"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

AID P - 4816

Subject : USSR/Engineering

Card 1/2 Pub. 107-a 2/13

Author : Gulyayev, A. I.

Title : Effect of welding technique on strength of spot-welded joints subjected to variable loading.

Periodical : Svar. proizv., 3, 4-8, Mr 1956

Abstract : The author describes experiments carried out at the Automobile Plant im. Molotov in Gor'kiy in order to find the proper method of increasing the cyclical strength of spot-welded joints. He was also interested in the influence of defects in welding(most importantly of incomplete fusion) the effect of the shape of the welding spot on the welded joint or the size of gaps between the welded sheets on the strength of the junction, and the influence of annealing after welding. Nine tables, 4 graphs and 2 drawings. Seven Russian references (1944-51) and 2 American references (1941-50).

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AID P - 4816

Svar. proizv., 3, 4-8, Mr 1956

Card 2/2 Pub. 107-a - 2/13

Institution : Laboratory of the Automobile Plant im. Molotov

Submitted : No date

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

137-58-1-1091

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 1, p 148 (USSR)

AUTHOR: Gulyayev, A. I.

TITLE: How to Correct Defective Iron Castings (Praktika ispravleniya chugunnykh otlivok)

PERIODICAL: V sb.: Novoye v liteyn. proiz-ve. Nr 2. Gor'kiy, Knigoizdat, 1957, pp 86-91

ABSTRACT: The experience of an automobile plant in correcting casting defects (D) in iron parts by welding and brazing is described. Gas welding with preliminary heating to 500-600°C is employed to correct D in parts of complex configuration made of gray iron not subject to machining. The filler metal consists of iron rods 6-8 mm in diameter, the flux (borax) is applied to the rods by immersion, and after welding the parts are annealed in a furnace at an initial temperature of 500-600°C for 45-60 min. Soldering with L-62 filler metal subsequent to pre-heating to 500-600°C is also employed to correct D in parts of complex configuration. Fixing of D by arc welding is done with monel metal electrodes (63-65% Ni, 32-35% Cu), with combination electrodes (monel rods within brass tubes), and with steel elec-

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137-58-1-1091

How to Correct Defective Iron Castings

trodes. The correction of porosities and cavities in castings of gray and ductile iron is done by electrical metallizing with LK2 and EM-3 guns. Metallizing is employed for sealing after welding-up, fixing of shape D, etc. Zn is used to metallize iron parts. The thickness of the layer applied is 0.3-0.5 mm. Through D in thin cylinder walls are corrected by brazing with a Pb-Ag filler metal (5% Ag, the rest Pb), m. p. 385-405°. Brazing is done with an electrical soldering iron. Multiple-layer fusing-on of iron by Cu electrodes with a coating consisting of 50% Fe powder and 50% dry mix (UONI 13-55 coating) is described. To weld up large cavities, and in edging operations during the repair of iron parts, it is recommended that edging be replaced by charging a layor of a mixture of iron and steel filings with added FeSi. Edging is done by the usual steel electrodes with chalk coating. Preliminary investigations on the welding-up of D in parts of Mg-iron are presented. Positive results therein were obtained with gas welding employing heating and brass brazing.

A. K.

1. Castings--Defects--Salvage methods

Card 2/2

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

GULYAYEV, A.I.

135-9-10/24

AUTHORS: Gulyayev, A.I., Engineer, and Skurikhin, V.I., Candidate of Technical Sciences

TITLE: Ignitron Contactors with Varying Current Intensity Cycle (Ignitronnyye kontaktory s narastaniyem i spadom svarochnogo toka)

PERIODICAL: "Svarochnoye Proizvodstvo", 1957, # 9, p 25-27 (USSR)

ABSTRACT: The article gives a detailed description of the ignitron contractor made by the Gor'kiy Automobile Plant, along with general information on the electronic control system for contact welding machines which allows a gradual increase and drop of welding current. The contactor described controls the welding current between 100 and 20% and the time of increase and of drop of current between the limits of 1 and 10 periods.
The article contains 4 diagrams

ASSOCIATION Gor'kiy Automobile Plant (Gor'kovskiy avtozavod) Ivanovo Institute of Energetics (Ivanovskiy energeticheskiy institut)

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

KISELEV, I.I.; BORISOV, N.I.; YASINOVSKIY, B.S., inzh.; SANNIKOV, Yu.K., inzh.; SOKOLOV, V.A., inzh.; LEVCHENKO, L.D., inzh.; NALOYEV, G.A., inzh.; CHICHAKOV, K.K., inzh.; BARYKIN, V.I., inzh.; FREYDLIN, A.Ya., inzh. GULYAYEV, A.I., inzh.; STIGNEYEV, Ya.F., inzh.; SHAGANOVA, K.N., inzh.; KHELIMSKIY, I.Ye., inzh.; AVROV, A.N., inzh.; DEMIDOVA, M.I., inzh.; NIKIFOROVA, Ye.D., inzh.; KLIBANOVA, F.I., inzh.; CHIVKUNOV, K.I., inzh.; STOROZHKO, I.G., inzh.; NOVAKOVSKIY, Ye.Ya., inzh.; GOYKHTUL', A.O., inzh.; TARASOV, A.M., inzh.; SHISHKO, A.P., inzh.; UVAROV, P.T., ekonomist; DRAGUNOV, M.V., ekonomist; KARANDASHOV, A.A., ekonomist; KONKIN, M.V., ekonomist; GOREV, M.S., ekonomist. Prinimali uchastiye: LAPIN, T.I.; RAMENSKIY, Yu.A.; KADINSKIY, B.A.; SOKOLOV, S.D.; STOROZHKO, I.G.; FOMINYKH, A.I.. POLYAKOVA, N., red.; SMIRNOV, G., tekhn.red.

[Organization and improvement of production; practices of the Gorkiy Automobile Plant] Organizatsiia i sovershenstvovanie proizvodstva; opyt Gor'kovskogo avtozavoda. Moskva, Gos. izd-vo polit. lit-ry, 1958. 332 p. (MIRA 12:2)

1. Direktor Gor'kovskogo avtomobil'nogo zavoda (for Kiselev).
2. Glavnyy inzhener Gor'kovskogo avtomobil'nogo zavoda (for Borisov).
3. Gor'kovskiy avtomobil'nyy zavod (for all except Kiselev, Borisov, Polyakova, Smirnov).
(Gorkiy--Automobile industry)

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

135-58-6-4/19

AUTHOR: Gulyayev, A.I., Engineer

TITLE: Outlook on the Use of Welding Equipment and Steps Necessary to Raise Its Quality (Perspektivy primeneniya svarochnogo oborudovaniya i neobkhodimyye mery po uluchsheniyu yego kachestva)

PERIODICAL: Svarochnoye Proizvodstvo, 1958, Nr 6, pp 10-12 (USSR)

ABSTRACT: The article contains a brief outline of the scope of welding operations at the Gor'kiy Automobile Plant and of the equipment that will be needed in connection with the planned production increase during the period 1959-1965. A detailed critique is given of design faults found in the machines "MTP", MTPG", "MRP", in the pneumatic valve "EPK-6" of the plant "Elektrik", etc. Poor quality of welding transformers, cables, ignitrons, generators, etc. is pointed out and the damage caused by frequent breakdowns is indicated.

ASSOCIATION: Gor'kovskiy avtozavod (Gor'kiy Automobile Plant)

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

12(2) SOV/113-59-6-15/21

AUTHOR: Gulyayev, A.I.

TITLE: Welding Wheels of Sedans

PERIODICAL: Avtomobil'naya promyshlennost', 1959, Nr 6, pp 37-39 (USSR)

ABSTRACT: The article describes a variation of spot contact welding of sedan wheels adopted as the most efficient; a pulsating welding cycle with gradual increase of the welding current is used. An MTP-300 spot machine produced by the "Elektrik" plant, on which mechanical operators are installed, does the job in 42 secs. A two-feeler ultrasonic control system developed by the MVTU imeni Baumana (MVTU imeni Bauman) is used to check the quality of the spot welding and measures the diameter of the cast core (qmm) with an accuracy of ± 0.5 mm. The new process saves 200,000 rubels annually at the plant, one worker can operate two machines and the pro-

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Welding Wheels of Sedans

cess can be fully automated in the future. There is 1 photo and 1 diagram.

ASSOCIATION: Gor'kovskiy avtozavod (Gor'kiy Automobile Plant)

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

SOV/135-59-11-10/26

12(2,3), 18(5)

AUTHOR: Gulyayev, A.I., Engineer

TITLE: Using Suspended Seam Welders in Manufacturing Automotive Bodies

PERIODICAL: Svarochnoye proizvodstvo, 1959, Nr 11, pp 25-27 (USSR)

ABSTRACT: Seam welding of automotive bodies has received, of late, a wide application and is gradually replacing the formerly used method of spot welding. It permits obtaining compact and smooth seams and eliminates the bulging of sheets during the process of welding (Fig 1). Seam welding was applied when bodies for automobiles "Volga" were manufactured. Two types of welders, the specifications of which are given in a Table on p 26, were developed: they differ only in the construction of their tongs: those tongs which have a step-feed are simpler than the ones driven by an alternating current electromotor. The tong rollers are manufactured from MT0-4 alloy which ensures their stability. There are 1 table, 4 diagrams and 1 photograph.

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ASSOCIATION: Gor'kovskiy avtomobil'nyy zavod (Gor'kiy Automobile Works)

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VLADIMIRSKIY, T.A., doktor tekhn.nauk; VROBLEVSKIY, R.V., inzh.; GLEBOV, L.V., inzh.; GODIN, V.M., kand.tekhn.nauk; GUZOV, S.G., inzh.; GULYAYEV, A.I., inzh.; YERSHOV, L.K., inzh.; KOCHANOVSKIY, N.Ya., kand.tekhn.nauk; LYUBAVSKIY, K.V., prof., doktor tekhn.nauk; PATON, B.Ye., akademik, prof., doktor tekhn. nauk; RABINOVICH, I.Ya., kand.tekhn.nauk; RADASHKOVICH, I.M., inzh.; RYKALIN, N.N., prof., doktor tekhn.nauk; SPEKTOR, O.Sh., inzh.; KHRENOV, K.K., akademik, prof., doktor tekhn.nauk; CHERNYAK, V.S., inzh.; CHULOSHNIKOV, P.L., inzh.; SHORSHOROV, M.Kh., kand.tekhn.nauk; BRATKOVA, O.N., prof., doktor tekhn.nauk, nauchnyy red.; BRINBERG, I.L., kand.tekhn.nauk, nauchnyy red.; GEL'MAN, A.S., prof., doktor tekhn.nauk, nauchnyy red.; KONDRATOVICH, V.M., inzh., nauchnyy red.; KRASOVSKIY, A.I., kand.tekhn.nauk, nauchnyy red.; SKAKUN, G.F., kand.tekhn.nauk; nauchnyy red.; SOKOLOV, Ye.V., inzh., red.; IVANOVA, K.N., inzh., red.izd-va; SOKOLOVA, T.F., tekhn.red.

