, the ZC-100/200 compressor with its 125 revolutions per minute, the new machine is half as heavy, occupies half as large an area, and requires a footing 2.3 times lighter. The new design of the compressor has made it possible considerably to reduce the weight and dimensions of the electric motor; its weight has been cut more than threefold, and its efficiency has increased by 1.5 percent.

The 50T-130/200 compressor is equipped with an automatic control system which signals during any emergencies arising from the parameters and actuates protective blocking actuated when the pre-set operating mode is disturbed. This system also provides for the automatic regulation of the capacity of the compressor within the limits of 100 to 70 percent during the rise in the fifth-stage pressure, automatic scavenging of the apparatus to remove condensate and oil, and also remote push-button control of the principal valve fittings.

Considerable successes have been achieved by the Plant imeni Frunze in the field of centrifuge building. A majority of the types of centrifuges manufactured by the plant consists of automatic continuous-action installations.

One of the new high-productivity installations being mastered by the plant is the APN-1250 automatic suspended centrifugal machine.

Compared with its predecessors -- the PN-100 semiautomatic and PS-1200 manual suspended centrifugal machines -- the APN-1250 automatic centrifugal machine assures a much higher productivity and an incomparably greater operational economy, considering that it fully eliminates manual

labor.

Below are cited comparative characteristics of these centrifuges.

<u>Parameter</u>	<u>APM-1250</u>	<u>PM-1000</u>	<u>PS-1200</u>
Rotor capacity, liters	475	300	325
RPM	1,500	1,500	1,000
Rotor diameter, mm	1,250	1,000	1,200
Maximum load, kg	700	450	500
Productivity, tons/hour	12	2	7

The rotor of the APM-1250 centrifuge, for the first time in centrifuge building, is executed of 30KhGSA high-strength steel with a yield point of 50 to 60 kilograms per square millimeter. This made it possible considerably to reduce the weight of the rotor and increase its accommodating capacity, and also to reduce the rate of power consumption per weight unit of the substance processed. A special five-speed, 1,500-, 1,000-, 750-, 300-, and 100-RPM asynchronous electric motor has been built for this centrifuge.

The automation system for the APM-1250 centrifuge assures its fully automatic performance in the following cycle: rotor being charged with the raw substance, 300 RPM; acceleration to 750, 1,000, and 1,500 RPM and centrifuging; washing, steaming, and the switching on of the segregator to separate the products; regenerative braking from 1,500 to 300 RPM; counter-flow braking to 100 RPM; discharge of the finished product from the rotor.

...An original new design is the AG-1200-6N automatic horizontal filtering centrifuge for the production of polyethylene, developed by the plant in collaboration with the Ukrainian NIIKhLTMASH. The productivity of the centrifuge is 200 kilograms of finished product per hour (in terms of dry polyethylene). The RPM of the centrifuge rotor is 1,000, and the rotor's diameter is 1,200 millimeters.

The isolation of the polyethylene from the suspension and its washing should take place under conditions of complete hermeticity.

The presence of a benzo-alcohol fraction in the suspension being centrifuged, in addition to hermeticity, has necessitated the development of intricate subassemblies assuring the necessary degree of explosion-proofing of the centrifuge.

A battery of centrifuges of this kind operates by the continuous automatic mode, is controlled from a central control post, and constitutes an element in the automatic line for the production of polyethylene.

The plant has designed and, in 1960, built an experimental series of new VVN-50 water-ring ["vodokolitssevyye"] pumps designed for pumping methane in coal mines as well as for the chemical and other industries,

The principal aim in developing the new design of the water-ring pump was to assure a reliable insulation of the working space of the pump from the external medium, and thereby to expand the range of applications of these pumps in the gas and chemical industry. An attendant aim was to improve the operating qualities of pumps of this type as well as the technology of their manufacture.

The main distinguishing feature of the design of the VVN-50 water-ring pump is that it is executed in two-cylinder form and has two vane wheels. The cylinders are joined by a single common housing through which gas enters both wheels.

... An automatic self-acting hydraulic device has been developed as the packing for the VVN-50 pump. This device makes possible a closed circulation of the liquid within the system as well as the utilization of acid, oil, and other liquid mixtures as the working liquid.

In the VVN-50 pump the delivery rate is regulated by means of the passage of gas from the pressure pipe to the suction pipe through a connecting pipe outfitted with a slide valve. The principal advantage of this new pump is the complete isolation of its working space from the external environment. As a result, in the VVN-50 pumps, the coefficient of delivery, efficiency, and final compression pressure are higher than in pumps of the present designs, while the residual intake pressure at vacuum operation can be achieved in the maximal value, that is, equal to the pressure of the vapors of the liquid ring at a given temperature. To increase the vacuum, the pump can be equipped with an ejector device serving to reach the maximum vacuum -- two millimeters of the mercury column.

One of the principal operational advantages of the VVN-50 water-ring pump is the simplicity and convenience of its assembling and dismantling. With the brackets and cylinders removed, the pump is completely accessible to inspection and cleaning. This year the plant has switched to the mass production of pumps of this type....

4. The New LV-130T Leaf-Type Pressurized Vertical Filter

(Kharkovskoye Mashinostroyeniye, Moscow, No 5, Sept-Oct 1961, p 46)

The NIIMKhMASH has drafted a technical design of a high-productivity filter made from titanium VML, for operation with strongly aggressive media. Individual components of the filter were made from teflon, nairit rubber, and polyethylene obtained at a low pressure. The LV-130T filter is designed for the filtration of electrolytes in nonferrous metallurgy, as a replacement for the filter-presses with labor-consuming manual removal of the sediment.

The filter consists of a housing, a lid with drive, a bottom together with a top, a distributing collector, filtration frames, and a power-driven tube for hosing off the sediment.

The filter performs as follows: With the air vent open, it is filled with the suspension to be filtered. After this filling, filtration begins. The filtrate from the frames is eliminated through the drain, and the precipitate is retained by the filtering fabric. The filtration is followed by the washing and steaming of the precipitate, which is hosed off the frames and removed from the housing through the bottom connecting pipe. The design of the LV-130T filter provides for the full automation of the entire technological process.

Specifications

Filtration surface, square meters -----	130
Passing capacity, in M3 of water per hour -----	up to 200
Number of filtering frames -----	42
Spacing of frames, mm -----	65
Working pressure in the filter body, kg/cm ² -----	3
Pressure in packing hose, kg/cm ² -----	10-20
Accommodating capacity of filter (without frames), m ³ -----	11
Filtration temperature, °C -----	up to 80
Dimensions, mm:	
Length -----	4,350
Width -----	3,240
Height -----	5,025
Weight, kg -----	6,324
Power rating of electric motors, kilowatts -----	6.2

The technical design of the filter has been transferred to the manufacturing plant for drafting the working blueprints and building the experimental model.

1386

END

- 13 -