SUPPLEMENT TO BIBLIOGRAPHY AND ABSTRACTS ON THERMOSTAT METALS - 1960 AND 1961

1960

No. 520. A. S. Belorusov and Ya. S. Shvartsbart, "Manufacture of Coiled Thermo-Bimetallic Strip," Metallurg, January, 1960, pp. 25-27.

Production of TB-3 thermo-bimetal, composed on N23Kh2 alloy as an active layer and N36 alloy as a passive layer. Degreasing in Na_2CO_3 concentrate and electrolytic etching of billets. Deposition of Fe as an intermediate layer by means of electrolysis. Rolling is performed within 48 hours after welding to avoid oxidizing.

No. 521. G. Cosmin and R. Tomoioaga, "Contributions to the Calculation of Thermal Relays for the Protection of Motors," Electrotecknica (Roumania), Vol. 8, No. 7, pp. 233-243 (July 1960).

The performance of bimetallic strips is studied in view of their application in thermal relays for the protection of motors. An equation is derived for the deflection of the bimetallic strip in terms of temperature for a given restraining force, and verified experimentally. By introducing an equivalent temperature, the direct relationship between the current passing through the bimetallic strip and its deflection is established. From this it is possible to calculate the dimensions of thermal relays for protecting motors (Science Abstracts).

No. 522. R. Fischgold and I. Dragen, "Beitrag zum Studium der Verformung von Bimetallen beim Warmwalzen," Revue Roumaine de Metallurgie, Vol. 5, No. 1, 1960, pp. 60-71.

Study of deformation in hot rolling of bimetals; factors influencing process of cladding by rolling; attempt made to explain relation between reduction and increase of width; data on clad steel-copper, and steel-brass presented. (Engineering Index)

No. 523. A. C. Gilbraith, "Some Properties and Uses of Clad Metals," Sheet Metal Industries, Vol. 37, No. 399, July, 1960, pp. 514-518.

Four major categories of clad metal combinations are non-precious metal cladded to non-precious metal, precious metal to non-precious metal, precious metal to precious metal, and thermostat metals; specifying clad metals; design functions; comparisons between clad and electroplated metals; applications. (Engineering Index)

No. 524. Karlheinz Hild, "Motor Protective Relay ZO," Klockner-Moeller Post, Vol. 1960, No. 2, pp. 16-23, 1960.

A description of a new Thermometal Overload Relay. A wide range of adjustment necessitates temperature compensation. Relay is equipped with a snap action switch. After a description of the device, short circuit interruption capacity, release time and fuse selection are discussed. The need for accurate calibration is explained and calibration procedure of this device is described. Installation of the device on starters is demonstrated.

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No. 525. Calvin J. Holtkamp, "An Automatic Surface Unit Control for Electric Ranges," American Institute of Electrical Engineers Conference Paper CPA 60-5033, 7 pages, May 16-17, 1960.

Describes a new type of automatic surface unit control which is simple in design and rugged in construction.

No. 526. F. Kaspar, "Special Materials for Thermal Relays," Elektrotech. Obzor, Vol. 49, No. 1, pp. 14-19, (1960).

Bimetallic strips of these relays can be damaged on excessive short-circuit currents. Recently bimetallic strips came into use which are covered on both sides with a copper layer. Mainly, these layers conduct excessive short-circuit currents and prevent unpermissible deflections of the bimetal. In addition protection against corrosion is provided. This strip is subjected to both extension and bending and the theory is developed connecting strains, stresses, and strip deflection with temperature increase. Similar relations are derived for another type of bimetallic strip, where a third kind of metallic layer is inserted between the two main layers. (Science Abstracts)

No. 527. F. Kaspar, "Thermo-Bimetalle in Der Elektrotechnik," VEB Verlag Technik, Berlin, Germany, 371 pages, 1960.

This translation of a Czechoslovakian book on thermostatic bimetals provides thorough coverage, beginning with the details of bimetal construction and the basic types of mechanisms utilizing bimetals. The author devotes a major part of the book to their use in protective devices for electric plants and installations. Subsequent chapters treat their use as control devices for a wide range of electric machinery, household equipment, etc., the processing of bimetals, and standards and testing. The calculations are aided by nomograms, and a considerable bibliography is given in several languages.

No. 528. David B. Price, "Immersible Coffee Maker," American Institute of Electrical Engineers Conference Paper CPA 60-5036, 6 pages, May 16-17, 1960.

Describes a new immersible coffee percolator developed by Westinghouse Corporation.

No. 529. B. Rusjan, "Control of Room Temperature by Thermostats," Elektrotek. Vestnik (Yugoslavia), Vol. 28, No. 8-10, pp. 184-188, August-October, 1960.

