"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, M.V.; PUTSYKIN, G.G.; STEPANOVA, M.V.; TIKHONOV, B.S.; VORONTSOVA, L.A.

High strength copper conductor alloys. Issl. splav. tsvet. met. no.4:239-244 '63. (MIRA 16:8)

(Copper alloys—Electric properties)

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, M.V.; SVIDERSKAYA, Z.A.; DRITS, E.M.; TROKHOVA, V.F.

Effect of tin on the properties of deformable magnesium alloys at room and higher temperatures. Trudy Inst. met. no.12:152-160 '63. (MIRA 16:6)

(Magnesium alloys—Metallography)
(Deformations(Mechanics))

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, M. V.

"Outline of Psychology for Pilots," 1948

Evaluation A-3,076,721

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

"Quantitative Relationship of the Composition of Alloys to Strengthening by Thermal Treatment. A. A. Bochvar and M. V. Zakharov (*Sbornik Nauch. Trud. Moskov. Inst. Tsvetnykh Metal. Zol.*, 1938, 15, 41–45; *Khim. Referat. Zhur.*, 1938, 1, (11–12), 99; *C. Abs.*, 1939, 33, 9249). – [In Russian.] Increases of hardness in a number of aluminium–copper alloys (99·96% aluminium and electrolytic copper) after natural and artificial ageing are tabulated and presented in the form of curves. A simple formula is deduced from which fairly accurate maximum values for the hardening of the aluminium–copper alloys can be found.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

PROPERTIES AND PROCESSES INDEX

Establishing optimum conditions for heating and cooling during differential thermal analysis. M. V. Zakharov. *Zavodskaya Lab.* 8, 968-73(1939); *Khim. Referat. Zhur.* 1940, No. 3, 50.—The effects of (1) uniform heating of the sample and the standard, (2) mass of the sample, (3) nature of the standard, (4) velocity of heating and cooling, (5) nature of heat insulation and (6) character of furnace on the character of the differential curve were investigated. The expts. were made with a eutectic Al bronze. The rate of heating and the value of the e. m. f. of the differential thermocouple has the greatest effect on the value of the peak corresponding to the thermal effect of transformation. The mass of the sample has no appreciable effect (if the mass of the standard is increased simultaneously). Optimum effect is obtained with 10-15-g. samples. A greater difference between the wt. of the sample and the standard produces a nonuniform heating of the samples and a considerable deviation of the curves. Porcelain, mica, glass and asbestos were used as thermal insulators. Best results were obtained with asbestos. The nature of the standard has no appreciable effect. A no. of heating curves of Al bronze obtained under various conditions are given.

W. R. Heus

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

M

4

The Determination of Optimum Heating and Cooling Rates in Differential Thermal Analysis. M. V. Zakharov (*Sbornik Nauch. Trudov Moskov. Inst. Tsvet. Metallov Zolota*, 1940, (8), 78–83). – [In Russian]. Z. discusses factors affecting the character of the curves obtained in thermal analysis by using the Le Chatelier Saladin pyrometer. – N. A

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

7

CA

High-temperature strength of several binary copper alloys. M. V. Zakharov (Kalin'n Moscow Inst. Nonferrous Metals and Gold). *Izvest. Akad. Nauk S.S.S.R., Otdel. Tekh. Nauk* 1949, 124-30. Cast binary copper alloys contg. up to 63% Zn, 38.4% Sn, 20.5% Al, 5% Fe, 25% Mn, and 45% Ni were Brinell-hardness tested at 325 to 500° in the conditions: as cast; stabilized for 100 hrs. at the testing temp.; and annealed at 800° for 3 to 4 hrs. The Bochvar method of hardness testing for various times up to 1 hr. was used to det. the high-temp. strength. The condition of the alloy had little effect, but at high temps. the 2-phase alloys tended to be softer than the α-solid soln. alloy although the reverse was true at 20°. In the Cu-Ni system the 1-hr. hardness rose continuously at 500° from 24 kg./mm.² at 0% Ni to about 53 at 45% Ni. The 30-sec. hardnesses of some intermetallic compds. at 20° and at 500° were: δ (CuZn) 120, 25; CuAl, 300, 20; Cu_3Sn 300-350, 27; $Cu_{31}Sn_8$ 330-400, 35; γ (Cu_5Zn_8) 450-500, 25; Cu_3Al_2 500-550, 100. The data of this paper give further support to the "dissolving phase" mechanism of softening at high temps. of 2-phase alloys. However, in some systems this may be offset by the relatively high hardness retained by the second phase.

A. G. Guy

Evaluation B-81183, 15 Dec 54

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, M. V.

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On Various Diagrams of the Effect of Alloying Additions on the Strength of Binary Copper Alloys at Elevated Temperatures. M. V. Zakharov (*Izvestiya Akad. Nauk S.S.S.R.*, 1940, 65, (3), 327-330.—In Russian). Three diagrams are given showing the effect of certain alloying elements on the relative strength of binary Cu alloys at elevated temp. The first, examples of which are Cu-Cr at 400°-500° C. up to 5% Cr, Cu-Ca at 400°-500° C. up to 4% Ca, Cu-NiAl at 400°-500° C. up to 15% NiAl, shows that relative strength increases in every case with increase of alloying element. The second, examples of which are Cu-Zn at 350°-400° C. up to 48% Zn, Cu-Si at 400°-500° C. up to 7% Si, Cu-Sb at 400°-500° C. up to 15% Sb, Cu-Be at 400°-500° C. up to 5% Be, &c., shows that although a progressive increase of relative strength with increase in alloying element is maintained at 20° C., at 500° C. the curve rises to a max. at the optimum concentration of the α solid soln. and then decreases. The third, examples of which are Cu-Al at 500° C. up to 20% Al, Cu-Sn at 400°-500° C. up to 32.0 Sn, &c., shows that whereas the 20° C. curve is much the same as in the other two cases, the 500° C. curve takes on an S-form with a max. in the α solid soln. range followed by a min. and then another increase.—W. J. K.

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APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, M.V.

Category : USSR/Solid State Physics - Mechanical properties of crystals and poly- E-9
crystalline compounds

Abs Jour : Ref Zhur - Fizika, No 1, 1957 No 1361

Author : Zakharov, M.V.
Title : Effect of Temperature on the Shape of the Composition vs. Heat Resistance Curve

Orig Pub : Sb. nauch. tr. Mosk. in-ta tsvet. met. i zolota, 1955, No 25, 315-324

Abstract : Thirty-three copper alloys, containing small amounts of fourteen different admixtures, were investigated. The specimens were annealed at 700 -- 800° after casting prior to being tested for hardness, or were tested after hot forging. The micro-structure of the alloy was measured at the test temperature to permit determination of its phase composition, and also to afford a qualitative estimate of the character of deformation of the specimen at the site of the indentation. The composition vs. heat-resistance (or composition vs. prolonged hardness) diagrams experience a principal change with increasing temperature. In the case of temperatures on the order of 0,5 -- 0.6 of the absolute melting temperature of the solvent, the three principal types of the composition vs. heat-resistance diagrams remain

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"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

Category : USSR/Solid State Physics - Mechanical properties of crystals and poly- E-9
crystalline compounds

Abs Jour : Ref Zhur - Fizika, No 1, 1957 No 1361

valid (Dokl. AN SSSR, 1949, 65, No 3, 337), but for higher temperatures only two types of diagrams remain valid (the first type pertains to the relatively refractory systems with heat-resisting excess phases; the second type of diagram pertains to the case when the soluble admixtures, though reducing considerably the melting point of the alloys, hardly strengthen the solvent). When searching for new heat-resisting alloys, it is necessary to concentrate on those soluble admixtures that hardly reduce the melting temperature of the solvent.

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"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

AKIMOVA, K.I.; BAZHENOV, M.F.; BAKHVALOV, G.T.; BEZKIJUDENKO, N.P.; BERMAN, S.I.; BOGDANOV, Ye.S.; BODYAKO, M.N.; BOYKO, B.B.; VINOGRADOV, S.V.; GAGEN-TORN, K.V.; GLEK, T.P.; GOREV, K.V.; GRADUSOV, P.I.; GUSHCHINA, T.N.; YEMEL'YANOV, A.K.; YESIKOV, M.P.; ZDZYARSKIY, A.V.; ZAKHAROV, M.V.; ZAKHAROVA, M.I.; KARCHEVSKIY, V.A.; KOMAROV, A.M.; KORZHENKO, O.T.; LAYNER, V.I.; MAL'TSEV, M.V.; MILLER, L.Ye.; MILOVANOV, A.I.; MIRONOV, S.S.; NIKONOROVA, N.A.; OL'KHOV, N.P.; OSIPOVA, T.V.; OSOKIN, N.Ye.; PERLIN, I.L.; PLAKSIN, I.N.; PROKOF'YEV, A.D.; RUMYANTSEV, M.V.; SEVERIDENKO, V.P.; SEREDIN, P.I.; SMIRYAGIN, A.P.; SPASSKIY, A.G.; TITOV, P.S.; TURKOVSKAYA, A.V.; SHAKHNAZAROV, A.K.; SHPICHINETSKIY, Ye.S.; YURKSHTOVICH, N.A.; YUSHKOV, A.V.; YANUSHEVICH, L.V.

Sergei Ivanovich Gubkin. TSvet.met. 28 no.6:60-61 N-D '55. (MIRA 10:11)
(Gubkin, Sergei Ivanovich, 1898-1955)

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, M. V.

137-58-1-1896

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 1, p 255 (USSR)

AUTHOR: Zakharov, M.V.

TITLE: Principles to Be Followed in the Alloying of Heat-resistant Non-ferrous Alloys (Printsipy legirovaniya zharoprochnykh tsvetnykh splavov)

PERIODICAL: V sb.: Prochnost' metallov. Moscow, AN SSSR, 1956, pp 81-90

ABSTRACT: The principles to be followed in the alloying of heat-resistant non-ferrous alloys are examined. It is observed that ordinarily, the greater the energy of activation, the heat of sublimation, the E and temperature of fusion, and the point of onset of re-crystallization, and the higher the coefficient of linear expansion, the higher, all other conditions being equal, is the heat resistance (HR). The values of creep strength under compression at 1000° for 1 percent deformation during a 24-hour period of W, Ir, Mo, Ta, Cr, Nb, Rh, Co, Fe, Ni, V, Ti, and Zr are presented, together with their temperature of fusion and densities. An examination is also presented of questions having to do with the effect of alloying additives on the HR of a given base metal, the effect

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137-58-1-1896

Principles to Be Followed in the Alloying of Heat-resistant Non-ferrous Alloys

the effect of excess phases upon the HR of alloys and of small amounts of additives upon the heat-resistance of Cu at high temperatures. It is indicated that when new alloys are being developed under factory conditions, their technological qualities, i.e., their behavior in casting, press working, heat treatment, and so forth, is of significant importance.

