

I, Norma Sáenz Carbonell, identity card number 1-515-087, Official Translator of the Ministry of Foreign Relations of the Republic of Costa Rica, **DO HEREBY CERTIFY:** That the attached document hereunder translated from Spanish into English says as follows:

Decree N° 26789 MTSS

**THE PRESIDENT OF THE REPUBLIC
AND THE MINISTRY OF LABOR AND SOCIAL SECURITY**

With the powers vested in them by Articles 140, subsections 3), 18) and 20) of the Political Constitution of Costa Rica, 26, 27 and 28 of the General Law of Public Administration, and Article 274, subsection f), of Title IV of the Labor Code;

...

They decree:

The following:

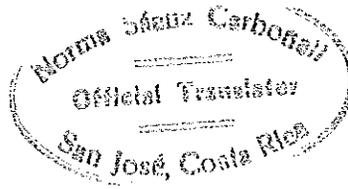
**BOILER REGULATIONS
CHAPTER ONE**

Glossary of Terms

Article 1°- Definitions: For purposes of these Regulations, the following terms mean:

- a) **Logbook:** A notebook with duly numbered pages, to be registered with the Department, used for entering all the main events related to the installation and operation of the user's steam system.
- b) **Boiler:** An enclosed vessel where, for any purpose other than domestic cooking of food, water is heated or steam is generated, usually using water, at a pressure higher than the atmospheric water, to be used outside such vessel. Superheaters, reheaters, economizers or other parts under pressure, directly connected to the boiler, without involving any valves, shall be considered part of the boiler.
- c) **Boiler Room:** A separate one-story building, used to house one or more boilers and any ancillary equipment thereof, which is built in accordance with the provisions of the Construction Code and these Regulations.
- d) **Boiler Compartment:** Room inside a building, used to house one or more boilers and any ancillary equipment thereof, which is built in accordance with the provisions of the Construction Code and these Regulations.

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- e) **Department:** The Department of Occupational Safety, Hygiene and Medicine.
- f) **Generation:** Capacity of a boiler to produce steam, expressed in kilograms of steam per hour, at the maximum working pressure.
- g) **Boiler Inspector:** Professional authorized by the Federate Professional Association of Engineers and Architects of Costa Rica, to conduct the inspections and perform other tasks set forth in these Regulations.
- h) **Location:** Building or part thereof to be used by people, such as offices, dining rooms, locker-rooms, houses and apartments, etc.
- i) **Operator:** Duly qualified person, responsible for the operation and supervision of a boiler or a set of boilers;
- j) **Operation Permit:** Permit issued after approval of the installation permit, including the performance of the tests specified in these Regulations;
- k) **Installation Permit:** Initial proceedings to be conducted by the user prior to installing a boiler in his company or entity.
- l) **Renewal Permit:** Annual renewal of the operation permit of a boiler or set of boilers.
- m) **Pressure:** manometric pressure.
- n) **Maximum Working Pressure:** Top pressure at which a boiler can operate safely.
- o) **Regulated Pressure:** Pressure at which the safety valves are graded and sealed.
- p) **Working Pressure:** Pressure required by the boiler to achieve its specific purpose in the installation of which it is a component.
- q) **Heating Surface:** Boiler surface exposed to the heating source, to absorb and transfer the heat to the heated fluid.
- r) **User:** Individual or legal entity that is benefiting from or responsible for the industry, business or entity that have the boilers installed.

Amended by Executive Decree N° 29626-MTSS, Official Journal "La Gaceta" N° 130, Friday the 6th of July, 2001.

CHAPTER TWO

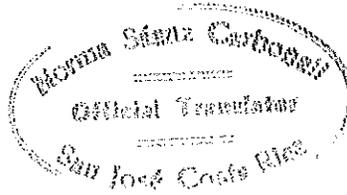
Classification of Boilers

Article 2 -Boilers are classified as follows:

a) With regard to Capacity:

a.1.) **Category A:** boilers that generate steam at rates over 7500 kg/hour, or with a heating surface larger than 200 square meters, whichever value is higher.

a.2.) **Category B:** boilers that generate steam at rates over 2000 kg/hour and up to 7500 kg/hour, or with a heating surface larger than 60 square meters and up to 200 square meters, whichever value is higher.

