TARMISTO, V., kand. geogr. nauk; Prinimali uchastiye: RENTER, R.;
VINT, E.; ELENURM. Kh.[Ellenurm, H.]; REBANE, I.; ANSBERG, T.;
DAVYDOVA, T., red,; LIIVAND, T., tekhn. red.

[The Estonian S.S.R.]Estonskaia SSR.  Tallinn, Estonskoe gos.
izd-vo, 1962.  635 p.                        (MIRA 15:11)
                         (Estonia)

S/096/63/000/005/010/011
E194/E455

AUTHORS:      Elepko, V.F., Candidate of Technical Sciences,
              Semenova, T.F., Engineer

TITLE:        An investigation of the fundamental properties of the
              metal in experimental tubes made of steel ЭИ-756
              (EI-756)

PERIODICAL: Teploenergetika, no.5, 1963, 83-85

TEXT:    Turbine blades and rotors have been made of 12% chrome
alloy steel.    To find whether it can be used for steam pipes
operating at a pressure of 255kg/cm$^2$ and a temperature of 585°C,
tests were made on experimental steam pipes of 36 mm inner diameter
273 mm outer diameter made of steel grade EI-756 of the following
analysis:   0.13% C, 0.70% Mn, 0.32% Si, 0.014% P, 0.015% S,
11.0% Cr, 0.8% Ni, 2.10% W, 0.80% Mo and 0.20% V.    In addition
to heat-resistance, determinations were made of sensitivity to rate
of cooling, threshold of cold brittleness, stability of structure
and properties during ageing and tendency of the steel to thermal
embrittlement.    This last mentioned was determined both by impact
testing and by long-term strength testing of smooth and notched
Card 1/2

An investigation of the fundamental ...    S/096/63/000/005/010/011
E194/E455

specimens.   The tabulated test results indicate that in its initial condition the steel has excellent properties but is very sensitive to the rate of cooling during heat treatment and displays structural instability during ageing.   Hence its impact strength falls to 3.2 kg m/cm$^2$ after 3000 hours ageing at 585°C.   Steel EI-756 displays a certain tendency to thermal embrittlement which is accompanied by a change in the physical-mechanical properties and fine structure.   The cause of embrittlement in ageing is intensive evolution of fine particles of a secondary phase in the free ferrite and the formation of a brittle envelope around the grain boundaries.   Long-term static tensile testing showed that the ageing did not give rise to marked thermal embrittlement. It was confirmed that steel EI-756 can be used for steam pipes in turbines operating at a pressure of 255 atm and temperature of 585°C.   There are 3 figures and 4 tables.

ASSOCIATION: Vsesoyuznyy teplotekhnicheskiy institut
             (All-Union Heat Engineering Institute)

Card 2/2

L 20597-66    EWT(d)/EWT(m)/EWP(w)/EWP(o)/EWA(d)/EWP(v)/T/EWP(t)/EWP(k)/EWP(l)/ETC(m)-6

ACC NR:    AP6009808  JD    ( N )        SOURCE CODE:   UR/0096/66/000/004/0010/0013

AUTHOR:  Elepko, V. F.; Shustova, T. A. (Engineer)

ORG:  All-Union Heat Engineering Institute (Vsesoyuznyy teplotekhnickeskiy institut)

TITLE:  Reliability of austenitic steels in power units operating with 650C and
315 atm steam

SOURCE:  Teploenergetika, no. 4, 1966, 10-13

TOPIC TAGS:  austenitic steel, heat resistant steel, tube steel, steel property

ABSTRACT:  Heat-resistant austenitic steels EP17 and EP184 (both used in pipelines of
the Kashira power station operating with steam 650C and 315 atm) were tested for the
effect of prolonged aging (up to 15,000 hr) at 550, 650, and 700C.  Both steels,
expecially EP17, were found to undergo significant structural changes which affected
their mechanical properties.  At exposures up to 5000 hr, the structural changes are
limited to the precipitation of $Cr_{23}C_6$ carbide and $Fe_2W$ intermetallic compound, with
the precipitation of the latter becoming especially intensive after 3000, 5000, and
10,000 hr at 700, 650, and 550C, respectively.  The precipitation of both phases
continued for the entire test period (15,000 hr).  After 10,000 hr, small amounts of
Sigma-phase were observed and the notch toughness of both steels dropped from the
original 23—27 $mkg/cm^2$ to 8—10 $mkg/cm^2$, regardless of the aging temperature.  Pro-
longed aging also lowered the rupture strength, especially that of EP17 steel.  In

Card  1/2                        UDC:  669.15-194:621.772.4.001.45

L 20597-66

ACC NR: AP6009808

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the first 3000—5000 hr, both steels develop a susceptibility to intergranular frac-
ture which then disappears completely (EP184) or decreases (EP17) with prolonged
aging. It is concluded that in service under the above conditions both steels, and
especially EP17, are less reliable than earlier tested EI695 steel. Orig. art. has:
4 figures and 4 tables.                                                          [DV]

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 002/ ATD PRESS: 4224

Card 2/2 BK

USSR / Soil Science.  Genesis and Geography of Soils.          J-2

Abs Jour   : Ref. Zhur - Biologiya, No 17, 1958, No 77386

Author     : Elordashvili, S. I.
Inst       : Georgian Scientific Research Institute of Hydrotechnics
             and Irrigation
Title      : On Soil Damage and Sources of Salt Accumulation in Soils
             of the Verkhno-Samgor Irrigation Region (Between the
             Kura and Iora Rivers in the Georgian SSR)

Orig Pub   : Tr.Gruz. n.-i. in-ta. gidrotekhn. i melior., 1957,
             vyp. 18-19, 445-452

Abstract   : No abstract given.


Card 1/1

ELERDASHVILI, S. I.,  Cand of Geologo-Mineral-Sci --- (diss)  "Hydro-

geological and Engineering Geological Conditions of the Sionskiy

Water Reservoir,"

Tbilisi, 1959, 26 pp  (Stote  Committee on Higher and Secondary ℗

Specialist Education of the Council of Ministers, Georgian SSR.  Poly-

technic Institute imeni V. I. Lenin),  (KL, 6-60, 121)

ELERDASHVILI, S. I.

Cand Geol-Min Sci, Diss -- "Hydrogeological and engineering-geological conditions of the Sioni water reservoir". Tbilisi, 1961. 26 pp.with graphics, 23 om (State Committee of Higher and Inter Spec Educ, Council of Min Georgian SSR. Order of Labor Red Banner Georgian Poly Inst imeni V. I. Lenin), 150 copies, No charge (KL, No 9, 1961, p 178, No 24296). /61-54130/

ELERDASHVILI, S.I.

Building the discharge structures of Sioni Reservoir in semihard
and soft rocks.  Trudy GruzNIIGiM  no.20:283-292  '58.  (MIRA 15:5)
(Sioni Reservoir—Hydraulic structures)

LINDENAU, N.I., insh.; BLERT, G.K., insh.

Technological innovations in the shield system of coal mining in beds subjected to clay inrush. Bezop.truda v prom. 4 no.7:5-7 Jl '60.    (MIRA 13:8)

1. Kombinat Kuzbassugol'.
            (Coal mines and mining)

ELERT, G.K., gornyy inzh.; YAKOVLEV, Yu.P., gornyy inzh.; KHVOSHCHEVSKIY, N.M., gornyy inzh.; KOVALEV, V.M., gornyy inzh.

New blasting method for caving the roof in longwalls and layers.
Ugol' 39 no.10:13-17  O '64.                     (MIRA 17:12)

1. VzryvPEU kombinata Kuzbassugol'.

RABA, Karel, okl.mernok (Praha, Czechoslovakia); ELES, Istvan [translator]

Data on the Czechoslovak high-sea navigation. Kozl tud sz
12 no.4:149-154 Ap '62.

1. Hajoskapitany, es a Csehszlovak Tudomanyos Akademia
hajozastudomanyi fomunkatarsa (for Raba).

ELES, L.

TECHNOLOGY

Periodical: KOHASZATI LAPOK Vol. 17, no. 1, 1959

ELES, L.  Remark on the article on training metallurgic enginners
          in Hungary and abroad. p. 41.

Monthly List of East European Accessions ( EAI) LC, Vol. 8, No. 5,
                                                May 1959, Unclass.

ELES, Laszlo, okleveles kohomernok

Questions relating to the technology and quality of the Hungarian foundry crude-iron manufacture. Koh lap 93 no.11: Suppl: Ontode 11 no.11:248-255 N '60.

1. Dunai Vasmu.

EMBER, Kalman, dr.; PALOVICS, Pal; DOBOS, Gyorgy, dr.; ELES, Laszlo;
GAGYI Palffy, Andras, dr.; RADO, Aladar; SAFAR, Laszlo; SERFOZO,
Ivan

Report on the Executive Committee session of the National
Hungarian Mining and Metallurgical Society, Inota, December 7,
1963.  Bany lap 97  no. 2:133-140  F '64.

1.  Orszagos Magyar Banyaszati es Kohaszati Egyesulet alelnoke
    (for Ember).
2.  "Banyaszati Lapok" szerkeszto bizottsagi tag a (for Gagyi
    Palffy and Rado).