No. 530. E. J. Stefanides, "Spiral Bimetal Strip Rotates Vane to Modulate Furnace Air Flow," Design News, July 4, 1960, pp. 24-25.

A device for regulating furnace air flow uses a spiral bimetallic element with a flexible strip heater wound between the turns to position a vane across the blower discharge.

No. 531. W. C. Stevens, Jr., "Calibration and Quality Control, Testing of Thermostats," American Institute of Electrical Engineers Conference Paper CPA 60-5025, 12 pages, May 16-17, 1960.

Outlines methods, costs of equipment, operating costs, practical scope, and problems in checking the calibration of bimetal thermostats.

No. 532. V. W. Wigotsky, "Coupling of Bimetals Eliminates Ambient Effect on Overload Protection," Design News, April 11, 1960, pp. 46-47.

Describes ambient-compensated overload relay designed by Arrow-Hart and Hegeman Electric Company. Unit incorporates compensating bimetal element which is coupled to identical working bimetal. Tripping time is independent of ambient temperature and only a function of overload condition.

No. 533. R. Wyeth, "Thermal Metering Insures Maximum Electrical Efficiency," Plant Engineering, Vol. 14, No. 11, November 1960, pp. 133-140.

This discussion concerns making electrical measurements using various types of meters, including the time lagged thermal response meter employing matched bimetal coils. Advantages of each type meter are covered with regard to the type of information obtained from each meter, the relative value of this information, and the cost of obtaining it. Operating principles of the thermal response meter are illustrated, and its importance for certain applications is discussed.

No. 534. F. Yeaple, "Which Heat Protector for the Motor?" Product Engineering, Vol. 31, No. 37, September 12, 1960, pp. 53-61.

All factors affecting response and accuracy of motor thermal-protection systems are given. Describes characteristics and gives limitations of each available sensing device. Inherent (inside-the-motor) detectors are shown to provide complete protection even when duty cycle is not readily predictable.

No. 535. "Spec. for Thermographs (Bimetallic Type)," British Standards Institution, B. S. 3231, 1960, 7 pages.

Specification covers bimetallic-type thermographs for general and marine use at 0 - 140°F., materials not specified beyond stating that selection should be based on avoidance of electrolytic or atmospheric corrosion.

No. 536. "Thermobimetalle & Irhe Anwendung," (Thermobimetals and Their Uses), G. Rau, Pforzheim, 1960.

This book covers bimetal lore: history, uses, mathematics, etc.

1961

No. 537. E. C. Ballard and R. D. Mulry, "Temperature Correlation Between Customer and Vendor Pertaining to Disc Thermostats," American Institute of Electrical Engineers Conference Paper CPA 61-5026, 12 pages, May 1, 2, 3, 1961.

Discussed problem of temperature correlation of snap-action disc thermostats between customers and vendors.

No. 538. R. L. Candlish, "Electric Windshield Washer Uses Glass Tube Circuit Breaker," Design News, February 13, 1961, pp. 56-57.

The operating time of an electric drive windshield washer system is controlled by a small glass-housed circuit breaker that also provides overload protection for the motor.

No. 539. S. O. Grant, "Control of Electrical Heat Storage Systems," Electrical Times (GB), Vol. 140, No. 11, September 14, 1961, pp. 365-372.

The economical performance of off-peak electrical floor-warming installations is closely connected with the method used for control of the charge. Three methods of control in commercial use are described: (1) Sectionalized control solely by room thermostats, (2) Temperature/time regulators, (3) Thermostat combinations. These three methods are reviewed. Reference is made to the improvement of a simple thermostat by the addition of a heater, whereby it is converted to one having proportional control action. (Science Abstracts)

No. 540. W. D. Huston, "The Accuracy and Sensitivity of Bimetallic Temperature Measuring Elements," paper presented at the 4th Symposium on Temperature, American Institute of Physics, Instrument Society of America, and National Bureau of Standards, Columbus, Ohio, March 27-31, 1961, 9 pages.

Topics presented include bimetallic materials, mechanics of materials, and stability, sensitivity, accuracy, and applications of bimetal thermometers.

No. 541. E. R. Kebbon, "Bimetal Thermometers," Instruments and Control Systems, May, 1961, pp. 841-845.

Bimetal thermostats feature simplicity, ruggedness, and economy. Here are their principles, features, application, response, and accuracy characteristics. This is a review article giving a brief summary of thermostatic bimetal and applications to industrial thermometers.

No. 542. P. Martin and N. Yarworth, "Theory and Use of Thermostatic Bimetals," Engineering, Vol. 192, September 22, 1961, pp. 366-367.

