



TD-MIXVENT & TD-SILENT

For Outside Air

2009 International Mechanical Code



One of the most efficient applications for the TD-MIXVENT and TD-SILENT fans is for outside air. Sections 403.2, 403.3 of the 2009 International Mechanical Code clearly define the requirements for mechanical ventilation and identify the flow rates for the outdoor air required to meet this code.

Table 403.3 of 2009 International Mechanical Code

Required Outdoor Ventilation Air

OCCUPANCY CLASSIFICATION	PEOPLE OUT-DOOR AIRFLOW RATE IN BREATHING ZONE	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE	DEFAULT OCCUPANT DENSITY	EXHAUST AIRFLOW RATE
	R _p CFM/PERSON	R _a CFM/FT ² _a	#/1000 FT ² _a	CFM/FT ² _a
Correctional facilities				
Cells				
without plumbing fixtures	5	0.12	25	—
with plumbing fixtures ⁹	5	0.12	25	1
Dining halls (see food and beverage service)	—	—	—	—
Guard stations	5	0.06	15	—
Day room	5	0.06	30	—
Booking/waiting	7.5	0.06	50	—
Dry cleaners, laundries				
Coin-operated dry cleaner	15	—	20	—
Coin-operated laundries	7.5	0.06	20	—
Commercial dry cleaner	30	—	30	—
Commercial laundry	25	—	10	—
Storage, pick up	7.5	0.12	30	—
Education				
Auditoriums	5	0.06	150	—
Corridors (see public spaces)	—	—	—	—
Media center	10	0.12	25	—
Sports locker rooms ⁹	—	—	—	0.5
Music/theater/dance	10	0.06	35	—
Smoking lounges ^b	60	—	70	—
Day care (through age 4)	10	0.18	25	—
Classrooms (ages 5-8)	10	0.12	25	—
Classrooms (age 9 plus)	10	0.12	35	—
Lecture classroom	7.5	0.06	65	—
Lecture hall (fixed seats)	7.5	0.06	150	—
Art classroom ⁹	10	0.18	20	0.7
Science laboratories ⁹	10	0.18	25	1
Wood/metal shops ⁹	10	0.18	20	0.5
Computer lab	10	0.12	25	—
Multiuse assembly	7.5	0.06	100	—
Locker/dressing rooms ⁹	—	—	—	0.25
Food and beverage service				
Bars, cocktail lounges	7.5	0.18	100	—
Cafeteria, fast food	7.5	0.18	100	—
Dining rooms	7.5	0.18	70	—
Kitchens (cooking) ^b	—	—	—	0.7

TABLE 403.3—continued MINIMUM VENTILATION RATES

OCCUPANCY CLASSIFICATION	PEOPLE OUT-DOOR AIR-FLOW RATE IN BREATHING ZONE	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE	DEFAULT OCCUPANT DENSITY	EXHAUST AIRFLOW RATE
	R _p CFM/PERSON	R _a CFM/FT ² _a	#/1000 FT ² _a	CFM/FT ² _a
Hospitals, nursing and convalescent homes				
Autopsy rooms ^b	—	—	—	0.5
Medical procedure rooms	15	—	20	—
Operating rooms	30	—	20	—
Patient rooms	25	—	10	—
Physical therapy	15	—	20	—
Recovery and ICU	15	—	20	—
Hotels, motels, resorts and dormitories				
Multipurpose assembly	5	0.06	120	—
Bathrooms/toilet—private ⁹	—	—	—	25/50 ^f
Bedroom/living room	5	0.06	10	—
Conference/meeting	5	0.06	50	—
Dormitory sleeping areas	5	0.06	20	—
Gambling casinos	7.5	0.18	120	—
Lobbies/prefunction	7.5	0.06	30	—
Offices				
Conference rooms	5	0.06	50	—
Office spaces	5	0.06	5	—
Reception areas	5	0.06	30	—
Telephone/data entry	5	0.06	60	—
Main entry lobbies	5	0.06	10	—
Private dwellings, single and multiple				
Garages, common for multiple units ^b	—	—	—	0.75
Garages, separate for each dwelling ^b	—	—	—	100 cfm per car
Kitchens ^b	—	—	—	25/100 ^f
Living areas ^c	0.35 ACH but not less than 15 cfm/person	—	Based upon number of bedrooms. First bedroom, 2; each additional bedroom, 1	—
Toilet rooms and bathrooms ⁹	—	—	—	20/50 ^f

