# MINIMUM EFFICIENCY REQUIREMENTS TABLES FOR HEATING AND COOLING PRODUCT CATEGORIES

The Federal Energy Management Program (FEMP) created tables that mirror American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 90.1-2013 tables, which include minimum efficiency requirements for FEMP-designated and ENERGY STAR-qualified heating and cooling product categories.

**Air-Source Heat Pumps (Residential), Central Air Conditioners (Residential), Geothermal Heat Pumps (Residential), and Light Commercial Heating and Cooling Equipment**

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| **Electrically Operated Unitary Heat Pumps: Minimum Efficiency Requirements** | | | | |
| **Equipment Type** | **Size Category** | **Heating Section Type** | **Subcategory or Rating Condition** | **Minimum Efficiency** |
| Air-cooled (cooling mode) | <65,000 Btu/h | All | Split system | 15.0 SEER; 12.5 EER; 8.5 HSPF (single phasea) |
| Single package | 15.0 SEER; 12.0 EER; 8.2 HSPF (single phasea) |
| ≥65,000 Btu/h and <135,000 Btu/h | Electric resistance (or none) | Split system and single package | 11.8 EER; 12.8 IEER; 3.4 COP at 470F |
| ≥135,000 Btu/h and <240,000 Btu/h | Electric resistance (or none) | Split system and single package | 10.9 EER; 12.0 IEER; 3.3 COP at 470F |
| ≥240,000 Btu/hb | Electric resistance (or none) | Split system and single package | 9.5 EER; 10.6 IEER |
| Geothermal, closed loop water-to-air |  |  |  | 17.1 EER; 3.6 COP (single phase) |
| Geothermal, open loop water-to-air |  |  |  | 21.1 EER; 4.1 COP (single phase) |
| Geothermal, closed loop water-to-water |  |  |  | 16.1 EER; 3.1 COP (single phase) |
| Geothermal, open loop water-to-water |  |  |  | 20.1 EER; 3.5 COP (single phase) |
| Geothermal, DGX |  |  |  | 16.0 EER; 3.6 COP (single phase) |
| a Three phase heat pumps in the <65,000 Btu/h category are not covered by ENERGY STAR  b Heat pumps with size equal to or greater than 240,000 Btu/h are not covered by federal purchasing requirements. Minimum efficiency presented is consistent with ASRHAE 90.1-2013 Table 6.8.1-2. | | | | |

**Central Air Conditioners and Light Commercial Heating and Cooling Equipment**

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| **Electrically Operated Unitary Air Conditioners: Minimum Efficiency Requirements** | | | | |
| **Equipment Type** | **Size Category** | **Heating Section Type** | **Subcategory or Rating Condition** | **Minimum Efficiency** |
| Air conditioners, air-cooled | <65,000 Btu/h | All | Split system | 15.0 SEER and 12.5 EER (single phasea) |
| Single package | 15.0 SEER and 12.0 EER (single phasea) |
| ≥65,000 Btu/h and <135,000 Btu/h | Electric resistance (or none) | Split system and single package | 12.2 EER and 14.0 IEER |
| All other | Split system and single package | 12.0 EER and 13.8 IEER |
| ≥135,000 Btu/h and <240,000 Btu/h | Electric resistance (or none) | Split system and single package | 12.2 EER and 13.2 IEER |
| All other | Split system and single package | 12.0 and 13.0 IEER |
| ≥240,000 Btu/h and <760,000 Btu/hb | Electric resistance (or none) | Split system and single package | 10.0 EER and 11.6 IEER |
| All other | Split system and single package | 9.8 EER and 11.4 IEER |
| ≥760,000 Btu/hb | Electric resistance (or none) | Split system and single package | 9.7 EER and 11.2 IEER |
| All other | Split system and single package | 9.5 EER and 11.0 IEER |
| a Three phase air conditioners in the <65,000 Btu/h category are not covered by ENERGY STAR  b Air conditioners with size equal to or greater than 240,000 Btu/h are not covered by federal purchasing requirements. Minimum efficiency presented is consistent with ASRHAE 90.1-2013 Table 6.8.1-1. | | | | |