F.N.

1. Metals--Alloying--Processes

Card 2/2

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"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, M. V.

Category : USSR/Solid State Physics - Systems E-4

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 1154

Author : Glazov, V.M., Zakharov, M.V., Stepanova, M.V.

Title : Plotting the Limited-Solubility Surface in a Ternary System by Using the Micro-Hardness Method.

Orig Pub : Izv. AN SSSR, Otd. tekhn. n., 1956, No 1, 162-164

Abstract : Description of methods for preparation of alloys of Cu with Cr and Zr and measuring the micro-hardness. The solubility boundary of Cr and Zr in Cu and the relative influence of these additives and their solubility in Cu were determined for the temperature range 700 -- 1000° from the flexure of the micro-hardness vs. additive concentration curve.

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"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV M. V.

Shaped Casting of Copper (Cont.) book. 509

Collection of Articles, Moscow, Mashgiz, 1957, 205 pp. 6,500 copies.

This book contains papers presented during a technical and scientific convention held in Moscow, Dec. 1955, on the theory and practice of shaped copper castings.

Zakharov, M. V., Doctor of Technical Sciences, Professor, Principles of Alloying Heat-resistant Nonferrous Metals 85

The author states that heat resistance present new and complex problems, many of which are still in the development stages. However, sufficient experimental data has now been gathered to formulate some basic principles for alloying heat-resistant metals. The main topics discussed in this paper include selection of heat-resistant base metals, effect of alloying elements on heat resistance of the base metal, transition from simple alloys to complex heat-resistant alloys, and resistance to oxidation of some alloys at elevated temperatures. Some new heat-resistant alloys already adopted by Soviet industry are listed and their composition given. There are numerous phase diagrams and tables listing various properties of nonferrous alloys. Soviet personalities mentioned include G. V. Kurdyumov, a research worker in metallurgy. There are 4 references, 3 of which are Soviet and 1 English.

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"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

Zakharov, M.V.

USSR/Solid State Physics - Mechanical Properties of Crystals and Polycrystalline Compounds. E-10

Abs Jour : Referat Zhur - Fizika, No 5, 1957, 11932

Author : Zakharov, M.V.
Inst : -
Title : Concerning the Problem of the Fundamental Types of Diagrams Representing the Composition vs. the Refractoriness of Metallic Systems.

Orig Pub : I ssled. splavov tsvet. metallov No 1, M., Izd-vo AN SSSR, 25-41

Abstract : Generalization of experimental material on the study of the dependence of the refractoriness of alloys on the composition for various types of diagrams of state with limited solubility, lead to three fundamental types of state vs. refractoriness diagrams: (1) Refractoriness increases with changing composition. (2) Presence of maximum refractoriness at an optimum composition.

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"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, M.V.

DZAGUROVA, T.S. (Moskva); ZAKHAROV, M.V. (Moskva); SIROTA, N.N. (Moskva)

Comparison of Young's modulus with other mechanical properties of aluminum alloys at various temperatures. Izv.AN SSSR.Otd.tekh.nauk no.2:120-122 F '57. (MLR 10:5)
(Aluminum alloys--Metallurgy)

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, M.V.

24-9-20/33

AUTHORS: Glazov, V. M., Zakharov, M.V. and Stepanova, M. V. (Moscow)

TITLE: Influence of the phase composition on the heat resistance of alloys of the system copper-chromium-zirconium. (Vliyaniye fazovogo sostava na zharoprochnost' splavov sistemy med'-khrom-tsirkoniy).

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1957, No.9, pp. 123-126 (USSR)

ABSTRACT: Development of new high temperature alloys is based on studying the diagram of state and mainly the diagram of composition-heat resistance, which is the basis of the modern physico-chemical theory of heat resistance. Of particular interest are such diagrams relating to complex metallic systems, containing three, four or more components. In this paper the copper angle of the diagram, copper-chromium-zirconium, is investigated and the influence is studied of the phase composition on the heat resistance of chromium-zirconium bronzes. In earlier work (Refs.2-4) the authors established, on the basis of microscopic and thermal analyses and measurement of the microhardness of the individual structural components, that the copper angle of the copper-chromium-zirconium diagram (up to 3.5% Cr and 3.5% Zr) is characterised in the solid state by

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24-9-20/33

Influence of the phase composition on the heat resistance of alloys of the system copper-chromium-zirconium.

the six-phase ranges α; (α + Cr); (α + Cr + Cr_2Zr); (α + Cr_2Zr);)α + Cr_2Zr + Cu_3Zr); (α + Cu_3Zr) and that in the ternary system a quasi-binary section Cu-Cr_2Zr exists which represents the binary diagram of the eutectic type with a eutectic transformation temperature of 1020°C; this section sub-divides the complex ternary diagram into two elementary ternary diagrams of the eutectic type with limited solubility in the solid state. Furthermore, they established that an area exists of uniform solid solutions of Cr and Zr in copper at various temperatures. The heat resistance (long duration hardness) of Cu-Cr-Zr alloys was investigated along three polymetric cuts: the quasi-binary section Cu-Cr_2Zr, the section of the ternary diagram for a variable Zr content and a constant (0.5%) Cr content and, finally, the section of the ternary diagram with a variable Cr content and a constant (0.5%) Zr content. All these sections of the diagrams are reproduced in the top part of the Figs.2, 3 and 4. For evaluating the heat resistance of the alloys, the 30 sec and 60 min hardness values were determined at

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"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

24-9-20/33

Influence of the phase composition on the heat resistance of alloys of the system copper-chromium-zirconium.

the temperatures 600 and 800°C which represent the most frequent pertaining operating temperatures of Cu-Cr-Zr alloys. The results of the comparative heat resistance are given on the same graphs and these give a lucid picture of the influence of the phase composition on the heat resistance of the Cu-Cr-Zr alloys. Hardness tests at room temperature (given in the Table, p.125) show that the hardness increases continuously with increasing degree of alloying. On the basis of the results it is concluded that the most heat resistant ternary alloys of this system are those within the phase range $\alpha + Cr_2Zr$, i.e. those which are located on the quasi-binary $Cu-Cr_2Zr$ section. Within this phase range the heterogeneous alloys containing 0.8-1.2% Cr_2Zr proved to have the highest heat resistance. There are 4 figures, 1 table and 5 Slavic references.

SUBMITTED: April 19, 1957.

AVAILABLE: Library of Congress.

Card 3/3

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

AUTHOR: Zakharov, M. V. SOV/163-58-3-42/49

TITLE: The Ratio Between the Melting Temperature and the Tempering Temperature in Non-Ferrous Alloys (Sootnosheniye mezhdu temperaturami plavleniya i otpuska v tsvetnykh splavakh)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1958, Nr 3, pp 248-252 (USSR)

ABSTRACT: Highly oversaturated solutions are the more stable the lower the tempering temperature is which is necessary for their complete destruction. The state of stability of hardened solid solutions does not necessarily depend on their degree of oversaturation. The most decisive factor for the state of stability of the oversaturated solid solutions is the initial temperature in the melting of the alloys.
In the alloy systems Al-Cu, and similar ones, as, for instance, Cu-Be and Ag-Cu the normal tempering temperature considerably decreases with the increase of the oversaturation of the solid solution. If the solidus temperature of the alloy is changed only little with the increase of the degree of oversaturation of the solid solution it is at any rate necessary to drop the optimum tempering temperature. In the alloy systems Cu-NiAl,

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SOV/163-58-3-42/49

The Ratio Between the Melting Temperature and the Tempering Temperature in Non-Ferrous Alloys

Cu-NiBe, Cu-Cr_2Zr and others the solidus temperature does not at all change with the increase of the degree of oversaturation of the solid solutions; however, the tempering temperature is decreased.

The relation between the solidus temperature and the tempering temperature of the alloys is clearest in the ternary system Cu-Ni-Be. In this system low melting and comparatively high melting ternary alloys occur: Br.B -2,5 (2,5% Be, 0,5% Ni, rest Cu).

Beryllium has an initial melting temperature of about 860°, beryllium bronze with 0,25-0,5% of beryllium has a comparatively high melting temperature at 1010-1050°C. The tempering temperatures of these ternary alloys are also different. Beryllium bronze Br.B 2,5 has a tempering temperature of 325°, and ternary alloys with lower beryllium content have it at 470-480° C. The ratio found may be successfully used with a previous determination of the optimum tempering temperature of the new alloys.

Card 2/3 There are 1 figure, 1 table, and 4 references, 3 of which are

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"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

SOV/163-58-3-42/49

The Ratio Between the Melting Temperature and the Tempering Temperature in Non-Ferrous Alloys

Soviet.

ASSOCIATION: Moskovskiy institut tsvetnykh metallov i zolota (Moscow Institute of Non-Ferrous Metals and Gold)

SUBMITTED: October 1, 1957

Card 3/3

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

SOV/136/58-8-15/27

AUTHORS: Zakharov, M.V., Karpenko, L.I. and Stepanova, M.V.

TITLE: Relation Between the Tensile Strength and Hardness for Some Copper Alloys at High Temperatures (Sootnosheniye mezhdu predelom prochnosti na razryv i tverdost'yu dlya nekotorykh mednykh splavov pri vysokikh temperaturakh).