[Welding handbook] Spravochnik po svarke. Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit.lit-ry. Vol.1. 1960. 556 p. (MIRA 14:1)

1. AN USSR (for Paton, Khrenov). 2. Chleny-korrespondenty AN SSSR (for Rykalin, Khrenov).

(Welding--Handbooks, manuals, etc.)

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

GULYAYEV, Anatoliy Ivanovich; RYABINKIN, Vladimir Pavlovich; KNYAZEV, V.V., red.; ISUPOVA, Ye.F., tekhn. red.

[Automatic control and mechanization of welding processes] Avtomatizatsiia i mekhanizatsiia protsessov svarki. Gor'kii, Gor'kovskoe knizhnoe izd-vo, 1960. 116 p. (MIRA 14:6)
(Welding--Equipment and supplies) (Automatic control)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

MALKOV, M.P., prof., red.; KEYLIN, V.Ye. [translator]; GULYAYEV, A.I. [translator]; SIDOROV, V.Ya., red.; DZHATIYEVA, F.Kh., tekhn. red.

[Problems in deep freezing] Voprosy glubokogo okhlazhdeniia; sbornik statei. Moskva, Izd-vo inostr. lit-ry, 1961. 429 p. (MIRA 15:2)

(Refrigeration and refrigerating machinery)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

22239
S/125/61/000/001/009/016
A161/A133

1.2300

AUTHOR: Gulyayev, A.I.

TITLE: Measuring instruments for checking resistance welding process in the shop

PERIODICAL: Avtomaticheskaya svarka, no. 1, 1961, 57-63

TEXT: The author gives a description of instruments used at the Gor'kovskiy avtomobil'nyy zavod (Gor'kiy Automobile Plant) and intended for the control and checking of instruments mounted on welding machines. Time recorder (Fig.1) for the periodical checking of time relays on machines, and for measurements on machines that have no time relay system. The measurement accuracy is 0.01 sec. The current flow time is determined by the number of cycles of the sinusoid traced by a stilus attached to the core of an electromagnet. It is connected in parallel to the primary winding of the welding transformer for measuring the current flow time, and to the terminals of the ignitron contactor to measure the idle time. The recorder is used also

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22239
S/125/61/000/001/009/016
Measuring instruments for checking resistance ... A161/A133

for the graduating of time relay scales being repaired and for checking the stability of ignitron choppers on seam welders. It is simple in design, handy, weighs 6 kg. Dynamometers for measuring the stress on electrodes. of hydraulic and spring design. They are produced at the plant. The base of the hydraulic dynamometer is a steel diaphragm whose inside is connected to a pressure gage by a pipe. The space inside is filled with oil. The three available sizes of the instrument have measurement ranges up to 500, 1,500 and 5,000 kg. The spring type is more accurate. The work principle is based on the measurement by an indicator of deformation of a U-shaped or leaf spring. The readings are converted into kilograms (using a conversion table). On welders with pedal or electric spring drive the space between the electrodes must fit the "A" dimension of the instrument. Instruments for current measurements. Two methods are used. The first consists in the determination of the welding current by the primary current I_1 of the welding transformer. This is the simpler design, and the results are satisfactory. The current is determined with the formula

$$I_{weld} \approx k_T(I_1 - I_{x.x})$$

where $I_{x.x}$, k_T is the idle-run current and transformation factor of the

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transformer. Tables can be used for measurements on many similar welders. The Ц-30 (Ts-30) tongs can measure current up to 600 amp. Its scale has several ranges. To eliminate the effect of the inertia of mobile parts, the hand is fitted with a fixing stop. It moves until the ammeter hand moves 1.0 ÷ 1.5 mm from the fixing stop under the effect of short current pulsations. If greater accuracy of measurement is needed, the hand must be observed for a while and the fixing stop set correctly. Without the stop, measurements are possible for pulses of 1 second only. The instrument weighs 2 kg. Direct measurement on the secondary circuit is effected by a toroid with connected milliammeter, and the readings are converted into kiloamperes by a diagram. The milliammeter has also a fixing reference hand. The instrument is shown in a photo. The method yields sufficiently accurate readings only in the case of the welding current curve not differing to much from the sinusoidal. A universal measuring instrument (Fig.6) for the setting of all basic parameters. It need not be connected to the electric network of the shop or of the welder, has a removable toroid and coil that are mounted on the console of the welder for measurements. The toroid (Fig.6,8) is intended for the measurement of the welding current with the aid of a milliammeter with a fixing stop. Coil (9) (wound on a removable iron core) feeds

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S/125/61/000/001/009/016
Measuring instruments for checking resistance ... A161/A133

vibrator coils (11) with rectified current. A germanium diode is used for the rectifier. The current flow time is recorded on a telegraph tape that is actuated by a spring mechanism. A small dynamometer is added to measure the stress on electrodes. All elements are mounted on a panel in an aluminum case. The instrument can measure currents of 2-20 kiloampere with ±5% accuracy, and electrode stresses of up to 500 kg. Its weight is 8 kg. Working cycle recorder for butt welders, recording and measuring the basic process parameters (Fig.8). An electromagnetic vibrator records the working cycle during the operation of the vibrator which is coupled with the machine table. The instrument is connected in parallel to the welding transformer winding through an auxiliary transformer (1). The reel with the paper tape is driven by synchronous motor (2) through reduction gear (3) and coupling (4), and makes 1 revolution per minute. Mobile carriage (11) is coupled with the machine table by gear (6) and rack (7). The carriage bears the vibrator whose coil is fed through selenium rectifier (12). Vibrator armature (9) is pulled back into the initial position by spring (10). Pencil (14) is attached to the armature in a special holder. The recorder makes possible the determination of the following process parameters: the total welding allowance; the allowance for flashing off and upsetting; the flashing off and upsetting

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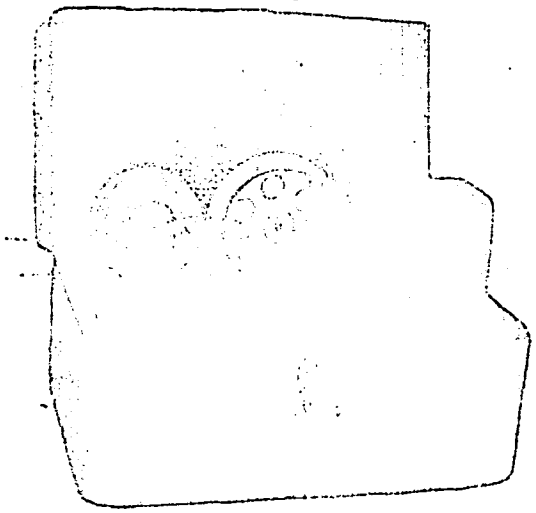
Measuring instruments for checking resistance ... A161/A133

rate; the moment of current cutoff during upsetting. The instrument is simple, weighs about 6 kg. There are 8 figures.

ASSOCIATION: Gor'kovskiy avtomobil'nyy zavod (Gor'kiy Automobile Plant)

SUBMITTED: September 21, 1960



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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

GULYAYEV, A.I., inzh.; RASTVOROVA, A.I., inzh.

Automatic and semiautomatic welding in carbon dioxide in the automobile industry. Svar. proizv. no.9:16-19 S '62. (MIRA 15:12)

1. Gor'kovskiy avtomobil'nyy zavod.
(Steel, Automobile—Welding)
(Protective atmospheres)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

GULYAYEV, A.I.

Conditions of spot-welding thin-sheet, low-carbon steel. Avtom.svar. 15 no.4:64-70 Ap '62. (MIRA 15:3)

1. Gor'kovskiy avtomobil'nyy zavod.
(Sheet steel—Welding)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

KHODANOVICH, I.Ye.; KRIVOSHEIN, B.L.; GULYAYEV, A.I.; NIZIYENKO, I.G.; CHERNOBYL'SKIY, V.A.

Results of factory tests of an expansion-chamber condensate tank with automatic cleaning. Gaz. delo no.6/7:65-68 '63. (MIRA 17:10)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut prirodnogo gaza, Krasnodarskoye upravleniye magistral'nykh gazoprovodov i Gosudarstvennyy proizvodstvennyy komitet po gazovoy promyshlennosti SSSR.

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

GULYAYEV, A.I.

Work practices of plant laboratories. Avtom. svar. 17 no.3:88-91 Mr '64. (MIRA 17:11)

1. Gor'kovskiy avtomobil'nyy zavod.

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

ZIL'BERBERG, V.I.; ROZNO, L.I.; GULYAYEV, A.I.; TSYRLIN, M.I.; BOBKOV, L.S., inzh., retsenzent; MANUYKOV, P.N., inzh., red.

[Overall mechanization and automation of painting operations] Kompleksnaia mekhanizatsiia i avtomatizatsiia okrasochnykh rabot. Moskva, Mashinostroenie, 1965. 146 p. (MIRA 18:6)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

GULYAYEV, A.I.

Study of the structure of the weakness zone during spot welding of thin sheet low carbon steel. Avtom svar. 18 no.8:31-33 Ag '65. (MIRA 18:11)

1. Gor'kovskiy avtomobil'nyy zavod. Submitted September 22, 1963.

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

GOLYAYEV, A.I., kand. tekhn. nauk; NASTVORCVA, A.J.

Using automatic and semiautomatic welding in a carbon dioxide medium. Avt. prom. 31 no.3:36-39 Mr '65. (MIRA 18:7)

1. Gor'kovskiy avtomobil'nyy zavod.

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

S/057/62/032/003/015/019
B117/B101

26.5700

AUTHOR: Gulyayev, A. I.

TITLE: Calculation of thermal flow meters

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 3, 1962, 365 - 369

TEXT: An analytical method is suggested for determining the characteristic lines of thermal flow meters (Fig. 1) in which the tube ends have a fixed temperature (T_1), and to whose central tube section a constant heat flow (q_0) is supplied from an electric heater. The temperature field of the tube is deformed by the passing gas flow. The temperature difference at two points of the tube, on either side of the point of heating, depends on the gas comsumption. The equation

$$\Psi_1 = (8/KPe) \left[1 - \mathrm{sch}\,(KPe/8)\right] \qquad (14)$$

was derived for the theoretical characteristic line of flow meters under certain conditions on measuring the temperature difference between the points Б and Д. Here, $\Psi_1 = \Delta T_1/\Delta T_0$ (T_0 = temperature of the tube at the

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point of heating, without gas flow); $K = L\lambda_{gas}/\delta\lambda_{tube}$, characterizing the peculiarities of the construction (λ_{gas} and λ_{tube} are heat conduction coefficients of the gas and the tube material, δ = thickness of the tube wall); Pe = Peclet's index. The equation

$$\Psi_2 = \Delta T_2/\Delta T_o = (8/KPe)\left[\exp(KPe/4) - 1\right]/\left[\exp(KPe/4) + 1\right] \quad (16)$$

is suggested for the characteristic line when measuring the temperature difference between the points A and B. These equations are only applicable to sufficiently small Pe values and with $W_o \gg W$. A comparison of the characteristic lines determined from (14) with experimental results (three copper-tube flow meters; measurement of the temperature at the individual points with copper-constantan thermocouples, and of the air consumption with a gas counter) showed the theoretical conditions to hold for $KPe < 1.55$. In this range, the characteristic lines are practically linear and can be determined from $\Psi_1 = (1/16)\,KPe$ (15). With $KPe > 1.55$, the flow meter is less sensitive. Its range can be extended substantially by measuring the

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temperature difference between points A and B. An increase of the parameter K improves the sensitivity of the flow meter, but slightly deteriorates its dynamic qualities. For measurements of the temperature difference between points A and B, the thermal inertia of flow meters greatly depends on the thermal capacity of the heater and on the heat insulation. The author thanks P. L. Kapitsa for interest, and A. I. Shal'nikov and D. I. Vasil'yev for supplying experimental data not yet published. There are 3 figures and 2 references: 1 Soviet and 1 non-Soviet. The reference to the English-language publication reads as follows: P. L. Kapitza, J. D. Cockcroft. Nature, Febr. 13, 1932.