L 34964-66   EWP(t)/ETI    IJP(c)    JD/JG

ACC NR: AP6026661                           SOURCE CODE:   HU/0014/65/098/008/0342/0349

AUTHOR:  Eles, Laszlo

ORG:  Research Institute for the Iron Industry (Vasipari Kutato Intezet)

TITLE:  Effects of various alloying elements on weldable structural steels with increased flow limit

SOURCE:  Kohaszati lapok, v. 98, no. 8, 1965, 342-349

TOPIC TAGS:  structural steel, steel microstructure, weldability, metal property

ABSTRACT:  Laboratory and plant experiments were conducted to determine the effect of Al, Ti, Nb, Ni, Zr, Mo, and V alloying elements on the properties of structural steels having flow limits of > 34.0 kp./sq. mm. Emphasis was placed on microstructure, mechanical properties, weldability, and economic factors. Generally, all alloying elements investigated improved the performance of the steels, and plans were made to extend the use of the alloyed steels where the improvements are likely to outweigh the disadvantage of increased expenditure. Orig. art. has:  6 figures and 5 tables. [JPRS:  32,491]

SUB CODE:  11  /  SUBM DATE:  none  /  ORIG REF:  002  / SOV REF:  001
OTH REF:  006

Card 1/1          JS                            UDC:   669.018.29....6.001.4

ELES, S.

Let us utilize our machines in a more ecomomical way! Remarks on
the article "Continuous Repair of Machines" published in the May
issue of Allami Gazdasag. p. 10, ALLAMI GAZDASAG (Allami Gazdasagok
Miniszteriuma es a Mezogazdasagi es Erdeszeti Dolgozok Szakservezete)
Budapest, Vol. 8, No. 6, June 1956

SOURCE:  East European Accessions List (EEAL) Library of Congress,
         Vol. 5, No. 11, November 1956

ELES, C.

Engine failures of electric equipment in tractors.  p. 8.
ALLAMI GAZDASAG.  (Allami Gazdasagok Miniszteriuma es a
Mezogazdasagi es Erdeszeti Dolgozok Szakszervezete)
Budapest.  Vol. 8, no. 8 Aug. 1956.

SOURCE:  East European Accessions List (EEAL) Library of Congress,
Vol. 5, No. 12, December 1956.

ELES, S.

"Correct maintenance and storage of machines."

p. 8 (Allami Gazdasag) Vol. 9, no. 12, Dec. 1957
Budapest, Hungary

SO:  Monthly Index of East European Accessions (EEAI) LC. Vol. 7, no. 4,
     April 1958

CANI, P., prof.; ELEZI, B.

Cardiac massage. Bul. univ. shtet. Tirane[Mjek] 2:28-34 '62.

1. Katedra e Kirurgjise hospitaliere "Dr. F. Shiroka".
(HEART MASSAGE)

ELEZI, Besim

Perforated gastric and duodenal ulcers. Bul. univ. shtet.
Tirane[Mjek] 3:15-27 '62.

(PEPTIC ULCER PERFORATION)

GANI, Petro, prof.; ELEZI, Besim

Some clinical and roentgenological characteristics of
pulmonary echinococcosis. Bul. univ. shtet. Tirane[Mjek]
4:12-18 '62.

(ECHINOCOCCOSIS, PULMONARY)

ELEZI, B., dr.

  Recent data on oral and cardiac resuscitation. Shendet pop 6
  '62.
    (RESPIRATION, ARTIFICIAL)  (HEART MASSAGE)

CANI, P., prof.; ELEZI, B.

"Dumping syndrome".  Bul. univ. shtet. Tirane [Mjek] 2:53-59 '63.

1.  Katedra e Kururgjise hospitaliere "F. Shiroka" (shef i katedres prof. P. Cani).

HOXHA, F., prof.; CANI, P., prof.; BITRI, P.; BURNAZI, P.; ELEZI, B.

A case of successfully operated pheochromocytoma.   Bul.Univ.
Shtet.Tirane   no.3/4:66-73  '63.

1. Katedra e kirurgjise, petalogjise hospitaliere dhe e
patologjise se pergjitheshme, Universitetit Shteteror te
Tiranes.

YUGOSLAVIA

MILJKOVIĆ, V., Dr., Professor, OLUJIĆ, M., Dr., Assistant; Faculty of
Veterinary Medicine, Belgrade; ELEZOVIĆ, I., Veterinarian, Pozarevac

"Observations on the Occurrence, Etiology, Diagnosis, and Treatment of Egg
Retention (Logenot) in Laying Hens"

Abstract: The legenot egg laying disturbance represents a great economic
and scientific problem. Legenot was encountered in 15 to 30% of investigated
birds and most frequent causes for egg retention seem to be due to
salphingitis, oviduct atonia, and irregular position and structure of eggs
(too soft, big, etc.). Such disturbances cause death in 4 to 20% of the
hens. Legenot may be prevented by proper nutrition, maintainance, and
selection of hens and by therapeutic measures (manual extraction of eggs,
artificial prolapse of the cloaca, and the like) if necessary. There are
1 Yugoslav and 5 Western references. (Manuscript received, 19 Aug 66.)

1/1

ELE/OVIC, M.

Training in the technique of the control of firing. p. 16.
(GLASNIK, Vol. 11, No. 3, Mar. 1957)

SO: Monthly List of East European Accessions (EEAL) LC Vol. 6, No. 12, Dec. 1957.
Uncl.

ELFMARK, J.

Distr: 4E2c

3

1

Superheated and burnt steel. Jiří Elfmark and Lubomír Toman, *Hutnické listy* 15, 200-7(1960).—Investigations carried out with construction steels heated nearly to the temp. of their m.p. showed that superheating is caused by the concn. of S on the boundaries of austenitic grains, and its sepn. in the form of sulfides after cooling. 20 references. Petr Schneider

Z/032/61/011/003/003/005
E073/E335

AUTHOR:    Elfmark, J., Engineer

TITLE:     Extrusion of Tubes of High-alloy Steels

PERIODICAL:    Strojírenství, 1961, Vol. 11, No. 3, pp. 235-236

TEXT:    Summary of a paper presented at a conference of the
Czechoslovak Scientific and Technical Society, Prague, held
from September 13 - 15, 1960.
The results were described of hot extrusion experiments in the
manufacture of rods, sections and tubes made of high-alloy
steels.  Experiments with the austenitic stainless steel AKVS
after heating in a chamber furnace fueled by coke gas (with
sleeving for protection against scale-formation) have shown
that deep transverse cracks formed in the rods.  On the other
hand, for equal heating and lubricating conditions, the high-
alloy chromium steel AKX was faultless.  Positive results with
the steel AKVS were achieved only by scale-free heating in a
salt bath in the case of uniform distribution of a glass
laminate.  Mastering of this technology for the steels AKX,
AKVS and CrMnTi enabled successful extrusion of cladded tubes

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Extrusion of Tubes ....          Z/032/61/011/003/003/005
                                 E073/E335

which gave positive results. (This is a complete translation.)

ASSOCIATION:   VŽKG, Ostrava

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36177
Z/034/62/000/005/001/007
E073/E335

18·11S1

AUTHOR:    Elfmark, Jiří, Engineer, Candidate of Sciences

TITLE:     Forming ability of 12% chromium heat-resistant steels

PERIODICAL:   Hutnické listy, no. 5, 1962, 311

TEXT:      In view of the fact that some types of 12% Cr steels
that are used in the manufacture of turbine rotors are in a
two-phase state at the forming temperatures, the influence of
the second phase on the forming ability has been investigated
by means of hot tensile tests, hot impact bending tests and
upsetting tests.  The tensile and bending-test specimens were
produced from forged rods made from 40- and 100-kg laboratory
heats prepared in a high-frequency furnace.  The upsetting tests
were made on cylinders cut from forged rods and on 2-kg ingots
of circular cross-section.  The forming ability of 12% Cr steels
modified with Mo, W, V, Nb and B was compared with equal non-
modified steel.  For some of the heats the influence of
δ-ferrite was considered.  In addition, a modified 12% Cr steel
with a very low carbon content and a high content of carbide-
forming elements was produced for the purpose of obtaining a

X

Z/034/62/000/005/001/007
E073/E335

purely ferritic structure. The composition (in %) of the steels
investigated is given in Table 1, where the first column gives
the designation of the steel, the second column - the serial
number of the heat and the last column gives the percentage of
$\delta$-ferrite after quenching from 1 050 $^\circ$C (stopy = traces). All
the heats were deoxidized by adding Al and Ti. The results are
given in numerous graphs. The rate of deformation in the
tensile tests was of the order of 1% per second and the rate of
deformation in the impact-bending tests was of the order of

$10^3$% per second. It was found that, compared with unmodified
steels alloyed only with 12% Cr and having an austenitic
structure at the forming temperatures, the forming ability of
modified steels was poorer due to the presence of carbide-
forming elements. Steels with a purely austenitic structure
have a reduced plasticity at the forming temperatures and are
more prone to forming cracks. If $\delta$-ferrite is present in the
steel, forming proceeds when the material is in the two-phase
state and these steels can be more easily formed than purely
austenitic ones. They are less prone to develop cracks and

Forming ability of ....

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E073/E355

the forming can be carried out at higher temperatures since
they are not prone to grain-coarsening. If the stress exceeds
the strength of the material in the hot tensile and bending
tests, cracks occur in the austenite whilst the ferritic mass
continues to deform plastically. The presence of $\delta$-ferrite
in the structure prevents formation of a coarse grain at
elevated forging temperatures. Forging of these steels can be
carried out without difficulty in the temperature range 1 200 -
1 000 $^{o}$C and steels with higher ferrite contents can be forged
at temperatures up to 1 250 $^{o}$C. Forging with large reductions
under 1 000 $^{o}$C is not recommended since it brings about formation
of cracks caused by slow-down/recrystallization and precipitation
of carbides from the solution. Sizing, with small reductions,
of forgings can be carried out down to 900 $^{o}$C. The results of the
study were verified in the manufacture of rotors from 3 ingots,
each weighing 4 tons; ultrasonic tests of these rotors did not
reveal any defects and the mechanical properties were also
satisfactory. It is mentioned in a reviewer's note that
ZVIL, Pilsen, developed high-temperature, high-strength 12% Cr

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Forming ability of ....