PERIODICAL: Tsvetnyye Metally, 1958, Nr.8, pp.64-67 (USSR)

ABSTRACT: Hardness determination can form a rapid method of evaluating the short-term tensile strength of metals and alloys if the relation between the two is known. Although linear relations have been found for some ferrous alloys (Refs.5,6) the data for non-ferrous alloys is insufficient. The authors have studied these relations for binary (Cu-Al, Cu-Mn, Cu-Cr, Cu-Zr), ternary ($Cu-Ni_2S$, Cu-NiAl, Cu-Cr-Zr, Cu-Ni-Be) and quaternary (Cu-Ni-Be-Zr, Cu-Ni-Be-Cd) copper alloys at 600 and 800°C. Altogether 70 alloys were made from electrolytic copper and the appropriate alloys. All alloys were predeformed in the hot state to 50%. Some were binary and ternary alloys tested in the annealed state (annealing at 800°C for 50-70

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"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

SOV/136-58-8-15/27

Relation Between the Tensile Strength and Hardness for Some Copper Alloys at High Temperatures.

hours); others ternary and quaternary in the heat-hardened state (quenching from 1000°C into cold water followed by 5 hours tempering at 475°C). A 2-ton Amsler press with a loading rate of 20 mm/min. was used for tensile tests, hardness being determined by indentation of a 5-mm radius hemisphere for 30 seconds and all test pieces being heated for 15 minutes in a furnace at the test temperature and soaked for 5 minutes. The results for binary alloys at 800°C (Table 1), for Zr-Cr-Zr alloys at 600 and 800°C (Table 2 and Fig.1) and for Cu-Ni-Be, Cu-Ni-Be-Zr and Cu-Ni-Be-Cd at 600 and 800°C (Table 3 and Fig.2) show a satisfactorily linear hardness vs strength relation, and hot hardness tests are recommended as a first evaluation of hot strength. The compositions of the alloys are given in the tables.

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"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

SOV/136-58-8-15/27

Relation Between the Tensile Strength and Hardness for Some Copper Alloys at High Temperatures.

There are 2 figures, 3 tables and 6 references, 4 of which are Soviet and 2 English.

1. Copper alloys--Mechanical properties 2. Copper alloys--Temperature factors 3. Copper alloys--Test results

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"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

SOV/24-58-9-5/31

AUTHORS: Zakharov, M.V. and Karpenko, L.I. (Moscow)

TITLE: Composition-heat Resistance Diagrams at Homologous Temperatures (Diagrammy sostav - zharoprochnost' pri sootvetstvennykh temperaturakh)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1958, Nr 9, pp 31 - 36 (USSR)

ABSTRACT: The effect of the composition of alloys on their heat resistance is usually studied isothermally, at temperatures of practical interest. More useful data about the basic properties of alloys can be obtained if investigations of this type are carried out at homologous temperatures, i.e. at such temperatures T that the ratio T/T_M (where T_M = melting point of the alloy) is the same for the whole range of investigated alloys of a given system. In the present investigation, the copper-rich alloys of the following binary and pseudo-binary systems were studied: Cu-Zn, Cu-Al, Cu-Sn, Cu-Sb, Cu-Zr, Cu-Ni_2Si and Cu-NiAl. All the test pieces prepared from both cast and hot-rolled materials were subjected to a long (70-100 hrs) annealing treatment at 600 - 850 °C (depending on the composition

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of the alloy). The heat resistance of the alloys was determined by means of hardness measurements taken in air, at homologous temperatures $T = 0.6 - 0.9\ T_M$, with the load applied for 60 min. After the completion of the test, each test piece was quenched from the test temperature so that the structure of the alloys at the test temperature could be determined by microscopic examination. The results are reproduced graphically in the form of the high-temperature hardness/composition curves, superimposed on the appropriate portions of the equilibrium diagrams of the investigated systems (Figures 1-7). The curves (whose shape depended on factors such as the extent of the solid solubility range, variation of the solid solubility limit with temperature, presence or absence of intermediate phases or intermetallic compounds) can be divided into four groups: to the first of these groups belong curves with the maximum high-temperature hardness at $T = 0.6 - 0.8\ T_M$ shifted from the solid solubility limit towards the solvent metal, i.e. situated in the region of dilute solid solutions (systems Cu-Zn, Cu-Al). In systems of this type, there is a wide solid

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SOV/24-58-9-5/31

Composition-heat Resistance Diagrams at Homologous Temperatures

solubility range (18-38 atm%) and the phases of these systems become very ductile at $T = 0.7-0.8\ T_M$.

Diagrams with the maximum high-temperature hardness at $T = 0.7 - 0.9\ T_M$ situated at, or near, the solid solubility limit of the β-phase constitute the second group (systems Cu-Sn, Cu-Sb). Systems of this type are characterised by a narrow solid solubility range (5-8 atm%) and at $T = 0.7\ T_M$ the strength of the α and β-phases is almost the same.

In the diagrams of the third group, hardness of the alloys at $T = 0.6 - 0.8\ T_M$ increases gradually as the content of the solute atoms increases (systems Cu-Cr, Cu-Zr). The solid solubility range in systems of this type is very narrow (a fraction of atm%) and the β-phase is characterised by high strength at elevated temperatures. Diagrams with the maximum high temperature hardness at $T = 0.6-0.8\ T$ situated in the two-phase region constitute the fourth group (systems Cu-Ni_2Si, Cu-NiAl). The sudden increase of the heat resistance of the two-phase alloys of these

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Composition-heat Resistance Diagrams at Homologous Temperatures

systems is associated with the appearance of highly refractory phases which usually consist of the solute elements only. In systems of this type, the solid solubility often increases with the rising temperature and the resulting solution-precipitation and recrystallisation processes may cause reduction of the strength of the two-phase alloys. For this reason, the maxima on the heat resistance composition curves for the cast and plastically deformed alloys do not coincide. In the latter case, the maximum is more sharply pronounced and is situated nearer the Cu end of the equilibrium diagram. There are 7 figures and 6 Soviet references.

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69404

SOV/137-59-4-8724

Translation from: Referativnyy zhurnal, Metallurgiya, 1959, Nr 4, p 198 (USSR)

18.1210

AUTHORS: Zakharov, M.V., Barbanel', R.I., Solov'yeva, V.V. Gurevich, Ye.I.

TITLE: The Effect of Modification on Heat Resistance of D16 Aluminum Alloy

PERIODICAL: Sb. nauchn. tr. Nauchno-tekhn. o-vo tsvetn. metallurgii, Mosk. in-t tsvetn. met. i zolota, 1958, Nr 29, pp 72 - 83

ABSTRACT: Ti was used as a modifier introduced in an amount of 0.03% in the form of Al - 5% Ti alloy. Casting of the alloy into ingots of 385 mm in diameter was carried out by the semi-continuous method. Heat resistance at 300°C was determined by the method of durable strength and hardness in the cast, homogenized (495°C, 12 hours) and stabilized (300°C, 100 hours) state, as well as in the pressed state after quench-hardening and annealing. It was shown that modification strongly affected the refinement of macrograins of the initial solid solution, but practically did not affect the character of microstructure. Durable strength and hardness of non-modified and modified cast alloys decreased from the periphery to the center of the ingot; in the modified alloy these differences manifested less pronounced, particularly in homogenized state. Durable strength and hardness of non-

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The Effect of Modification on Heat Resistance of D16 Aluminum Alloy

modified duraluminum in cast and stabilized state are higher than in modified duraluminum; after homogenization a certain increase in the heat-resistance of the modified alloy was observed. The authors indicate the slight positive effect of modification on heat-resistance of pressed and heat-treated D16 alloy sections.

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SOV/137-59-4-8720

Translation from: Referativnyy zhurnal, Metallurgiya, 1959, Nr 4, p 197 (USSR)

18.1200A

AUTHORS: Zakharov, M.V., Ivliyeva, V.I.

TITLE: Durable and Temporary Hardness of Some Metals and Chemical Compounds at Corresponding Temperatures

PERIODICAL: Sb. nauchn. tr. Nauchno-tekhn. o-vo tsvetn. metallurgii, Mosk. in-t tsvetn. met. i zolota, 1958, Nr 29, pp 84 - 92

ABSTRACT: The authors determined durable and temporary (hot) hardness of cubic (Pb, Al, Cu, Ni) and hexagonal (Cd, Zn, Mg, Ti) metals and of some chemical compounds on Cu and Al bases at corresponding temperatures (0.4 - 0.8 $T_{m.p}$). It was established that in cubic metals durable and temporary hardness raised with higher melting point. Having the same refractoriness, the metals of hexagonal system possess higher durable and temporary hardness; they are, however, characterized by more intensive softenability, proportional to raising temperatures. In most metals the rate of hardness decrease diminishes when approaching the solidus. Chemical compounds of high hardness and brittleness at room temperatures are softening by tens and hundreds of times at

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Durable and Temporary Hardness of Some Metals and Chemical Compounds at Corresponding Temperatures

temperatures of the order of magnitude of 0.8 $T_{m.p.}$ No definite correlation between hardness and refractoriness of chemical compounds at corresponding temperatures was observed. Durable hardness of chemical compounds depends in a high degree on the structure of the crystalline lattice. Usually the hardness of the compounds increases with a more complex composition and structure of its crystalline lattice. Very high durable hardness at 0.8 $T_{m.p}$ was revealed in complex-structure chemical compounds such as Al_2CuMg and Al_5FeSi.

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SOV/137-59-5-11023

Translation from: Referativnyy zhurnal, Metallurgiya, 1959, Nr 5, p 221 (USSR)

AUTHORS: Zakharov, M.V., Karpenko, L.I.

TITLE: Composition Heat Resistance Diagrams of Alloys at Corresponding Temperatures

PERIODICAL: Sb. nauchn. tr. Nauchno-tekhn. o-vo tsvetn. metallurgii, Mosk, in-t tsvetn. met. i zolota, 1958, Nr 29, pp 93 - 100

ABSTRACT: The article has not been reviewed.

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ZAKHAROV, M. V.

Third prize(imeni D. K. Chernov) awarded to Doctor of Technical Sciences Professor M. V. Zakharov (Institute of Non-Ferrous Metals and Gold imeni Kalinin) for the papers "On the Principles of Alloying Non-Ferrous High Temperature Alloys" and "Relations Between the Fusion and Tempering Temperatures in Non-ferrous Metals".

Results of the 1958 Competition for Obtaining imeni D. K. Chernov and imeni N. A. Minkevich Prizes, Metallovedeniye i termicheskaya obrabotka metallov, 1959, No. 6, pp 62-64

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ZAKHAROV, M.V.

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Akademiya nauk SSSR. Institut metallurgii

Issledovaniya splavov tsvetnykh metallov [Studies of Nonferrous Metal Alloys; Collection of Articles, [No. 1]] Moscow, Izd-vo AN SSSR, 1960. 204 p. Errata slip inserted. 2,500 copies printed.