ASSOCIATION: Institut fizicheskikh problem AN SSSR, Moskva (Institute for Research on Problems of Physics AS USSR, Moscow)

SUBMITTED: April 10, 1961

X

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

L 15519-63 EPR/EPA(b)/EWT(1)/BDS AEDC/AFFTC/ASD Ps-4/Pd-4 WW/
JXT(LJP)
ACCESSION NR: AP3000713 S/0258/63/003/002/0236/0245

69
66

AUTHORS: Gulyayev, A. I.; Kuznetsov, V. M. (Moscow)

TITLE: Oscillations of gas in closed tube

SOURCE: Inzhenernyy zhurnal, v. 3, no. 2, 1963, 236-245

TOPIC TAGS: resonance, shock wave, oscillation, energy dissipation

ABSTRACT: An experimental study has been made to determine the shock wave formation in the large amplitude, nonlinear oscillations of a column of gas at resonant frequencies. It is noticed that the oscillations at resonant frequencies generate a series of unpredicted effects, such as stationary vortices and turbulence, indicating a change in the magnitude of the pressure jump due, possibly, to the unequal shock energy dissipation in directions normal and parallel to the tube axis. An energy balance is made in which the governing dissipative mechanisms have been shown to be the energy loss in the shock wave and in the boundary layer. "The author expresses his gratitude to P. L. Kapitsy* under whose guidance

Card 1/2

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L 15519-63
ACCESSION NR: AP3000713

3

this work was done and to L. P. Gor'kov for his valuable advice. Thanks are also given to P. V. Cheby*shev for his help in the hot-wire anemometry techniques." Orig. art. has: 19 equations and 5 figures.

ASSOCIATION: none

SUBMITTED: 09Jul62 DATE ACQ: 21Jun63 ENCL: 00

SUB CODE: AI NO REF SOV: 004 OTHER: 006

Card 2/2

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

GULYAYEV, A.I.

Ranque effect at low temperatures. Inzh.-fiz. zhur. 8 no.3:354-357 S '65. (MIRA 18:9)

1. Institut fizicheskikh problem AN SSSR, Moskva.

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

L 7707-66 EWT(1)/EWP(m)/EPF(c)/ETC/EPF(n)-2/EWG(m)/FCS(k)/ETC(m)/EWA(1) WW/JH

ACC NR: AP5025903 SOURCE CODE: UR/0057/65/035/010/1869/1881

AUTHOR: Gulyayev, A.I.

ORG: Institute of Physical Problems, AN SSSR, Moscow (Institut fizicheskikh problem)

TITLE: Investigation of the vortex effect

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 35, no. 10, 1965, 1869-1881

TOPIC TAGS: gas dynamics, thermodynamics, vortex tube, cooling, heating, turbulent heat transfer, Ranque effect

ABSTRACT: This paper is concerned with the vortex or Ranque effect (G.Ranque, J. de phys. et rad., 7, 4, 112, 1933). From a thermodynamic discussion of the vortex tube based on the assumption of local equilibrium it is concluded that the Ranque effect is impossible in an ideal compressible fluid, and that transport processes giving rise to an energy flux from the axial to the peripheral regions of the tube are essential. There is derived a limitation on the magnitude of the effect, which has not always been recognized. The views of many investigators, sometimes conflicting, are mentioned and briefly discussed. In order to demonstrate the counter current heat exchange, a vortex tube which the author has described in more detail elsewhere (IFZh, 8, No. 10, 1965) was fitted with a shorter internal coaxial tube of smaller radius and non-

Card 1/2

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L 7707-66

ACC NR: AP5025903

12

rotating gas was introduced through it. Under these conditions the cooling was even greater than with normal operation, although the heating was somewhat less. A theory of the vortex tube is developed on the basis of the semi-empirical theory of turbulent transfer, and the results are compared with earlier experiments of the author loc. cit. supra). Encouraging agreement is shown. The factors determining the efficiency of the vortex tube are discussed. The theory is not adequate to support a definite conclusion, but the author has the impression that nearly the maximum possible efficiency has already been reached. The author thanks P.L.Kapitsa, M.P.Malkov, I.B.Danilov, and A.F.Andreyev for discussing the work. Orig. art. has: 20 formulas and 4 figures.

SUB CODE: ME, TD/ SUBM DATE: 04Jan65/ ORIG REF: 011/ OTH REF: 012

Card 2/2

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

GULYAYEV A. I.

USSR / Diseases of Farm Animals. Diseases Caused by Bacteria and Fungi R

Abs Jour: Ref Zhur-Biologiya, No 16, 1958, 74186

Author : Gulyaev, A. I.

Inst : Institute of Veterinary Medicine, Kazakhstan Affiliate of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin

Title : Determination of the General Physiological Reaction in the Organism of Calves with Para-Typhoid

Orig Pub: Tr. In-ta vet. Kazakhsk. fil. VASKHNIL, 1957, 8, 103-107

Abstract: No abstract.

Card 1/1

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

GULYAYEV, A.I.

REMENTSOVA, M.M.; GULYAYEV, A.I.; SOLOMINA, V.F.

Red fox and dogs as carriers of Brucella. Izv.AN Kazakh.SSR. Ser. fiziol. i med. no.7:62-69 '56. (MLRA 9:10)

(BRUCELLA)
(DOGS AS CARRIERS OF DISEASE)
(FOXES AS CARRIERS OF DISEASE)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

GULYAYEV, A. I., CAND VET SCI, "ON THE PROBLEM OF DIFFERENTIATING IMMUNOBIOLOGICAL REACTIONS IN VACCINATED SHEEP AND THOSE ~~SUFFERING FROM~~ affected with BRUCELLOSIS." ALMA-ATA, 1960. (MIN OF HIGHER AND SEC SPEC ED KAZSSR, ALMA-ATA ZOOVETERINARY INST). (KL, 3-61, 227).

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

GULYAYEV, A.K., gornyy inzh.

Using coal picks for cleaning mine cars. Ugol' Ukr. 4 no.1: 26 Ja '60. (MIRA 13:5)
(Coal mines and mining--Equipment and supplies)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

SOV/137-57-11-21293

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 11, p 96 (USSR)

AUTHOR: Gulyayev, A. M.

TITLE: Periodic Rolling of Rolling-stock Axles (O periodicheskoy prokatke vagonnoy osi)

PERIODICAL: V sb.: Ratsionalizatsiya profiley prokata. Moscow, Profizdat, 1956, pp 338-339

ABSTRACT: The question of the development of the technology of periodic rolling of hollow axles for rolling stock is posed.

B.Ye.

Card 1/1

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

S/081/62/000/013/032/054
B177/B101

AUTHOR: Gulyayev, A. M.

TITLE: On the accuracy of determining fiber lengths by Glagolev's method

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 13, 1962, 425, abstract 13K312 (Tr. Kazakhsk. n.-i. in-ta mineral'n. syr'ya, no. 3, 1960, 137-138)

TEXT: The length of fiber is computed from the formula $L = \pi^2 D/4 \cdot N/M$ where M is the number of fiber ends, N the number of intersections, and D the diameter of the circle. This formula is derived from probability theory. The more calculations are made the higher the accuracy with which fiber lengths are determined. The method is analyzed mathematically. [Abstracter's note: Complete translation.]

Card 1/1

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

L 4541-66 EWT(1)/EWT(m)/EWP(i)/T/EWP(b) IJP(c) JD/GG

ACC NR: AT5025642 SOURCE CODE: UR/2657/65/000/013/0306/0311

AUTHOR: Shalimova, K. V.; Gulyayev, A. M.; Shnitnikov, A. S.; Kalinina, O. B.

ORG: none

TITLE: Hall pickups based on thin layers of indium antimonide

SOURCE: Poluprovodnikovyye pribory i ikh primeneniye; sbornik statey, no. 13, 1965, 306-311

TOPIC TAGS: thin film transducer, Hall effect, thermoelectric sensor, magnetic field measurement, indium antimonide

ABSTRACT: Hall pickups prepared by K. G. Günter's three-temperature method were developed for use as functional elements in electronic systems and for measuring the strength and configuration of magnetic fields. Thin films of indium antimonide were used as semiconductor layers, with dimensions ranging from 0.4 x 1.2 mm to 4 x 8 mm. Four different types of pickups were developed. The first type, designed for use as functional elements in multipliers, dividers, and detectors, had overall dimensions of 10 x 15 mm with a semiconductor layer 3 x 3 mm in area. Two other types of pickups were designed for measuring magnetic fields and for use in automatic devices. The fourth type measured 1.2 x 0.4 mm and was developed for measuring the configuration of magnetic fields. The resistance of the pickups was less than 1000 ohm; sensitivity was 70—180 μv/oe. The relationships between the parameters of the pickups

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L 4541-66

ACC NR: AT5025642

and temperature, conditions of heat transfer, and magnetic field strength were studied. The pickups were successfully used in magnetic field measurements, especially, between stators and rotors of electric machines. Orig. art. has: 3 figures. [JR]

SUB CODE: EM,EC/ SUBM DATE: none/ ORIG REF: 001/ OTH REF: 005/ ATD PRESS: 4135

Card 2/2

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

GULYAYEV, A. N., Eng.

Clothing Industry

Shortcomings in planning at clothing factories. Leg. prom. 12 No. 9, 1952.

9. Monthly List of Russian Accessions, Library of Congress, December 1952 ~~1953~~, Uncl.

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

GULYAYEV, A.N.

Planning and accounting operations should by improved. Leg.prom. 15 no.12:7-8 D '55. (MLRA 9:5)

1. Nachal'nik otdela Kuybyshevskogo upravleniya legkoy promyshlennosti.

(Russia--Manufactures--Accounting)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

RYBAKOV, Yu.Yu., inzh.; LEVCHUK, V.N., inzh.; GULYAYEV, A.N., inzh.