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E073/E335

steels modified with W and V (steels T 58, T 59 and T 60).
Discs for gas turbines were produced from 4-ton ingots of the
steel T 58 and large blades (exceeding 800 mm in length) for
the condensing part of a steam turbine were produced from the
high-strength steel T 60. Tests of the forming ability and
practical experience gained with these steels fully confirm the
findings of VZKG, namely, that the presence of $\delta$-ferrite in
these steels is very favourable for achieving high creep values.
LZ, Pilsen, also proved that the presence of $\delta$-ferrite was very
favourable for the heat-resisting properties. These findings are
contrary to the widely-held view that two-phase structures are
unfavourable in chromium steels.   There are 25 figures and
1 table.

ASSOCIATION:   Výzkumny ustav VZKG, Ostrava
               (VZKG Research Institute, Ostrava)

SUBMITTED:    October 7; 1961

Card 4/5

*EL EMARK, J.*

ELEMARK, J.

Heating steel in forge furnaces.  p. 537. (Hutnicke Listy. Brno. Vol. 9, no. 9, Sept. 1954)
SO:  Monthly List of East European Accession (EEAL), LC, Vol. 4, No. 6, June 1955, Uncl.

ELFMARK, J.

Development in the rolling of mill bails in the Klement Gottwald Ironworks in Vitkovice.

p. 813 (Hutnicke Listy)  Vol. 12, no. 9, Sept. 1957, Praha, Czechoslovakia

SO:  MONTHLY INDEX OF EAST EUROPEAN ACCESSIONS (EEAI) LC, VOL. 7, NO.1, JAN. 1958

21.1310
21(4,9)

66017

CZ/38-60-2-5/22

AUTHORS:     Elfmark, Jaroslav;  Panýr, Miloš

TITLE:       Heavy and Hydrated Concrete, Its Composition and Use

PERIODICAL:  Jaderná Energie, 1960, Nr 2, pp 50 - 52

ABSTRACT:    This article is an analysis of the types of concrete that are best suited
             for reactor shielding, i.e. screening off gamma and neutron radiation.
             The author stresses that ordinary concrete (specific gravity 2,300 $kg/m^3$)
             is unsuited for screening off very intense gamma radiation, because
             extremely thick walls would be required.  Ordinary concrete, the author
             holds, is absolutely unable to slow down neutrons, since water molecules -
             which are the chief deterrant agents - must be chemically bound with
             certain types of concrete.  For nuclear technology, a concrete composition
             is needed which will bind about twice the quantity of water than ordinary
             concrete (ordinary concrete binds approximately 20% of its weight).  There-
             fore, it is necessary to produce so-called hydrated concrete.  The author
             considers limonite ($2Fe_2O_3 \cdot 3H_2O$) a suitable mineral for the production
             of hydrated concrete and gives the compression strength and specific
             gravity of the only suitable limonite of Czechoslovak origin:  296 $kg/m^2$
Card 1/3     and 3,230 $kg/m^3$ respectively.  This mineral is capable of binding water up

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Heavy and Hydrated  Concrete, Its Composition and Use          CZ/38-60-2-5/22

to 11% of its own weight.  The author stresses that the reinforcement
material of hydrated and heavy concrete must also have a high compression
strength and a great specific gravity, in order to function as a shield
against gamma radiation.  Some data on reinforcement materials are given.
The shielding capability of concrete necessitates two requirements:  a) a
certain specific gravity and  b) a certain quantity of hydrogen in the
form of chemically bound water in 1 $m^3$ of concrete.  It is emphasised that
the concrete must also have sufficient bearing qualities and shows by the
following formula the rate of cement needed in order to obtain sufficient
compression strength, i.e. cubical strength:

$$K = 0.5 \, K_c \left( \frac{c}{v} - 0.5 \right)$$

Legend:  K = cubical strength of concrete;  $K_c$ = type of cement;  c =
quantity of cement (kg) per 1 $m^3$ of concrete;  v = quantity of water (kg)
per 1 $m^3$ of concrete.  Advising on the practical application of heavy and
hydrated concrete the author points out that it was first used in
Czechoslovakia in the construction of the ČSAV Nuclear Research Institute.
Concrete of 3.2 $t/m^3$, for instance, was used for the reactor shield which
Card 2/3          had a wall thickness of 2.5 m, while heavy concrete of 4.2 $t/m^3$ was utilized

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Heavy and Hydratec Concrete, Its Composition and Use            CZ/38-60-2-5/22

for the combustion chambers.  In conclusion the author gives an analysis
of the economic aspects related to the application of heavy concrete, in-
cluding its prices.
There are:  1 table, 1 diagram, 2 photographs and 2 Czech references.

ASSOCIATION:    Chemoprojekt, Prague.

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Z/034/60/000/011/007/009
E073/E335

AUTHOR:    Elfmark, J.

TITLE:     International Symposium on New Trends in Forming
           Technology

PERIODICAL:  Hutnické listy, 1960, No. 11, p. 896

TEXT:  On the occasion of the International Fair at Brno four
symposia were held, one of which was a Symposium on New Forming
Technology, held in Prague on September 13 - 15, 1960, with
participants from Great Britain, Hungary, East and West Germany,
Poland, Austria, USSR, Switzerland, USA and Czechoslovakia.  The
main subject of the symposium was forming without machining and
the papers could be subdivided into the following categories:
a)  High-speed forming; b)  hot and cold extrusion of steel;
c)  manufacture and heat-treatment of forging dies.
There were also papers on forging, on forging rolls. grooving
of shafts by rolling and accurate forging of turbine blades.
The papers relating to high-speed forming were mainly on
theoretical solutions of this method of forming, which is not
very well known in Czechoslovakia.

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E073/E335
International Symposium on New Trends in Forming Technology

Professor Doctor F. Drastík (VŠD, Prague) reported on problems
in designing machinery for high-speed forming.   Other papers
dealt with problems relating to the change in the plastic
properties of steels - particularly, the problem was solved
of determining the critical impact speed at which the cohesion
of the steel is impaired during cold-forming.   This is
particularly important for explosion forming.   Equally of
interest are the results of investigation of the stresses and
strains in a cylinder subjected to high-speed upsetting.   In
the second part of the symposium, two papers were read relating
to problems of the service life of the extrusion dies, the
conditions pertaining to extrusion of high-alloy steels and to
extrusion of cladded profiles;   the obtained results indicate
that such a technology will be economical not only in the
manufacture of rods and profiles from steels which are difficult
to shape but they may also prove favourable in the manufacture
of tubes cladded with high-alloy steels.   The technology of
extrusion and volume forging in the cold state has been discussed
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E073/E335
International Symposium on New Trends in Forming Technology

in great detail.
F. Griffiths (Austin Motor Co.Ltd., Great Britain) reported
on the results of economic analysis of special production lines
for automatic mass production of cold-formed components. During
the third day, papers were read and discussed on the use of dies
and on hot die forging. The conditions for selecting steel and
its treatment in relation to the service life and stresses
of forging dies in operation were discussed.
Ing. Ullmann (Switzerland) gave several examples of economic
manufacture of dies by electro-erosion machining.
Ing. Tarmann (Bühler, Austria) presented a paper on precision
forging of blades for steam and gas turbines;  a brief summary
of this paper is given. The blades are forged with a grinding
addition not greater than 0.3 mm;  the thickness tolerance varies
between 0.1 and 0.25 mm for a blade length of 500 mm. The
profile accuracy for the same length is 0.15 to 0.3 mm

Card 3/3

ELFMARK, Jiri, inz.; SEDENKA, Otakar, inz.

Formation of conchoidal fracture in superheated steel. Hut listy
16 no.8:546-552 Ag '61.

1. Vyzkumny ustav, Vitkovicke zelezarny Klementa Gottwalda,
Ostrava.

ELFMARK, J.

"Forging machines and forging technology" by [prof., dr., inz.]
Frantisek Lrastik. Reviewed by J. Elfmark. Hut listy 16 no.9:680-681
S '61.

L 17514-63       EWP(q)/BDS    AFFTC/ASD    JD
ACCESSION NR: AP3001437                               Z/0034/63/000/006/0407/0415

                                                                        54
AUTHOR: Elfmark, J. (Engineer, Science Candidate)                       53

TITLE:  The influence of the degree of forging and pressing on the mechanical
properties of metals

SOURCE: Hutnicke listy, no. 6, 1963, 407-415

TOPIC TAGS: forging, pressing, forging limit

ABSTRACT:  The article deals with the improvement of mechanical properties that may
be obtained in steel ingots that are subjected to forging operations.  The author
conducted experiments using Czech steel CSN 16251; this steel contains 0.46-0.55%
C, 0.72-1.02% Mn, 0.23-0.55% Si, 1.98-2.25% Ni, 0.16-0.29% Cr, 0.18-0.27% V, 0.02-
0.04 P, 0.017-0.049% S.  Forging operation improved all the mechanical properties
of steel.  There is a limit to the number of forging operations that still show a
satisfactory result.  The degree of forging is measured by the decrease of the cross-
sectional area; should this be one-half of the original, then the degree of forging
is 2.  Optimum results are obtained with values of 2 to 4.  The metallurgical prop-
erties of the ingot play an important role.  Experiments were conducted to determine
how far pressing of the ingot could improve the properties by replacing forging

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L 17514-63

ACCESSION NR: AP3001437

operations. The pressing operation changed both the cross sectional area and the length of the ingot. The degree of forging was then expressed with respect to the sectional area at the start of forging operations. The overall changes were expressed as the ratio of the original and final cross sectional areas. An equation expressing the optimum improvement is presented: PK = A sub n x P sub n x K being equal or greater than 3 where PK is the overall degree of forging operations, A is = 0.7, n = number of pressing operations, P = degree of pressing, K = ratio of cross-sectional areas of the ingot at the beginning and at the end of operations. Orig. art. has: 28 figures, 3 tables.