Ed.: I.A. Oding, Corresponding Member, USSR Academy of Sciences; Ed. of Publishing House: V.A. Fomenkov; Tech. Ed.: T.P. Polenova; Editorial Board: A.A. Bochvar, Academician; M.Ye. Drits, Candidate of Technical Sciences (Deputy Resp. Ed.); M.V. Zakharov, Professor, Doctor of Technical Sciences; E.D. Fadeev, Candidate of Technical Sciences (Resp. Secretary); A.N. Kraskin, Doctor of Technical Sciences; N.V. Maltsev, Professor, Doctor of Technical Sciences; and E.A. Sviderskaya, Candidate of Technical Sciences.

PURPOSE: This collection of articles is intended for use in scientific research institutes, metal and machine works, for teaching personnel, and for students attending schools of higher education.

COVERAGE: [illegible] metal alloys prepared by the Institut metallurgii imeni A.A. Baykova [illegible] Institute of Metallurgy imeni A.A. Baykov of the Institute of Metallurgy [illegible] and the Moskovskiy institut tsvetnykh metallov i zolota imeni M.I. Kalinina [illegible] (Moscow Institute of Nonferrous Metals and Gold imeni M.I. Kalinin). The [illegible] discuss problems in the melting and physical metallurgy of nonferrous alloys. The effect of alloying and deformation on the properties of various alloys and the problems created with the study of the melting in vacuum and with the plotting of phase diagrams for nonferrous alloys are discussed. [illegible]

[illegible] The growth of individual crystals of [illegible] castings 155

Zhukova, M.M., and Ye.A. Obradovskiy. Calcium Borate in the PS Bearing Alloy after Repeated Remelting [illegible]

Zhukov, M.V., and Ye.A. Zhukov. The Development of Porosity in Magnesium Alloy Castings [illegible]

Zakharov, M.V., and V.P. Maltsev. Classification of the Defects in Aluminum Alloys [illegible]

Zakharov, M.V., [illegible] The Effect of Impurities in the Mechanical Properties of [illegible] [illegible]

Zakharov, M.V., [illegible] Melting the High-Purity Alloys and [illegible] Purity of Glass [illegible]

Gorenbein, [illegible] Estimating the Ignition Strength of Magnesium Alloys [illegible]

[illegible] Properties of [illegible] Alloys [illegible]

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77733
SOV/149-60-1-22/27

AUTHORS: Zakharov, M. V., Sviderskaya, Z. A., Kadaner, E. S., Turkina, N. I.

TITLE: Effect of Copper and Magnesium on Properties of Aluminum-Manganese Alloys at Room and Elevated Temperatures

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Tsvetnaya metallurgiya, 1960, Nr 1, pp 145-149 (USSR)

ABSTRACT: A highly alloyed heat-resistant metal containing many excess phases is usually low-melting and cannot be recommended for the highest working temperatures. Conversely, if an alloy has a high mp, and a moderate number of excess phases, it will also be heat-resistant at adequately high working temperatures. From this point of view it was interesting to study the influence of a variable addition of s-phase (Al_2MgCu) on heat resistance of high-melting Al-Mn

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Effect of Copper and Magnesium on Properties of Aluminum-Manganese Alloys at Room and Elevated Temperatures

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(1.5% Mn) alloy. Cu and Mg content varied from 1.3 to 4.5 and from 0.5 to 2%, respectively. Alloy "A", free of these metals, and alloy VD17 (2.9% Cu, 2.2% Mg, 0.57 Mn, the rest Al) were also tested for comparison. Up to 0.1 Ti was added for finer grain structure. Ingots were cast in a water-cooled dipped mold, the specimens (10.5 mm rods) were extruded (in a 100 ton press) after 48 hr homogenizing at 480° C. Temperature of container was 400-420° C. Subsequent heat treatment comprised quenching in water from 500° C and artificial aging for 6 hr at 190° C. Samples to be tested for heat resistance were conditioned for 100 hr at the temperature of the test. The results of tests are shown in Table 1 and in Figs. 1 and 2.

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Effect of Copper and Magnesium on Properties of Aluminum-Manganese Alloys at Room and Elevated Temperatures

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Table 1. Mechanical properties of alloys.

A	B	ALLOY A (1,5% Mn, 0,3% Fe, 0,3% Si, 0,1% Ti, REST Al)	A + 1,5% Cu + 0,5% Mg (2,5% S-PHASE)	A + 2,5% Cu + 1,0% Mg (5,5% S-PHASE)	A + 3,5% Cu + 1,5% Mg (7,5% S-PHASE)	A + 4,5% Cu + 2,0% Mg (10% S-PHASE)	ALLOY VD17 (2,5% Cu, 1,5% Mg, 0,5% Mn REST Al)
C	20°	33,0	57,5	100,0	120,5	128,0	112,0
	200°	20,5	38,0	65,0	67,0	79,0	74,5
	200¹	15,5	31,0	50,0	55,5	62,5	58,0
	250°	17,0	24,0	33,0	40,0	44,5	43,5
	250²	10,0	16,0	23,0	27,5	32,0	31,0
	300¹	12,0	16,5	18,5	22,5	23,5	23,0
	300²	7,0	8,5	10,5	12,5	14,0	12,5
D	20	11,5	24,0	37,5	44,5	49,5	42,5
	200	4,5	10,5	23,0	23,5	25,0	23,0
	250	4,0	9,0	14,5	14,5	16,0	16,5
	300	1,0	5,5	8,5	8,0	8,0	8,0

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Effect of Copper and Magnesium on Properties of Aluminum-Manganese Alloys at Room and Elevated Temperatures

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A	B	ALLOY A (1,5% Mn, 0,3% Fe, 0,3% Si, 0,1% Ti, REST Al)	A + 1,3% Cu + 0,5% Mg (2,8% S-PHASE)	A + 2,5% Cu + 1,0% Mg (5,5% S-PHASE)	A + 3,5% Cu + 1,5% Mg (7,8% S-PHASE)	A + 4,5% Cu + 2,0% Mg (10% S-PHASE)	ALLOY VD 17 (2,9% Cu, 2,2% Mg, 0,37% Mn, REST Al)
E	20	6,5	12,5	29,0	36,5	41,5	37,0
	200	5,0	7,5	20,0	18,5	21,0	20,5
	250	3,5	8,0	13,0	12,0	3,0	13,5
	300	3,5	4,5	8,0	6,5	7,0	7,0
F	20	34,5	20,0	11,0	7,0	7,0	10,0
	200	32,0	31,0	23,0	21,5	21,5	19,0
	250	33,5	35,0	29,0	19,5	20,5	23,5
	300	36,0	35,0	30,0	26,5	26,0	30,0

Key to Table 1: (A) Properties; (B) Test temperature, °C; (C) Hardness (H_b), kg/mm^2; (D) Tensile strength (σ_b) kg/mm^2; (E) Yield point ($\sigma_{0,2}$) kg/mm^2; (F) Elongation (δ) %; (G) Remark: action time of indenter: (1) 30 sec, (2) 60 min.

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Effect of Copper and Magnesium on Properties of Aluminum-Manganese Alloys at Room and Elevated Temperatures

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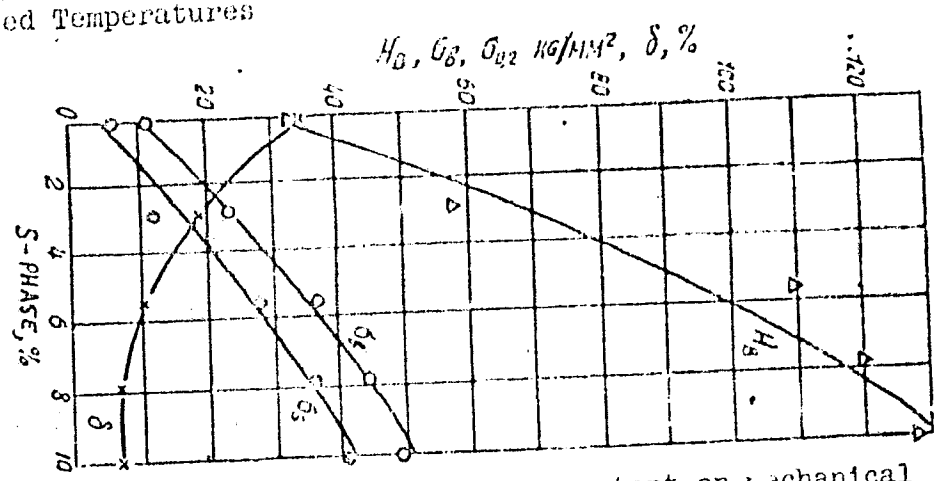

Fig. 1. Effect of s-phase content on mechanical properties of Al-Mn alloy at room temperature.

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Effect of Copper and Magnesium on Properties of Aluminum-Manganese Alloys at Room and Elevated Temperatures

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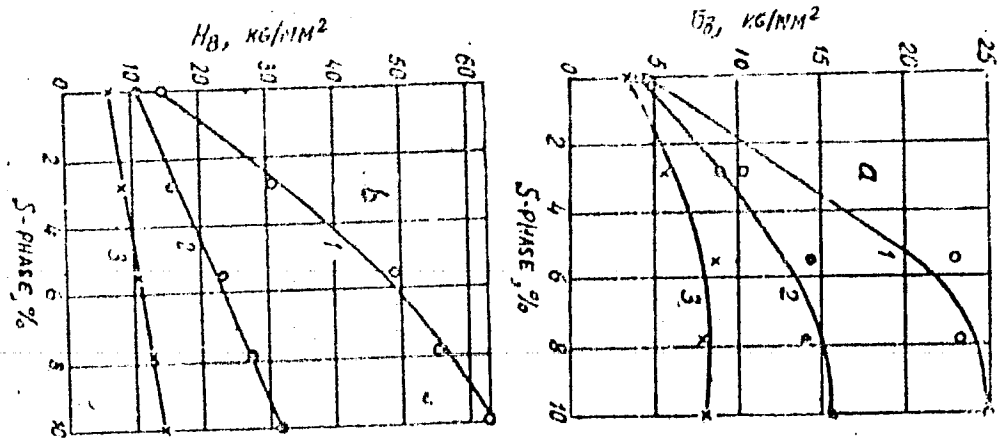

Fig. 2. Effect of s-phase content on tensile strength (a) and ultimate hardness (b) of Al-Mn alloy at elevated temperatures: (1) 200° C; (2) 250° C; (3) 300° C.