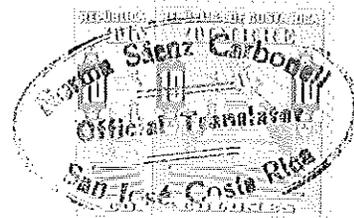


a.3.) **Category C:** boilers that generate steam at rates over 70 kg/hour and up to 2000 kg/hour, or with a heating surface larger than 2 square meters and up to 60 square meters, whichever value is higher.

a.4) **Category D:** boilers that generate steam at rates up to 70 kg/hour, or with a heating surface under two square meters.

- b) With regard to use: they are classified in New and Used.
- c) With regard to installation: permanent, temporary or portable.
- d) With regard to location: rural zone, urban zone, industrial zone or industrial park.
- e) With regard to the fuel used: liquid fuel, bunker, diesel or others; solid fuel, coal, firewood, bagasse, or others; electric power, gas, others.
- f) With regard to the heated fluid: water, thermic fluid or other.
- g) With regard to the way in which the working fluid is heated: fire-tube, water-tube, electric, others.
- h) With regard to assembly: vertical, horizontal, curve tubes, straight tubes, longitudinal domes, transverse, one or several domes, etc.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal, at the city of San José, on this the seventh day of September, two thousand and twelve. Legal tax stamps are added and cancelled.





I, Norma Sáenz Carbonell, identity card number 1-515-087, Official Translator of the Ministry of Foreign Relations of the Republic of Costa Rica, **DO HEREBY CERTIFY:** That the attached document hereunder translated from Spanish into English says as follows:

DECREE

Nº 36551-S-MINAET-MTSS

THE PRESIDENT OF THE REPUBLIC,
THE MINISTER OF HEALTH, THE MINISTER OF ENVIRONMENT,
ENERGY AND TELECOMMUNICATIONS,
AND THE MINISTER OF LABOR AND SOCIAL SECURITY

With the powers vested in them by Articles 140 subsections 3), 8) and 18) and 146 of the Political Constitution; Article 28, second paragraph, subsection b) of Law Nº 6227 of May 2, 1978, "Law General de la Public Administration"; 262, 263, 293, 295, 363 and 364 of Law Nº 5395 of October 30, 1973; "General Health Law", 1, 2 subsection g), and 6 of Law Nº 5412 of November 8, 1973, "Organizational Law of the Ministry of Health", 273, 274 and 283 of the Labor Code, Law Nº 6727 of March 9, 1982, "Law on Occupational Hazards", "Organizational Law of the Ministry of Labor and Social Security", Law Nº 1860 of April 21, 1955, "Law of Regulation of the Rational Use of Energy" Law Nº 7447 of November 3, 1994, "Boiler Regulations", Executive Decree Nº 26789-MTSS of February 16, 1998, "Regulations for Regulation of the Rational Use of Energy", Executive Decree Nº 25584-MINAE-H-MP of October 24, 1996, the "Organizational Law of the Professional Association of Chemical Engineers and Related Professionals, and Organizational Law of the Professional Association of Chemists of Costa Rica, Law Nº 8412 of April 22, 2004, the "Law of the National System for Quality", Law Nº 8279 of May 2, 2002, "Regulations on Industrial Hygiene", Executive Decree 11492-SPPS of April 22, 1980, as amended.

Whereas:

1—The increasing pollution, mainly in the Grand Metropolitan Area and adjacent zones, require urgent actions, in order to adjust it to a range within the maximum tolerable levels, and prevent damages to the health of the population and the environment.

2—The potential air pollution that may be generated by the emissions produced by industrial, commercial and service activities, justifies the adoption of stricter control measures on air quality, levels of emission of pollutant substances, quality of the fuels used, manufacture, repair and homologation of engines, transformation of energy and other stationary and mobile sources of emission of pollutants.

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3—The prevention and reduction of the problem requires a legal and technical focus, to define the appropriate emission levels, by means of setting forth in these Regulations maximum limits of emission of pollutants at the emitting sources, mainly agricultural, livestock, agribusiness and industrial facilities and activities.