**Boilers (Residential) and Boilers (Commercial)**

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| **Gas- and Oil-Fired Boilers: Minimum Efficiency Requirements** | | | | |
| **Equipment Type** | **Subcategory or Rating Condition** | **Size Category (Input)** | **Efficiency Metric** | **Minimum Efficiency** |
| Boilers, hot water | Gas-fired | <300,000 Btu/h | AFUE | 90% |
| ≥300,000 Btu/h and ≤2,500,000 Btu/h | Eta | 95% |
| >2,500,000 Btu/h and ≤10,000,000 Btu/h | Et | 95% |
| >10,000,000 Btu/hb | Ec | 82% |
| Oil-fired | <300,000 Btu/h | AFUE | 87% |
| ≥300,000 Btu/h and ≤2,500,000 Btu/h | Et | 85.5% |
| >2,500,000 Btu/h and ≤10,000,000 Btu/h | Et | 88.5% |
| >10,000,000 Btu/hb | Ec | 84% |
| Boilers, steam | Gas-fired | <300,000 Btu/h | AFUE | 90% |
| Gas-fired (all, except natural draft) | ≥300,000 Btu/h and ≤2,500,000 Btu/h | Et | 81% |
| >2,500,000 Btu/h and ≤10,000,000 Btu/h | Et | 83% |
| >10,000,000 Btu/hb | Et | 79% |
| Gas-fired, natural draft | ≥300,000 Btu/h and ≤2,500,000 Btu/h | Et | 81% |
| >2,500,000 Btu/h and ≤10,000,000 Btu/h | Et | 83% |
| >10,000,000 Btu/hb | Et | 79% |
| Oil-fired | <300,000 Btu/h | AFUE | 87% |
| ≥300,000 Btu/h and ≤2,500,000 Btu/h | Et | 84% |
| >2,500,000 Btu/h and ≤10,000,000 Btu/h | Et | 85.5% |
| >10,000,000 Btu/hb | Et | 81% |
| a Thermal efficiency (Et) is based on Hydronics Institute, Method to Determine Efficiency of Commercial Space Heating Boilers (HI BTS-2000, Rev. 06.07).  b Boilers with input greater than 10,000,000 Btu/h are not covered by federal purchasing requirements. Minimum efficiency presented is consistent with ASRHAE 90.1-2013 Table 6.8.1-6. | | | | |

**Electric Chillers, Air-Cooled and Water-Cooled**

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| **Water-Chilling Packages: Minimum Efficiency Requirements** | | | | |
| **Equipment Type** | **Size Category** | **Units** | **Minimum Efficiency** | |
| **Path A (Full-Load Optimized Applications)** | **Path B (Part-Load Optimized Applications)** |
| Air-cooled | <150 t | EER (Btu/W) | ≥10.70 FL | ≥9.70 FL |
| ≥13.7 IPLV | ≥15.9 IPLV |
| Air-cooled | ≥150 t | EER (Btu/W) | ≥10.73 FL | ≥9.70 FL |
| ≥14.00 IPLV | ≥16.37 IPLV |
| Water-cooled, electrically operated positive displacement | <75 t | kW/t | ≤0.728 FL | ≤0.78 FL |
| ≤0.60 IPLV | ≤0.50 IPLV |
| Water-cooled, electrically operated positive displacement | ≥75 t and <150 t | kW/t | ≤0.714 FL | ≤0.75 FL |
| ≤0.56 IPLV | ≤0.49 IPLV |
| Water-cooled, electrically operated positive displacement | ≥150 t and <300 t | kW/t | ≤0.629 FL | ≤0.68 FL |
| ≤0.54 IPLV | ≤0.44 IPLV |
| Water-cooled, electrically operated positive displacement | ≥300 t and <600 t | kW/t | ≤0.61 FL | ≤0.625 FL |
| ≤0.52 IPLV | ≤0.41 IPLV |
| Water-cooled, electrically operated positive displacement | ≥600 t | kW/t | ≤0.56 FL | ≤0.585 FL |
| ≤0.50 IPLV | ≤0.38 IPLV |
| Water-cooled, electrically operated centrifugal | <150 t | kW/t | ≤0.61 FL | ≤0.695 FL |
| ≤0.55 IPLV | ≤0.44 IPLV |
| Water-cooled, electrically operated centrifugal | ≥150 t and <300 t | kW/t | ≤0.544 FL | ≤0.635 FL |
| ≤0.55 IPLV | ≤0.40 IPLV |
| Water-cooled, electrically operated centrifugal | ≥300 t and <400 t | kW/t | ≤0.544 FL | ≤0.595 FL |
| ≤0.52 IPLV | ≤0.39 IPLV |
| Water-cooled, electrically operated centrifugal | ≥400 t and <600 t | kW/t | ≤0.541 FL | ≤0.585 FL |
| ≤0.50 IPLV | ≤0.38 IPLV |
| Water-cooled, electrically operated centrifugal | ≥600 t | kW/t | ≤0.55 FL | ≤0.585 FL |
| ≤0.50 IPLV | ≤0.38 IPLV |