ASSOCIATION: Vyzkumny Ustav Metalurgicky VZKG, Ostrava (Research Institute of Metallurgy, Klement Gottwald Iron Works at Vitkovice)

SUBMITTED: 00                DATE ACQ: 08Jul63              ENCL: 00

SUB CODE: ML,EL              NO REF SOV: 007               OTHER: 021

Card 2/2

ELFMARK, Jiri, inz.

Effect of the high heating temperature on the mechanical properties of steel.  Sbornik skol ban  8  no.3:329-343  '62.

1. Vyzkumny ustav, Vitkovice zelezarny Klementa Gottwalda.

ELFMARK, Jiri, inz., CSc,

       Effect of the degree of forging and upsetting on the mechanical
       properties of forgings. Hut listy 18 no.6:407-415 Je '63.

       1. Vyzkumny ustav metalurgicky, Vitkovicke zelezarny Klementa
       Gottwalda, Ostrava.

ACCESSION NR: AP4010411                           Z/0034/64/000/001/0022/0027

AUTHOR: Elfmark, Jiri (Engineer, Candidate of sciences)

TITLE: Effect of titanium addition upon improvement of deformability of steel containing 24% Cr.

SOURCE: Hutnicke listy, no. 1, 1964, 22-27

TOPIC TAGS: steel, steel hot working, steel deformability, chronium alloyed steel, titanium alloyed steel, titanium, shock bending test, hot twist test

ABSTRACT: The effect of titanium addition upon deformability of CSN 17 061 steel was studied. When large ingots of this steel containing titanium additions of 0.2% were forged at 1050C, very large cracks appeared. Shock bending and hot twist tests indicated that an addition of 0.5 to 0.7% Ti greatly improves the steel's hot workability. Metallographic analysis showed that intercrystalline cracks appear above 1100C in steels without Ti content or only with a small one. Their origin cannot be attributed to the presence of austenite on the ferrite grain boundaries since the intercrystalline cracks also originated in beneficiated

Card   1/2

ACCESSION NR: AP4010411

heats in which there was no austenite in the structure. The favorable effect of an 0.5 to 0.7% Ti addition is found in the refinement of the grain, a reduction in the nonhomogeneity of the steel in the cast state and augmentation of the steel's deoxidation and denitrification. Forgings from CSN 17 061 steel containing 0.4 to 0.6% Ti additions have been commercially produced from 5 ton ingots. "Author wishes to thank his colleagues, Engineers M. Tomasova and O. Sedenkov for conducting the metallographic test." Orig. art. has: 14 figures and 4 tables.

ASSOCIATION: Vyzkumny ustav VZKG, Ostrava (VZKG Research Institute)

SUBMITTED: 00                DATE ACQ: 07Feb64          ENCL: 00

SUB CODE: ML                 NO REF SOV: 003            OTHER: 005

Card 2/2

EWA(d)/EWP(t)/EWP(z)/EWP(b)    JD

cz/0034/64/000/012/0910/0911

AUTHOR: Elfmark, J.

TITLE: Tool steel containing Cr, Mo. W. and V suitable for work at 200 to 600°C and resistant to wear at these temperatures

SOURCE: Hutnicke listy, no. 12, 1964, 910-911

TOPIC TAGS: tool steel, rupture strength, fatigue strength, heat resistant steel, wear resistant ferrous alloy, carbide

The article is an abstract of Patent Application Class no, PV 6722-63, dated 5 Dec 63. The composition of the steel. It contains .90% Mn, 0.8 - 1.2% Si, 4 - 6% Cr, 0.8 - 1.5% Mo, 0.8 - V. The V content is substantially higher than in other tool steels. The steel has a resistant, and keeps its strength at high working temperatures, and does not crack under working conditions. It is

Card  1/2

L 62736-65
ACCESSION NR: AP5021411

0

highly resistant to temperature changes. The V content and the formation of complex carbides are the reason for its resistance to high temperatures.

ASSOCIATION: none

SUBMITTED: 05Dec63

ENCL: 00

SUB CODE: MM, AS

NR REF SOV: 000

OTHER: 000

JPRS

Card 2/2

ACC NR: AP5027873    EWP(w)/EWA(d)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)/EWA(c)    JD/HW
CZ/0034/65/000/002/0096/0105

AUTHOR: Elfmark, Jiri (Engineer, Candidate of sciences)

TITLE: Calculation of the forging reduction ratio for forgings with a section larger than the ingot section

SOURCE: Hutnicke listy, no. 2, 1965, 96-105

TOPIC TAGS: metal forging, steel/CSN 16251 steel

ABSTRACT: To find a method of calculating the forging reduction ratio for forgings of larger section than the initial section of the ingots, an investigation was made of the influence of the degree of upsetting on the properties of CSN 16251 steel. An equation is derived. Orig. art. has 7 formulas, 19 graphs, and 3 tables.

ASSOCIATION: Vyzkumny ustav metalurgicky VZKG, Ostrava (Research Institute for Metallurgy)

SUBMITTED: 00

NO REF SOV: 003

ENCL: 00

OTHER: 004

SUB CODE: MM

JPRS

Card 1/1

L 46626-66    EWP(k)/EWP(t)/ETI    IJP(c)    JD/HW

ACC NR: AP6026067                             SOURCE CODE:   CZ/0034/65/000/012/0855/0859

AUTHOR:   Elfmark, Jiri (Docent; Engineer; Candidate of sciences)                 10
                                                                                   B

ORG:   Metallurgical Research Institute, Klement Gottwald Vitkovice Iron Works, Ostrava
(Vyzkumny ustav metalurgicky VZKG)

TITLE:   Computation of the forging reduction degree of billets extended by Mandrel
forging

SOURCE:  Hutnicke listy, no. 12, 1965, 855-859

TOPIC TAGS:   metal forging, mechanical engineering

ABSTRACT:   The author presents derivation of equations used for the calculation
of the degree of forging reduction.  Orig. art. has:  7 figures, 19 formulas, and
2 tables. /Based on author's Eng. abst./ /JPRS:   34,272/

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

Card  1/1 afs                                          UDC:  621.974.8 669.134

L 38589-66    EWP(t)/ETI/EWP(k)    IJP(c)    JD/HW
ACC NR: AP6027700                         SOURCE CODE:    CZ/0034/66/000/001/0016/0023

AUTHOR:  Burda, Svatopluk (Engineer); Elfmark, Jiri (Engineer; Candidate of sciences);
Turon, Slavomir (Engineer)

ORG:  Klement Gottwald Vitkovice Iron Works, Ostrava (Vitkovicke zelezarny KG)

TITLE:  Optimum forged rings manufacturing technique

SOURCE:  Hutnicke listy, no. 1, 1966, 16-23

TOPIC TAGS:  metal forging, metallurgic industry

ABSTRACT:  The manufacture of rings by the mandrel forging technique is discusse.
The optimum forging reduction degree is a product of partial reduction degrees resul-
ting from the stages of: forging of the billet, forging of the disk, and the mandrel
forging process. An equation for the optimum diameter of the original billet is
derived. It states that this diameter equals the cube root of the product of a coef-
ficient and of the weight of the forging billet divided by the product of the wall
thickness of the ring and its height. Methods for calculation of the constant are
given. Orig. art. has: 3 figures, 24 formulas and 6 tables. [Based on author's
Eng. abst.]    [JPRS: 34,519]
SUB CODE:  13, 05 / SUBM DATE:  none / ORIG REF:  006 / SOV REF:  001

Card 1/1                                              UDC:  621.73.032

ACC NR: AP6032759        (N)          SOURCE CODE: CZ/0057/66/000/008/0392/0397

AUTHOR: Elfmark, J. (Engineer; Candidate of sciences); Foldyna, V. (Engineer; Candidate of sciences)

ORG: Metallurgical Research Institute, VZKG, Ostrava (Vyzkumny ustav metalurgicky VZKG)

TITLE: Production and properties of large forgings from heat resistant modified 12% chrome steels CSN 17 134 and CSN 17 135

TOPIC TAGS: chromium steel, steel forging, solid mechanical property

ABSTRACT: Two grades of modified 12% chrome steel have been developed particularly for use in superheated (600 C) and high-pressure electric generating equipment, such as superheater chambers, steam lines, and for large forgings such as mixing chambers, as well as for steam turbine wheels. Chemical composition and mechanical properties of the two grades are tabulated. Some difficulties in forging austenitic and other grades of steel are described as related to the formation of ferrite delta, but 20 or 30% ferrite delta in CSN 17 134 does not adversely affect its slabbing and upset rolling, apparently due to its content of vanadium or titanium. Slabbing tests on 4-ton ingots are described at 1000 and 1200 C and further reductions were rolled at 950 C without danger of cracks. Mechanical properties of CSN 17 135 were tested after

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ACC NR: AP6032759

further forging in steps down to 125 mm diameter and after various types of heat treat-
ment.  Examples are given of proper cooling and heat treatment for large forgings, also
of mechanical properties in a steam turbine wheel made from a 4-ton ingot of CSN
17 134 and of another made of CSN 17 135.  Heat treatment of and tests on these two
sample forgings are described in detail.  Orig. art. has: 4 formulas, 6 tables, and
7 figures.
SUB CODE: 11/  SUBM DATE: none/  ORIG REF: 004/  OTH REF: 004

Card  2/2

EL'FOND, M.A., dotsent; PLATONOVA, N.P., vrach

Prevention of skin diseases in the workers of the "Oktiabr'"
Plant. Nauch. trudy Kub. gos. med. inst. 19:48-55 '62.
(MIRA 17:8)
1. Iz kafedry kozhnykh i venericheskikh bolezney (zaveduyushchiy
prof. L.A. Neradov) Kubanskogo gosudarstvennogo meditsinskogo
instituta.