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Effect of Copper and Magnesium on Properties of Aluminum-Manganese Alloys at Room and Elevated Temperatures

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Further tests for long-lasting strength at 250° C were carried out by determining strength after 20 and 100 hr. The results (on logarithmic scale) are shown in Fig. 4.

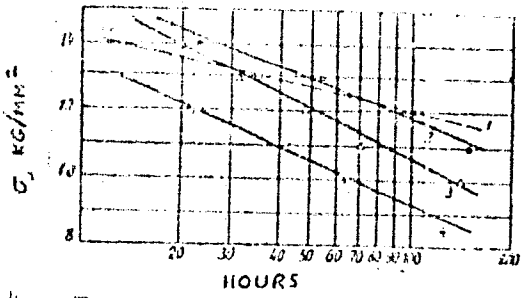

Fig. 4. Test results for long-lasting strength (at 250° C) of VD17 (1) and "A" alloy containing 7.8% sigma phase (2); 10% (3); 5.5% (4).

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Effect of Copper and Magnesium on Properties of Aluminum-Manganese Alloys at Room and Elevated Temperatures

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The authors conclude that the optimum results (for 100 hr at 250° C) were shown by an aluminum alloy with 1.5% Mn and 7.8% s-phase (3.5% Cu and 1.5% Mg), meaning that moderate alloying by this binary phase results in higher characteristics than a 10% addition. There are 2 tables; 4 figures; and 7 Soviet references.

ASSOCIATION: Institute of Metallurgy, AS USSR and Krasnoyarsk Institute of Nonferrous Metals (Institut metallurgii AN SSSR i Krasnoyarskiy institut tsvetnykh metallov)

SUBMITTED: April 15, 1959

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APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

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ZAKHAROV, M.V., prof., doktor tekhn.nauk

Potential mechanical properties of alloys at high temperatures. Issl.splav.tsvet.met. no.2:9-18 '60. (MIRA 13:5)
(Nonferrous alloys)
(Metals at high temperatures)

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"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, M.V.; CHISTYAKOV, Yu.D.; BAZHENUK-MELIKOVA, I.G.; TSEYTLIN, S.N.

Searching for new copper alloys for a gold-colored metallization of glass. Issl.splav.tsvet.met. no.2:184-188 '60. (MIRA 13:5)

(Copper alloys) (Metal spraying)

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"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

83241

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E193/E483

9,2165

AUTHORS: Zakharov, M.V., Doctor of Technical Sciences, Professor. Putsikin, G.G. and Stepanova, A.V., Candidates of Technical Sciences and Vorontsova, L.A., Engineer

TITLE: High Conductivity, Heat-Resistant Copper-Base Alloys

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, 1960, No.9, pp.25-29

TEXT: The object of the present investigation was to develop a copper-base alloy with electrical conductivity no lower than 90 to 95% of that of pure copper, yield point no less than 15 kg/mm^2 and elongation no less than 20 to 30%, the additional requirement being that the alloy should retain these properties after prolonged heating at 170 to 200°C. To this end, Cu-Ag, Cu-Cr, Cu-Zr, Cu-Cr-Cd and Cu-Cr-Zr alloys with various contents of the alloying additions, were examined. It was concluded that binary alloys containing 0.12% Cr or 0.2% Zr, and ternary alloys with 0.2% Cr and 0.15% Cd, or 0.15% Cr and 0.10% Zr, are most promising. The room temperature properties of these alloys are as follows: yield point - 16 to 23 kg/mm^2; U.T.S. - 29 to 36 kg/mm^2; elongation - 21 to 24%; conductivity - 88 to 95% of

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High Conductivity, Heat-Resistant Copper-Base Alloys

that of copper grade MO. The alloys retain their properties after 1000 h at 200°C. Even at 220°C, the yield point of these alloys remains at 15 to 18 kg/mm^2, U.T.S. at 22 to 31 kg/mm^2 and elongation at 20 to 29%. It was concluded that the alloy containing 0.15 to 0.3% chromium should be first subjected to large-scale industrial tests, the alloy containing 0.15 to 0.2% Cr and 0.1 to 0.2% Zr being more suitable for critical applications in which the conducting elements operate at 250 to 350°C. There are 2 figures, 4 tables and 7 references: 3 Soviet and 4 English.

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36118

18.1210 (2408)

S/019/62/000/004/046/108
A152/A126

AUTHORS: Zakharov, M.V.; Mal'tsev, M.V.; Vorin, F.A.; Rogel'berg, L.N.; Volkov, Yu.A.; Solomasov, S.D.; Fiveyskaya, V.I.; Sokolova, T.I.

TITLE: High-strength deformable aluminum-base alloy

PERIODICAL: Byulleten' izobreteniy, no. 4, 1962, 44

TEXT: Class 40b, 18. No. 144992 (738952/22-2 of July 21, 1961). A high-strength deformable aluminum-base alloy containing 7 - 8% magnesium, 0.15 - 0.35% manganese, 0.02 - 0.07% titanium, differing from others in that in order to improve its mechanical properties and raise its resistance to corrosion, there are added: 0.5 - 1.5% zinc, 0.002 - 0.005% beryllium, 0.02 - 0.08% zirconium.

Card 1/1

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32173
S/019/61/000/021/041/074
A154/A126

AUTHORS: Novikov, I.I., Zakharov, M V., Rytvin, Ye. I.

TITLE: A heat-resistant aluminum casting alloy

PERIODICAL: Byulleten' izobreteniy, no. 21, 1961, 51

TEXT: Class 40b, 18. No. 142433 (698243/22 of February 18, 1961). A heat-resistant aluminum casting alloy, distinguished by the fact that, in order to improve its casting properties and heat-resistance, it contains 6.5 - 7.5% copper, 0.15 - 0.30% manganese, 1.5 - 2.5% silicon and 0.08 - 0.15% titanium, whereby the total content of permissible impurities is limited to 0.5%, of which not more than 0.25% may be iron and not more than 0.1% zinc.

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32174
S/019/61/000/021/042/074
A154/A126

AUTHORS: Novikov, I.I., Zakharov, M.V., Rytvin, Ye.I.

TITLE: An aluminum casting alloy

PERIODICAL: Byulleten' izobreteniy, no. 21, 1961, 51

TEXT: Class 40b, 18. No. 142434 (698244/22 of February 18, 1961). An aluminum casting alloy containing copper, manganese, titanium, iron and zinc, distinguished by the fact that, in order to improve its heat-resisting properties, it contains: 6.5 - 8% copper, 0.15 - 0.30% manganese, 0.08 - 0.15% titanium, whereby the maximum permissible content of impurities is 0.7%, of which not more than 0.25% may be iron, not more than 0.25% silicon, and not more than 0.10% zinc.

Card 1/1

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21848

S/019/61/000/007/027/067
A154/A127

18.1210

AUTHORS: Zakharov, M.V., Novikov, I.I., and Rytvin, Ye.I.

TITLE: A high-strength heat-resistant aluminum alloy for chill casting

PERIODICAL: Byulleten' izobreteniy, no. 7, 1961, 42-43

TEXT: Class 40b, 18. No. 137268 (663144/22 of April 13, 1960). A high-strength heat-resistant aluminum alloy for chill casting [brand АЛ-7-4 (AL-7-4)], distinguished by the fact that, in order to improve the plastic and casting properties of the alloy, it contains (in %): silicon - 6.85-7.25; copper - 3.8-4.2; additives - no more than 0.55, including no more than 0.25 iron.

Card 1/1

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USSR

ACCESSION NR: AP3009574 S/0286/63/000/015/0126/0126

AUTHOR: Korolev, F. V.; Chizhov, S. I.; Zakharov, N. V.

TITLE: Heat-resistant bronze for electrodes of welding machines. Class 40, No. 148242

SOURCE: Byul. izobret. i tovarn. znakov, no. 15, 1963, 126

TOPIC TAGS: heat resistant bronze, spot welding electrode, bronze electrode, spot welding

ABSTRACT: An Author Certificate has been issued for a heat-resistant bronze for spot-welding electrodes. The bronze contains 0.2—0.4% Be and 1.4—1.6% Ni (or Ni+Co); 0.05—0.15% Ti is added to save on scarce nonferrous metals and to prolong the service life of the electrode.

ASSOCIATION: none

SUBMITTED: 00 DATE ACQ: 08Nov63 ENCL: 00

SUB CODE: IE NO REF SOV: 000 OTHER: 000

Card 1/1

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TOPIC TAGS: electric conductivity, hardness, recrystallization temperature

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L 32738-66 EWT(m)/EWP(v)/T/EWP(t)/ETI/EWP(k) IJP(c) JD/HM

ACC NR: AP6016334 (N) SOURCE CODE: UR/0149/65/000/006/0106/0113

AUTHORS: Zakharov, M. V. (Professor); Korolev, F. V.; Chizhov, S. I.; Tikhonov, B. S.; Stepanova, M. V.; Sliozberg, S. K.

