HVAC Systems Compliance Forms

Compliance forms are provided in the User's Manual to assist in understanding and documenting compliance with the HVAC requirements. Copies of the forms are provided both in printed and electronic form. Modifiable electronic forms are included on the CD distributed with the Manual, as well as available for download from the ASHRAE website. The HVAC system forms are organized in three parts and on five pages.

- Part I is used with the simplified approach (6.3). This is the only form required with this compliance option.

- Part II, the Mandatory Provisions, consists of two pages and should be used with either the Prescriptive Path (6.5) or Energy Cost Budget (11) compliance methods. The first page contains header information, tables for entering equipment efficiencies for heating and cooling equipment, and checklists of general and special mandatory requirements. The second page contains the HVAC System Worksheet. Multiple copies of each page may be required to list all central heating and cooling equipment and all HVAC systems.

- Part III should only be used for the Prescriptive Path (6.5) compliance method. Page one is a checklist of the prescriptive requirements and needs to be completed only once for each building. Page two addresses the fan power requirements.

Part I: Simplified Approach

This compliance approach may be used for small buildings with two or fewer floors and single zone systems. HVAC systems must have DX cooling.

Header Information

Project Name. Enter the name of the project. This should agree with the name that is used on the plans and specifications or the common name used to refer to the project.

Project Address. Enter the street address of the project, for instance "142 Minna Street."

Date: Enter the date when the compliance documentation was completed.

City: The name of the city where the project is located.

Zip/Postal Code: Enter the zip or postal code of the project site.

HVAC Designer of Record/Telephone: Enter the name and the telephone number of the designer of record for the project. This will generally be the mechanical engineer or contractor.

Contact Person/Telephone: Enter the name and telephone number of the person who should be contacted if there are questions about the compliance documentation.

Checklist Qualification

Only small buildings less than 25,000 ft^2 (2,323 m^2) and with two or fewer stories may use the simplified approach. The HVAC systems must meet all of the criteria of Section 6.3.2.

Requirements

This section of the form summarizes the simplified approach requirements. Each form is separated into two sections.

The upper part of the form contains a list of the requirements. Check each box to indicate that the requirement applies to the HVAC system and that the system complies with the requirement. If the requirement is not applicable, then leave the box unchecked.

The lower part of the form contains a table for entering HVAC unit heating and cooling data for comparison against the Standard requirements. The rated capacity and efficiency for heating and cooling should be taken from manufacturers specifications.

The Minimum Efficiency for heating should be taken from Table 6.8.1B for heat pumps, or Table 6.8.1D for PTHP units, Table 6.8.1E for AC units with furnaces, and Table 6.8.1F for systems with hydronic heating. Note hydronic heating is limited to a single zone in the simple system approach. For units with electric resistant heaters enter 100%.

The Cooling Minimum Efficiency columns should include values taken from Table 6.8.1A for AC units, Table 6.8.1B for heat pump units, or Table 6.8.1D for PTAC or PTHP units. In the column, "Airside Econ?," enter "Y" if the unit has an airside economizer that complies with 6.5.1, enter "N/A" if an economizer is not required per Table 6.5.1A or 6.5.1B, or the exception letter from the exception to 6.5.1 that is being applied. The last column "Econ. Min. Efficiency" need only be completed if an exception to the economizer requirement is being taken per exception i to Section 6.5.1. If that exception i to Section 6.5.1 is being used, fill in the minimum efficiency from Table 6.3.2 in this column.

Part II: Mandatory Provisions

This section of the compliance documentation summarizes the Mandatory Provisions. These apply with either the Prescriptive Path or Energy Cost Budget Method of compliance. The two pages of mandatory requirements are organized into three sections:

- The efficiency tables on Page 1 document that heating and cooling equipment meets or exceeds the efficiency requirements.
- The check boxes in the lower part of Page 1 demonstrate compliance with the general and special provisions of the Mandatory Provisions.
- The Systems Worksheet on Page 2 summarizes the requirements specific to air-handling systems.

Equipment Efficiency Tables

Enter the requested data for each piece of mechanical heating or cooling equipment using one entry per row. Identical pieces of equipment can be entered as a group on a single line. For each row, enter data from the mechanical equipment schedules and Tables 6.8.1 (A through K). Where there are multiple requirements for a piece of equipment (e.g. full and part load ratings for heating or cooling) enter all of the requirements for each piece of equipment.