AUTHOR:        El'gard, A.M.                                      32-12-44/71

TITLE:         Coercive Force Meter for the Control of the Quality of the Thermal
               Treatment of Steel Details (Koertsitimetr dlya kontrolya
               kachestva termicheskoy obrabotki stal'nykh detaley).

PERIODICAL:    Zavodskaya Laboratoriya, 1957, Vol. 23, Nr 12, pp. 1504-1505 (USSR)

ABSTRACT:      The principle of the construction of the apparatus, the wiring
               circuit of which is given here, is based upon the connection between
               the coercitive force and the quality of the thermal treatment of
               some brands of steel. For the purpose of determining coercitive
               force, the detail to be examined is magnetized up to saturation,
               after which it is de-magnetized. The amperage necessary for de-mag-
               netization is taken as a measure of coercitive force and thus also
               as a suitable characteristic of the thermal treatment of the detail
               in question. As the lowest amperage such an average is assumed at
               which the plate of the ponderomotive indicator falls off. According
               to the position of the indicator plate the hardness of the detail
               can be judged. The signal lamps of the apparatus begin to burn as
               soon as its adjustment corresponds to the hardness of the detail,
Card 1/2       and they continue burning until the detail to be examined rests

Coercive Force Meter for the Control of the Quality of          32-12-44/71
   the Thermal Treatment of Steel Details

            upon the magnetic poles. The scheme of the apparatus makes a com-
            plete automation of control possible. The apparatus is used most
            frequently in the USSR for the control of needles and similar
            small details made of steel in various apparatus. There are 2 fig-
            ures, and 1 Slavic reference.


AVAILABLE:     Library of Congress

Card 2/2      1. Steel-Heat treatment    2. Meters-Coercive force

AUTHORS:      El'gard, A.M., Ginzburg, S.K.                    32-1-39/55

TITLE:        Control of Quality in the Thermal Treatment of Steel Parts
              According to Their Magnetic Permeability in Medium Fields
                                        (Kontrol'kachestva termicheskoy
              obrabotki stal'nykh detaley po magnitnoy pronitsayemosti v
              oblasti srednikh poley).

PERIODICAL:   Zavodskaya Laboratoriya, 1958, Vol. 24, Nr 1, pp. 96-101 (USSR)

ABSTRACT:     In the present paper a certain type of transformer is described as
              a highly sensitive indicator of structural deviations in steel.
              This transformer consists of an open magnetic chain, where the
              steel object to be investigated is connected within the magnetic
              circuit. In the case of a source of a constant magnetic voltage,
              the current in the first transformer winding corresponds to the
              magnetic permeability of the steel object to be investigated.
              Therefore, the voltage which is formed by the induction in the
              second winding of the transformer, represents a function, which
              corresponds to the magnetic permeability of the steel object in the
              respective range of the magnetic field. Measurements in this case
              are carried out according to the differential scheme after attain-
Card 1/2      ing magnetic equilibrium in the compensation winding, which is

Control of Quality in the Thermal Treatment of Steel Parts          32-1-39/55
According to Their Magnetic Permeability in Medium Fields

brought about by means of an additional control winding and a re-
sistance. In the chapter: Experimental part numerous examples of
the application of this method with respect to the most usual
steels in the USSR (20,45,YIO,38XA,18XHBA and P18) are given for
various kinds of thermal treatment. This method is well suited for
the purpose of determining the degree of hardness of the steel. An
exception is formed by sharp cutting steels, which, because of
their special thermal treatment, are subjected to complicated
structural changes, which renders application of this method diffi-
cult. For this purpose it is necessary, in addition, to carry out
a control of microstructural changes and to take them into account.
At present this method is used for the purpose of controlling the
production of needles made from "P18" steel (in the USSR). There
are 4 figures, 2 tables, and 4 Slavic references.

AVAILABLE:     Library of Congress

Card 2/2       1.  Quality control-Methods     2.  Transformer-Nomenclature

e(2)                                                    SOV/32-25-2-48/78

AUTHOR:              El'gard, A. M.

TITLE:               An Electromagnetic Thickness Gauge for Measuring Coatings With
                     a Rod-shaped Measuring Device and Improved Accuracy (Elektro-
                     magnitnyy tolshchemer pokrytiy so sterzhneobraznym datchikom
                     i povyshennoy stabil'nost'yu pokazaniy)

PERIODICAL:          Zavodskaya Laboratoriya, 1959, Vol 25, Nr 2,  pp 223-225 (USSR)

ABSTRACT:            The apparatus described is designed for determinations of
                     the thickness of non-magnetic coatings on a magnetic base
                     (Fig 1). The measuring device of the apparatus is a rod-shaped
                     transformer consisting of a steel core (steel S.20) with two
                     coils (Fig 2) and enclosed in a steel cylinder with a length-
                     wise slit (to attenuate Foucault currents). The distribution
                     of the magnetic current over the rod depends on the (non-
                     magnetic) distance between the bottom end of the measuring
                     device and the metallic base, i.e. on the thickness of the
                     coating. Since the  measurements made by this apparatus are
                     based on the differential method, the apparatus is provided
                     with a compensation unit (Fig 3) whose design is similar to
                     that of the measuring device. The primary coils of the two
Card 1/2             units are connected in series and supplied with current from

APPROVED FOR RELEASE: 08/22/2000     CIA-RDP86-00513R000412020010-1"

An Electromagnetic Thickness Gauge for Measuring Coatings SOV/32-25-2-48/78
With a Rod-shaped Measuring Device and Improved Accuracy

an A.C. (50 cycles) stepdown transformer. The current forming
in the secondary coils is then fed to Grätz rectifiers. The
scale of the device is graduated for measuring ranges of
0-5µ, 0-200µ and 0-500µ. The effect of the magnetic properties
of the materials investigated was studied on transformer-
and armco irons as well as steels with a high carbon content
and steel alloys of the U 10, R 18, 18 KhNVA, KhVG grades.
The divergencies in the measurements were 10-25%, the effect
of magnetic properties was, however, only one-fifth of the
effect to be found in the case of measuring devices based
on changing magnetic resistances. There are 3 figures.

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SOV/32-25-4-41/71

28(4)
AUTHOR:        El'gard, A. M.

TITLE:         Coercimeter With a Device for the "Magnetic Preliminary Treat-
               ment" of the Products to Be Controlled (Koertsitimetr s
               ustroystvom dlya "magnitnoy podgotovki" kontroliruyemykh izdeliy)

ABSTRACT:      A differential coercimeter (Ref 1) was worked out, in which the
               influence of the primary magnetic state of the articles to be
               tested is excluded by a "magnetic preliminary treatment" pro-
               duced by a four-to-sixfold commutation of the magnetizing cur-
               rent. The device (Figure of the circuit) consists of an electro-
               magnet with a ponderomotive indicator of the demagnetization,
               the magnetizing and demagnetizing wiring, the current-feeding
               unit and the relay scheme. The electromagnet with the indicator
               is the transmitter of the device and carries out the repeated
               magnetization and demagnetization. All necessary commutations
               are automatic by means of the relay, the operation of which is
               described by means of a sketch. The device makes it possible to
               test about 300 articles an hour. There are 1 figure and 1 Soviet
               reference.

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05756

25(5)

SOV/32-25-10-45/63

AUTHOR:    El'gard, A. M.

TITLE:    An Automatic Coercimeter With Ferrotransmitter for the
Quality Control of the Thermal Working of Steel Parts

PERIODICAL:    Zavodskaya laboratoriya, 1959, Vol 25, Nr 10, pp 1256-1258
(USSR)

ABSTRACT:    An automatic coercimeter for the magnetic series control of
the quality of thermal treatment was constructed. The measure
for the coercive force and indirectly of hardness is the
amperage of the current of the demagnetized object which had
previously been magnetized up to saturation. For magnetiza-
tion and demagnetization (Fig) an additional electromagnet is
used, between the poles of which the portion of the part to
be tested is located. The device consists of the electro-
magnet with a ferrotransmitter, a phase-sensitive measuring
arrangement, a magnetization- and demagnetization circuit,
the working mechanism with a relay system, and the current
supply block. The measuring system contains a microammeter
of the type US-200. The schematical representation of the
device shows that selenium rectifiers of the types VS-15 and
VS-45 as well as relays of the type MKU-48 were used. Before

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An Automatic Coercimeter With Ferrotransmitter for the SOV/32-25-10-45/63
Quality Control of the Thermal Working of Steel Parts

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determination, the corresponding demagnetization current is
adjusted according to a standard sample (of known hardness).
If, during measurement of the sample, the latter's coercive
force should be higher or lower than that of the standard
sample, the investigated part will be either not entirely
demagnetized or hypermagnetized, so that the indicator of the
measuring device (which had been adjusted to zero during
adjustment to the standard sample) will be displaced propor-
tional to the difference between the coercive force of the
sample and the standard sample. The device may be calibrated
according to units of hardness, so that hardness may be read
off directly. The many years during which the device has been
used for the hardness control of parts made from steel of the
type 18KhNVA showed that the normal sensitivity of hardness
measurements (with an accuracy of 1-2 $H_{RS}$) is not influenced
by the variations of the chemical composition (within the
permitted limits for the respective type of steel). There
are 1 figure and 4 Soviet references.

Card 2/2

85878

*9.2180 (3203,1162)*
*24.7800 (1635,1144)*

S/048/60/024/011/014/036
B006/B056

AUTHORS:      Zaytseva, V. I., Pasynkov, R. Ye., Pozern, V. I.,
              El'gard, A. M.