ORG: Moscow Institute of Steel and Alloys, Chair for the Metallurgy of Nonferrous, Rare, and Radioactive Metals (Moskovskiy institut stali i splavov, Kafedra metallovedeniya tsvetnykh, redkikh i radioaktivnykh metallov)

TITLE: New transmission copper alloys, their alloying principles, properties, and uses

SOURCE: IVUZ. Tsvetnaya metallurgiya, no. 6, 1965, 106-113

TOPIC TAGS: METAL HEAT TREATMENT, WELDING, THERMAL STABILITY, copper alloy, nickel containing alloy, chromium containing alloy / Br.NBT copper alloy, Mts-5A copper alloy

ABSTRACT: The alloying techniques, properties at different temperatures, and stability under contact welding of a number of transmission copper alloys were investigated. The investigation supplements the results of V. M. Glazov, M. V. Stepanova, and M. V. Chuprakova (Izv. AN SSSR, OTN, No. 3, 1962). The experimental results are summarized in graphs and tables (see Fig. 1). It was found that the most thermostable transmission alloys are Mts-5A and Br.NBT, situated on the quasi-binary sections of Cu--Cr_2Zr

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ACC NR: AP6016334

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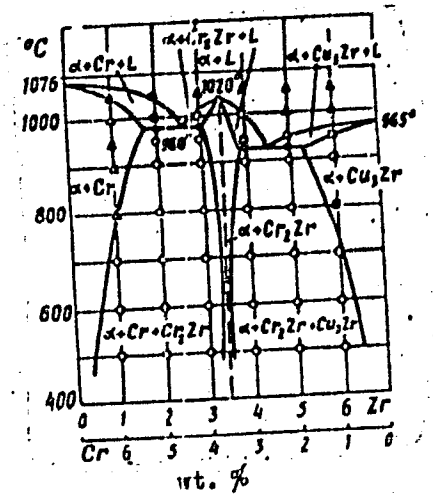

Fig. 1. Polythermic cross section, perpendicular to the quasi-binary section Cu--Cr_2Zr at 93% Cu.

and Cu--NiBe respectively. The most effective thermal treatment of the alloys consists of quenching which results in the formation of a supersaturated solution, followed by cold deformation of 40--60%, and annealing at 0.55 T_{mp} of the alloy. The best alloy for spot welding was found to be the alloy Mts-5A and for seam welding the alloy Br.NBT. Orig. art. has: 3 tables and 6 graphs.

SUB CODE: 11/ SUBM DATE: 25Jun64/ ORIG REF: 005

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L 32685-66 EWT(m)/EWP(w)/T/EWP(t)/ETI/EWP(k) IJP(c) JD/HW/JG

ACC NR: AP6012729 SOURCE CODE: UR/0136/66/000/004/0074/0076

AUTHOR: Kucherov, V. I.; Zakharov, M. V.; Chizhov, S. I.; Korolev, F. V.; Tikhonov, B. S.; Ryabova, P. S.

ORG: none

TITLE: Mechanical properties of the alloy Br.NBT at various temperatures

SOURCE: Tsvetnyye metally, no 4, 1966, pp 74-76

TOPIC TAGS: beryllium bronze alloy, copper alloy, welding electrode, mechanical property, cold working, metal heat treatment/Br.NBT beryllium bronze alloy, Mts2 copper alloy, Mts3 copper alloy

ABSTRACT: This alloy, produced from the wastes of beryllium bronzes, is designed for use as electrode material for the spot, seam and butt welding of stainless and high-temperature steels with low heat conductivity and high strength. It differs from the Mts3 copper alloys (also used as electrode materials) in that it has a higher content of Ni (1.4-1.6%) and Be (0.2-0.4%) and contains Ti (0.05-0.15%) instead of Mg. The article presents data on the mechanical properties of the Br.NBT at room and elevated temperatures as a function of four different cold and hot working regimes of specimens of this alloy (regime 1 -- semicontinuous casting combined with quenching, tempering

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L 32685-66

ACC NR: AP6012729

at 500°C, 3 hr; regime 2 -- as above, followed by cold forging to 50% and tempering at 450°C, 3 hr; regime 3 -- semicontinuous casting, hot rolling at 800-900°C with 90% reduction in area, quenching from 900-920°C and tempering at 470°C, 3 hr; regime 4 -- as above, with 80% reduction in area, and with quenching followed by cold rolling with 50% reduction in area and tempering at 430°C, 3 hr). Findings: regimes 3 and 4 appear to be optimal, since then ultimate strength σ_B of the specimens increases by an average of 5-8 kg/mm^2 in the 20-600°C temperature range and is not accompanied by a decrease in the indicators of plasticity; the Br.NBT specimens thus treated acquire a strength (σ_B = ~75 kg/mm^2) that exceeds the strength of Cu-Co-Be, Mts2 and Mts3 alloys at elevated temperatures (σ_B = ~55 kg/mm^2). Its high strength at temperatures as high as 600°C, combined with its moderate electrical conductivity (45-50% of the electrical conductivity of pure annealed copper) and comparatively low cost, make the alloy Br.NBT an excellent material for the electrodes used in the welding of stainless steels and high-temperature alloys. Orig. art. has: 1 figure, 2 tables.

SUB CODE: 11, 13/ SUBM DATE: none/ ORIG REF: 004/ OTH REF: 002

Card 2/2 BLG

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L 29424-66 EWT(m)/EWP(t)/ETI IJP(c) JD

ACC NR: AP6017979 (A) SOURCE CODE: UR/0413/66/000/010/0081/0081

INVENTOR: Zakharov, M. V.; Lisovskaya, T. D.

ORG: none

TITLE: Aluminum-base conductor alloy. Class 40, No. 181817

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 10, 1966, 81

TOPIC TAGS: aluminum alloy, magnesium containing alloy, zirconium containing alloy, copper containing alloy, silicon containing alloy, iron containing alloy, conductor alloy

ABSTRACT: This Author Certificate introduces an aluminum-base alloy with improved mechanical properties and high electrical conductivity containing 0.4—0.6% magnesium, 0.15—0.25% silicon, 0.4—0.6% iron, 0.1—0.15% zirconium, and 0.4—0.6% copper. [AZ]

SUB CODE: 11/ SUBM DATE: 08Oct64/ ATD PRESS: 5010

Card 1/1 UDC: 669.715.018.5

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"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

L 02937-67 EWT(1)/EWT(m)/EWP(t)/ETI IJP(c) JD/AT/WW/JG
ACC NR: AP6021057 (A,N) SOURCE CODE: UR/0292/66/000/003/0021/0023

AUTHOR: Zakharov, M. V. (Doctor of technical sciences); Putsykin, G. G. (Candidate of technical sciences); Stepanova, M. V. (Candidate of technical sciences); Vorontsova, L. A. (Engineer)

ORG: none

TITLE: Alloys for electric-machine commutators

SOURCE: Elektrotekhnika, no. 3, 1966, 21-23

TOPIC TAGS: electric machine, electric machine commutator, copper alloy

ABSTRACT: The results are reported of an experimental investigation of high-conductivity low-alloy coppers: Cu-Ni-Be, Cu-Ni-Ti, Cu-Cr-Zr, Cu-Cr-Mg, Cu-Cr-Be, Cu-Cr-Ti, Cu-Co-Be, Cu-Cr-Al, Cu-Cr-Cd, Cu-Fe; for control purposes, copper M1, a copper-magnesium alloy, and Cu-Zr and Cu-Cr bronzes

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ACC NR: AP6021057

were also tested. The alloys were subjected to two treatments: (1) Water-quench hardening at 960—980C and tempering at 470—480C for 5 hrs; (2) The same hardening, then 50% workhardening, and then tempering at 470—480C for 4 hrs. Experimental curves and tabulated data show that: 1. By their hardness, wear resistance, heat resistance, and electric conductivity, the following alloys can be recommended for the commutators of electrical machinery operating at 350—500C: a chrome-zirconium bronze containing 0.25—0.5% Cr and 0.15—0.35% Zr (or its cheaper substitute, chrome-magnesium bronze) and a nickel-beryllium bronze containing 0.8—1.1% Ni and 0.15—0.25% Be. The second thermal treatment is recommended for these bronzes. Orig. art. has: 1 figure and 2 tables.

SUB CODE: 10, 11, 09 / SUBM DATE: none / ORIG REF: 004 / OTH REF: 005

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"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ACC NR: AP6035882 SOURCE CODE: UR/0413/66/000/020/0123/0123

INVENTOR: Zakharov, M. V.; Lisovskaya, T. D.

ORG: none

TITLE: High conductivity heat-resistant aluminum-base alloy. Class 40, No. 187310

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 20, 1966, 123

TOPIC TAGS: aluminum magnesium, silicon alloy, iron containing alloy, copper containing alloy, beryllium containing alloy, high conductivity aluminum alloy, heat resistant aluminum alloy

ABSTRACT: This Author Certificate introduces a high-conductivity heat-resistant aluminum-base alloy containing magnesium, silicon, iron, and copper. To improve mechanical properties and ensure high electric conductivity, the alloy has following chemical composition: 0.4—0.6% magnesium, 0.15—0.25% silicon, 0.4—0.6% iron, 0.4—0.6% copper, and 0.03—0.05% beryllium.

SUB CODE: 11/ SUBM DATE: 03May65/ ATD PRESS: 5108

Card 1/1 UDC: 669.715.018.5

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"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

KUZ'MIN, I. F., tekhnicheskiy redaktor

(Aviation astronomy) Aviatsionnaya astronomiya; posobie dlia shturmanov VVS vooruzhennykh sil Soiuza SSR. Izd. 2-e, perer, i dop. Moskva, Voen. Izd-vo Ministerstva Vooruzhennykh Sil SSSR, 1947, 159 p. (Microfilm) (MLRA 6:5)

(Navigation[Aeronautics])

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, M. V., [illegible], TANATAR, I. Ya., [illegible], I. [illegible], [illegible]
NIKITIN, G. N., tekhnicheskiy, redaktor.

(Aerology; method of pilot balloon observations from one point)
Aerologiia; metod sharov-pilotov, nabliudaemykh s odnogo punkta,
Moskva, Voennoe izd-vo Ministerstva vooruzhennykh sil Soiuza SSR, 1948.
346 p. (Microfilm) (MIRA 8:1)

(Meteorology--Observations) (Balloons, Pilot)

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

SOKOLOV, V.I., general-mayor aviatsii, redaktor; ZAKHAROV, M.V., polkovnik, redaktor; STREL'NIKOVA, M.A., tekhnicheskiy redaktor

[Air navigation] Samoletovozhdenie. Moskva, Voen. izd-vo Ministerstva oborony Soiuza SSR, 1955. 366 p. [Microfilm] (MLRA 8:2)
(Navigation (Aeronautics))

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

STERLIGOV, B.V., general-leytenant aviatsii; ZAKHAROV, M.V., polkovnik, red.

[Instructions for the air-navigation service of the Soviet Air Force (NShL-47)] Nastavlenie po shturmanskoi sluzhbe aviatsii Vooruzhennykh Sil Soiuza SSR; NShS-47. Moskva, 1947. 175 p. (MIRA 14:9)

1. Russia (1923- U.S.S.R.) Ministerstvo vooruzhennykh sil. (Aeronautics, Military)

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"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, M.V.