4—By means of Executive Decree N° 30222-S-MINAE, published in the Official Journal *La Gaceta* N° 60 of March 26, 2002, the Executive Branch issued the “Regulations on Emission of Air Pollutants from Boilers”.

5°—The regulations do require a periodical review and update for compliance with the functions set forth in the General Health Law, and, with the objective of reviewing the maximum emission values, an inter-institutional and interdisciplinary technical board analyzed the data of operating reports on boilers received by the Ministry of Health and information from laboratories with certified tests for the 2006-2009 period, as well as data on the quality of the fuels distributed by RECOPE, for the purpose of complying in full with the provisions contained in Article 296 of the General Health Law.

6—Executive Decree N° 26789-MTSS: Boiler Regulations, published in the Official Journal *La Gaceta* N° 65 of April 2, 1998, as amended, regulates the safety conditions of boilers, which operating conditions are directly related to their air emissions and their energy efficiency. **Therefore,**

DECREE:

The following

**Regulations on Emission of Air Pollutants
from Boilers and Indirect-Type Furnaces**

CHAPTER I

General Provisions

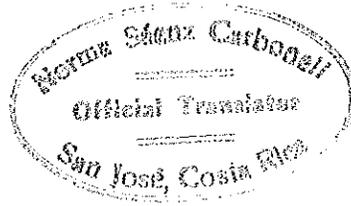
Article 1—**Purpose and Scope of Application.** These Regulations establish the maximum emission values to be met by the establishments which processes or activities include the operation de boilers and indirect-type furnaces, classified as follows:

A) Classification of Boilers (*)

Category	A	B	C	D
Steam production capacity (kg/h)	> 7500	2000-7500	> 70 - 2000	≤ 70
Area (m ²) of heating surface	>200	60 - 200	>2 - 60	≤ 2

(*) Executive Decree No. 26789-MTSS: Boiler Regulations, Official Journal *La Gaceta* N° 65, of April 2, 1998.

Boilers type C and D which only use liquefied petroleum gas (LPG) for fuel are excluded from application of these Regulations.



B) Classification of Indirect-Type Furnaces

Category	A	B	C	D
Power (kW)	> 6000	2001-6000	100 - 2000	≤ 100

Indirect-type furnaces which use biomass fuels with a power under or equal to 500 kW are excluded from application of these Regulations. For purposes of applying for exclusion, the generating entity shall submit to the Ministry of Health a Thermal Balance Report signed by a qualified professional.

Article 2—**Definitions.** The following definitions are established for purposes of these Regulations:

Air: Mix of gases which natural components are: nitrogen, oxygen, argon, carbon dioxide, other inert gases and water steam, which changes according to the location and its conditions. The following percentages in volume are used for practical purposes: twenty-one percent (21%) of oxygen and seventy-nine percent (79%) of nitrogen, including other gases.

Competent Authority: Ministry of Health.

ASTM: American Society for Testing and Materials. Scientific and technical organization established in the United States to develop standards on the characteristics and functioning of materials, products, systems and services, together with the promotion of related knowledge.

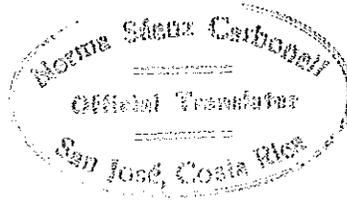
ISO: International Organization for Standardization. World federation of entities of 157 countries created in 1947. Its usual name around the world is ISO.

Biofuel: Fuel obtained from the biomass.

Biomass: Material that comes directly from living organisms.

Logbook: Notebook with duly numbered pages, used for entering all the main events related to the installation and operation of the equipment regulated by these Regulations. When involving steam systems, the logbook shall be registered with the Department of Occupational Safety, Hygiene and Medicine of the Ministry of Labor and Social Security, as provided in the Boiler Regulations of said Ministry.

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Boiler: An enclosed vessel where, for any purpose other than domestic cooking of food, water is heated or steam is generated, usually using water, at a pressure higher than the atmospheric water, to be used outside such vessel. Superheaters, reheaters, economizers or other parts under pressure, directly connected to the boiler, without involving any valves, shall be considered part of the boiler.