TITLE:        The Dielectric Properties of Polarized Ceramics in
              Strong, Variable Electric Fields

PERIODICAL:   Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960,
              Vol. 24, No. 11, pp. 1357 - 1361

TEXT:  The present paper is a reproduction of a lecture delivered on the
3rd Conference on Ferroelectricity, which took place in Moscow from
January 25 to 30, 1960. The authors measured the dependence of the dielec-
tric constant and of the tangent of the loss-angle of polarized ceramics
upon the applied electric field strength, and give a report on the re-
sults obtained. In the introduction, the theory of the problem is brief-
ly dealt with, and L. P. Kholodenko is mentioned. The measurements them-
selves were made in parallel- as well as in series connection, for which
purpose a pulse operation resonance method was used. With a pulse dura-
tion of 10-20 msec and an interval between the pulses of 1-5 sec it was

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The Dielectric Properties of Polarized
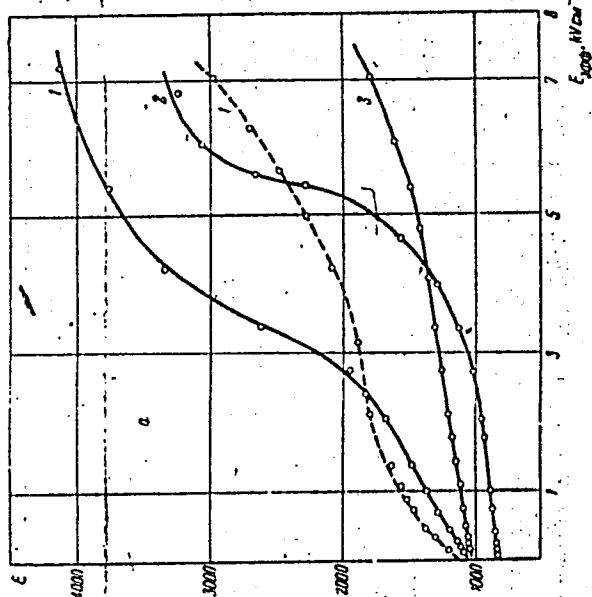Ceramics in Strong, Variable Electric Fields

85878
S/048/60/024/011/014/036
B006/B056

found that the samples were practically not heated. The measurements of
voltage and current as well as the control of the shape (of voltage and cur-
rent) in pulse operation was carried out by means of an oscilloscope of the
type ЭНО-1 (ENO-1) with a frequency of 10 kc/sec. The temperature of the
sample was controlled by means of a thermocouple. The samples were all
produced in the same manner and had a thickness of 1.55 mm. The sample
heated up to Curie point was polarized in a constant electric field of
0.8 kv/mm (1 hour), after which it was cooled down to room temperature
in stages. $\varepsilon_{zz}^1$ and tan δ as a function of E were measured on samples of
three different compositions: 1) BaTiO$_3$ (broken curve: non-polarized
sample); 2) 94% BaTiO$_3$ - 6% CaTiO$_3$, and 3) 95% BaTiO$_3$ - 5% CaTiO$_3$ -
0.75% CoCO$_3$. The results are shown in the attached Figure. The course
taken by the curve is discussed in detail. The experimental results
agree in E-ranges, where no depolarization occurs, qualitatively with
the theoretical results. There are 3 figures and 6 references: 2 Soviet,
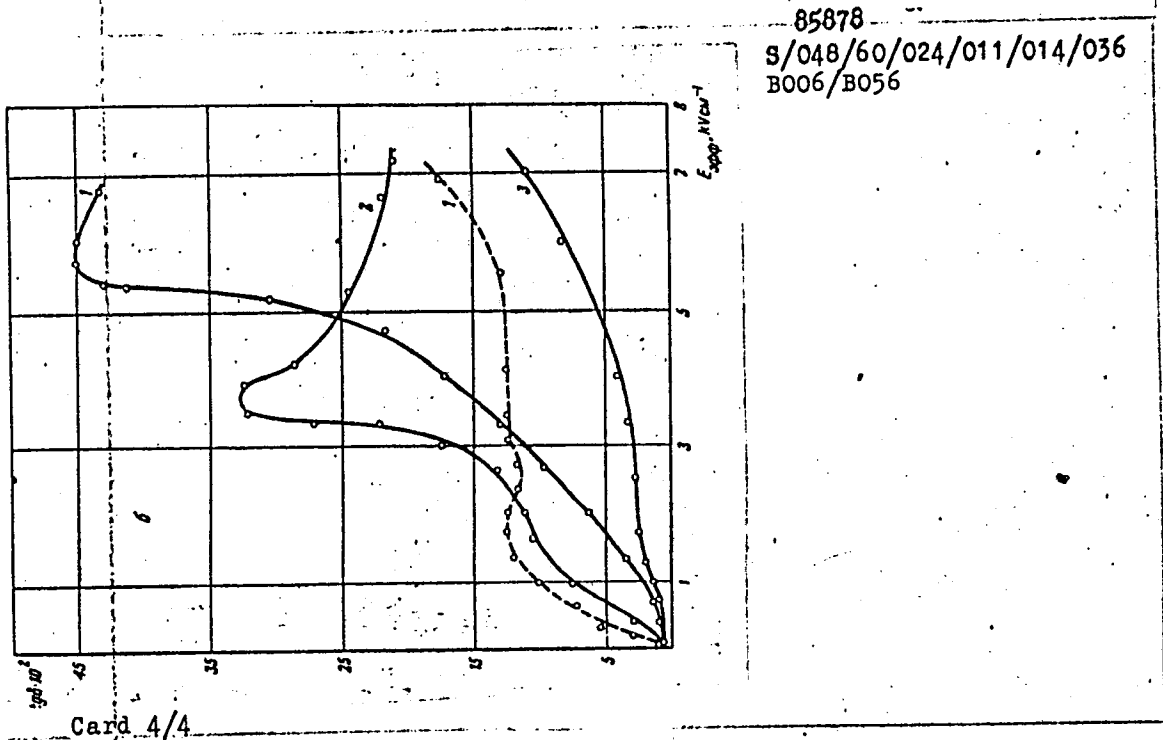3 US, and 1 Canadian.

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S/048/60/024/011/014/036
B006/B056

Card 3/4

85878
S/048/60/024/011/014/036
B006/B056

Card 4/4

8 5879

*9.2181 (3203,2303)*
*24.7800 (1144,1162)*

S/048/60/024/011/015/036
B006/B056

AUTHORS:       Velyukhanova, G. A., Pasynkov, R. Ye., Pozern, V. I.,
               El'gard, A. M.

TITLE:         The Piezoelectric Properties of Polarized Ceramics in
               Strong, Variable Electric Fields

PERIODICAL:    Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960,
               Vol. 24, No. 11, pp. 1362 - 1365

TEXT:  The present paper is a reproduction of a lecture delivered on the
3rd Conference on Ferroelectricity, which took place in Moscow from
January 25 to 30, 1960. Under the same assumptions as made in Ref.1, the
authors calculated the dependence of the piezomoduli $d_{33}$ and $d_{31}$ upon
electric field strength; for the case of tetragonal symmetry, they obtain
$d_{33}^{(1)}(E_z) = \frac{2\nu_{33} P_{oz}}{4\pi} \varepsilon_{zz}^{(1)}(E_z)$; $d_{31}^{(1)}(E_z) = \frac{2\nu_{31} P_{oz}}{4\pi} \cdot \varepsilon_{zz}^{(1)}(E_z)$; the super-
script (1) denotes that the first harmonic is investigated; the $\nu_{ik}$ are

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85879

The Piezoelectric Properties of Polarized     S/048/60/024/011/015/036
Ceramics in Strong, Variable Electric Fields  B006/B056

the electrostriction coefficients, $P_{oz}$ the components of polarization.

It further holds that $\varepsilon_{zz}^{(1)}/\varepsilon_{zzo} \approx d_{33}^{(1)}/d_{330} = d_{31}^{(1)}/d_{310} = f(e_z)$. The
third subscript o means that the moduli have been measured in the case
of very weak fields. The field strength dependence of the piezo-moduli
was measured on cylindrical samples which were radially and tangentially
polarized, viz. for the following substances: 1) $BaTiO_3$, 2) 95% $BaTiO_3$
+ 5% $CaTiO_3$, and 3) $BaTiO_3$ + 0.75% $CoCO_3$. To the sample (which was in the
air), pulses with 8 kc/sec were applied with a pulse duration of 5 msec;
the mechanical resonance frequency was about 15 kc/sec. The temperature
of the samples, which practically did not change either at ~8 kv/cm,
was controlled by means of thermocouples, and could be varied between
-20 and +40°C. The results obtained, which are shown in diagrams, may
be summarized as follows: 1) the ratio $d_{ik}^{(1)}/d_{iko}$ in all samples increases
with the field strength (up to ~4.5 kv/cm), 2) in fields of more than
4.5 kv/cm, $d_{ik}^{(1)}/d_{iko}$ decreases rapidly for $BaTiO_3$, and less rapidly for

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The Piezoelectric Properties of Polarized          S/048/60/024/011/015/036
Ceramics in Strong, Variable Electric Fields        B006/B056

the second composition, and increases further for the third composition
of the samples. 3) The behavior of $d_{33}^{(1)}$ and $d_{31}^{(1)}$ agrees qualitatively.

4) The curves (in both directions) $d_{ik}^{(1)}/d_{iko} = f(E_\sim)$ recorded at 8 kv/cm
in the course of 30 min, take a completely equal course for compositions
2 and 3 (Curves 3 and 4), and for 1 the curves recorded in the two direc-
tions (Curves 1 and 2) deviate from each other (cf. the attached figure).
There is qualitative agreement with the theory. There are 4 figures and
6 references: 4 Soviet, 1 US, and 1 Canadian.
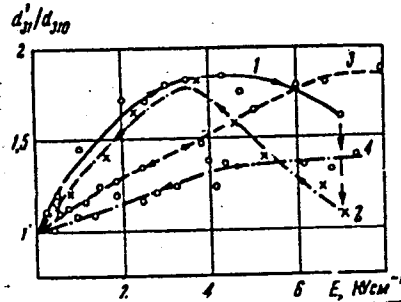


Card 3/3

24.7700 (1035, 1043, 1395)

27713
S/120/61/000/003/026/041
E194/E155

AUTHOR:    El'gard, A.M.