Mechanizing the placing of reinforced concrete tubing in horizontal workings. Shakht. stroi. 9 no.9:22-24 S '65. (MIRA 18:9)

1. Pechorskiy nauchno-issledovatel'skiy ugol'nyy institut.

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

L 23894-66 EWT(m)/EPF(n)-2/EWP(t) IJP(c) JD/JG/WB

ACC NR: AP6008621 SOURCE CODE: UR/0365/65/001/006/0652/0657

54
B

AUTHORS: Gulyayev, A. P.; Georgiyeva, I. Ya.

ORG: Moscow Institute of Chemical Machinery Construction (Moskovskiy institut khimicheskogo mashinostroyeniya)

TITLE: Corrosion stability of binary alloys of niobium

18 27

SOURCE: Zashchita metallov, v. 1, no. 6, 1965, 652-657

TOPIC TAGS: niobium base alloy, corrosion resistant alloy, tantalum containing alloy, titanium containing alloy, niobium, tantalum, titanium, binary alloy

ABSTRACT: Corrosion stability of alloys of niobium with Ta, Ti, Zr, V, and Mo to acid solutions has been investigated. The work was undertaken to find cheaper acid-resistant alloys than the presently used Ta. The second element was added in a ratio of 5, 10, 15, and 25 atomic %. The acids tested were: HCl - 5, 10, 15, and 20%; H_2SO_4 - 20, 40, 50, 70, and 90%; and H_3PO_4 - 20, 40, 60, and 80%. The tests were performed at 185C and at the boiling points of the acids, and lasted from 72 to 144 hours. It was established that alloying Nb with Ti, Zr, and V increases its corrosion rate in all the acids tested, while alloying it with Ta and Mo lowers the rate. Alloys of Nb with Ta containing 15—25 atomic % of Ta can be substituted for Ta in corrosive acid media. They are cheaper and lighter than

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L 23894-66

ACC NR: AP6008621

pure Ta. Ti can be introduced in the amount of 5--10 atomic % as a second component of the alloy. At such concentrations, Ti has no effect upon the corrosion stability of the alloy; however, it improves the technological properties, facilitates the alloying process, and makes the product more economical. Use of Mo is not advisable as it affects the deformation of the alloys. Orig. art. has: 8 figures.

SUB CODE: 07/ SUBM DATE: 20Mar65/ ORIG REF: 004/ OTH REF: 002

Card 2/2dda

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

ACC NR: AP7002430 SOURCE CODE: UR/0129/66/000/012/0015/0021

AUTHOR: Klypin, B. A.; Gulyayev, A. P.; Morgunova, N. N.

ORG: TsNIIChERMET

TITLE: Mechanical properties of refractory metals

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 12, 1966, 15-21

TOPIC TAGS: refractory metal, high temperature strength, mechanical property, plasticity, transition temperature, impurity content, crystal structure, grain size, annealing, metallographic examination, TENSILE TEST, CRYSTAL DISLOCATION, TEMPERATURE DEPENDENCE

ABSTRACT: Data on Ni, Nb, Ta, Mo, and W were correlated and the temperature dependence of the mechanical properties determined. Tensile testing was done at temperatures ranging from -196 to 2500°C and the strength was given as a logarithmic function of the homologous temperature T/T_m, where T_m is the melting point and T is the test temperature. Three different slopes were obtained for the bcc metals (Nb, Mo), at the following temperature intervals: below 0.2 T_m, 0.2-0.5 T_m, and above 0.5 T_m. These changes were due to different dislocation mechanisms. For Ni, an fcc metal, no slope change occurred between the first and second regions. The location of the first interval depended mainly on the metal and the deformation rate, and only slightly on

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the impurity content. The position of the high temperature region did not depend on the crystal lattice type or impurity content, but was a function of strain rate. The strength and ductility of Mo were given as functions of temperature for different impurity contents and a constant grain size (No. 5-ASTM). Similar tests were also done for the deformed and annealed conditions. The strength rose sharply as the temperature decreased for all tests. Impurities and structural changes affected the ductility and the ductile-brittle transition temperature. With a decrease in impurity content (C, O, N, H), the transition temperature decreased. The grain size dependence of W, Mo, and Cr on the transition temperature was given as

$$T_{br} = A + B \lg d_{av}$$

where A and B are constants and d_{av} is the average recrystallized grain size. Impurities and structure had the most effect on the strength in the intermediate temperature range. Above 0.5 T_m the temperature dependence of strength was given by

$$\sigma = a' e^{-m' T/T_m}$$

where a' and m' are coefficients which depend on the testing method and strain rate. Microstructures of TsM-2A (Mo alloy) are shown after various deformations at 1670 and 2070°C. After 10-15% deformation at 1400-2400°C elongated grains and substructure were visible. Only after 60-80% deformation at 2070°C did an equiaxed structure appear. Orig. art. has: 6 figures, 1 table, 3 formulas.

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 006/ OTH REF: 011

Card 2/2

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

ACC NR: AP7002576 (A,N) SOURCE CODE: UR/0413/66/000/023/0073/0073

INVENTOR: Fatkina, A. M.; Gulyayev, A. P.; Ul'yanin, Ye. A.; Tyurin, Ye. I.

ORG: none

TITLE: Nickel steel. Class 40, No. 189152 [announced by the All-Union Scientific-Research Institute of Oxygen Machine Building Industry (Vsesoyuznyy nauchno-issledovatel'skiy institut kislorodnogo mashinostroyeniya)]

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 23, 1966, 73

TOPIC TAGS: nickel steel, LOW TEMPERATURE METAL, MECHANICAL PROPERTY

ABSTRACT:

This Author Certificate introduces a nickel steel with improved mechanical properties at subzero temperatures containing 0.06% max carbon, 0.45 to 0.60% manganese, 0.17—0.37% silicon, and 6.0—6.5% nickel.

SUB CODE: 11/ SUBM DATE: 14Sep65/ ATD PRESS: 5113

Card 1/1 UDC: 669.14.018.41:669.15'24-194

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1933- 1958

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

M

Properties of Metals Cast under Pressure. A. P. Gulyayev. (Vestnik Inzhenerov i Tekhnikov [*Messenger of Engineers and Technologists*], 1932, (8), 350-353). [In Russian.] Casting under pressure gives castings which are insufficiently dense (large cavities and blowholes), but by taking suitable precautions (low pouring temperature, thin stream of liquid metal, convenient arrangement of cores, insertions and other obstacles in the path of the flowing metal) this porosity may be, if not entirely avoided, at least considerably reduced. The portions without cavities show a dense and extremely fine-grained structure. Yield-point and hardness are always greater in pressure castings than those produced by other methods, but usually the toughness is somewhat lower, especially Silumin and copper aluminium alloys. The 12% copper aluminium alloy used in aero engine pistons has the best properties after pressure casting. N. A.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

7

On the Theory of Quenching and Ageing of Aluminium Alloys. A. P. Gulyayev. (*Vestnik Inzhenerov i Tekhnikov* (*Messenger of Engineers and Technologists*), **1954**, (4), 185-187).—[In Russian.] A review of modern knowledge of this subject.—N. A.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

MATERIALS INDEX

3RD AND 4TH ORDERS

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

GULYAEV, A. P.

Gulyaev, A. P.

C. A. Vol. 32, June 10 - Nov. 20, 1938
6998-7

"The maximum cross-section in the step hardening of carbon-containing instrument steel," A. P. Gulyaev, Vestnik Inzhenerov i Tekh. 1936, [illegible]-6; Chem. Zentr. 1937, I, 701.

Expts show that the time of retention of the austenite structure by the hardened steel specimen during cooling depends in large measure upon the temp. of hardening and the diam. of the piece (or more correctly, the ratio of vol. to surface). Insufficiently rapid cooling of the specimen in the salt baths (KNO_3-$NaNO_3$, 1:1) is greatly influenced by the Mn content of the steel. With 0.2-0.3% Mn and a bath temp. above the martensite conversion point of a max. diam. of 5-6 mm. is specified for cylindrical pieces. Lowering of the bath temp. to 150-160° by the use of a 1:1 KNO_3-$NaNO_2$ mixt. permits the treatment of specimens of greater diam. The subsequent tempering of specimens taken from this bath is, however, rendered more difficult since the austenite transition in such cases has already begun.

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

Isothermal determination of grain size in steels. A. P. Gulyaev and A. P. Belova. *Zavodskaya Lab.* 5, 1329-34 (1936); cf. C. A. 30, 7520[1].—The previous isothermal method applied to the examn. of high- and low-C steels revealed the "grain" more distinctly than other procedures. In the detn. of alloyed steels the cooling time is reduced from 8-16 hrs. to 1-2 hrs. Chas. Blanc

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

GULYAEV, A. P.

GULYAEV, A. P. C. A. Vol. 33, June 20 - December 10, 1939
7234-9

"The Decomposition of the Residual Austenite [illegible] High-Speed Steel by Cooling to Below 0°." A. P. Gulyaev. Vestnik Inzhenerov i Tekh. 1937, [illegible] (1937) Chem. Zentr. 1938, I, 411.-

Magnetic, dilatometric and microscopic investigations and tests of hardness are reported for high-speed steel after quenching from 1250-1300° to a temp. below 0° with the use of liquid O. The amt. of residual austenite in the steel so treated is 9%, while the same steel after normal quenching showed an austenite content of 34%. By cooling in liquid O the amt. of tetragonal martensite is greatly increased. Photographs of structure showed only austenite and carbide. Specimens quenched in liquid O showed a Rockwell hardness 2-2.5 units higher than specimens quenched in the usual manner. By annealing at 120° a further increase in hardness of 1 Rockwell unit was obtained, so that steel quenched in liquid O from 1250° and then annealed at 120° showed a hardness of 67-8 units.

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

GULYAEV, A.

Gulyaev, A.

J. A. Vol. 32, June 10 - Dec. 20, 1938
4500-3

"Martensitic transformation of high-speed steel." A. Gulyaev. Kachestvennaya Stal 5, No. 1, 41-7(1937); Met. Abstracts (Ferrous & Alloys) 5, No. 1 45 (1938).

Steel contg. C 0.77, W. 17.73, Cr 3.95 and [illegible] was investigated dilatometrically. Curves plotted show that increasing quenching temp. and heating time lower the martensitic transformation point, which should be understood as a range of temps. rather than a definite point. The range depends on the amount of carbides in soln. and increases with the latter. The location of the [illegible] martensitic point defines [illegible] character of a steel. Max. hardness depends on drawing temp., [illegible] is the best, producing 65.5-66 Rockwell C hardness.

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

Ca

9

Aging of undercooled austenite in high-speed steels. A. Gulyaev. *Kachestvennaya Stal* 5, No. 5-6, 49-51(1937); *Met. Abstracts* (in *Metals & Alloys*) 9, No. 1, 20(1938). Aging was investigated by detg. dilatometrically the martensitic point of steels quenched from 1300° and drawn at 600 to 650°. No carbide pptn. was found by this means after heating 1 hr., but keeping at temp. for 9 hrs. shifted martensite formation temp. 25 and 50° for 600 and 650°, resp. Aging effects are observed on tempering quenched specimens as well and even more pronouncedly.