Normal temperature and pressure conditions (NTP): 273.15 K (0° C) and 101.3 kPa (760 mm Hg or one atmosphere).

Stack: Duct that facilitates the transfer of combustion products generated in the stationary source to the air.

Fuel: Compound or mix of chemical compounds which, when combined with oxygen, produce mostly carbon oxides, releasing energy in the process.

Solid fossil fuels: Varieties of mineral coal which fixed content of carbon ranges from 10% to 90% in mass and coke.

Liquid and gaseous fossil fuels: Oil and natural gas byproducts, such as: kerosene, LPG, butane, propane, methane, isobutene, propylene, butylene or any combinations thereof, bunker, gas and diesel.

Combustion: Rapid oxidation which consists in a reaction of oxygen with oxidizable materials or substances, resulting in the generation of gases, particulate matter, light and heat.

Air pollutants: Any substance, material or form of energy emitted to the air, whether by human activity or by natural processes, adversely affecting the environment, living organisms o buildings and structures.

Density of Smoke: Concentration of solid particulate matter from incomplete combustion over a specified time, conveyed by the stream of gases.

Sulfur Dioxide (SO₂): Colorless gas with a pungent smell, which, when oxidizing and combining with water, forms sulfuric acid, main component of acid rain.

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DMHSO: Department of Occupational Safety, Hygiene and Medicine of the Ministry of Labor and Social Security.

Emission: Exhausting to the air of liquid, solid or gaseous substances from stationary or mobile sources, from combustion or the production process.

ECA: Costa Rican Entity of Accreditation.

Generating Entity: Individual or legal entity, public or private, responsible for the issuance of air pollutants by boilers or indirect-type furnaces.

EPA: U.S. Environmental Protection Agency.

Emission Control Equipment: Current technology for reduction of air emissions, considering energy, environmental and economic aspects, after applying improvements in the production processes as well as emission reduction methods, techniques and systems.

Ringelmann Scale: Testing method to define the apparent visual density of smoke, following the procedure described in the Ringelmann Smoke Chart-Revision of IC-7718, U.S. Bureau of Mines.

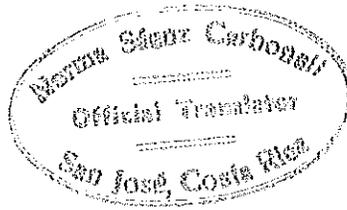
Establishment: Public or private location with a well-defined, open or enclosed infrastructure, for development of one or several agricultural, commercial, industrial or service activities; on a permanent or temporary basis.

Stationary Source: Every establishment located in a single place, while in operation, or activities that generate or can generate pollutant emissions to the air.

Furnace: Container of low pressure or atmospheric pressure, in which heat is released from fuel directly or indirectly transferred to the circulating air or any other medium that is not under pressure.

Indirect-type furnace: Furnace in which the material to be heated is not in direct contact with the combustion products: for example, oil refinery heating furnaces, thermic fluid heaters, industrial water heaters, indirect dryers and steam generators.

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Smoke: Solid suspended particulate matter dragged by the gases resulting from combustion.

IAAC= Inter-American Accreditation Cooperation.

Laboratory: Laboratory that conducts tests to establish the levels of air emissions generated by boilers and indirect-type furnaces, which operates under a current Sanitary Operating Permit issued by the Ministry of Health.

Monitoring: Systematic sampling conducted by means of automatic and/or manual equipment.

MTSS: Ministry of Labor and Social Security.

Sampling: Taking of samples and data representative of the air emissions generated by boilers and indirect-type furnaces.

Isokinetic Sampling for Particulate Matter: Technique that permits to collect total airborne particulate matter, conveyed by combustion gases, with the same speed with which they go through the sampling point in the stack or duct of the boilers and indirect-type furnaces.

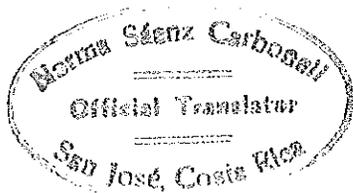
Emission Standard: Value that indicates the maximum admissible release of each air pollutant expressed in milligrams per cubic meter under NTP.

Registration Number: Official number assigned to each boiler by the DMHSO, which represents the authorization of installation and operation of the boiler, for a term of effectiveness of one year.

