

Exhibit K

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DEPARTMENT OF ENERGY

Office of Energy Efficiency and Renewable Energy

10 CFR Parts 434 and 435

[Docket No. EE-RM-79-112-C]

RIN 1904-AA69

Energy Code for New Federal Commercial and Multi-Family High Rise Residential Buildings

AGENCY: Office of Energy Efficiency and Renewable Energy, DOE.

ACTION: Final rule.

SUMMARY: The Department of Energy today issues a rule that establishes building energy efficiency standards for new Federal commercial and multi-family high rise residential buildings pursuant to the requirements of the Energy Conservation and Production Act (ECPA). The final rule revises the current interim Federal standards to conform generally with the format of the current voluntary building energy codes. The final rule contains substantive changes from the interim rule in the areas of lighting, mechanical ventilation, motors, building envelopes, fenestration rating test procedures, and test procedures for heating and cooling equipment.

DATES: Effective Date: This regulation is effective October 8, 2001. The incorporation by reference of certain publications listed in this rule is approved by the Director of the Federal Register as of October 8, 2001.

FOR FURTHER INFORMATION CONTACT:

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I. Introduction

A. Authority

Section 305(a)(1) of the Energy Conservation and Production Act, as amended (ECPA), 42 U.S.C. 6834(a)(1), requires the Department of Energy ("Department" or "DOE") to establish by rule energy standards for new Federal buildings. In developing this final rule, the Department is directed to consult with other Federal agencies as well as

private and State associations and other appropriate persons.

Section 305(a)(1) requires that the rule contain energy efficiency measures that are technologically feasible and economically justified. Since ECPA establishes that the new standards meet, at a minimum, the requirements of the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE)/Illuminating Engineering Society of North America (IESNA) Standard 90.1-1989 (hereinafter Standard 90.1-1989) (Section 305(a)(2)(A)), the Department is not required to establish the technological feasibility and economic justification for these minimum statutorily prescribed requirements (otherwise referred to as the "statutory baseline"). The Department is interpreting this minimum requirement to include those addenda to Standard 90.1-1989 which were in effect at the time the Energy Policy Act of 1992 (EPACT), which amended ECPA, was enacted. Since these addenda were part of Standard 90.1-1989 at the time EPACT was enacted, they are part of the baseline against which the final rule is compared for the purposes of assessing its energy and economic impacts.

Section 305(a)(2)(A) requires that the rule contain energy saving and renewable energy specifications that meet or exceed the energy saving and renewable energy specifications of Standard 90.1-1989 for commercial buildings and of the Model Energy Code (MEC), 1992, for residential buildings. MEC 1992 exempts multi-family high-rise residential buildings (over three stories in height above ground) which comply with Standard 90.1-1989. As a result, Standard 90.1-1989 is the applicable standard under section 305 of ECPA for high-rise residential buildings. The final rule complies with section 305(a)(2)(A).

The rule issued today is required to become effective no later than one year after it is issued. (Section 305(a)(1)). The effective date is October 8, 2001.

Section 305(a)(2)(B) requires that to the extent practicable, the new Federal building energy standards use the same format as the appropriate voluntary building energy code. The final rule revises the current interim Federal standards to conform generally with the format and language of the codified version of Standard 90.1-1989. The addenda to Standard 90.1-1989 included in the final rule are also generally incorporated in their codified form.

Section 305(a)(2)(C) further requires that the final rule be established in consultation with the Environmental

by considering the energy cost and other costs and cost savings that occur during the expected economic life of the alternative.

603.2.2 The designer shall use the procedures set forth in subpart A of 10 CFR part 436 to make this determination. The fuel selection life cycle cost analysis shall include the following steps:

603.2.2.1 Determine the feasible alternatives for energy sources of the Proposed Design's HVAC systems, service hot water, and process loads.