Non-standard chillers are water-cooled centrifugal chillers that cannot operate at the ARI Standard 550/590 test conditions of 44°F (7.2°C) chilled water supply and 85°F (29°C) condenser water supply. Use the lower worksheet for these chillers (if any exist in the building). For each chiller provide data for both the full and part-load ratings.

General and Specific Mandatory Provisions

The lower part of the Page 1 form contains the general and special system requirements. Check the box to indicate that the requirement applies to the HVAC system and that the system complies with the requirement. If the requirement is not applicable, then leave the box unchecked.

Systems Worksheet

Page 2 contains the mandatory requirements for HVAC systems. Data for each system or group of identical systems should be entered in the columns. The first five rows are data that can be obtained from the

mechanical equipment schedules (system tag, supply airflow, supply external static pressure, supply fan motor rated horsepower, and outdoor air airflow). The remaining 11 rows contain the mandatory requirements. For each requirement enter the appropriate code from the notes below the table. For example, for the Automatic Shutdown requirement (6.4.3.2.1), if a complying time switch with manual override is provided on the system the user should enter the code "C1."

Part III: Prescriptive Requirements

This section of the compliance documentation summarizes the prescriptive requirements. The first page has a checklist of the prescriptive requirements.

Prescriptive Economizer Requirements

Check all of the boxes that apply for HVAC systems in this project. Note: if systems are exempt from the economizer requirement, mark the basis for the exception in the space provided. If a requirement is not applicable, then leave the box unchecked.

Prescriptive Air-System Requirements

The next section contains the air-system requirements. Check all of the boxes that apply to HVAC systems in this project. If a requirement is not applicable, then leave the box unchecked.

Prescriptive Water-System Requirements

The next section contains the water-system requirements. Check all of the boxes that apply to HVAC systems in this project. If a requirement is not applicable, then leave the box unchecked.

Prescriptive Special System Requirements

Check all of the boxes that apply to HVAC systems in this project. If a requirement is not applicable, then leave the box unchecked. If none of the requirements are applicable, the form may be omitted.

Fan Power Limitations

Fill out the worksheet on Page 3 for each fan system with greater than 5 nameplate-rated horsepower (3.7 kW). Identical fan systems may be combined into a single worksheet. Fill out the system worksheet on page 2 for each fan system; there are multiple options. The fan power is now on page 3.

There are two options for showing compliance with the fan power limitation. Option 1 is shown at the top of the page. Option 2 is shown at the bottom. For each fan system only the top or the bottom part of the table will be completed.

❖ *Option 1—Nameplate Horsepower*

With this option, each of the fans in the system are listed in the table on the left. The option buttons are used to indicate the type of fan. The Tag is a reference to a schedule on the mechanical drawings. For each, the nameplate horsepower is listed in the last column and summed at the bottom of the table.

This value shall be less than the allowed nameplate horsepower calculated in the table on the right. The allowed nameplate horsepower is calculated by multiplying Design Supply Airflow Rate (CFMS) times the allowance from Table 6.5.3.1.1A. A value of 0.0011 is used for constant volume systems and 0.0015 for variable volume systems.

❖ *Option 2—Brake Horsepower*

With Option 2, the allowed brake horsepower for the fan system is calculated in the top two tables of this section. The base allowance is calculated by multiplying the Design Supply Airflow Rate (CFMS) times the Option 2 allowance from Table 6.5.3.1.1A. A value of 0.00094 is used for constant volume systems and 0.0013 for variable volume systems.

Additional brake horsepower is allowed for devices listed in Table 6.5.3.1.1B and described earlier in this chapter. Each device is listed along with the CFM through the device and the pressure drop allowance from Table 6.5.3.1.1B. The additional brake horsepower is calculated using the equation below. The additional allowances are summed and added to the base brake horsepower allowance in the left side table.

❖ Equation 6-L

$$bhp_{Addition} = \frac{CFM_i \times PD_i}{4131}$$

With Option 2, it is necessary to calculate the installed brake horsepower for the fan system. The Installed Brake Horsepower table at the bottom of the form provides a means for making this calculation.

Each fan in the system is listed along with the Tag, which keys the fan to the mechanical schedules. A brief description of each fan is provided and the type of fan is indicated by choosing one of the option boxes.

The brake horsepower for each fan is calculated based on the CFM of each fan; the pressure drop across the fan; and the efficiency of the fan, the drive (if applicable). Brake horsepower is given by the following equation:

❖ Equation 6-M

$$bhp_i = \frac{CFM_i \times PD_i}{6356 \times \eta_{Fan}}$$

The total brake horsepower from this worksheet shall be less than the total allowed brake horsepower.