M. W. B.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

[illegible]

Gulyaev, A.

C. A. Vol. [illegible], June 10 - [illegible]
8344-1

"Tempering silcrome." A. Gulyaev. Kachestvennaya Stal 5, [illegible] (1937); Met. Abstracts (in Metals & Alloys) [illegible], 507(19[illegible]).

Silcrome contg. C 0.44, Cr 11.0 Si 3.85% was investigated microscopically and dilatometrically. In the quenched state, the steel is fully austenitic. On the drawing at 100-200°, tetragonal martensite is decompd. into cubic, and no further transformation takes place up to 500°, when aging or aptn. of ultra-microscopic carbides occurs. Between 600° and 700°, austenite is decompd. into troosto-sorbite, a reaction on which is superimposed the phenomenon of tempering of martensite. This transformation is completed between 700° and 720° and above this no phase changes occur below the crit. point, 1150-1200°. Secondary martensitic transformation can be produced by heating to 500-600° and cooling, because only on cooling can austenite with lower C content have this transformation. The exact temp. of transformation depends on C soly. in austenite. Tempering at a higher temp. produces the same degree of austenite decompn. as repeated tempering at lower temps. but C satn. of martensite so produced is much lower in the 2nd case. Aging phenomenon

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PROCESSES AND PROPERTIES INDEX

Effect of thermal treatment on change of hardness of high-speed cutting steel. A. P. Gulyaev. *Vestnik Metallopromy*, 1938, No. 1, 131-8.—A study was made of the effect of hardening temp., of time of heating at this temp., of subsequent annealing temp. and of the no. of annealings, on hardness of high-speed steel. The method consisted in heating specimens in a salt bath to temps. up to 1325°, keeping at these temps. for 1 to 12 min. and quenching in oil. Annealing treatment was then carried out by heating for 1 hr. in an elec. muffle furnace at temps. up to 600°. A curve showing hardness plotted against quenching temp. passes through a max. at 1200°; curves showing hardness plotted against time of heating at quenching temp. pass through a max. at 2 min. for the 1300° and 1325° quenching temps., at 3 min. for the 1200° and at 8 min. for the 1100° quenching temp. Curves showing hardness plotted against annealing temp. pass through minima at 300–400° for all quenching temps. Repetition of annealing in the case of the 1150° and 1250° quenched specimens resulted in a lowering of hardness, while in the case of the 1300° quenched specimen there was an increase in hardness after the 1st, 2nd and 3rd annealing, but a decrease in hardness after the 4th and 5th annealing.

S. L. Madorsky

ASM SLA METALLURGICAL LITERATURE CLASSIFICATION

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GULYAEV, A. P.

Gulyaev, A. P., Bolova, A. P., C. A. Vol. 32, June 10 - Nov. 20, 1938
7385-5

"Tempering with minimum change of volume." A. P. Gulyaev and A. P. Bolova. Vestnik Metalloprom. 1938, No. 1, 139-49.

The stock investigated analyzed: C 1.18, Mn 0.21% (I), C 1.22, Mn 0.59, Cr 1.44% (II) and C 1.49, Mn 0.14, Cr 10.95, Mo 0.26% (III). In order to obtain min. deformation in the structure of the metal parts, and therefore min. change of vol., the following optimum heat-treatment is suggested: For I, keeping in a salt bath at 830° for 1-2 min. quenching in a low-melting salt bath at 175° until temp. of the steel reaches that of the bath, transferring to an oven (or oil bath) maintained at 200°, keeping at this temp. for 20 min. and allowing oven or oil bath to cool gradually to room temp. For II, treatment same as for I, except that initial temp. of salt bath should be 890° instead of 830° and temp. of quenching bath should be 200° instead of 175°. For III keeping in salt bath at 1050° for 2-3 min., quenching in a low-melting salt bath at 250°, transferring to oven maintained at 250° and keeping there for 30 min. and cooling the oven to room temp. The results of the expts. are shown in numerous tables and diagrams.

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Grain Size in High-Speed Tool Steel. A. P. Gulyaev (Kachestvennaya Stal, 1938, No. 3, pp. 30-35). (In Russian). The method developed by the author for the determination of grain size in high-speed steel consisted of heating specimens 10 × 10 mm. in cross-section for 4 min. at 1300° C. and then cooling rapidly by quenching in oil. The austenite grain size caused by this quenching was determined at a magnification of 250 and expressed in terms of the American Society for Testing Materials scale. Strictly similar heating conditions, sizes of specimen, &c., are required if reproducible results are to be obtained. The results obtained by using this method for the study of some hundred heats of several types of high-speed steel are discussed, and a number of the structures are shown in micrographs. The importance of grain size in this type of steel is emphasised.

A.S.M. - C.A. METALLURGICAL LITERATURE CLASSIFICATION

GULYAEV, A. P.

GULYAEV, A. P. C. A. Vol. 33, June 20 - Nov. 10, 1939

"Decomposition of residual austenite during the annealing of carbon steel." A. P. Gulyaev. Vestnik Inzhen. [illegible] Chimie & industrie rl, 482-3.

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

The quantity of residual austenite (detd. dilatometrically) increases uninterruptedly as long as the temp. rises, up to 1000-1100°. The transformation temp. of residual austenite lies between 170 and 270°; the intensity of transformation reaches a max. at about 240-70°; this temp. is independent of the quenching temp.; the quantity of C dissolved in the residual austenite has, therefore, no effect on its stability. Annealing at a temp. below the interval of transformation of austenite is accompanied by an isothermal contraction corresponding to the end of the transformation of α-martensite into β-martensite. On the other hand, annealing at a temp. within the transformation of residual austenite produces an expansion (transformation of residual austenite into martensite); above this range, annealing again produces a contraction, owing to the decompn. of martensite into troostite.

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GULYAEV, A. I.

GULYAEV, A. I. C. A. Vol. 34, June 6 - Nov. 1940

"The "Grain" in High-speed Steel". A. I. Gulyaev. [illegible] 6, No 2, 30-5(1938); Chem. Zentr. 1939, 1, 1[illegible]; cf. C. [illegible], 4500[illegible].

The development of an austenite grain in specimens of high-speed steel 10 x 10 mm. in cross section is reported. The specimens [illegible] to the hardening temp. of 1260-1340° (the optimum [illegible]) in 4 min. in a Silite furnace with the admission of air and then subjected to rapid cooling in oil or combined air and water cooling. Detns. of grain size were made on specimens from 100 different melts. The various melts were found to fluctuate widely as regards the austenite grain size.

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GULYAEV, A. P.

GULYAEV, A. P. C. A. Vol. 33, June 20 - November 10, 1939
7255-7

"Isothermal Decomposition of Austenite in the Neighborhood of the A_1 point". A. P. Gulyaev. Metallurg 13, No. 1, 81-3 (1938); Chimie & Industrie 41, 688; cf. C. A. 33, 4932[2].-

Slight superheating of high-C steel above Ac_1 produces, at all the transformation temps. (670-710°) granular pearlite, while greater superheating over the same temp. range produces pearlite in plates. In the former case there are numerous crystn. nuclei, while in the second case there are but few. Strong superheating of the steel above A_1 results in soln. of the nonmetallic inclusions (carbides, etc.) which act as crystn. nuclei during transformation.

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GULYAEV, A. P.

GULYAEV, A. P., AND PODBEREZKIY, P. I. J.I.S.I. Vol. 140, 1939, No. 2

"Stepped Quenching and Multiple Tempering of High-Speed Steel." A. P. Gulyaev and P. I. Podberezkiy. (Metallurg, 1939, No. 2, pp. 70-75). (In Russian).

Specimens of steel containing 0.82% of carbon, 18.71% of tungsten, 4.19% of chromium, 0.62% of vanadium, 0.33% of manganese, 0.21% of silicon, 0.012% of phosphorus, 0.016% of sulphur and 0.10% of nickel were subjected to stepped quenching from 1280°C. to "ageing temperatures" of 500° min. to 3 hr. prior to cooling and multiple tempering at 560-575°C. for periods of 1 hr. The effects of such heat treatments on the hardness and microstructure of the steel and finally on the properties of milling cutters made from it were investigated. Some data were also obtained by dilatometric analysis. Ageing at the intermediate temperatures caused a slight increase (of 1-2 Rockwell units) in hardness, due to the precipitation of carbides, which was

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S

Investigation of the Transformation of Austenite at Temperatures Below 0°C. A. P. Gulyaev. (Zavodskaya Laboratoriya, 1939, No. 2, pp. 230-231) (In Russian). The author describes the apparatus used and an experimental magnetic method of studying the transformation of austenite at low temperatures down to that of liquid nitrogen. He reproduces some of the transformation-rate curves which he obtained.

METALLURGICAL LITERATURE CLASSIFICATION

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The Transformation of Residual Austenite in High-Alloy Steels at Temperatures Below 0° C. A. P. Gulyaev. (Metallurg, 1939, No. 3, pp. 64–71). (In Russian). Earlier work is summarised. The present investigation was carried out on high-speed steel (carbon 0·74%, tungsten 18·2%, chromium 4·01%, vanadium 0·58%), high-chromium steel (carbon 1·85%, chromium 10·38%) and silchrome (carbon 0·44%, chromium 11·0%, silicon 3·85%). Temperatures down to − 180° C. were applied in a special apparatus in which the amount of austenite present in the specimens was measured by the magnetic induction method. In the case of steels quenched from comparatively low temperatures, although some residual austenite was present, they did not change into martensite on cooling down to liquid-oxygen temperatures. As the quenching temperature was raised, the temperatures of both the upper and lower martensite points were lowered, the latter, which was determined in the present investigation, falling considerably below 0° C. The martensite transformation exhibited low hysteresis. At the end of the transformation a certain amount of stable residual austenite was left unchanged.

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19

Some Generalisations Regarding the Equilibrium Diagrams of Ferrous Alloys. A. P. Gulyaev. (Metallurg, 1939, No. 6, pp. 3-6). (In Russian). The effects of alloying elements in binary alloy equilibrium diagrams are subdivided into four groups from the point of view of the displacement of the critical points and the effect on the γ region. A survey of available data shows that the effect of alloying elements in widening the γ region (the limits of the $\alpha + \gamma$ region) is directly connected with the atomic weight of the element. In the case of alloying elements which lower and those which raise the A_4 point, the position of the outer limit of the $\alpha + \gamma$ region always occurs at about 2 atomic-% of the element in alloys with the usual amount of impurities.

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GULYAEV, A. P.

GULYAEV, A.P.

C.A. Vol. 34, No. 20-[illegible], 1939
9239-5

Transformations of austenite at temperatures below 0°. Zavodskaya Lab. 8, 230-[illegible] 2 (1939); cf. C.A. 33, 7254[illegible].