TITLE:    Measurement of the permittivity and dielectric loss in strong electric fields in the ultrasonic range

PERIODICAL: Pribory i tekhnika eksperimenta, 1961, No.3, pp.151-153

TEXT:    The special feature of the equipment described is that it permits measurements under impulse conditions without heating the specimen.  It uses a simple device to measure the first harmonic of current when the wave shape is much distorted.  It is difficult to measure the properties of piezoceramic materials in strong fields because the specimens become heated by dielectric loss.  The equipment described is intended to measure permittivity and dielectric loss in semiconductors as functions of field strength in the sonic and ultrasonic frequency ranges.  The equipment uses a resonance substitution method based on a parallel circuit.  In this way a good matching can be obtained with the generator.  The parallel circuit method is also convenient for operating in strong fields, because the high voltage applied to the specimen can easily be measured by a voltmeter or cathode ray

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oscillograph.  To avoid heating the specimens in strong fields the
measurements are made under impulse conditions, so that the
specimen is subjected to alternating voltage only for a short time,
followed by a prolonged resting period.  Tests showed that with
fairly short impulses of 5-10 milliseconds and considerable
intervals between impulses, say 1 - 5 seconds, heating of specimens
10-15 mm thick hardly occurs in fields up to 10 kV/cm.  In
measurements on small thin specimens with forced cooling by a flow
of air or oil the duration of the impulse can be significantly
greater.  The measuring circuit consists of an inductance coil and
a variable reference capacitor (made up of mica capacitors) and
a variable air capacitor.  By altering the changeover switch
either the specimen to be measured or a reference resistance can
be connected into the circuit.  The circuit including the specimen
is first tuned to resonance by altering the standard capacitors.
The specimen is then disconnected and the circuit is again tuned
to resonance.  The resistance box is then connected into the
circuit and the resistance is steadily decreased until the volt-
meter reading, which corresponds to the current in the circuit, is
the same as when the specimen was connected in circuit.  The
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specimen capacitance is determined from the change in reading of the standard capacitor. The equivalent resistance of the specimen is used to calculate the tangent of the loss angle. The measuring circuit is supplied from a special impulse generator in which the duration of impulse and the interval between impulses can be controlled. An oscillograph type ЭНО-1 (ENO-1) is used to measure the voltage applied to the circuit and the current passing through it. Because of the selectivity of the tuned circuit any deviation of the applied voltage waveform from the sinusoidal causes a considerable non-linear distortion of current. This is particularly so if the circuit is of high Q-factor. Measurement of specimens with non-linear properties also gives rise to non-linear current. As the resonance tuning and assessment of Q-factor depends upon the current in the circuit, the distortion of the current wave-shape makes measurements difficult and leads to errors. Accordingly, a device was used to measure the fundamental harmonic of the current. It consists of an RCL resonant mesh in which the low resistance is connected in the current-carrying circuit. The device is based on the resonance principle and the voltage measured across the capacitor in the Card 3/5

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resonant circuit is greater than that across the resistor by the
Q-factor of the circuit. The device is simple and works over a
wide range of frequencies from a few kilocycles to tens of
megacycles. With this device it was possible to make measurements
on piezoceramic specimens with highly non-linear properties in
strong fields. Fig.2 shows curves of the permittivity and tangent
of dielectric loss angle as function of field strength for ceramic
$BaTiO_3$ at room temperature. The left-hand curve indicates the
permittivity and the right-hand curve the tangent of loss angle.
The measurements were made at frequencies of 1-5, 2-20 and 3-100
kc/s. The errors in measurement of capacitance and tangent of
loss angle under impulse conditions when oscillographs were used
as measuring instruments and with high losses in the specimen
(tan $\delta$ about 0.3) did not exceed $\pm$ 5% and $\pm$ 15% respectively.
There are 2 figures and 5 references: 4 Soviet and the following
English language reference:
Ref.3: K. Kambe, J. Nakada, H. Takahasi, Phys.Soc.Japan, 1953,
      Vol.8, 9.
SUBMITTED: July 22, 1960
Card 4/5

94.7800 (1144, 1142, 1138)

AUTHOR:      El'gard, A. M.

TITLE:       Dielectric constant and dielectric loss angle in seignetto-
electric substances as functions of electric field strength
between 50 cycles and 100 kilocycles

PERIODICAL:  Fizika tverdogo tela, v. 3, no. 5, 1961, 1485 - 1492

TEXT:  Practical use of seignettoelectric substances requires a knowledge
of their dielectric properties in strong and weak fields within a wide
frequency range. Since $\tan\delta$ in such substances attains values up to 0.3 -
0.4, the losses give rise to considerable heating which renders the study
of the dielectric properties very difficult, considering that both the die-
lectric constant $\varepsilon$ and $\tan\delta$ are highly dependent on temperature. Studies
conducted in the past (Ref.1: K. Kambe, I. Nakada, a. H. Takahasi, J. Phys.
Soc. Japan, 8, 9, 1953, Ref.2: F. S. Zavel'skiy, ShETF, 25, 479, 1953,
Ref.3: Ye. V. Sinyakov and V. V. Gal'pern, ZhETF, 30, 675,1956) involved
the use of pulse, continuous, and resonance methods. These and other studies
have shown $\varepsilon$ to drop in strong fields with rising frequency, whereas $\tan\delta$

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23116

S/181/61/003/005/021/042
B136/B201

Dielectric constant and ...

at a high frequency is only little dependent upon the field strength. $\varepsilon$ and $\tan \delta$ were measured from 5 to 100 kilocycles by the circuit shown in Fig.1. The specimens were prevented from heating by pulsed application of the electric field with long intervals, by cooling them with silicone oil, and by the use of large electrodes. Current, voltage, and pulse shape were supervised by an EHO -1 (YeNO-1) oscilloscope ($V_1$ and $V_2$ in Fig.1). $\varepsilon$ was measured with respect to the second harmonic which, in turn, was measured by means of a circuit embodying $R_{connect}$, $L_1$, and $C_1$, which was adjusted to this harmonic. The pulse generator IG (Fig.1) has a controllable output voltage, output frequency, pulse duration, and dead time. Capacity and e-quivalent resistance of the specimens were measured, and $\varepsilon$ and $\tan \delta$ were calculated therefrom. The measurements of capacity and $\tan \delta$ were accurate within $\pm 5$ and $\pm 15\%$, respectively. At 50 cycles the two quantities were measured with a Schering bridge of the type МДП (MDP); at 0.4, 1, and 2.5 kilocycles with a Schering bridge TM-351-G manufactured by Tesla. $BaTiO_3$ and its solid solutions with 5 and 10% $BaSnO_3$, 5% $CaTiO_3$, as well as 5% $CaTiO_3$ with cobalt traces (0.75% $CoCO_3$), in percents by weight, were exam-

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Dielectric constant and ...                     S/181/61/003/005/021/042
                                                B136/B201

ined. The first and second maximum of tan $\delta$ coincide with the steepest ascent
of $\varepsilon$ . The behavior of the specimens can be explained with the aid of the
domain structure of seignettoelectric substances. The main results are sum-
marized as follows: 1) $\varepsilon$ (f) rises with growing E, and is strongest when$\varepsilon$(E)
passes through a maximum; in stronger fields the $\varepsilon$ (f) curve is smoothed a-
gain. In weak fields $\varepsilon$ is only little dependent upon f. 2) $\varepsilon$ (E) displays an
inflection in fields near the coercive field, and tan $\delta$ displays a maximum.
This is indicative of a variation of the rate of growth of the orientation
polarization with the field. 3) Maximum and inflection of $\varepsilon$(E) shift with
growing f toward stronger fields. The frequency dependence of $\varepsilon$ in weak
fields is determined by easily short-period rearrangement processes, with
the action of the field exceeding the duration of rearrangement in every
semi-period. Therefore, in the audio-frequency and ultrasonic ranges, $\varepsilon$ does
not depend on frequency. In case of higher field strengths, however, the
processes with a higher critical field strength and duration of rearrange-
ment play a part determining the frequency dependence $\varepsilon$ . G. A. Smolenskiy,
Doctor of Physical and Mathematical Sciences, is thanked for advice and
discussions. There are 7 figures and 6 references: 5 Soviet-bloc and 1 non-
Soviet-bloc. The most recent reference to English-language publication

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23116

Dielectric constant and ...

reads as follows: K. Kambe, I. Nakada, and H. Takahasi, J.Phys. Soc. Japan, 8, 9, 1953.

SUBMITTED: October 11, 1960. (initially)
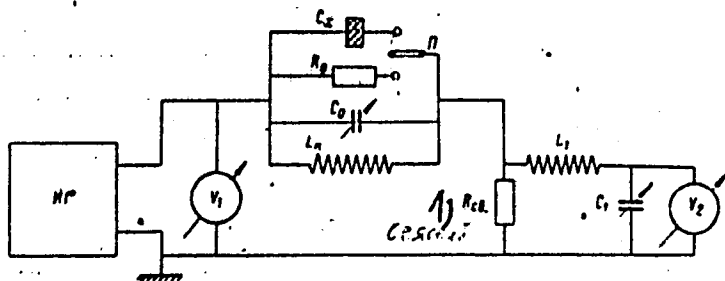January 16, 1961 (after revision)

Fig.1

Fig.1. Circuit diagram of measuring arrangement for $\varepsilon$ and tan $\delta$

Legend: 1) $R_{connect}$

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23119

S/181/61/003/005/024/042
B108/B209

*24,7800 (1144,1142,1138)*

AUTHOR:      El'gard, A. M.