(continued)

TABLE 403.3—continued MINIMUM VENTILATION RATES

OCCUPANCY CLASSIFICATION	PEOPLE OUT-DOOR AIR-FLOW RATE IN BREATHING ZONE	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE	DEFAULT OCCUPANT DENSITY	EXHAUST AIRFLOW RATE
	R _p CFM/PERSON	R _a CFM/FT ² _a	#/1000 FT ² _a	CFM/FT ² _a
Public spaces				
Corridors	—	0.06	—	—
Elevator car	—	—	—	1
Shower room (per shower head) ^g	—	—	—	50/20 ^f
Smoking lounges ^b	60	—	70	—
Toilet rooms — public ^g	—	—	—	50/70 ^e
Places of religious worship	5	0.06	120	—
Courtrooms	5	0.06	70	—
Legislative chambers	5	0.06	50	—
Libraries	5	0.12	10	—
Museums (children's)	7.5	0.12	40	—
Museums/galleries	7.5	0.06	40	—
Retail stores, sales floors and showroom floors				
Sales (except as below)	7.5	0.12	15	—
Dressing rooms	—	—	—	0.25
Mall common areas	7.5	0.06	40	—
Shipping and receiving	—	0.12	—	—
Smoking lounges ^b	60	—	70	—
Storage rooms	—	0.12	—	—
Warehouses (see storage)	—	—	—	—
Specialty shops				
Automotive motor-fuel dispensing stations ^b	—	—	—	1.5
Barber	7.5	0.06	25	0.5
Beauty salons ^b	20	0.12	25	0.6
Nail salons ^{b, h}	—	—	—	0.6
Embalming room ^b	7.5	0.18	10	2
Pet shops (animal areas) ^b	7.5	0.06	8	0.9
Supermarkets	8	7.5	0.06	—
Sports and amusement				
Disco/dance floors	20	0.06	100	—
Bowling alleys (seating areas)	10	0.12	40	—
Game arcades	7.5	0.18	20	—
Ice arenas without combustion engines	—	0.3	—	0.5
Gym, stadium, arena (play area)	—	0.3	—	—
Spectator areas	7.5	0.06	150	—
Swimming pools (pool and deck area)	—	0.48	—	—
Health club/aerobics room	20	0.06	40	—
Health club/weight room	20	0.06	10	—

(continued)

TABLE 403.3—continued MINIMUM VENTILATION RATES

OCCUPANCY CLASSIFICATION	PEOPLE OUT-DOOR AIRFLOW RATE IN BREATHING ZONE	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE	DEFAULT OCCUPANT DENSITY	EXHAUST AIRFLOW RATE
	R _p CFM/PERSON	R _a CFM/FT ² _a	#/1000 FT ² _a	CFM/FT ² _a
Storage				
Repair garages, enclosed parking garages ^{b,d}	—	—	—	0.75
Warehouses	—	0.06	—	—
Theaters				
Auditoriums (see education)	—	—	—	—
Lobbies	5	0.06	150	—
Stages, studios	10	0.06	70	—
Ticket booths	5	0.06	60	—
Transportation				
Platforms	7.5	0.06	100	—
Transportation waiting	7.5	0.06	100	—
Workrooms				
Bank vaults/safe deposit	5	0.06	5	—
Darkrooms	—	—	—	1
Copy, printing rooms	5	0.06	4	0.5
Meat processing ^c	15	—	10	—
Pharmacy (prep. area)	5	0.18	10	—
Photo studios	5	0.12	10	—
Computer (without printing)	5	0.06	4	—

For SI: 1 cubic foot per minute = 0.0004719 m³/s, 1 ton = 908 kg,
 1 cubic foot per minute per square foot = 0.00508 m³/(s * m²),
 °C = [(°F) -32]/1.8, 1 square foot = 0.0929 m²