Thermostatic bimetals tested are Fe-base alloys containing 14 - 50% Ni with small additions of Cr and Mn. Determination of the effect on thermal activity of varying and low expansion component in combination with a common high expansion alloy at -70 to 500°C. Application of thermostatic bimetals for industrial and domestic use (thermostat, voltage regulator).

No. 543. P. Martin and N. Yarworth, "An Introduction to the Theory and Use of Thermostatic Bimetals," Telcon Metals Limited, Crawley, England, 1961, 12 pages.

This paper covers a discussion of principles of operation, design formula, practical design considerations, and applications.

No. 544. A. Milnes, "Load Factors - Keys to Steam Trap Operation," Modern Plant Operation and Maintenance, August - September, 1961, pp. 22-24.

Author simplifies the complex field of steam trap load factors, how to determine them, and how they affect efficient operation. Balanced-pressure thermostatic, liquid expansion thermostatic, bimetallic expansion thermostatic, float-thermostatic, inverted bucket, and "Thermo-Dynamic" steam traps are discussed.

No. 545. C. C. Perry, "Matching Bimetal Elements to Snap Action Switches," American Institute of Electrical Engineers Conference Paper CP 61-393, January 29 - February 3, 1961, 12 pages.

Presents problem of achieving optimum design of a cantilever bimetal element for actuating a snap-action switch.

No. 546. T. Schanche, "Protection of Delta-Connected Motors with Bimetal Cut-Outs," Elektrotek. Tidsskrift (Norway), Vol. 74, No. 7, pp. 97-99 (March 5, 1961).

Bimetallic cut-outs are usually arranged in the three wires of delta-connected three-phase motors to be protected against thermal overloads. It is concluded that every delta-connected three-phase motor with bimetal-cut-out protection will probably suffer damage without the protection acting, if the motor works at about half-load and loses voltage on one of the three wires. If bimetal cut-outs are used for delta-connecting motors, it is very important that the cut-outs are not set higher than the rated current of the motor. (Science Abstracts)

No. 547. E. W. Schrader, "Bimetal Washer Compensates Speed Switch for Temperature," Design News, Vol. 16, No. 17, August 18, 1961, pp. 82-83.

A bimetal Belleville washer compensates for temperature expansion of a coil spring in a speed-sensitive switch.

No. 548. R. M. Sears, "What Metal Shall I Use---for Resistance-Welded Thermostats?" Metal Progress, Vol. 80, October, 1961, p. 133.

Welding of bimetallic thermostats from high and low expansion metals such as Invar, 430 stainless steel, B Monel, silicon bronze and Ni.

No. 549. H. Spengler, "Aging of Bimetallic Thermal Elements," Elektrotechnische Zeitschrift, Vol. 13, October 30, 1961, pp. 596-601.

Review of physical, chemical and mechanical properties of bimetallic elements based on Fe Ni, Fe Ni Mn, Ni, Mn, stainless steel and brass and investigation of change of thermal properties and modulus of elasticity, hardness and bending strength during 300-500°C. aging.

No. 550. C. F. Zeigler, "Thermostatic Bimetal Element Design Techniques," American Institute of Electrical Engineers Conference Paper CPA 61-5025, 11 pages, May 1, 2, 3, 1961.

Discusses new concepts of thermostatic bimetal element design techniques. Subjects mentioned are specific deflection, frictional loads, mechanical work analysis, simply supported beams, matching elements to snap action switches, and deflection due to flow of electrical current.

No. 551. "How an Automatic Shower Valve Works," Popular Science, August, 1961, pp. 80-81.

Describes the operation of an automatic shower valve containing a bimetal spiral coil as the actuator.

No. 552. "Telcon Thermostatic Bimetals," Telcon Metals Ltd., Crawley, England, Publication No. TMI/861, 1961, 16 pages.

Description of the thermostatic bimetals produced by Telcon Metals Ltd. Properties, design data, tolerances, and examples of uses are given.

No. 553. "Timers," Electromechanical Design, March, 1961, p. 56.

Reference to thermostat metal as one of several sources of time delay mechanisms. Time delay is accomplished through thermal lag. Here the physical variable is temperature. Voltage is applied to a heater whose heat, following a time lag, causes the temperature change of the bi-metal. In others, the heater current flows through a contact of the relay itself.

No. 554. "DIN 1715," German Industrial Standards, March, 1961, 6 pages.

Draft of a standard on a number of types of thermobimetals. Covered are specific thermal deflection, linear range, maximum temperature, specific electrical resistance, permissible bending stress, chemical composition, designation, heat treatment, forming, corrosion protection, dimensions and tolerances, methods of manufacture, method of shipping, conditions of shipping, identification, and testing.