**Electric Storage Water Heaters, Gas Storage Water Heaters, Gas Water Heaters, and Solar Water Heaters**

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| **Water-Heating Equipment: Performance Requirements** | | | |
| **Equipment Type** | **Size Category (Input)** | **Subcategory or Rating Condition** | **Performance Required** |
| Electric storage water heaters | ≤24 A and ≤250 V | Heat pump ≤55 gal | EFa ≥2.0 and FHR ≥50 gal/h |
| Heat pump >55 gal and ≤120 gal | EF ≥2.2 and FHR ≥50 gal/h |
| Gas storage water heaters | ≤75,000 Btu/h | ≥20 gal and ≤55 gal | EF ≥0.67 and FHR ≥67 gal/h |
| >55 gal and ≤100 gal | EF ≥0.77 and FHR ≥67 gal/h |
| >75,000 Btu/h | >100 gal and ≤140 gal | TE ≥0.94 or EF ≥0.93 and SL ≤0.84 \* [(input rate/800) + 100√volume)] Btu/h |
| Gas instantaneous water heaters | ≥50,000 Btu/h and <200,000 Btu/h | <4,000 (Btu/h)/gal | EF ≥0.90 and GPM ≥2.5 over a 77-deg rise |
| ≥200,000 Btu/h | ≥4,000 (Btu/h)/gal | TE ≥0.94 or EF ≥0.93 |
| Solar water heaters | ≤75,000 Btu/h | Electric backup | SEF ≥1.8 |
| Gas backup | SEF ≥1.2 |
| a Energy factor (EF) is an efficiency ratio of the energy supplied in heater water divided by the energy input to the water heater.  SL is the standby loss | | | |

**Gas Furnaces**

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| **Warm-Air Furnaces: Minimum Efficiency Requirements** | | | |
| **Equipment Type** | **Size Category (Input)** | **Subcategory or Rating Condition** | **Minimum Efficiency** |
| Warm-air furnace, gas fired | <225,000 Btu/h | Maximum capacity | ≥95.0% (U.S. North/Canada) |
| ≥90.0% (U.S. South) |
| ≥225,000 Btu/ha | Maximum capacity | 80% Et |
| Warm-air furnace, oil fired | <225,000 Btu/h | Maximum capacity | ≥85% AFUE |
| ≥225,000 Btu/ha | Maximum capacity | 81% Et |
| a Furnaces with input equal to or greater than 225,000 Btu/h are not covered by federal purchasing requirements. Minimum efficiency presented is consistent with ASRHAE 90.1-2013 Table 6.8.1-5. | | | |

**Room Air Conditioners**

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| **Electrically Operated Room Air Conditioners: Minimum Efficiency Requirements** | | | |
| **Equipment Type** | **Size Category (Input)** | **Subcategory or Rating Condition** | **Minimum Efficiency** |
| Room air conditioners with louvered sides | <6,000 Btu/h | - | 12.1 CEER |
| ≥6,000 Btu/h and <8,000 Btu/h | - | 12.1 CEER |
| ≥8,000 Btu/h and <14,000 Btu/h | - | 12.0 CEER |
| ≥14,000 Btu/h and <20,000 Btu/h | - | 11.8 CEER |
| ≥20,000 Btu/h and <28,000 Btu/h | - | 10.3 CEER |
| ≥ 28,000 |  | 9.9 CEER |
| Room air conditioners without louvered sides | <8,000 Btu/h | - | 11.0 CEER |
| ≥8,000 Btu/h and <11,000 Btu/h | - | 10.6 CEER |
| ≥11,000 Btu/h and <14,000 Btu/h | - | 10.5 CEER |
| ≥14,000 Btu/h and <20,000 Btu/h | - | 10.2 CEER |
| ≥20,000 Btu/h |  | 10.3 CEER |
| Room air-conditioner heat pumps with louvered sides | <20,000 Btu/h | - | 10.8 CEER |
| ≥20,000 Btu/h | - | 10.2 CEER |
| Room air-conditioner heat pumps without louvered sides | <14,000 Btu/h | - | 10.2 CEER |
| ≥14,000 Btu/h | - | 9.6 CEER |
| Room air conditioner, casement only | All capacities | - | 10.5 CEER |
| Room air conditioner, casement slider | All capacities | - | 11.4 CEER |