603.2.2.2 Model the Proposed Design including the alternative HVAC and service water systems and conduct an annual energy analysis for each fuel source alternative using the simulation tool specified in this section. The annual energy analysis shall be computed on a monthly basis in

conformance with subpart E with the exception that all process loads shall be included in the calculation. Separate the output of the analysis by fuel type.

603.2.2.3 Determine the unit price of each fuel using information from the utility or other reliable local source. During rapid changes in fuel prices it is recommended that an average fuel price for the previous twelve months be used in lieu of the current price. Calculate the annual energy cost of each energy source alternative in accordance with procedures in subpart E for the Design Energy Cost. Estimate the initial cost of the HVAC and service water systems and other initial costs such as energy distribution lines and service connection fees associated with each fuel source alternative. Estimate other costs and benefits for each alternative including, but not necessarily limited

to, annual maintenance and repair, periodic and one time major repairs and replacements and salvage of the energy and service water systems. Cost estimates shall be prepared using professionally recognized cost estimating tools, guides and techniques.

603.2.2.4 Perform a life cycle cost analysis using the procedure specified in subsection 603.2.

603.2.2.5 Compare the total life cycle cost of each energy source alternative. The alternative with the lowest total life cycle cost shall be chosen as the energy source for the proposed design.

§ 434.604 Compliance.

604.1 Compliance with this section is demonstrated if the Design Energy Use is equal to or less than the Energy Use Budget.

$$DEU < EUB \quad \text{Equation 604.1}$$

604.2 The energy consumption shall be measured at the building five foot line for all fuels. Energy consumed from non-depletable energy sources and heat recovery systems shall not be included in the Design Energy Use calculations. The thermal efficiency of fixtures, equipment, systems or plants in the proposed design shall be simulated by the selected calculation tool.

§ 434.605 Standard Calculation Procedure.

605.1 The Standard Calculation Procedure consists of methods and assumptions for calculating the Energy Use Budgets for Prototype and Reference Buildings and the Energy Use for the Proposed Design. In order to maintain consistency between the Energy Use Budgets and the Design Energy Use, the input assumptions stated in subsection 510.2 are to be used.

605.2 The terms Energy Cost Budget and Design Energy Cost or Design Energy Consumption used in subpart E of this part correlate to Energy Use Budget and Design Energy Use, respectively, in subpart F of this part.

§ 434.606 Simulation tool.

606.1 The criteria established in subsection 521 for the selection of a simulation tool shall be followed when using the compliance path prescribed in subpart F of this part.

§ 434.607 Life cycle cost analysis criteria.

607.1 The following life cycle cost criteria applies to the fuel selection

requirements of this subpart and to option life cycle cost analyses performed to evaluate energy conservation design alternatives. The fuel source(s) selection shall be made in accordance with the requirements of subpart A of 10 CFR part 436. When performing optional life cycle cost analyses of energy conservation opportunities the designer may use the life cycle cost procedures of subpart A of 10 CFR part 436 or OMB Circular 1-94 or an equivalent procedure that meets the assumptions listed below:

607.1.1 The economic life of the Prototype Building and Proposed Design shall be 25 years. Anticipated replacements or renovations of energy related features and systems in the Prototype or Reference Building and Proposed Design during this period shall be included in their respective life cycle cost calculations.

607.1.2 The designer shall follow established professional cost estimating practices when determining the costs and benefits associated with the energy related features of the Prototype or Reference Building and Proposed Design.

607.1.3 All costs shall be expressed in current dollars. General inflation shall be disregarded. Differential escalation of prices (prices estimated to rise faster or slower than general inflation) for energy used in the life cycle cost calculations shall be those in effect at the time of the latest "Annual Energy Outlook" (DOE/EIA-0383) as

published by the Department of Energy's Energy Information Administration.

607.1.4 The economic effects of taxes, depreciation and other factors not consistent with the practices of subpart A of 10 CFR part 436 shall not be included in the life cycle cost calculation.

Subpart G—Reference Standards

§ 434.701 General.

