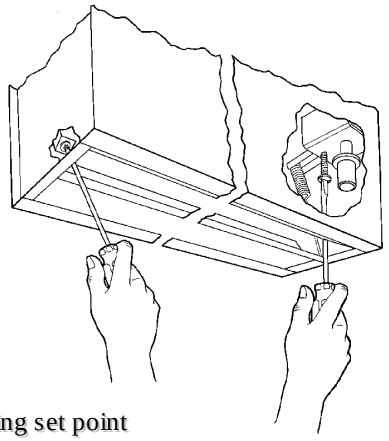
APPLICATION GUIDELINES
TLB Bi-Directional Perimeter Slot Diffusers

The current trend towards overhead heating has created a need for a more efficient means of effectively distributing heated and cooled air to the perimeter of a building. The operation of the Thermal Logic Bi-directional (TLB) perimeter slot diffuser is based on the necessity to change the air flow pattern of a perimeter linear diffuser from horizontal (when discharging cold air) to vertical (when discharging hot air).

A substantial increase in the comfort level of a room can be achieved by adjusting the discharge opening to accommodate the maximum cool air volume and respective discharged velocity independent of the reduced maximum warm air volume and respective discharge velocity.

The optimum diffuser efficiency is achieved when the required air volume is discharged at a velocity that causes rapid entrainment and maintains comfortable levels of overall secondary room air movement.

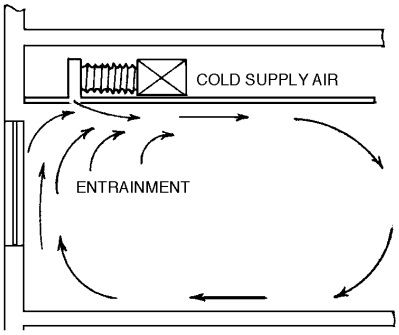
The TLB achieves the above criteria with the use of a single pattern controller that rotates to adjust the discharge opening of two discharge slots. A thermal element that is mounted in the supply air stream



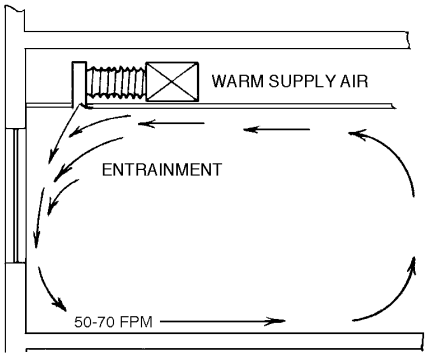
Heating set point stop

Cooling set point stop

automatically adjusts the pattern controller for heating (vertical air pattern) or cooling (horizontal air pattern). Two manually adjustable set point stops are mounted at each end of the diffuser under the pattern controller. One for the cooling discharge velocity and one for the heating discharge velocity.
The set point stops are easily accessed from the face of the diffuser. Maximum efficiency and comfort is achieved in the heating mode (vertical discharge) by adjusting the heating set point stop to obtain a Vt of 50 - 70 FPM at the floor. In applications where a large window sill or office furniture are placed at the exterior wall, the Vt should be adjusted to 30 - 50 FPM at the obstructions. This will prevent drafts and undesirable air flow patterns.



THERMAL LOGIC BI-DIRECTIONAL
COOLING AIR PATTERN



THERMAL LOGIC BI-DIRECTIONAL
HEATING AIR PATTERN

Room comfort levels are enhanced by blanketing the exterior wall with warm air to negate the effects of cold wall radiation. Room comfort levels are further
heightened by the room air flow pattern that is created by the velocity and mass of the vertically discharging air. Warm air is forced to the floor creating a circular flow of air that breaks the room stratification. The discharging air at the diffuser induces warm stratified air at the ceiling into the primary stream forcing it to the occupied portions

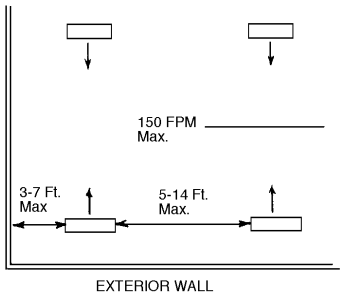
diffusers will result in ***first cost savings***, ***energy savings, and occupant comfort levels*** equivalent to baseboard perimeter radiation.

Building Type

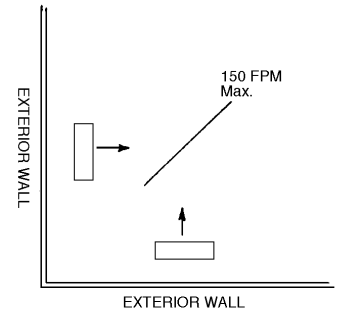
TLB diffusers will function well in buildings that have skin heat loss of 475 BTUH/lineal foot or less. Satisfactory results will not be achieved in buildings having skin heat loss exceeding 475 BTUH/lineal foot.

Diffuser Placement

When TLB diffusers are used in an application where cooling air flow patterns collide, it is recommended that the collision velocities of the two diffusers not exceed 150 FPM in rooms with up to 9 ft. ceilings. TLB diffusers should be placed one to two feet from the exterior wall.



The separation of the units will be determined by heat loss. Locate diffusers to blanket areas of highest heat loss, especially glass. If there is a continuous expanse of glass, diffusers should not be placed more than five feet apart to ensure coverage of the wall.



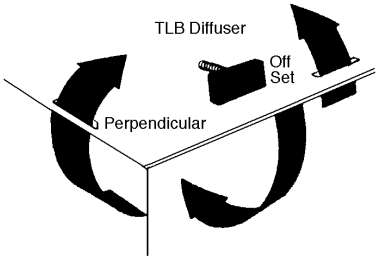
Maximum separation should not exceed 14 feet. This will prevent hot/cool spots and areas of stagnation.

Perimeter Corners

Effective blanketing of perimeter corners could produce erratic air flow patterns during the cooling operation as the air patterns of the two diffusers will converge at right angles. There are two solutions to the problem. One is to adjust the cooling set point stop on one of the TLB diffusers for minimum air volume and adjust the other corner diffuser for the required flow. The second option is to adjust the cooling set point stops on both corner diffusers so that the converging air patterns do not meet at velocities greater than 150 FPM.

Return Location Guidelines

The prime consideration in the placement of return air diffusers is to avoid short circuiting supply air to the return.The return can be placed offset from the



supply diffusers or perpendicular to the discharging air flow. Systems using fan powered boxes for heat will typically not have a direct source of fresh air. In this case, the return should be placed close to the interior zones where a greater amount of fresh air is available from cooling system air.

Heating Supply Air Temperature

The supply air temperature, discharge velocity, and discharge volume will be a product of the system that is being used. Several facts should be kept in mind with respect to supply air temperature. Heated air is buoyant when delivered into a room of cooler air. The
prime function of the TLB diffuser is to break the stratification of hot and cold air in the room. With these facts in mind, the use of a larger volume of warm air is much more effective at improving the comfort
level of the space than delivering a lower volume of hot air. The cause of many unsuccessful attempts at heating from overhead are high levels of stratification caused by the low volume of hot air. The recommended heating supply air temperatures are 80 deg. - 130 deg. F. max.

Conclusion

These application guidelines are intended to provide an overview of the potential applications with various types of manufacturer's equipment, air distribution systems, and building construction. The application objectives and common problems have been outlined in an effort to guide the design engineer. Specific design application information can be obtained from the sales representative or the factory.

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