

AIR CONDITIONING MEDIA ROOM WITH PROJECTOR

by

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Introduction

It is common to find movie projectors in home theaters. The lights in the projectors produce an enormous amount of heat. Most projector manufacturers have specific requirements for the temperature that must be maintained so that the picture does not become distorted or the equipment becomes overheated and damaged.

Heat Removal

The best way to remove the heat from the projector is to pull exhaust air from the room, into the projector, through an exhaust fan that dumps the heat back into the air conditioner where it can be cooled. Because of the many different air conditioning systems in use, it is important to design a heat removal system specifically for the air conditioning system.

Single Speed Air Conditioners

Several different kinds of air conditioning systems have single speed fans. Among them are water-cooled heat pumps, air-cooled direct expansion units, and chilled water units. These fans typically cycle on and off based on the space temperature. However, occasionally, chilled water air handler fans may run continuously.

For these types of systems, projector exhaust is relatively simple. An exhaust grille should be located within the theater and be ducted to the projector. The duct will then be routed to a remotely located exhaust fan. The purpose of remotely locating this fan is to keep the noise away from the theater. Terminate the exhaust into the return duct of the air handler. When the projector is on, the exhaust fan will also be on. A motorized damper should be installed in the return duct so when the projector is on, the damper closes slightly to limit the amount of return to allow for the

exhaust. See the attached sketch for *Theater Exhaust for Single Speed Air Conditioners*.

Variable or Two-Speed Air Conditioners

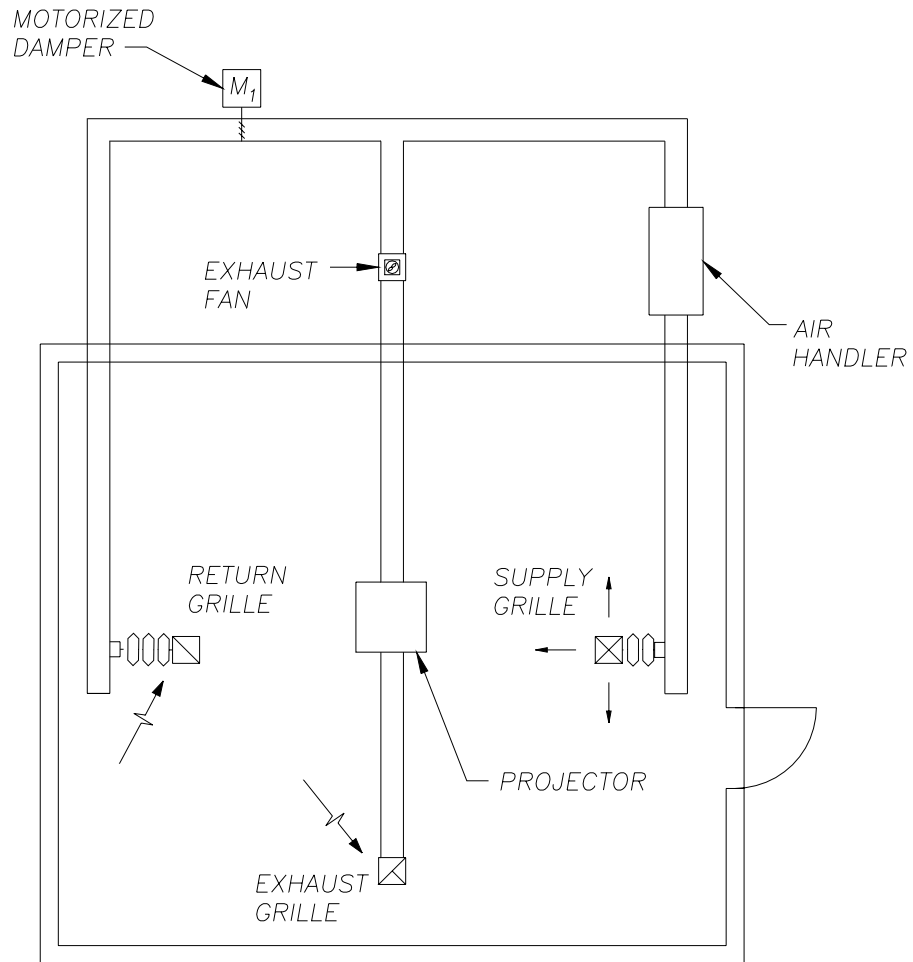
Variable speed or two-speed air conditioners are primarily used with chilled water systems, however, occasionally, air-cooled, direct expansion units and water-cooled, heat pump units are used. Because the air conditioner fans can operate at changing air flows, it is important to make sure that the appropriate amount of exhaust be pulled across the projector for proper cooling regardless of fan speed. One way to do this is with modulating motorized dampers located in the return and exhaust ducts that will adjust based on the speed of the fan. These dampers should be interlocked with the fan speed. Special care should be taken to locate the dampers in accessible locations because they require service. See the attached sketch for *Theater Exhaust for Variable or Two-Speed Air Conditioners*.