USSR/ Miscellaneous - Communications

Card 1/1 Pub. 133 - 9/23

Authors : Zakharov, M. V., Chief Engineer, and Kristal, V. B., Economist-Engineer, Telephone Exchange, Trunk Line Department

Title

[illegible] unit, i.e., the amount of telephone-exchange work produced over a certain line should be calculated on the basis of the number [illegible]

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"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, M.V.; TIKHONOV, B.S.; OSINTSEV, O.Ye.

Highly resistant, electric conductivity copper alloy not containing scarce and costly elements. Izv.vys.ucheb.zav.; tsvet.met. 5 no.3:122-128 '62. (MIRA 15:11)

1. Krasnoyarskiy institut tsvetnykh metallov, kafedra metallovedeniya.
(Copper alloys—Electric properties)

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, M.V.; SVIDERSKAYA, Z.A.; KADAMER, E.S.; TURKINA, N.I.

Effect of lithium on the properties of aluminum-manganese alloys at room temperatures and higher. Izv. vys. ucheb. zav.; tsvet. met. 4 no.4:134-138 '61. (MIRA 14:8)

1. Institut metallurgii AN SSSR i Krasnoyarskiy institut tsvetnykh metallov. Rekomendovana kafedroy metallovedeniya Krasnoyarskogo instituta tsvetnykh metallov.
(Alluminum-manganese-lithium-alloys--Metallography)
(Metals at high temperature)

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35775

S/180/62/000/001/011/014
E111/E135

18.1910

AUTHORS: Rogel'berg, L.N., Zakharov, M.V., Kuznetsov, G.M., and Pigidina, E.N. (Moscow)

TITLE: Ageing of aluminium-magnesium and aluminium-magnesium-zinc alloys

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Metallurgiya i toplivo. no.1, 1962, 147-150

TEXT: The process of decomposition of the supersaturated solid solution of three complex alloys was studied. The alloys contained 7.3 Mg and 0.3% Mn (alloy 1); 7.3 Mg, 0.3 Mn and 0.94% Zn (alloy 2); and 7.3 Mg, 0.3 Mn and 1.19% Zn (alloy 3). Specimens were prepared from 1mm rolled strip, water quenched from 450 °C after holding at this temperature for 5 hours, and aged at 70, 100, 150, 200, 250 and 280 °C for times of several seconds to 90 days. X-ray photographs were taken using a copper anode and the lattice parameter of the solid solution was determined from the (420) and (422) lines. The accuracy was

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0.0013kX. Ageing at 70 °C produces practically no change in the parameter of any of the alloys. At 100 °C the parameter of the initial solid solution did not change but, after 30 days, decomposition began leading to the formation of a new solid solution with a different lattice parameter. After 30 days at 100 °C the lattice parameter of the solid solution formed by decomposition of the alloy containing 1.19% Zn varied in the limits 4.0661-4.0600kX and after 60 days 4.0661-4.0564kX. The magnesium content in the regions where partial precipitation of the secondary phase had occurred was calculated to have decreased from 5.4 to 4.1% after 30 days and from 5.4 to 3.0% after 60 days. Ageing at 150 °C was also shown to cause "two phase" decomposition. After 2 days the lattice parameter of the initial solid solution of all the alloys decreased. After 5 days a new solid solution appeared. Ageing at 200 °C caused a gradual change in lattice parameter. After a short time, regions with different concentrations appeared. Ageing at 250-280 °C resulted in the same type of decomposition. At 280 °C, decomposition occurred later and the rate was lower than at

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250 °C. This was due to a decrease in supersaturation of solid solution at 280 °C. Thus, the solid solution is most unstable at 250 °C; the increased stability of the solid solution below 250 °C is due to the slower rates of diffusion with decreased temperature. The increase in stability above 250 °C is due to a decrease in supersaturation. The presence of zinc accelerated the process of decomposition at all temperatures but had no effect on the type of decomposition.
There are 4 figures.

SUBMITTED: May 12, 1961

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"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, M.V.; NOVIKOV, I.I.; RYTVIN, Ye.I.

High strength AL7-4 aluminum foundry alloy. Lit. proizv. no.9: 37-39 S '61. (MIRA 14:9)

(Aluminum founding)

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28051 S/128/61/000/009/007/009
A054/A127

18.1210 2408

AUTHORS: Zakharov, M.V.; Novikov, I.I.; Rytvin, Ye.I.

TITLE: High-strength АЛ7-4 (AL7-4) casting aluminum alloy

PERIODICAL: Liteynoye proizvodstvo, no. 9, 1961, 37 - 39

TEXT: Based on the study of silumin-type ternary alloys a new casting aluminum alloy combining the good casting properties of the АЛ4 (AL4), АЛ5 (AL5) and АЛ9 (AL9) alloys with the high strength of the АЛ8 (AL8) and АЛ19 (AL19) alloys has been developed. Tests were carried out with ternary alloys containing 5, 6, 7, 8, 9 and 10% Si and 0.5, 1, 2, 3, 4, 5, 6 and 7% Cu. The highest σ_b and δ values were obtained with alloys containing 6 - 8% Si and 3 - 5% Cu (26 - 36 kg/mm² and 2 - 6%, respectively). The optimum combination of tensile strength and relative elongation was obtained with an alloy containing on an average 7% Si and 4% Cu. The new alloy called AL7-4 (Author's Certificate No. 137268) has to be heat-treated as follows: solution heat treatment for 6 h at 515 ± 5°C, water quenching (20 - 40°C), aging at 175 ± 5°C for 6 h and air-cooling. The permissible amount of iron which affects the strength and ductility of the alloy was found to be 0.25%. Tests on heat resistance showed that the strength, duct-

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A054/A127

High-strength АЛ7-4 (AL7-4) casting aluminum alloy

ility and casting properties of the AL7-4 alloy considerably exceeded those of the AL4, AL5 and AL9 alloys in the 20 - 250°C temperature range. Since modification with 40% NaF, 45% NaCl and 15% cryolithe does not improve the strength and elongation of the new alloy, this treatment could be omitted, simplifying the technology. Tests of the casting properties of the AL7-4 alloy covered mainly hot cracking on specimens 2, 3, 4, 6, 8 and 10 mm in diameter based on the assumption hot cracks in the 10-mm diameter specimens would mean that the alloy is characterized by maximum hot-shortness, while the absence of hot cracks in the 2-mm specimens would reveal minimum hot-shortness. The AL7-4 alloy was found to be highly crack-resistant (nearly as high as AL5 and much higher than AL8 and AL19). Tests to determine the temperature range of linear shrinkage in the new alloy showed shrinkage to start at 560 ± 5°C, while its solidus is at 525°C. The actual interval of solidification is not more than 35°C, and this is about half the value of the AL8 alloy. Equally favorable results were obtained with the new alloy as to fluidity and air-tightness. Modification with magnesium, manganese, zinc, antimony, cerium, titanium, lithium and beryllium did not affect the mechanical properties of the AL7-4 alloy. Modified with 0.1% antimony and 0.3% magnesium, the tensile strength of the alloy increased from 32 - 34 kg/mm² to 38 - 42 kg/mm², while elongation decreased from 4 - 6 to 1 - 2%.

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A054/A127

High-strength АЛ7-4 (AL7-4) casting aluminum alloy

However, these additions increased the tendency to hot-crack formation. When only magnesium (without antimony) was added, the strength increased by 3 - 4 kg/mm^2, elongation did not change and hot cracking became more frequent, but not to such an extent as when Mg and Sb were added. Due to its higher mechanical and casting properties the AL7-4 alloy can replace the AL4, AL5 and AL9 alloys in many fields. This makes it possible to reduce the weight of the casting or to increase its strength by 20 - 40%. There are 8 figures, 3 tables and 2 Soviet-bloc references.

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"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ROGEL'BERG, L.N. (Moskva); ZAKHAROV, M.V. (Moskva); KUZNETSOV, G.M. (Moskva); PIGIDINA, E.N. (Moskva)

Aging of aluminum-magnesium and aluminum-magnesium-zinc alloys. Izv. AN SSSR. Otd. tekh. nauk. Met. i topl. no.1:147-150 Ja-F '62. (MIRA 15:2)

(Aluminum-magnesium alloys--Hardening)
(Metallography)

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, M.V.

Temperature relation of certain types of heat treatment with that of nonferrous alloy melting. Izv. vys. uchebn. zav.; tsvet. met. 4 no.3:115-119 '61. (MIRA 15:1)

1. Krasnoyarskiy institut tsvetnykh metallov, kafedra metallovedeniya.

(Nonferrous alloys—Heat treatment)
(Melting points)

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

S/149/62/000/003/007/011
A006/A101

AUTHORS: Zakharov, M. V., Tikhonov, B. S., Osintsev, O. Ye.

TITLE: High-strength conductive copper alloys without scarce or expensive components

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Tsvetnaya metallurgiya, no. 3, 1962, 122 - 128

TEXT: To select a high-strength conductive copper alloy with good operational properties and without scarce or expensive admixtures, the authors studied the properties of four groups of copper alloys (Cu-Cr-Zr; Cu-Cr-Cd; Cu-Cr-Mg; Cu-Ni-Be and Cu-NiBe+Ti). The composition of the alloys is given (Table 1). The alloys were prepared from charges of electrolytically pure "MO" grade copper and [illegible] ("NO") grade nickel and copper addition-alloys containing Zr, Cd, Mg, Be, Ti and Cr. The manufacture of the alloys is described. Castings, 50 x 60 x 110 mm in size, were hot and cold rolled; the cold rolled specimens were annealed or water quenched. The hardness, electric conductivity, long and short-lasting hardness and mechanical properties at various temperatures of the alloys were measured. With a view to the mechanical, electric and operational properties and the produc-

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tion cost of the alloys investigated, the authors recommend for industrial tests the new conductive chrome-magnesium copper-alloy, containing 0.15 - 0.35% Cr; 0.1 - 0.2% Mg, the rest M0 grade copper. This alloy shows in annealed state at 20°C σ_B as high as 35 - 40 kg/mm^2; δ = 15 - 20%, and at 600°C σ_B = 15 - 16 kg/mm^2 and δ = 19 - 26%. It can well replace the more expensive M1 5A (Mts5A)-type conductive alloys. Highest ultimate strength (σ_B ductility = 80 and 32 kg/cm^2) is offered by low-conductive alloy 14 showing low ductility at 20 - 600°C. This alloy should be improved by reducing its electric conductivity in annealed state and raising its strength properties. There are 7 tables.