701.1 *General.* The standards, technical handbooks, papers, regulations, and portions thereof, that are referred to in the sections and subsections in the following list are hereby incorporated by reference into this part 434. The following standards have been approved for incorporation by reference by the Director of the Federal Register in accordance with 5 U.S.C. 522(a) and 1 CFR part 51. A notice of any change in these materials will be published in the **Federal Register**. The standards incorporated by reference are available for inspection at the Office of the Federal Register, 800 North Capitol Street, NW, Suite 700, Washington, DC and the U.S. Department of Energy, Office of Energy Efficiency, Hearings and Dockets, Forrestal Building, 1000 Independence Avenue SW, Washington, DC 20585. The standards may be purchased at the addresses listed at the end of each standard. The following standards are incorporated by reference in this part:

Ref. No.	Standard designation	CFR section
RS-1	ANSI/ASHRAE/IESNA 90.1-1989, Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings, and Addenda 90.1b-1992, 90.1c-1993, 90.1d-1992, 90.1e-1992, 90.1f-1995, 90.1g-1993, 90.1i-1993, American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., ASHRAE 1791 Tullie Circle NE, Atlanta, GA 30329.	434.301.1; 434.402.1.2.4; 434.402.4.2; 434.403.2.1.
RS-2	ANSI/ASHRAE 55-1992 including addenda 55a-1995, Thermal Environmental Conditions for Human Occupancy, American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 1791 Tullie Circle NE, Atlanta, GA 30329.	434.301.2; 434.519.1.1.
RS-3	NEMA MG1-1993, "Motors and Generators," Revision No. 1, December 7, 1993, National Electrical Manufacturers Association, 1300 North 17th Street, Suite 1847, Rosslyn, VA 22209.	434.401.2.1.
RS-4	ASHRAE, Handbook, 1993 Fundamentals Volume, American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc., 1791 Tullie Circle NE, Atlanta, GA 30329.	434.402.1.1; 434.402.1.2.1; 434.402.1.2.2; 434.402.1.2.4; 434.402.2.2.5.
RS-5	ASTM C 177-85 (Reapproved 1993), Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.	434.402.1.1; 434.402.1.2.1; 434.402.1.2.2.
RS-6	ASTM C 518-91, Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.	434.402.1.1; 434.402.1.2.1; Table 402.1.2.2; Table 403.2.9.2.
RS-7	ASTM C 236-89 (Reapproved 1993), Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.	434.402.1.1; 434.402.1.2.1; 434.402.1.2.2.
RS-8	ASTM C 976-90, Test Method for Thermal Performance of Building Assemblies by Means of a Calibrated Hot Box, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.	434.402.1.1; 434.402.1.2.1; 434.402.1.2.2.
RS-9	Report TVAHB-3007, 1981, "Thermal Bridges in Sheet Metal Construction" by Gudni Johannesson. Lund Institute of Technology, Lund, Sweden.	434.402.1.2.3.
RS-10	ASTM E 283-91, Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Difference Across the Specimen, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.	434.402.2; 434.402.2.1.
RS-11	ANSI/AAMA/NWDA 101/I.S.2-97, Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors, American Architectural Manufacturers Association, 1827 Walden Office Square, Suite 104, Schaumburg, IL 60173-4628.	434.402.2.1; 434.402.2.2.4.
RS-12	ASTM D 4099-95, Standard Specification for Poly (Vinyl Chloride) (PVC) Prime Windows/Sliding Glass Doors, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.	434.402.2.1.
RS-13	ANSI/AAMA/NWDA 101/I.S.2-97, Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors, National Wood Window and Door Association (formerly the National Woodwork Manufacturers Association), 1400 East Toughy Avenue, Suite 470, Des Plaines, IL 60018.	434.402.2.1.
RS-14	ANSI/NWDA I.S.3-95, Wood Sliding Patio Doors, National Wood Window and Door Association (formerly the National Woodwork Manufacturers Association), 1400 East Toughy Avenue, Suite 470, Des Plaines, IL 60018.	434.402.2.2.1.
RS-15	ARI Standard 210/240-94, Unitary Air-Conditioning and Air-Source Heat Pump Equipment 1994. Air-Conditioning and Refrigeration Institute, 4301 North Fairfax Drive, Suite 425, Arlington, VA 22203.	434.403.1.
RS-16	ARI Standard 340/360-93, Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment 1993 edition. Air-Conditioning and Refrigeration Institute, 4301 North Fairfax Drive, Suite 425, Arlington, VA 22203.	434.403.1.
RS-17	ARI 310/380-93, Packaged Terminal Air-Conditioners and Heat Pumps, 1993 edition. Air-Conditioning and Refrigeration Institute, 4301 North Fairfax Drive, Suite 425, Arlington, VA 22203.	434.403.1.
RS-18	NFRC 100-97, Procedure for Determining Fenestration Product Thermal Properties, National Fenestration Rating Council, Inc., 1300 Spring Street, Suite 500, Silver Spring, MD 20910.	434.402.1.2.4.
RS-19	NFRC 200-Procedure for Determining Fenestration Product Solar Heat Gain Coefficients at Normal Incidence (1995) National Fenestration Rating Council, Inc., 1300 Spring Street, Suite 500, Silver Spring, MD 20910.	434.402.1.2.4.