- a. Based upon net occupiable floor area.
- b. Mechanical exhaust required and the recirculation of air from such spaces is prohibited (see Section 403.2.1, Item 3).
- c. Spaces unheated or maintained below 50°F are not covered by these requirements unless the occupancy is continuous.
- d. Ventilation systems in enclosed parking garages shall comply with Section 404.
- e. Rates are per water closet or urinal. The higher rate shall be provided where periods of heavy use are expected to occur, such as toilets in theaters, schools and sports facilities. The lower rate shall be permitted where periods of heavy use are not expected.
- f. Rates are per room unless otherwise indicated. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted where the exhaust system is designed to operate continuously during normal hours of use.
- g. Mechanical exhaust is required and recirculation is prohibited except that recirculation shall be permitted where the resulting supply airstream consists of not more than 10 percent air recirculated from these spaces (see Section 403.2.1, Items 2 and 4).
- h. For nail salons, the required exhaust shall include ventilation tables or other systems that capture the contaminants and odors at their source and are capable of exhausting a minimum of 50 cfm per station.

One of the most common applications that need outdoor air are split systems that operate in the 3-10 ton performance point. The TD-MIXVENT or TD-SILENT fans provide the simplest solution. Both fans come with two speed motors that can be used in conjunction with building management systems to provide demand based outdoor air supply.

TD-MIXVENT* Performance



Model	Nom. RPM	Volts	Max. Watts	Speed	CFM v Static Pressure (SP) Ins. WG							Max. SP	Max operating temp. (°F)	Wgt. (lbs)	Duct Dia. Ins.	Sones
					0"	0.125"	0.25"	0.375"	0.5"	0.75"	1.0"					
TD-100	2431	120	23	LS	97	81	51	-	-	-	-	.4	104	2	4"	1.1
	2516	120	26	HS	101	85	57	-	-	-	-	.4	104		4"	
TD-100x	1556	120	20	LS	100	77	48	-	-	-	-	.375	104	4.4	4"	1.7
	2096	120	33	HS	135	113	90	53	-	-	-	.55	104		4"	
TD-125	1633	120	24	LS	149	110	73	-	-	-	-	.35	104	4.4	5"	2.1
	2146	120	38	HS	197	168	133	86	22	-	-	.55	104		5"	
TD-150	1709	120	54	LS	218	193	163	128	105	24	-	.8	140	4.4	6"	2.8
	2289	120	65	HS	293	273	250	227	206	131	35	1.15	140		6"	
TD-200	2322	120	139	LS	476	422	373	317	260	40	-	1.38	140	8.8	8"	4
	2781	120	184	HS	538	495	458	418	367	190	10	1.625	140		8"	
TD-250	2400	115	162	LS	541	475	418	355	295	218	170	2.03	140	19.8	10"	5
	3200	115	241	HS	754	715	680	640	606	520	405	2.53	140		10"	
TD-315	2000	115	208	LS	751	670	545	420	285	190	130	1.62	140	30.9	12.4"	6.8
	2500	115	335	HS	1050	990	932	850	770	600	420	2.95	140		12.4"	

TD-SILENT* Air Performance



Model	Nom. RPM	Volts	Max. Watts	Speed	CFM v Static Pressure (SP) Ins. WG							Max. SP	Max operating temp. (°F)	Wgt. (lbs)	Duct Dia. Ins.	Sones
					0"	0.125"	0.25"	0.375"	0.5"	0.75"	1.0"					
TD-100XS	2000	120	21	LS	108	82	48	-	-	-	-	0.4	104	11.9	4"	0.6
	2500	120	35	HS	143	121	91	59	23	-	-	0.6	104		4"	
	2000	120	21	LS	147	110	63	-	-	-	-	0.4	104		5"	
	2500	120	36	HS	203	175	138	84	33	-	-	0.6	104		5"	
TD-150S	2200	120	55	LS	239	209	181	154	120	62	-	0.95	140	13.2	6"	0.5
	2700	120	65	HS	333	315	286	271	257	178	77	1.2	140		6"	
TD-200S	2000	120	115	LS	409	367	333	306	271	183	46	1.2	140	19.2	8"	0.5
	2200	120	122	HS	530	503	472	443	415	349	204	1.2	140		8"	

* TD-MIXVENT and TD-SILENT fans meet plenum rating requirements.

