



Carrier-Modified ASHRAE 90.1-2004 User's Guide Schedules for HAP

For more information on Schedules in HAP and their application, it is recommended that readers review "[HAP e-Help 008 – Applying Schedules and Profiles in HAP](#)" before incorporating the information in this e-Help.

According to ANSI/ASHRAE/IESNA Standard 90.1-2004, for both the Energy Cost Budget Method (Section 11 - 11.2.1.1.b) and the Performance Rating Method (Appendix G – G2.2.1.b), any approved simulation program must be able to explicitly model "hourly variations in occupancy, lighting power, miscellaneous equipment power, thermostat setpoints, and HVAC system operation, defined separately for each day of the week and holidays." Carrier's HAP program allows for this type of modeling through the use of schedules that can be defined for each of these items.

Appendix G of the User's Manual for Standard 90.1-2004 includes more information on the use of schedules and contains several sample schedules for different building types in Tables G-E to G-N. These schedules can be used as a guide when the exact schedules for the building are not known. These sample schedules are "based on ASHRAE Standard 90.1-1989, the last year schedules were included in this consensus document." Note that these schedules should only be used when the actual schedules are not known.

As a matter of convenience, Carrier has created a HAP project called Sample Schedules that contains the schedules from the ASHRAE 90.1 User's Manual. The project archive file is available from the Carrier Commercial website. [Click here to download the archive](#). Table 1 on page 2 shows the name and type of schedule in HAP, and the source table from the 90.1 User's Manual for this information. The User's Manual schedules were created and intended for energy simulation work only and as such contain only Weekday, Saturday and Sunday day types with no Design Day profiles. For each of these sample HAP schedules, the Weekday, Saturday and Sunday profiles were obtained from Tables G-E through G-N of the User's Manual. In addition to the Weekday, Saturday and Sunday hourly profiles, each of the HAP schedules include a Design Day profile. Design Day schedules are required for load estimating and equipment sizing and are not used for energy simulations. The Design Day profile for the Elevator, Service Hot Water and Thermostat schedules are identical to the Weekday profile defined in the 90.1 User's Manual. However, Carrier modified the Design Day profile to reduce the amount of diversity in the Lights & Plug and Occupancy schedules for design load analysis by including 100% values during occupied time periods to allow peak design loads to be properly calculated.

In order to use this archive, HAP v4.3 or later must be installed. Download the archive file from the website link above and save the file locally. The default location that HAP will access when retrieving a project is the \e20-ii\archives folder. Using the "Retrieve" process described in [HAP e-Help 013](#), this archive file creates a project in HAP with these schedules defined. This new project can then be used as a template to import these schedules to other projects, as explained in [HAP e-Help 012](#).

Remember, simply having the schedules available in a project, does not mean that they are currently being used in the modeling. A schedule needs to be applied to the load components in each space in order to be used for modeling. This is done on the "Internals" tab of the space properties, as shown in Figure 1.

Each of the load components on the Internals tab includes an option for defining a schedule, outlined in red in Figure 1. For Overhead Lighting, Task Lighting, or Electrical Equipment, use a "Lights & Plug" schedule. For the People component, use an "Occupancy" schedule.

Apply a Thermostat Schedule on the "Zone Components" tab of the System Properties by selecting the Thermostats option on that tab, see

