

DENSO

DENSO MANUFACTURING TENNESSEE, INC.

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January 3, 2000

Tennessee Department of Environment and Conservation
Division of Air Pollution Control
Attn.: Mr. Randy Thompson
9th Floor, L & C Annex
401 Church Street
Nashville, TN 37243-1531

RE: Emission Source Reference No. 54-0158-28 (Permit No. 952253P)

Dear Mr. Thompson:

DENSO Manufacturing Tennessee, Inc. agrees to a SO₂ emission limit for all six (6) boilers of 1.0 lbs SO₂/hr total. The aforementioned emission limitation is established pursuant to Rule 1200-3-14-.01(3) of the Tennessee Air Pollution Control Regulations.

If you have any questions or require further information, please contact Mike Fontinell at (865) 982-7000 extension 2564.

Sincerely,



Jack Helmboldt
Vice President

Attachment #4

	Emission Factors			Potential Emissions per Year		Potential Emissions per Year Lb Pollutant per Hour
	Potential 10 ⁶ Cubic Feet Gas Burned per Year	Lb Pollutant/10 ⁶ Cubic Feet Gas Burned		Lb Pollutant/ 10 ⁶ Cubic Feet Gas Burned		
RCO	26.3	5.7	Filterable PM	1.9	Condensible PM	
			Filterable PM	0.6	SO2	
		5.7		150	Condensible PM	
				50	SO2	
				16	Total PM	0.00180

	Emission Factors			Actual Emissions per Year		Actual Emissions per Year Lb Pollutant per Hour
	Actual 10 ⁶ Cubic Feet Gas Burned per Year	Lb Pollutant/10 ⁶ Cubic Feet Gas Burned		Lb Pollutant/10 ⁶ Cubic Feet Gas Burned		
RCO	18,000	5.7	Filterable PM	1.9	Condensible PM	
			Filterable PM	0.6	SO2	
		5.7		103	Condensible PM	
				34	SO2	
				11	Total PM	0.00180

Potential Gas Burned = (3,000 BTU/hr) x (1ft³/1,000 BTU) x (24 hrs/day) x (365 days/yr) ÷ (1,000,000) = 26.3 x 10⁶ ft Gas Burned per Year

Actual Gas Burned = (3,000 BTU/hr) x (1ft³/1,000 BTU) x (24 hrs/day) x (250 days/yr) ÷ (1,000,000) = 18.0 x 10⁶ ft Gas Burned per Year

Note: AP-42 emission factors were utilized

Table 1.4-1. EMISSION FACTORS FOR NITROGEN OXIDES (NO_x) AND CARBON MONOXIDE (CO)
FROM NATURAL GAS COMBUSTION^a

Combustor Type (MMBtu/hr Heat Input) [SCC]	NO _x ^b		CO ^c	
	Emission Factor (lb/10 ⁶ scf)	Emission Factor Rating	Emission Factor (lb/10 ⁶ scf)	Emission Factor Rating
Large Wall-Fired Boilers (>100) [1-01-006-01, 1-02-006-01, 1-03-006-01]				
Uncontrolled (Pre-NSPS) ^d	280	A	84	B
Uncontrolled (Post-NSPS) ^e	190	A	84	B
Controlled - Low NO _x burners	140	A	84	B
Controlled - Flue gas recirculation	100	D	84	B
Small Boilers (<100) [1-01-006-02, 1-02-006-02, 1-03-006-02, 1-03-006-03]				
Uncontrolled	100	B	84	B
Controlled - Low NO _x burners	50	D	84	B
Controlled - Low NO _x burners/Flue gas recirculation	32	C	84	B
Tangential-Fired Boilers (All Sizes) [1-01-006-04]				
Uncontrolled	170	A	24	C
Controlled - Flue gas recirculation	76	D	98	D
Residential Furnaces (<0.3) [No SCC]				
Uncontrolled	94	B	40	B

^a Reference 1.1. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. To convert from lb/10⁶ scf to kg/10⁶ m³, multiply by 16. Emission factors in this table may be converted to other natural gas heating values of 1,020 Btu/scf. To convert from lb/10⁶ scf to lb/MMBtu, divide by 1,020. The heating value to this average heating value, SCC = Source Classification Code. ND = no data. NA = not applicable.

^b Expressed as NO_x. For large and small wall fired boilers with SNCR control, apply a 24 percent reduction to the appropriate NO_x emission factor. For tangential-fired boilers with SNCR control, apply a 13 percent reduction to the appropriate NO_x emission factor.

^c NSPS = New Source Performance Standard as defined in 40 CFR 60 Subparts D and Db. Post-NSPS units are boilers with greater than 250 MMBtu/hr of heat input that commenced construction modification, or reconstruction after August 17, 1971, and units with heat input capacities between 100 and 250 MMBtu/hr that commenced construction modification, or reconstruction after June 19, 1984.

TABLE 1.4-2. EMISSION FACTORS FOR CRITERIA POLLUTANTS AND GREENHOUSE GASES FROM NATURAL GAS COMBUSTION^a

Pollutant	Emission Factor (lb/10 ⁶ scf)	Emission Factor Rating
CO ₂ ^b	120,000	A
Lead	0.0005	D
N ₂ O (Uncontrolled)	2.2	E
N ₂ O (Controlled-low-NO _x burner)	0.64	E
PM (Total) ^c	7.6	D
PM (Condensable) ^c	5.7	D
PM (Filterable) ^c	1.9	B
SO ₂ ^d	0.6	A
TOC	11	B
Methane	2.3	B
VOC	5.5	C

^a Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. Data are for all natural gas combustion sources. To convert from lb/10⁶ scf to kg/10⁶ m³, multiply by 16. To convert from lb/10⁶ scf to lb/MMBtu, divide by 1,020. The emission factors in this table may be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this average heating value. TOC = Total Organic Compounds. VOC = Volatile Organic Compounds.

^b Based on approximately 100% conversion of fuel carbon to CO₂. $CO_2[lb/10^6 scf] = (3.67) (CON) (C)(D)$, where CON = fractional conversion of fuel carbon to CO₂, C = carbon content of fuel by weight (0.76), and D = density of fuel, $4.2 \times 10^4 lb/10^6 scf$.

^c All PM (total, condensable, and filterable) is assumed to be less than 1.0 micrometer in diameter. Therefore, the PM emission factors presented here may be used to estimate PM₁₀, PM_{2.5} or PM₁ emissions. Total PM is the sum of the filterable PM and condensable PM. Condensable PM is the particulate matter collected using EPA Method 202 (or equivalent). Filterable PM is the particulate matter collected on, or prior to, the filter of an EPA Method 5 (or equivalent) sampling train.

^d Based on 100% conversion of fuel sulfur to SO₂. Assumes sulfur content is natural gas of 2,000 grains/10⁶ scf. The SO₂ emission factor in this table can be converted to other natural gas sulfur contents by multiplying the SO₂ emission factor by the ratio of the site-specific sulfur content (grains/10⁶ scf) to 2,000 grains/10⁶ scf.