Austenite transformations below 0° were [illegible] in an [illegible]meter consisting of a Cu vessel which served both as a container for the cooling liquid and as a framework for the outer magnetizing coil. The secondary coil consisted of two coils, one for the standard and one for the test specimen. The coils were in series and were connected through a shunt rheostat to a mirror galvanometer. The investigation covered the range of +20° to -160°. The results are given in graphs.

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18

Low-Alloy High-Speed Steels. A. Gulyaev and K. Ooipov. (Stal, 1939, No. 12, pp. 47–54). (In Russian). The authors consider that high-speed steels should contain alloying elements to form carbides which dissociate with difficulty. The high-speed steel substitutes used in Russia (*e.g.*, steels *EI*116, *EI*172, *EI*173 and *EI*184), in which chromium is the chief alloying constituent, are not of this type. Consideration of previous work led the authors to the choice of the following compositions:

	(1)	(2)	(3)	(4)	(5)
Carbon, %	1·01	1·19	1·56	1·3	1·35
Vanadium, %	3·18	4·56	6·68	4·88	4·77
Tungsten, %	3·13	3·34	2·84	...	3·03
Molybdenum, %	3·50	3·35	3·20	3·13	...
Chromium, %	4·3	4·4	4·4	4·6	4·5

In these steels the carbon content is based on the vanadium content. The above alloys were prepared in an H.F. furnace, cast, forged into billets, annealed at 900° C. and cooled in the furnace. Curves from data obtained with a dilatometer showed that the Ac_1 points of the steels were between 820° and 890° C. S-curves for the steels showed that they all possessed minimum austenite stability within the range 720–770° C. Maximum cooling rates on annealing and critical cooling rates for quenching were also obtained from the S-curves. Investigation of the optimum quenching temperatures showed that the permissible range was wide. In all the

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GULYAEV, A. P.

C. A. Vol. 34.

A. P. GULYAEV

"Transformation of residual austenite in alloy steels at temperatures below 0°." A. P. Gulyaev. Metallurg 14, No. 3, 64-71 (1939); cf. C. A. 33, 7254[8].

Specimens of steel contg. (1) C 0.7%, W 18.2, Cr 4.01 and V 0.56%; (2) C 1.05 and Cr 10.38%; and (3) 0.44, Cr 11.0 and Si 3.85% were quenched in oil from 900-1300° and immediately further cooled to -183°. Magnetic measurements showed that the austenite-martensite transformation occured between definite temp. limits and that these limits were below 0° if the steel was quenched from 1200° or 1300°. If the steel was quenched from a lower temp. the transformation took place above 0°. The amt. of residual austenite was greater if the steel was quenched from a high temp. If the specimen was held at room temp. after quenching the austenite became stabilized and did not transform so readily nor completely on subsequent cooling below 0°.

W. W. Rathmann

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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

Low-alloy high-speed steels. A. P. Gulyaev. *Vestnik Metallopromy*, 19, No. 10-11, 107-8(1939). A comparison was made of the cutting properties of the following steels: (1) W 18 and V 0.5%, (2) W 18 and V 1.2%, (3) C 1.0-1.2, V 2.5-3.5, W 2.5-3.2, Mo 2.5-3.5 and Cr 3.8-4.5%, and (4) C 1.2-1.4, V 3.5-4.5, Mo 2.5-3.5 and Cr 3.8-4.5%. The last 2 steels were superior to the first 2. The tests were conducted with steels of Brinell hardness 150 and 220.

B. Z. Kaunch

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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

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The Cutting Properties of Different Types of High-Speed Steels. A. P. Gulyaev and S. I. Krestnikov. (Vestnik Metallopromyshlennosti, 1940, No. 4–5, pp. 93–96). (In Russian). The results of machining tests with the following types of tool steels are reported: (*a*) High-tungsten steels; (*b*) steels with 9–13% of chromium, 1–2% of vanadium and about 1% of silicon with and without additions of 2–5% of tungsten; and (*c*) steels with 2–5% each of molybdenum, vanadium and chromium with and without additions of about 3% of tungsten. On the whole the high-chromium steels proved to be inferior to the low-alloy compositions, whilst the latter were equal to tungsten high-speed steel, for which they may be regarded as fully equivalent substitutes.

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PROCESSES AND PROPERTIES INDEX

1ST AND 2ND ORDERS

Transformations During the Tempering of Chromium-Bearing Substitutes for Stainless Steel. A. Gulyaev. (Stal, 1940, No. 8, pp. 42-45). (In Russian). The steel *E*/172 investigated contained carbon 1·00%, silicon 1·53%, chromium 11·05%, and vanadium 2·0%. Some experiments were also made with steel *E*/173 containing carbon 0·91%, silicon 0·40%, chromium 0·48%, tungsten 2·02% and vanadium 1·20%. The effect of the quenching temperature on the behaviour of the steel during subsequent heating, the effect of the tempering temperature and the holding time, also the behaviour on repeated tempering, and the effects of quenching in liquid oxygen as well as of interrupting the martensite transformation, were investigated by dilatometric analysis supplemented by magnetometric determination of the residual austenite. The critical temperature of steel *E*/172 is about 1000° C.; a quenching temperature of 1200° C. was adopted. In the quenched state the steel consists of austenite, martensite and carbides, the proportions of these being depending on the quenching temperature and time at that temperature. On heating to the tempering temperature, tetragonal martensite changes to cubic martensite at 150-250° C., this change being most marked in the steel quenched in liquid oxygen. On further heating, carbides precipitate from the austenite at temperatures between 500° and 600° C. and, on subsequent cooling, the secondary martensite transformation sets in at a temperature which is the higher the more complete the precipitation of carbides from the austenite. Repeated tempering leads more readily to transformation of the austenite than one prolonged tempering. Experiments with steel *E*/173 showed, however, that repeated tempering at 550-600° C. markedly reduces the hardness. Providing accurate temperature control is available, it is therefore advisable to temper at a comparatively high temperature (550-560° C.) and to reduce the number of tempering treatments.

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GULYAEV, A. P.

C. A. Vol. 37, 6228-9

GULYAEV, A. P.

"Molybdenum in Low-Alloy High-Speed Steels." Stal [illegible], No. 9, 33-8; [illegible] Referat. Zhur. 4, No. 5, 80(1941). As a result of studies of effect [illegible] quality of steel, the following compn. is proposed: C 1.10-1.20, [illegible] 2.8-3.3 and Cr 3.8-4.6%. Mo up to 2.5% increases the cutting properties of steel; a further increase fails to improve the cutting properties. Mo also increases the secondary hardness and facilitates the preservation of the hardness.

Evaluation B-58884

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GULYAEV, A. P.

C. A. Vol. 36, 2507-[illegible]

GULYAEV, A. P.

"Isothermal Transformation of Austenite in High-Speed Tool Steel." [illegible] 1940, No. 9, 43; Metallurgia 24, 22-5(1941).-- The [illegible] steel [illegible] contained C 0.68, W 14.86, Cr 2.98 and C 0.63, W 17.[illegible], [illegible] 4.[illegible], [illegible] resp. Austenitic transformation by isothermal decompn. within the upper temp. range (550-750°) is completed, at the temp. of min. stability (710°), [illegible] min. and 10 hr., after quenching from 900° and 1280° resp. Increasing the time of isothermal treatment within the lower range of temp. (200-400°) lowers the temp. at which the subsequent martensitic transformation occurs even when continued beyond the limit of addnl. austenitic transformation. The percentage of residual austenite following isothermal treatment at 300° decreases when the prior hardening temp. is 1000°. The secondary martensitic transformation accompanying tempering (after quenching from 1250°) is increased by isothermal treatment at 300°, and occurs at a somewhat higher temp. when this isothermal treatment is carried to completion. It is suggested that hardening followed by partial isothermal transformation in the lower temp. range may give an improved quality of tool steel.

Evaluation B-58884

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GULYAEV, A. P.

C.A. Vol. 35 3573-7

GULYAEV, A. P.

"Transformations during tempering of chromium substitutes for high-speed steel." Stal 10, No. 8, 42-5 (1940).--

After quenching from 1200°, steel contg. C 1.06, Si 1.53, Cr 11.0% and V 2.0% retained 40% austenite, the remainder being martensite and carbides. When reheated to 150-250° the steel contracted owing to the change of tetragonal martensite to the cubic lattice. Upon further heating to 500-600° carbides are pptd. from the austenite. Subsequent cooling of this austenite, which is impoverished in C and alloying elements, will cause secondary transformation to martensite, the temp. of this transformation depending on the time and temp. of the tempering operation. Several short tempering operations are more effective in transforming the residual austenite than one long temper.

Evaluation B-58884

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CA

Cutting properties of high-speed steel of different compositions. A. P. Gulya'ev and S. I. Krestnikiv. *Vestnik Metallopromy.* 20, No. 4/5, 93-6(1940); *Chem. Zentr.* 1941, I, 3572. Low-alloyed, high-speed steels contg. C 0.9-1.2, Si 0.6 with and without W 2.2-3.7, Mo 2.4-4.5, V 1.5-3.3, Cr 3.7-5.3% were compared with high alloyed W and Cr high-speed steels contg. 7.5-13% Cr. The low-alloyed steels have better cutting properties than the Cr-contg. steels. They are suggested as substitutes for the 17-18% W-steel. Only one steel contg. C 0.9-1, Mo 3.5-4, V 2-2.5 and Cr 4.5-5.3% gave less-satisfactory performance. Especially good performance was obtained with two steels contg. (a) C 1.1-1.22, Mo 2.4-2.9, V 2.8-3.3, Cr 3.8-4.6, and (b) C 1-1.12, Mo 2.2-2.9, V 2.3-2.8, Cr 3.8-4.0%. Hardness, cutting rate and stability of the steels are tabulated. Frederick C. Nachod

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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GULYAEV, A. P.

C. A., Vol. 37, 3386-8

GULYAEV, A. P.

"Vanadium in Low-Alloy High-Speed Steels." Stal 1[illegible], No. 4, 58-60(1941); Chem. Zentr. 1942, I, 798. The effect of quenching [illegible] temps. on the micro-structure, hardness and cutting properties of steels contg. C 0.[illegible]4-1.45, Cr 3.8-4.8, Mo 0.9-3.5, V 1.7-6.7 and W 1.5-3.3% as compared to a V-free steel contg. C 0.76, Cr 4.1, Mo 3.1 and W 3.2% was investigated. The fact that V decreases the stability of austenite in the region of decompn. to pearlite and raises the temp. of min. austenite stability greatly increases the crit. cooling rate. V speeds up the isothermal decompn. of austenite in the 2nd zone (at 300[illegible]). V raises the martensite point and decreases the amt. of residual austenite. V permits the transformation of residual austenite into martensite and forms carbides which are difficult to dissolve in austenite. V diminishes the drop in hardness during drawing. The addn. of 2-3% V increases the thermal stability of the steel and improves the cutting properties and is recommended for low-W high-speed steels.