Accessories



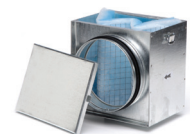
SC
Speed control



CAR
Backdraft Damper



SIL
Acoustic attenuators



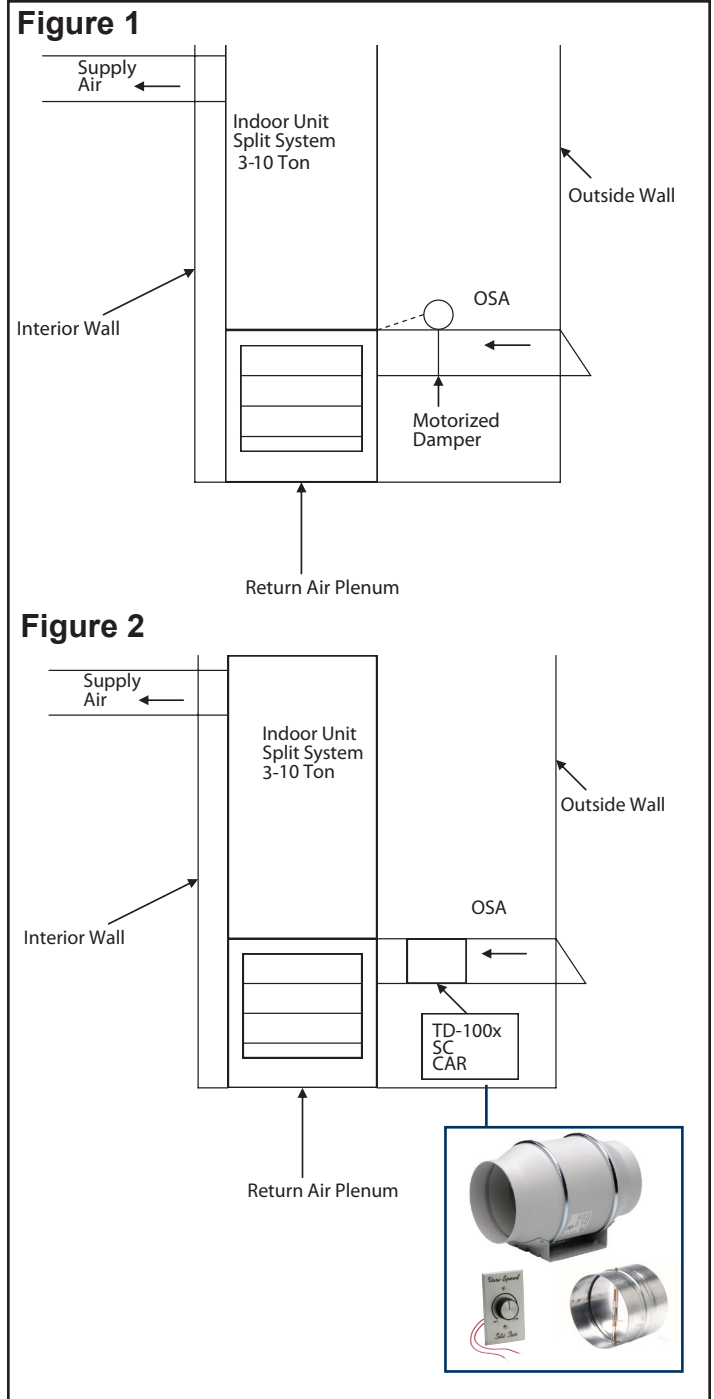
MFL
Filtering Box

A common way to introduce outdoor air to split systems is to extend outdoor air duct to the outside wall and place a motorized damper in that outdoor air duct then interlock the damper to the furnace. When the furnace is operating the damper opens and outside air is introduced into the return air plenum based on the theory that the furnace blower in the unit will pull the air through the duct. (see Figure 1)

In a perfect installation this would work very well when the total static of the system is kept under .50 esp. This is the max static pressure that the blower in most brands of air conditioning systems can overcome. However, systems are often installed in less than perfect applications or job site requirements change and the blowers in the units cannot overcome the pressure. This variance in pressure creates a situation where very little outdoor air is actually present in outside air duct work.

To remove this concern from the mind of the mechanical engineer and guarantee the exact outside air to each system (see Figure 2):

1. Determine the outdoor air required.
2. Analyze the external static of the outdoor air duct.
3. Select the appropriate fan from the performance chart.
4. Set the fan to the cfm and static required with the speed control.
5. Know the air required for the application is being delivered.



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