ASSOCIATION: Krasnoyarskiy institut tsvetnykh metallov (Krasnoyarsk Institute of Non-Ferrous Metals). Kafedra metallovedeniya (Department of Metal Science)

SUBMITTED: December 8, 1961

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

S/149/61/000/004/006/008
A006/A101

18.1210 2408, 2808, 2208, 1413 25549

AUTHORS: Zakharov, M. V.; Sviderskaya, Z. A.; Kadaner, E. S.; Turkina, N. I.

TITLE: The effect of lithium on the properties of aluminum-manganese alloys at room and elevated temperatures

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Tsvetnaya metallurgiya, no. 4, 1961, 134-138

TEXT: The authors studied the possibility of improving the properties of an aluminum-manganese alloy, by alloying it with lithium. Lithium forms with aluminum a rather extended zone of solid solutions and the solubility of lithium in solid aluminum decreases from 6.4 to 1.5% at temperatures dropping from 601 to 15°C. This indicates the possibility of heat treatment for these alloys. Investigations were made with Al alloys containing 1.5% manganese; 0.1% titanium; 0.3% iron and silicon each, and from 0.5 to 3.0% lithium. Optimum heat treating conditions were selected by measuring the hardness of the alloys in hot-pressed state; in water-quenched state after heating in a saltpeter bath at 600°C for 1 hour; after 5-day natural aging and after 10-day artificial aging at 150-250°C.

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25549

S/149/61/000/004/006/008
A006/A101

The effect of lithium on the properties ...

The properties of the alloys were studied by short-time tension at room and elevated temperatures (200, 250 and 300°C), and by the method of hot and long-lasting hardness. Specimens intended for high-temperature tests were subjected, in addition to heat treatment under optimum conditions (quench hardening at 600°C for 1 hour and artificial aging at 195°C for 6 hours), to 100-hour stabilization. The results obtained show that only alloys containing 2 - 3% Li are hardened by heat treatment. Heating to 250 and 300°C reduced the hardening effect of lithium. This is probably caused by coagulation processes of the hardening phase, developing at these temperatures. Strength properties of alloys with 3% Li approach those of Al-Cu-Mg alloys. Comparison tests showed the expediency of heat treatment for artificially aged alloys with 3% Li whose hardness exceeded that of not heat-treated hot-pressed alloys by 10 kg/mm^2. It is concluded that one of the basic factors of hardening the Al-Mn-Li alloy at elevated temperatures, is the development of a submicroscopical heterogeneity of the structure on account of dispersional precipitation of the hardening phase during the decomposition of the ternary solid solution, rich in aluminum. Apparently the hardening lithium phase has sufficiently stable properties at elevated temperatures and low proneness to coagulation when heated not over 200°C. This article was recommended for publication by the kafedra metallovedeniya Krasnoyarskogo instituta tsvetnykh metallov

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25549

The effect of lithium on the properties ... S/149/61/000/004/006/008/ A006/A101

(Department of Metal Science at the Krasnoyarsk Institute of Non-Ferrous Metals). There are 3 tables, 5 figures, and 9 references: 4 Soviet-bloc and 5 non-Soviet-bloc. The reference to the most recent English-language publication reads as follows: P. Frost, Techn. Rev. 8, no. 1, 1959)

ASSOCIATIONS: Institut metallurgii AN SSSR (Institute of Metallurgy of AS USSR); Krasnoyarskiy institut tsvetnykh metallov (Krasnoyarsk Institute of Non-Ferrous Metals)

SUBMITTED: June 27, 1960

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APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, A.V.; LEONOVSKAYA, T.S.

Effect of various elements on the electric conductivity, hardness, and temperature of the start of recrystallization of AK6OO aluminum. Izv. vys. uchebn. zav.; tsvet. met. 8 no.3:[illegible] 144 '65. (MIRA [illegible])

1. Moskovskiy institut stali i splavov, kafedra metallovedeniya tsvetnykh, redkikh i radioaktivnykh metallov.

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L 04176-67 EWT(m)/EWP(w)/T/EWP(t)/ETI IJP(c) JD/HW/JG/WB

ACC NR: AT6027302 (N) SOURCE CODE: UR/2817/66/015/000/0047/0056

AUTHOR: Portnoy, V. K.; Zakharov, M. V.; Novikov, I. I.

ORG: none

TITLE: The nature of embrittling temperature zones in high temperature alloys of the copper-nickel-beryllium system

SOURCE: Akademiya nauk Kazakhskoy SSR. Institut metallurgii i obogashcheniya. Trudy, vol. 15, 1966. Prevrashcheniya v splavakh tsvetnykh metallov v tverdom sostoyanii (Transformations in nonferrous metal alloys in a solid state), 47-56

TOPIC TAGS: high temperature metal, copper alloy, mechanical property, ductile material, brittle point, metallographic examination, grain structure, temperature dependence, oxidation resistance

ABSTRACT: High temperature brittleness was studied in the Cu-Ni-Be system. Two alloys containing 0.5 and 2 wt % NiBe were produced and their mechanical and physical properties were determined in the cast condition and after rolling in the annealed, quenched, and aged conditions. In order to determine whether intercrystalline oxidation was the cause of high temperature embrittlement, tests were conducted both in air and vacuum ($3 \cdot 10^{-4}$ mm Hg). The relative elongation was given as a function of temperature up to 900°C. In the cast alloys, embrittlement occured in the 400-800°C range whether or

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ACC NR: AT6027302

not testing was done in a vacuum; in fact the alloy with 0.5% NiBe had a higher ductility when tested in air. Microscopic analysis showed that the cast alloys had a single phase structure at room temperature, similar to quenched alloys, as a result of strong supersaturation upon cooling. When the test temperature was increased to 500°C, microstructural changes began to occur: the grain boundaries thickened and second phase particles began to appear within the grains. A wide two-phase region was observed at the grain boundaries in samples tested at 700°C, while at 860°C precipitation occured in the body of the grains. The fracture appearance in the brittle zone was primarily intercrystalline. The electroconductivity, measured as a function of temperature, increased in a slope at about 500°C, indicating a rise in precipitation. Changes in microhardness between the center and boundary of the grain were greatest in the brittle zone. In the 2% NiBe alloy, after annealing at 960°C for 2 hrs and step cooling to prevent supersaturation, a minimum in ductility also occured although it was much higher than for the cast condition. Metallography showed that in the annealed alloy the fractures were transcrystalline, with the cracks being initiated at the grain boundaries. X-ray analysis gave the lattice parameter for different cooling conditions and showed that a supersaturated solid solution could form even for air cooling at 20 deg/ /min. By slow furnace cooling at 1 deg/min the lattice parameter approached that of pure copper; however, the significance of supersaturation with regard to high temperature brittleness could not be rationalized. Tests done on the 2% NiBe alloy in both air and vacuum after cooling as slow as 0.03 deg/min still showed a ductility minimum at 500°C. Orig. art. has: 9 figures, 1 table.

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 010/ OTH REF: 001

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APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, M.Ye.

Practice of compiling a map on a plate with simultaneous engraving for publication. Geod. i kart. no.2:62-65 F '63. (MIRA 16:3)
(Map printing)

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

EYKHENVAL'D, Aleksandr Vil'gel'movich; SOCHINSKIY, Aron Ruvimovich; BILINKIS, M.S., inshener; retsenzent; ZAKHAROV, M.Z., inshener, retsenzent; LETENKO, V.A., kand.ekonom.nauk, dotsent, red.; BOGOLIUBOVA, I.Yu., [deceased], red.izdatel'stva; SOKOLOVA, T.F., tekhn.red.

[Operation and production planning and dispatching in machinery manufacture plants] Operativno-proizvodstvennoe planirovanie i dispetchirovanie na mashinostroitel'nom zavode. Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit.lit-ry, 1957. 247 p. (MIRA 10:10)
(Machinery industry)

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, M.Z., geroy sotsialisticheskogo truda.

Veterinary services improve the economic conditions of collective farms. Veterinariia 34 no.4:13-17 Ap '57. (MIRA 10:4)

1. Predsedatel' kolkhoza imeni Lenina, Leninskogo rayona, Moskovskoy oblasti.
(Stock and stock breeding)

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, N., inzhener.

Painting goods in electric fields. Posh.delo 3 no.3:8 Mr '57.
(MIRA 10:4)

(Painting, Industrial--Safety measures)

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, N., inzh.

Gas heating unit. Pozh.delo 6 no.1:15-16 Ja '60.(MIRA 13:5)
(Gas appliances)

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, N.

New regulations. Pozh.delo 5 no.1:32 Ja '59. (MIRA 11:12)
(Electric power plants--Fires and fire prevention)

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, N., inzh.

New sections in the Regulations on Electric Installations.
Pozh.delo 5 no.12:32 D '59. (MIRA 13:4)
(Fire prevention--Laws and regulations)

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, N.

Improving the design and making maintenance easier. Za rul. 18 no.3:23 Mr '60. (MIRA 13:6)
(Automobiles—Maintenance and repair)

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, N.

SERGEYEV, A.

"Establishment of technical norms for work processes in machine building." N.Zakharov, G.Obraztsov. Reviewed by A. Sergeyev. Sots.trud. no.9:121-125 S '56. (MIRA 9:12)
(Machinery industry—Production standard)
(Zakharov, N.) (Obraztsov, G.)

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, N.

Clothing industry workers' conference in Novosibirsk. Leg. prom. 16 no.8:18 Ag '56. (MIRA 10:12)

1. Zamestitel' predsedatelya pravleniya oblastnogo Nauchno-tekhnicheskogo otdela legkoy promyshlennosti.
(Clothing industry)

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, N., inzh.

New requirements for electric equipment. Pozh.delo 3 no.12:29 D '57. (MIRA 10:12)

(Electric engineering--Safety measures)

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"

"APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0

ZAKHAROV, N.

More fireproof building materials for collective farm construction. Sel'stroi. 11 no.6:17 Je '56. (MIRA 9:9)

1.Starshiy inzhener Glavnogo upravleniya pozharnoy okhrany Ministerstva vnutrennikh del SSSR.
(Building, Fireproof) (Farm buildings)

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001963520014-0"