Ref. No.	Standard designation	CFR section
RS-20	RESERVED.	
RS-21	Z21.47-1993, Gas-Fired Central Furnaces, including addenda Z21.47a-1995, American Gas Association, 400 North Capitol Street, N.W. Washington, DC 20001.	434.403.1.
RS-22	U.L. 727, including addendum dated January 30, 1996, Oil-Fired Central Furnaces (Eighth Edition) 1994, available from: Global Documents, 15 Inverness Way East, Englewood, CO 80112-5704, Underwriters Laboratories, Northbrook, IL 60062, 1994..	434.403.1.
RS-23	ANSI Z83.9-90, Including addenda Z83.9a-1992, Gas-Fired Duct Furnaces, 1990. (Addendum 90.1b) available from: Global Documents, 15 Inverness Way East, Englewood, CO 80112-5704.	434.403.1.
RS-24	ANSI Z83.8-96, Gas Unit Heater and Gas-Fired Duct Furnaces, American National Standards Institute, 11 West 42nd Street, New York, NY 10036.	434.403.1.
RS-25	U.L. 731, Oil-Fired Unit Heaters (Fifth Edition) 1995 available from: Global Documents, 15 Inverness Way East, Englewood, CO 80112-5704, Underwriters Laboratories, Northbrook, IL 60062.	434.403.1.
RS-26	CTI Standard-201, Standard for the Certification of Water-Cooling Towers Thermal Performance, November 1996, Cooling Tower Institute, P.O. Box 73383, Houston, TX 77273.	434.403.1.
RS-27	ARI Standard 320-93, Water-Source Heat Pumps, Air-Conditioning and Refrigeration Institute, 4301 North Fairfax Drive, Arlington, VA 22203.	434.403.1.
RS-28	ARI Standard 325-93, Ground Water-Source Heat Pumps, Air-Conditioning and Refrigeration Institute, 4301 North Fairfax Drive, Arlington, VA 22203.	434.403.1.
RS-29	ARI Standard 365-94, Commercial and Industrial Unitary Air-Conditioning Condensing Units, Air-Conditioning and Refrigeration Institute, 4301 North Fairfax Drive, Arlington, VA 22203.	434.403.1.
RS-30	ARI Standard 550-92, Centrifugal and Rotary Screw Water-Chilling Packages, Air-Conditioning and Refrigeration Institute, 4301 North Fairfax Drive, Arlington, VA 22203.	434.403.1.
RS-31	ARI Standard 590-92, Positive Displacement Compressor Water-Chilling Packages, Air-Conditioning and Refrigeration Institute, 4301 North Fairfax Drive, Arlington, VA 22203.	434.403.1.
RS-32	ANSI Z21.13-1991, including addenda Gas-Fired Low-Pressure Steam and Hot Water Boilers, Addenda Z21.13a-1993 and Z21-13b-1994, American National Standards Institute, 11 West 42nd Street, New York, NY 10036.	434.403.1.
RS-33	ANSI/U.L. 726 (7th edition, 1995), Oil-Fired Boiler Assemblies, available from: Global Documents, 15 Inverness Way East, Englewood, CO 80112-5704, Underwriters Laboratories, Northbrook, IL 60062.	434.403.1.
RS-34	HVAC Duct Construction Standards-Metal and Flexible, 2nd edition, 1995, Sheet Metal and Air-Conditioning Contractors' National Association, Inc., 4201 Lafayette Center Drive, Chantilly, VA 20151.	434.403.2.9.3.