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GUL'YAEV, A. P.

Instrumental'nye stali i ikh termicheskaia obrabotka. (Moskva) Mashgiz, 1943.
74 p. diagrs.

(Tool-steels and heat treatment.)

DLC: TS320.G8

SO: Manufacturing and Mechanical Engineering in the Soviet Union, Library of Congress, 1953.

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CA

Improving structural carbon steel. A. P. Gulyaev and F. M. Hal'perin. *Stal* [N. S.], 3, No. 5-6, 49-51(1943).—To improve C steel without introducing alloying components, steel was deoxidized by means of borax contg. 5% of Mg turnings as activator and by means of an alloy produced by melting Al, Fe-V and Fe-Ti taken in equal wts. the compn. of this alloy was Fe 61.0, Al 11.34, Si 2.0, Ni 2.0, Ti 6.0 and V 16.5%. The deoxidizer was added in the amt. of 500 g. per ton of steel 1-2 min. before tapping. Before addn. of the special deoxidizer, Fe-Si in the amt. of 2 kg. per ton was used. Steel deoxidized with the special deoxidants was superior to the steel deoxidized with Al. The improved qualities were more pronounced in specimens of large cross-sectional dimensions.

M. Hosch

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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[illegible], [illegible]. P., Professor.

Doctor of Technical Sciences.

"Theory of High-Speed Steel and Modern Low-Alloy and High-Speed Steels", Stanki I Instrument, 14, no. 4-5, 1943.

Sr-52059019.

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

PROCESSES AND PROPERTIES INDEX

B

Heat Treatment of Steel. (In Russian.) A. P. Gulyaev, Iu. M. Lakhtin, and A. I. Tarusin. 282 pages. 1946. State Scientific-Technical Publishing House for Machine Construction Literature, Moscow, U.S.S.R.

Theory and practice are analyzed without giving data concerning conditions of practical applications. Principal purpose is to interpret and evaluate data and theories concerning the mechanisms involved in heat treating.

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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

CH

Subzero treatment of steel. A. P. Gulyaev. *Vestnik Inzhenerov i Tekhnikov* **1946**, No. 1/3, 110-7. The temp., Ms, of the beginning of austenite-martensite transformation depends on the compn. of the austenite. At the temp., Mf, at which the transformation ceases a certain quantity of austenite remains and further cooling will not cause its transformation. As the C content of a steel increases both Ms and Mf are lowered and the quantity of residual austenite increases. Generally, Mf of steels contg. less than 0.6% C lies above room temp.; consequently subzero treatment of such steels is useless. The Mf point of steels with more than 0.6% C is usually below 0°; subzero treatment of such steels will induce further austenite-martensite transformation. The effect of alloying elements on the transformation is greater the higher the C content. Alloying elements appear to depress Mf more than they do Ms. In high-alloy carbide-type steels, during heating for hardening, the carbides dissolve in the austenite, and thus change its compn. Therefore, Ms and Mf of such steels depend on the hardening temp.

M. Hasch

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GULYAEV, A. P.

C. A. Vol. 41, Jan. 10 - June 10, 1947

GULYAEV, A. P.

"Phase Composition of High-Speed Steels". A. P. Gulyaev (Moscow Aviation Inst.). Stal 6, 188-91 (1946).

Four W-Cr-V steels commonly used for high-speed cutting were studied to det the structure and compn. of their carbides and the changes the latter undergo upon heating.

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CH

9

Phase analysis of steel (Analysis of the products of electrolytic decomposition of steel.) A. P. Gulyaev (Sergo Ordzhonikidze Aviation Inst., Moscow). *Zavod. skaya Lab.* 12, 9-14(1946).—The sample (anode) in a collodion bag is immersed in the electrolyte so that the upper part of the sample (connected to a d.c. battery circuit by means of Cu wire threaded through the sample) is above the level of the electrolyte and a Cu plate (cathode) is placed in the electrolyte. The circuit includes an ammeter, a voltmeter, and a rheostat. Electrolysis (1 v., 0.05 amp./sq. cm.) is continued until sufficient deposit is formed, but should not exceed 10-12 hrs. (longer electrolysis results in the deposition of the metal on the Cu cathode). Carbides of the metal in the form of a dark deposit are formed in the collodion bag. The wt. of the residue indicates the quantity of carbides in the steel. An x-ray analysis is made in conjunction with the chem. analysis. Analyses of the carbide residue of RF1 steel (C 0.73, W 17.0, Cr 3.8, and V 1.4%) yielded: C 2.5, W 62.6, Cr 6.1, V 4.5, and Fe 24.3% (by difference) or 17.5, 28.7, 10.1, 7.3, and 36.4 at. %, resp. X-ray analyses revealed the presence of the carbide lattice Fe_3W_3C (C 14.2, W 42.9, and Fe 42.9 at. %). The higher content of C in the residue is explained by the presence of cementite in the steel which was decompd. by the acid. The presence of Cr and V carbide lines in x-ray analyses indicates that Cr and V dissolve in the carbide Fe_3W_3C. Detn. of the compn. of the electrolyte is more reliable and can be used to det. the phase compn. of steel, depending on various factors. Analyses of various steels indicate that increasing the temp. of tempering decreased the content of excess carbides in the steel, owing to their soln. in austenite. Tempering at above 1100° decreased the content of excess carbides to less than 5%. Seven references.

W. R. Henn

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GULYAYEV, A. P.

13621 Phase Analysis of Steel. II. An Answer to the Discussion on the Author's Paper. A. P. Gulyaev. *Henry Brutcher Translation* No. 3540, 9 p. (Abridged from *Zavodskaya Laboratoriya*, v. 12, nos. 7-8, 1946, p. 646-650.) Henry Brutcher, Altadena, Calif. CH

Determination of carbides. Importance of selecting the right composition of the electrolyte used for anodic solution of the alloy, to match the composition of steel and carbide. Graph. 8 ref.

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CA

Composition and structure of solid solutions of complex alloyed steels. A. P. Gulyaev. *Izvest. Sektora Fiz.-Khim. Anal., Inst. Obshchei i Neorg. Khim. Akad. Nauk S.S.S.R.* 16, No. 2, 61-9(1940).—The study concerned the effect of C, V, W, Mo, and Cr on the phase compn. of steel. Analyses were carried out on annealed and hardened specimens which permitted the detn. of the compn. of ferrite, austenite, and carbides. In addn., the mixed carbides were subjected to x-ray analysis to det. their type and the lattice dimensions. The carbides taken separately did not present stochiometric compds. but rather solid solns. of other alloying elements and of Fe in the given carbide. At hardening temp. all of Cr, regardless of the quantity present, dissolved in austenite. The relation between the carbidic Cr and ferritic Cr was practically independent of the quantity of Cr in the steel. Approx. half of the Cr present dissolved in the ferrite and the other half either dissolved in carbides of other elements or formed Cr_4C. The latter was the least stable of the carbides. $Fe_3(W,Mo)_3C$ was more stable and the most stable was VC. Thus, in the absence of excess C, first formed VC, then $Fe_3(W,Mo)_3C$, and finally, if there was enough C, formed Cr_4C. The dissoln. of carbides in austenite was in the reverse order. In the $\gamma \rightarrow \alpha$ transformation apparently first sepd. out Cr_4C, next $Fe_3(W,Mo)_3C$, and last VC. Studying the effect of annealing temp. on the phase compn. 3 types of carbides were observed. The smallest of the carbides were the eutectoid carbides. They were part of the basic sorbite structure and sepd. out of the austenite in the course of eutectic transformation. These carbides were apparently a mixt. of Cr_4C and $Fe_3(W,Mo)_3C$ and dissolved a considerable quantity of Fe. The next type, secondary carbides, were somewhat larger, and sepd. out of austenite on cooling in the interval from the liquidus line to Ar_1. These carbides were a mixt. of $Fe_3(W,Mo)_3C$ and VC. The 3rd type, primary carbides, were the largest and sepd. out from the liquid soln. on solidification. This carbide was VC and it crystd. with a considerable quantity of W. As the annealing temp. rose (1) the carbides dissolved thereby decreasing the excess carbides, (2) in the remaining carbide phase the content of Cr and Fe decreased and of V, W, and C increased, and (3) the austenite became satd. first with Cr and as the annealing temp. rose with Mo and V. The satn. of austenite with W and C rose continuously with the rise in the annealing temp.

M. Hosch

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GULYAEV, A. P.

GULYAEV, A. P.

C. A. Vol. 40, July 20, 1946 - No. 20, 1946

"Theory of High-Speed Steel," A. P. Gulyaev. Steels & Instruments 17, No. 2/3, 14-19 (1946).

The most important property which d[illegible] the quality [illegible] steels is red hardness. A reliable indix of the red h[illegible] is its hardness after a 5-hour exposure at 600-650°. A series of tests was made to detn. this index of steels contg. known quantities (tabulated) of C, W, Mo, V, and Cr. The drop of hardness on heating is occasioned by irreversible changes taking place in martensite. The latter is solid soln. of C and alloying elements in -Fe. The dissolved C distorts the lattice thereby inhibiting plastic deformation, which is tantamount to raising the hardness. The mere sepn. of C out of its soln. does not reduce the hardness for the dispersed separate blocks the surfaces of gliding and plastic deformation is prevented. Only when the sepd. phase starts to coagulate does the hardness commence to decline. The sepn. of a phase from a satd. soln. takes place in 3 stages. First the atoms start migrating toward definite points in the lattice; then minute crystals are formed at the

Moscow Aviation Inst.

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points where these atoms collect; finally the minute crystals dissolve form-
ing large ones. This entire process which is essentially one of diffusion,
takes place successively and within [illegible] temp. ranges. As the temp.
increases the sequence of these stages is [illegible]. Therefore, to increase
red hardness, retard the diffusion process and cause it to occur at higher
temps. In C steel the C can form carbides. For coagulation of Fe
carbide C diffusion suffices. This takes place readily as evidenced by the
considerable drop of hardness when a steel is heated at 200°. It is there-
fore necessary to introduce into steel elements which have a greater affinity
for C than does Fe. For these elements to ppt. as carbides they have to
diffuse as well as the C and the entire process is shifted to higher temps.
The carbide-forming elements are the IVA, VA, VIA, and VIIA members of the
Periodic table, i.e., Mn, Cr, Mo, W, U, V, Cl, Ta, Ti, Zr, and Hf. No data
are available concerning the behavior of Th, Pa, Ma, and Re in steel. The
carbide forming tendency of these elements is due to the structure of their
inner electron shell. The farther to the left these elements are removed
from Fe the more stable are their carbides. The stability of carbides and
hence red hardness increases in the order $Mn_3C \rightarrow Cr_7C_3 + Cr_4C \rightarrow Fe_3Mo_3C \rightarrow$
$Fe_3W_3C \rightarrow VC \rightarrow TiC$. In addn. to being stable and resisting coagulation the
carbides must also be sol. in austenite if the elements are to be used for

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GULYAYEV, A.P., professor, dokter tekhnicheskikh nauk.