Exhaust Termination

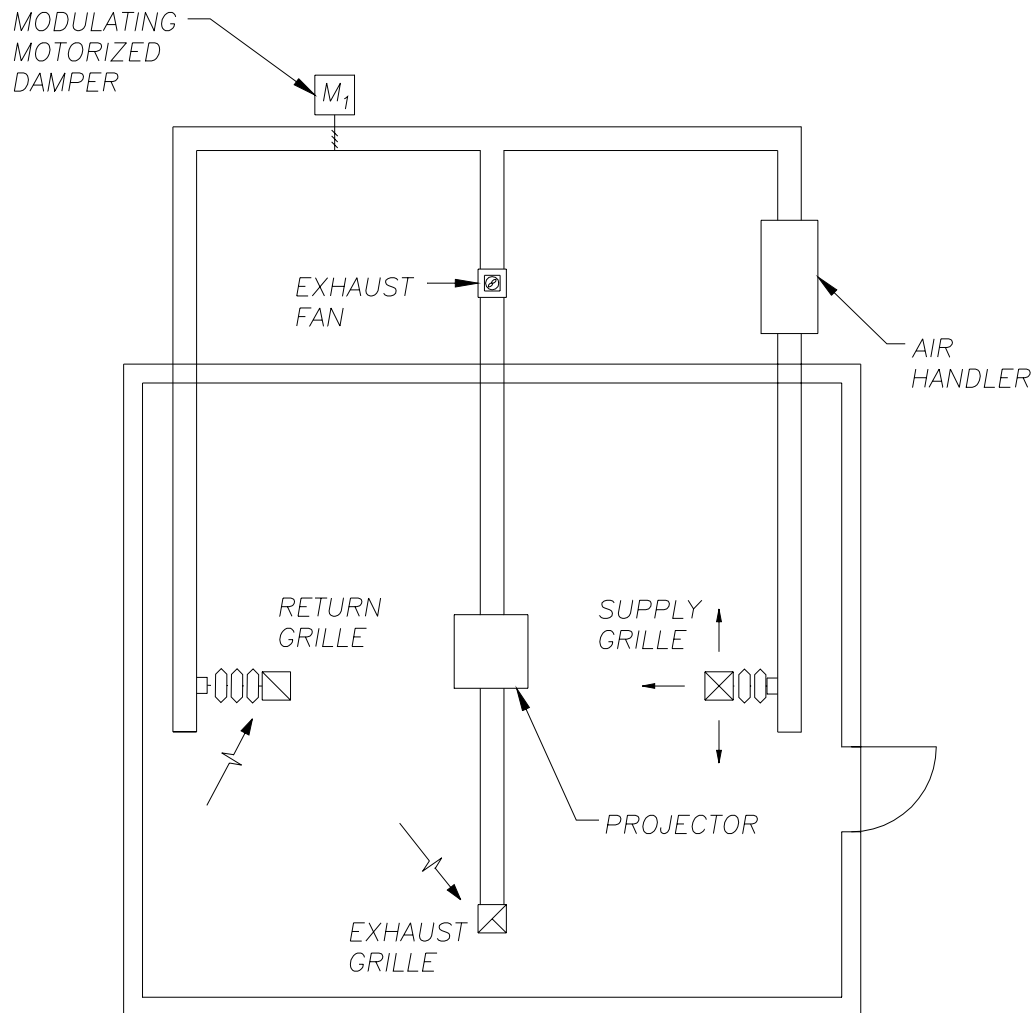
Since the air exhausted from the projector is only heat, it is not necessary to remove the air from the building. Doing so could lead to problems of negatively pressurizing the space which is not desirable.

Filtration

Because the projectors have lenses and some even have mirrors, it is advisable to install filtration at the exhaust grille. The filter will trap particles of dust so they do not build up on the lens or the mirror which diminish the quality of the picture.



*THEATER EXHAUST FOR SINGLE
SPEED AIR CONDITIONERS*



THEATER EXHAUST FOR VARIABLE OR TWO-SPEED AIR CONDITIONERS

NOTE: EXHAUST FAN CAN BE REPLACED WITH A MODULATING MOTORIZED DAMPER IF THE FAN RUNS CONTINUOUSLY. (ONLY RECOMMENDED FOR CHILLED WATER AIR HANDLERS WITH MODULATING VALVES.)