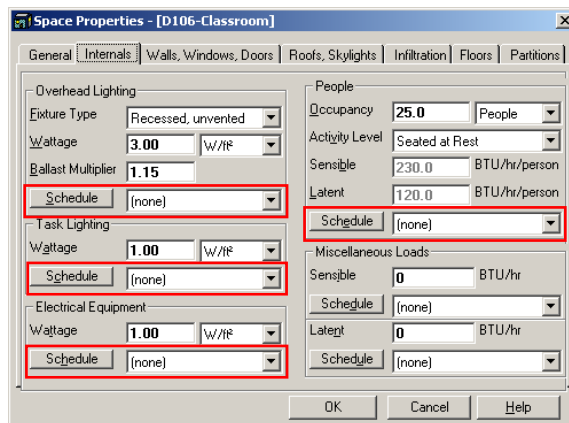


Figure 1 – Space Properties Internals Tab

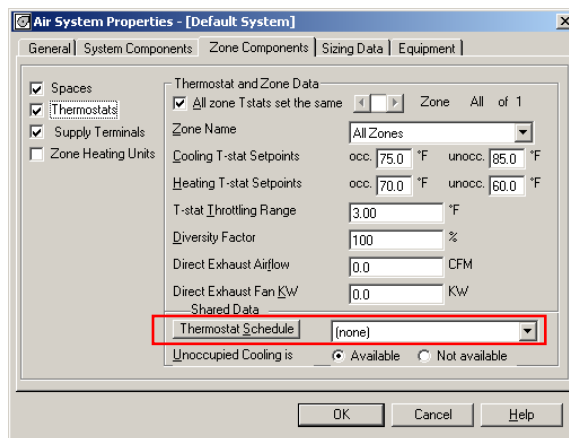


Figure 2 – System Properties Zone Components Tab



Carrier-Modified ASHRAE 90.1-2004 User's Guide Schedules for HAP

Figure 2. Service Hot Water and Elevators are normally accounted for in the "Misc. Energy" tab of the Building Properties. These are used for energy simulations only, not for design load calculations.

Table 1: Schedules Available in Sample Schedule HAP Archive

Schedule Name	Schedule Type	Based on User's Manual for ASHRAE Standard 90.1-2004 ...
Assembly Elevator	Fractional	Table G-E
Assembly Lights & Plug	Fractional	Table G-E
Assembly Occupancy	Fractional	Table G-E
Assembly Svc Hot Water	Fractional	Table G-E
Assembly Thermostat	Fan / Thermostat	Table G-E
Health Elevator	Fractional	Table G-F
Health Lights & Plug	Fractional	Table G-F
Health Occupancy	Fractional	Table G-F
Health Svc Hot Water	Fractional	Table G-F
Health Thermostat	Fan / Thermostat	Table G-F
Hotel/Motel Elevator	Fractional	Table G-G
Hotel/Motel Lights & Plug	Fractional	Table G-G
Hotel/Motel Occupancy	Fractional	Table G-G
Hotel/Motel Svc Hot Water	Fractional	Table G-G
Hotel/Motel Thermostat	Fan / Thermostat	Table G-G
Light Mfg. Elevator	Fractional	Table G-H
Light Mfg. Lights & Plug	Fractional	Table G-H
Light Mfg. Occupancy	Fractional	Table G-H
Light Mfg. Svc Hot Water	Fractional	Table G-H
Light Mfg. Thermostat	Fan / Thermostat	Table G-H
Office Elevator	Fractional	Table G-I
Office Lights & Plug	Fractional	Table G-I
Office Occupancy	Fractional	Table G-I
Office Svc Hot Water	Fractional	Table G-I
Office Thermostat	Fan / Thermostat	Table G-I
Pkg. Garage Lights & Plug	Fractional	Table G-J
Restaurant Elevator	Fractional	Table G-K
Restaurant Lights & Plug	Fractional	Table G-K
Restaurant Occupancy	Fractional	Table G-K
Restaurant Svc Hot Water	Fractional	Table G-K
Restaurant Thermostat	Fan / Thermostat	Table G-K
Retail Elevator	Fractional	Table G-L
Retail Lights & Plug	Fractional	Table G-L
Retail Occupancy	Fractional	Table G-L
Retail Svc Hot Water	Fractional	Table G-L
Retail Thermostat	Fan / Thermostat	Table G-L
School Elevator	Fractional	Table G-M
School Lights & Plug	Fractional	Table G-M
School Occupancy	Fractional	Table G-M
School Svc Hot Water	Fractional	Table G-M
School Thermostat	Fan / Thermostat	Table G-M
Warehouse Elevator	Fractional	Table G-N
Warehouse Lights & Plug	Fractional	Table G-N
Warehouse Occupancy	Fractional	Table G-N
Warehouse Svc Hot Water	Fractional	Table G-N
Warehouse Thermostat	Fan / Thermostat	Table G-N

NOTE: The values in these schedules should only be used if actual schedules are not known.