"Principles of heat treatment of steel." Stal' 7 no.1:90 '47. (MLRA 9:1)
(Steel--Heat treatment) (Steinberg, Sergei Samoilovich)

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Effect of alloying elements on the properties of ferrite. A. P. Gulyaev and V. P. Emelina (Moscow Aviation Inst.). Stal' 7, 139-43(1947).—This study concerned the effects of 1-5% of Cr, Ni, W, Mo, Si, and Mn on ferrite. The properties of the alloys were compared with Armco Fe contg. C 0.02, P 0.028, Si not more than 0.2, and Mn 0.1%. All of the alloys, with the exception of those contg. over 1.7% of Mn, had the structure of uniform solid solns., which did not differ from the structure of Armco iron. Mn lowered the crit. points and caused a martensitic structure. The alloying elements increased the tensile strength, yield point, and hardness, except 2-2.5% of Cr, which lowered these properties. In increasing order of their effect, the elements were: Cr, W, Mo, Mn, Ni, and Si. Mn above 2% was most effective in raising the strength of the alloy but it led to the formation of martensite. Ni, Cr, W, and Mo had practically no effect on necking and relative elongation. Mn and Si above 2.5% lowered these properties, but up to 2.5% Mn improved it somewhat. Ni up to 5.3, Cr up to 3.2, and Mn up to 1.5% raised the impact resistance, while W and Mo lowered it. Up to 0.74% Si did lower the impact resistance; above this quantity Si and Mn lowered it considerably. Up to 0.5-1.0 atom % all the elements raised the coeff. of linear expansion; above this content the coeff. dropped. The magnetic induction was lowered by all the alloying elements; Mn, Si, and Cr lowered it most. Except for Si, all the elements raised the coercivity. The elements raised the elec. resistance in the following increasing order: Ni, Cr, Mo, Mn, W, and Si. Practically all the alloying elements raised the strength of ferrite. This effect is attributed mostly to the cryst. structure of the given element. Elements having a lattice isomorphic with ferrite, e.g., Cr, Mo, and W, have a lesser effect than elements having a different lattice than ferrite, e.g., Ni, Si, and Mn. The generally accepted view that elements forming solid solns. with ferrite raise its strength is questioned. The specific effect of Mn is attributed to the formation of martensite.

M. Hosch

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Effect of alloying elements on the properties of high alloy austenitic steel. A. P. Gulyaev. *Stal* 7, 928-38 (1947).—The effect of alloying elements was studied on a number of specimens in which C, Cr, W, Mo, Ti, Ni, Co, and N contents were varied. The basic steel used in these expts. was a Cr (14%)-Ni (14%) steel. Heating the steel from 1000° to 1200° caused the grain to grow. The extent of the growth depended on the alloying element. Thus, carbide forming elements (W, Mo, Ti), addnl. Cr, and addnl. C to favor carbide formation retarded the grain growth of austenite. Elements forming no carbides, Ni, N, Co, had no effect on the size of austenite grain. The formation of carbides was studied analytically and roentgenographically. At a C content of 0.15% no carbide phase was observed. Cr_7C_3 was observed at a C content of 0.70%. Co and Ni enhanced the formation of this carbide even at lower concns. of C. W dissolved in Cr carbide and formed its own carbide when its concn. reached 7%. Small addns. of Ti formed TiC and at 0.7% Ti even $Cr_{23}C_6$ disappeared. At the same C content an increase in the concn of Cr, W, Ni, and Co found more of the alloying elements in the austenite. An increase of C beyond 0.5-0.6% reduced the Cr in the austenite. As the C content increased beyond 0.15%, a rise in the hardening temp. caused the carbide phase to dissolve gradually in the austenite but at 0.4% C and higher, the carbides did not dissolve entirely. An increase in the hardening temps. in all cases caused a reduced hardness; this is attributed to an increase in the grain size of austenite. Of the elements tested C was most effective in improving the hardness (at the same grain size). Of the other elements Cr, W, Mo, and Ti increased somewhat the hardness, while Ni and Co lowered it somewhat. On the resistance to scaling, C, Ni, and Ti had no effect. Cr improved the resistance as did W at low temps.; at elevated temps. W lowered the scale resistance. Steels with 14.7 and 19.8% of Co resisted scaling at 1200°. Creep in these alloys was studied at 650° at 6-12 kg. per sq. mm. stress for 1000-1500 hrs.; 0.15-0.70% of C had no marked effect on the creep resistance. The alloying elements did not show any considerable effect on the creep; the structure of the metal was of greater importance in affecting creep under the conditions of these expts.

M. Hosch

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GULYAEV, A. P.

GULYAEV, A. P.

C. A. Vol. 42, Sept. 10 - Nov. 20, 1948
8746e

"Nomogram For Determining Hardness of Steel From Heat-Treating Data". A. P. Gulyaev (Sergo Ordzhonikidze Aviation Inst. of Moscow). Zavodskaya Lab. 13, 888-9 (1947).

Construction of the nomogram was based on the following premises: (1) With rising temp. of tempering the hardness drops; for steels of varying C contents (0.11-1.18%) the intensity with which the hardness drops is the same with rising temp. of tempering within the range 300-650°. (2) Hardness plotted against duration of tempering on semilog paper for the interval 1 min. to 10-25 hrs. is a straight line. On the basis of data for 0.35% C steel the nomogram was constructed showing hardness as a function of C content and of tempering temps. 350, 450, 550, and 650°. Use of the nomogram is explained.

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CM

Influence of alloying elements on the cementability of iron. A. P. Gulyaev. *Vestnik Mashinostroeniya* 27 No. 7, 44-7(1947); *Chem. Zentr.* 1948, I, 517; cf. C.A. 43, 4201d.—Cementation tests were carried out on an unalloyed steel contg. C 0.02, S 0.047, P 0.028, Si 0.2, and Mn 0.1% and on the same steel alloyed with 1-5% of Cr, Mn, Mo, Ni, Si, or W. Cementation was carried out at 925° in an atm. of benzene vapor for a period of 11 hrs. The cementability of the steel decreased sharply with increasing Si content, becoming practically zero at 2.5% Si. Ni likewise had an inhibiting effect on cementation but it was less pronounced. W showed an inhibiting effect only up to a concn. of 2%; at higher concns. the inhibiting effect disappeared. Mo, Cr, and Mn promoted cementation, their effectiveness increasing in the order Mo, Cr, Mn. The max. effect was reached at about 1% for these elements. The cause of the varying effects of the elements studied is discussed in the light of their tendency to carbide formation and their diffusibility in Fe.

M. G. Moore

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

GULYAEV, A. P.

Metallovedenie (uchebnik) Moskva, Oborongiz, 1948. 566 p. illus.

Includes bibliographies.

(Metallography (textbook)

DLC: TN690.G89

SO: Manufacturing and Mechanical Engineering in the Soviet Union, Library of Congress, 1953.

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CA

Thermal treatment of alloyed ferrite. A. P. Gulyaev and V. P. Emelina. *Stal* 8, 1101-8(1948).—The effect of thermal treatment was studied on ferrite alloys with Si, W, Mo, Ni, Mn, and Cr (*C.A.* 41, 5837*f*). The alloys contained C 0.02-0.03% and 1-6% of the alloying element. The thermal treatment consisted of various rates of cooling from the α-phase (650°) and from the γ-phase (975°). There was little difference in the increase of hardness between alloyed and unalloyed ferrite when the cooling was from the α-phase. The largest increase was observed for alloys with Si 4.9, Cr 4.2, and Mn 1% in which case the increase was 50 Brinell units. In the cooling from the γ-phase Si, Mo, and W did not raise the hardness. Ni raised the hardness; the increase was greater the faster the cooling. The rate of cooling also affected the action of Mn. Slow cooling caused softening of the Cr alloys but the hardness of these alloys rose sharply when water-cooled. The elements having no significant effect on ferrite, Mo, W, and Si raised the A_1 point while the elements affecting the hardness of ferrite, Mn, Ni, and Cr, lowered the A_1 point. The increase in hardness is connected with formation of ferritic martensite (acicular ferrite). The ferritic martensite structure and the induced hardness is retained after tempering at 500°. Only temper at 650° restored the lower hardness obtained by slow cooling. M. Hosch

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R000617320007-5

PROCESSES AND PROPERTIES INDEX

10

S

Cold-Treatment of High-Speed Steel Tools. A. P. Gulyaev, P. P. Grudov and A. A. Badaeva. (*Stanki i Instrument*, 1949, No. 3, 3–6; No. 4, 16–18). [In Russian]. Reasons for the different conclusions on the desirability of using low temperatures to improve the properties of tools are considered. An outline is given of the transformations in steels during quenching in liquid oxygen, and it is concluded that −80° C. is the lowest temperature required in dealing with high-alloy steels and that the cooling must be carried out with the minimum of delay. Experiments on specimens of two high-speed tool steels are described in which the effects of cold-treatment on phase composition, hardness, and liability to crack formation were determined after various heat-treatments. Operating tests on cold-treated cutting tools are described. The general conclusion is that cold-treatment is most advantageous when close control over quenching conditions is not possible. – S. K.

Evaluation B-77406

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USSR/Metals Jul 49
Hardness

"Research on Long-Duration Hardness," Prof A. P. Gulyayev, Dr Tech Sci, Ye. F. Trusova, Cand Tech Sci, 2½ pp

"Zavod Lab" No 7

Explains difference between long-duration tests and regular method. Used Brinell system in both cases with high temperature for the steel or hard-alloy ball. Conducted long-duration tests (up to 60 min) while studying the influence of alloy components upon the properties of solid solutions of aluminum-zinc and aluminum-

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USSR/Metals (Contd) Jul 49

magnesium (varying from 0.5% to 5% alloying element). Concludes this test is not satisfactory for determining heat durability of alloys.

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A

Q

9-194. Determination of Hardness of High-Speed Tool Steels at High Temperature. (In Russian.) A. P. Gulyaev and R. I. Mitel'berg. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 15, Apr. 1949, p. 447-453.

Peculiarity of method described is compression of cylindrical test specimens at high temperature. Six different commonly used types of high speed steels have been investigated by this method. Results correspond closely to those obtained by other methods.

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PROCESSES AND PROPERTIES INDEX

27

S

Cutting Temperature and Methods for Its Determination.

A. P. Ordynsev. (Zavodskaya Laboratoriya, 1949, vol. 15, June, pp. 717–723). [In Russian]. Methods available for the determination of the temperature distribution in a cutting tool during its use are considered. An approximate method is described which is applicable to tool steels (carbon, alloy, and high-speed) and, to a lesser extent, to hard alloys. The method consisted of the following stages: (a) Thorough study of the red-hardness of the tool material; (b) the exposure of the tool to the action of heat by using it for cutting; and (c) the study of the residual effects of the heat generated on the hardness of the various parts of the tool. Some consequences of interest to the theory of cutting, which emerged from experiments carried out using the above method, are mentioned. —S. S.

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