RS-35	HVAC Air Duct Leakage Test Manual, 1st edition, 1985, Sheet Metal and Air-Conditioning Contractors' National Association, Inc., 4201 Lafayette Center Drive, Chantilly, VA 20151.	434.403.2.9.3; 434.403.1.
RS-36	Fibrous Glass Duct Construction Standards, 6th edition, 1992, Sheet Metal and Air-Conditioning Contractors National Association, Inc., 4201 Lafayette Center Drive, Chantilly, VA 20151.	434.403.2.9.3.
RS-37	RESERVED.	
RS-38	ANSI Z21.56-1994, Gas-Fired Pool Heaters; Addenda Z21.56a-1996, American National Standards Institute, 11 West 42nd Street, New York, NY 10036; American Gas Association, 1515 Wilson Boulevard, Arlington, VA 22209.	Table 404.1.
RS-39	ANSI Z21.10.3-1993, Gas Water Heaters, Volume III, Storage with Input Ratings above 75,000 Btu's per Hour, Circulating and Instantaneous Water Heaters, American National Standards Institute, 11 West 42nd Street, New York, NY 10036; American Gas Association, 1515 Wilson Boulevard, Arlington, VA 22209.	Table 404.1; 434.404.1.1.
RS-40	ANSI/AHAM RAC-1-1992, Room Air Conditioners, Association of Home Appliance Manufacturers, 20 North Wacker Drive, Chicago, IL 60606.	434.403.1.
RS-41	ASHRAE Standard 62-1989, Ventilation for Acceptable Indoor Air Quality, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1791 Tulle Circle, Atlanta, GA 30329.	434.403.2.4; 434.403.2.8; 434.519.3.
RS-42	ANSI Z21.66-1996, Automatic Vent Damper Devices for Use with Gas-Fired Appliances, available from: Global Documents, 15 Inverness Way East, Englewood, CO 80112-5704.	434.404.1.
RS-43	NEMA MG 10-1994, Energy Management Guide for Selection and Use of Polyphase Motors, National Electric Manufacturers Association, National Electrical Manufacturers Association, 1300 North 17th Street, Suite 1847, Rosslyn, VA 22209.	434.401.2.1.

Ref. No.	Standard designation	CFR section
RS-44	NEMA MG 11-1977 (Revised 1982, 1987, Energy Management Guide for Selection and Use of Single-Phase Motors, National Electrical Manufacturers Association, National Electrical Manufacturers Association, 1300 North 17th Street, Suite 1847, Rosslyn, VA 22209.	434.401.2.1.
RS-45	ARI Standard 330-93, Ground-Source Closed-Loop Heat Pumps, Air-Conditioning and Refrigeration Institute, 4301 North Fairfax Drive, Arlington, VA 22209.	434.403.1.
RS-46	ARI Standard 560-92, Absorption Water Chilling and Water Heating Packages, Air-Conditioning and Refrigeration Institute, 4301 North Fairfax Drive, Arlington, VA 22209.	434.403.1.
RS-47	ASHRAE, Handbook, HVAC Applications; I-P Edition, 1995, American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc., 1791 Tullie Circle NE, Atlanta, GA 30329.	434.518.2.

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