TITLE:       Investigation of the dependence of the dielectric constant
             and of the tangent of the dielectric loss angle of polarized
             seignettoelectric materials on the electric field strength
             in the range between 50 cps and 100 kc/sec

PERIODICAL:  Fizika tverdogo tela, v. 3, no. 5, 1961, 1515-1521

TEXT:  The present paper is a continuation of earlier studies (Refs. 4,5:
A. M. El'gard. FTT, v. 3, no. 5, 1483; A. M. El'gard, V. I. Zaytseva,
R. Ye. Pasynkov, V. Pozern. Izv. AN SSSR, ser. fizich., No. 11, 1960)
concerning $\varepsilon = f(E)$ and $\tan \delta = f(E)$ at various frequencies. The samples
were polarized in a field of 1 kv/mm for one hour at a temperature near
their Curie point, after which they were gradually cooled down to room
temperature. The measurements were begun not before 36 hr after polari-
zation. In the range of 5-100 kc/sec, $\varepsilon$ and $\tan \delta$ were measured by the
method of resonance substitution (Ref. 4) with pulsed operation in order
to prevent heating of the samples. Measurements at 50 cps were made with

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B108/B209

Investigation of the dependence of ...

the help of an МДТ (MDP) bridge. At 427 cps $\varepsilon$ was determined from the current flowing through the sample, by means of an AC-3 (AS-3) analyzer. The author used samples of $BaTiO_3$, solid solutions containing 95% $BaTiO_3$ + 5% $CaTiO_3$ (by weight) and, in addition, such containing 0.75% by weight of $CoCO_3$. The author found that both the dielectric constant and tan $\delta$ show a rapid increase within a narrow range of electric field strengths. Until this increase, polarized seignettoelectric materials have a lower $\varepsilon$ and tan $\delta$ than unpolarized ones, but in stronger fields $\varepsilon$ and tan $\delta$ of the former materials exceed the corresponding values of unpolarized samples considerably. The harder the seignettoelectric substance and the greater the residual polarization, the higher is the field strength at which a rapid increase of $\varepsilon$ and tan $\delta$ commences and the greater is the difference in $\varepsilon$ - $f(E)$ and tan $\delta$ - $f(E)$ of polarized and unpolarized seignettoelectric materials. In the case of polarized seignettoelectric substances, the maximum of the function $\varepsilon$ - $f(E)$ appears sooner than in unpolarized ones. This and the enhanced value of $\varepsilon$ in strong fields due to the action of a constant field are after-effects. The beginning of the sharp increase and

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Investigation of the dependence of ...

the maximum of the function $\varepsilon = f(E)$, as well as the maximum of $\tan \delta = f(E)$ of polarized seignettoelectric materials shift with rising frequency toward higher frequencies. The frequency dependence of $\varepsilon$ of polarized and unpolarized seignettoelectric materials has the same character. Their quantitative difference consists in that the frequency dependence of $\varepsilon$ of polarized samples in strong fields is more pronounced and that the sharp frequency dependence begins with weaker fields. The author thanks G. A. Smolenskiy, Doctor of Physical and Mathematical Sciences, for a discussion and for his interest in the work. There are 8 figures and 8 references: 5 Soviet-bloc and 3 non-Soviet-bloc. The reference to an English-language publication reads as follows: D. A. Berlincourt, B. Jaffe, G. Jaffe. IRE National Convention Record, 7, 227, 1959.

SUBMITTED:     November 15, 1960 (initially); January 16, 1961 (after revision)

Card 3/3

· 37940

S/181/62/004/005/035/055
B108/B112

24.7800

AUTHOR:    El'gard, A. M.

TITLE:    Dielectric properties of polarized ferroelectrics in strong electric fields

PERIODICAL:  Fizika tverdogo tela, v. 4, no. 5, 1962, 1312 - 1319

TEXT:  The dependences of $\varepsilon$ and $\tan\delta$ on the electric field strength were studied on polarized and non-polarized specimens of $BaTiO_3$ and solid solutions of 95% by weight $BaTiO_3$ + 5% by weight $CaTiO_3$ at 3 temperatures ranging from $-50°$ to $+140°C$. The frequencies were 50 cps and 10 kcps. The dielectric properties of polarized specimens differ considerably from those of unpolarized ones. As temperature rises, the inflexion in the $\varepsilon = f(E)$ curves of the examined ferroelectrics is displaced toward lower field strength considerably less than the maximum on these curves. The temperature dependence of the dielectric constant in a strong field change with increasing frequency. At low frequencies, it becomes smoother and the maximum is shifted to lower temperatures which is not the case at

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*24.7800*

*379l1*

S/181/62/004/005/036/055
B108/B112

AUTHOR:      El'gard, A. M.

TITLE:       Anisotropy of the dielectric properties in a strong electric
             field of ferroelectrics pretreated in an electric field

PERIODICAL:  Fizika tverdogo tela, v. 4, no. 5, 1962, 1320 - 1325

TEXT:  $\varepsilon$ and $\tan\delta$ of ferroelectrics pretreated in a constant or alternat-
ing electric field were studied in respect of their changes in a strong
electric alternating field (50 cps; 0 - 8 kv/cm).  Previously to the
measurements, the specimens were cooled down from their Curie temperature
to room temperature in an alternating electric field of some 5 kv/cm, and
subsequently they were polarized in a field of 10 kv/cm.  Experiments
were made at various temperatures between 20 and 100°C.  Such treatment of
the specimens caused a substantial dependence of $\varepsilon(E)$ and $\tan\delta(E)$ on the
direction of the field during pretreatment.  Also the temperature de-
pendences of the dielectric constant are different in the direction of the
field and perpendicular to it.  The shift of the maximum of these functions
to lower temperatures is stronger in the direction of the pretreatment.

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Anisotropy of the dielectric properties ...    S/181/62/004/005/036/055
B108/B112

These anisotropies increase with the intensity of the field applied. They
reach their maximum together with the dielectric constant. When an alter-
nating electric field acts upon a polarized ferroelectric it will destroy
the texture of the latter. Accordingly, the depolarization in the direc-
tion perpendicular to the texture proceeds gradually with increasing field
strength, but on the other hand the depolarization in the direction of the
texture takes place rapidly in a narrow band of field strengths. There
are 5 figures.

SUBMITTED:   September 2, 1961 (initially)
             January 12, 1962 (after revision)

Card 2/2

L 17330-63          EWT(1)/BDS/ES(s)-2    AFFTC/ASD/FSD-3/SSD    Pt-4

ACCESSION NR: AP3004897                S/0120/63/000/004/0094/0097

                                                              6 /

AUTHOR: El'gard, A. M.

TITLE: Thermometer method of measuring dielectric loss in strong electric fields

SOURCE: Pribory*i tekhnika eksperimenta, no. 4, 1963, 94-97

TOPIC TAGS: dielectric loss, dielectric-loss measurement

ABSTRACT: This method is based on measuring the rate of the initial tempera-
ture rise of a specimen due to dielectric loss. To avoid a too high rise rate in
strong electric fields and at high frequencies, measurements are made under
low-duty-factor pulse conditions. The claimed error of dielectric-loss
measurement is 20%. $BaTiO_3$ ferroelectric was used for testing the new instru-
ment. Theoretical considerations, functional and circuit diagrams, and techni-
cal data are supplied in the article. Orig. art. has: 3 figures and 2 formulas.

Card  1/1/

ACCESSION NR:   AP4043378                    S/0181/64/006/008/2502/2509

AUTHOR:   El'gard, A. M.

TITLE:   Effect of unilateral mechanical stresses on the dielectric and piezoelectric properties of polarized ferroelectrics

SOURCE:   Fizika tverdogo tela, v. 6, no. 8, 1964, 2502-2509

TOPIC TAGS:   ferroelectric material, barium titanate, dielectric property, piezoelectric property, ceramic dielectric, lead compound, polarization

ABSTRACT: . This investigation is stimulated by the fact that the effective mechanical stresses on ferroelectric properties have not been sufficiently well studied, with the possible exception of $BaTiO_3$ ceramic, and by the fact that recently highly effective piezoceramic materials have been developed on the basis of other ferroelectrics. The author investigated the effect of unilateral mechanical stresses

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ACCESSION NR: AP4043378

on the dielectric and piezoelectric properties of polarized ceramic ferroelectrics based on barium titanate, lead metaniobate, and lead zirconate-titanate. The unilateral compression was with the aid of a special lever-type press. The samples were prisms 8 x 8 x 15 mm with electrodes either on the ends or on the side faces, and were always compressed along the height so that the mechanical stresses were oriented either parallel or perpendicular to the polarization direction. The variation of the dielectric constant with the applied alternating voltage was obtained for the ferroelectrics both in the compressed state and after removal of the load. This yielded data on the reversible and irreversible variation of the piezoelectric moduli in both compression ($\sim$1200 kg/cm$^2$) and tension ($\sim$200 kg/cm$^2$). The differences between the various compositions are analyzed in detail. The results are interpreted on the basis of notions concerning the reorientation of domains under the influence of mechanical stresses. Orig. art. has: 4 figures.

Card   2/3

ACCESSION NR:   AP4043378

ASSOCIATION:   None

SUBMITTED:   24Aug63                                    ENCL:   00

SUB CODE:   SS                 NR REF SOV:   009         OTHER:   007

Card   3/3

-PA(e)-2/EWT(m)/EWP(e)/EPF(n)-2/EPA(w)-2/EWP(b)/EW4(h)    Pab-IO/
FWL/SOD/SD(a)-A/AS mp)-2/ASD(m)-3 AFPTH

AUTHOR:    Sy*rkin, L. N.; El'gard, A. M.

L 17591-65
ACCESSION NR:  AP4048393

AO - audio oscillator
V - VTVM
M - microphone
Sp - specimen
Sw - switch