Nitrogen Oxides (NO_x): Aggregate concentration expressed in ppm of nitrogen dioxide (NO₂) and nitrogen monoxide (NO), finally converted into mg/m³ in function of NO₂ under these conditions: NTP, the appropriate oxygen reference and dry base.

Opacity: Degree of reduction of the intensity of light caused by the presence of airborne particulate matter.

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Particles: Any material, except uncombined water, which exists in solid or liquid state in the air or in stream of gas.

Suspended Particulate Matter (SPM): For purposes of these Regulations, it is the particulate matter that is collected by a filter using isokinetic sampling.

Operating Emissions Report: Document submitted by the generating entity to the Ministry of Health, containing information related to technical and operating aspects and the levels of emission of the boilers and indirect-type furnaces, in order to evaluate their performance.

Maximum Emission Value: The maximum admissible limit of release of an air pollutant.

...

Article 5—Boiler Installation and Operation Permit. The application for a permit for installation and operation of boilers shall be filed with the Department of Occupational Safety, Hygiene and Medicine of the Ministry of Labor and Social Security, as required in Executive Decree N° 26789-MTSS, Boiler Regulations, the Official Journal *La Gaceta* N° 65 of April 2, 1998, as amended.

...

Article 7—Maximum Emission Values. The following maximum emission values for boilers and indirect-type furnaces that burn fossil and biomass fuels are established.

- A) **Suspended Particulate Matter.** The opacity of the emission cannot exceed 20% under normal operating conditions, equivalent to Grade 1 in the Ringelmann Scale and 40% upon starting or cleaning pipes or chamber, equivalent to Grade 2 in the Ringelmann Scale, over five minutes, with a time of observation of one hour or its equivalent, by the competent authority, as provided in Exhibit 2: "Measuring of Emissions from Stationary Sources by External Observation". The appropriate comparator can be acquired at the Directorates of Leading Areas of the Ministry of Health. Meeting this limit does not release from sampling and analysis of the suspended particulate matter. It shall also be required to comply with the provisions of

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Executive Decree N° 25584-MINAE-H-MP: Regulation of the Rational Use of Energy, *La Gaceta* N° 215 of November 8, 1996.

The determination of the suspended particulate matter shall be conducted by means of isokinetic sampling.

- A.1) Use of gaseous and liquid fossil fuels, biofuels and their mixes in boilers and indirect-type furnaces.

**Admitted emissions in mg/m³ (NTP) when using
gas and liquid fuels**

	LARGE	MEDIUM-SIZED	SMALL
CATEGORY (*)	A	B	C, D
	135	150	175

(*) For boilers classified in accordance with Executive Decree No. 26789-MTSS: Boiler Regulations, Official Journal *La Gaceta* N° 65 of April 2, 1998, as amended.
For indirect-type furnaces classified in accordance with Article 1, subsection B) of these Regulations.

- A.2) Use of solid fossil fuels in boilers and indirect-type furnaces. Mineral carbon and others: 100 mg/m³ (NTP) for all sizes of boilers and indirect-type furnace.

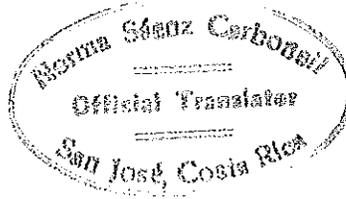
- A.3) Use of biomass as fuel in boilers and indirect-type furnaces.

	LARGE	MEDIUM-SIZED	SMALL
CATEGORY (*)	A	B	C, D
	120	150	175

(*) For boilers classified in accordance with Executive Decree No. 26789-MTSS: Boiler Regulations, Official Journal *La Gaceta* N° 65 of April 2, 1998, as amended.
For indirect-type furnaces classified in accordance with Article 1, subsection B) of these Regulations.

B) Sulfur Dioxide

- B.1) Use of liquid, gaseous and biomass fuels in boilers and indirect-type furnaces.



**Admitted emissions in mg/m³ (NTP) when using
gas, liquid and biomass fuels with a sulfur content of up to 3.0% in mass**

	LARGE	MEDIUM-SIZED	SMALL
CATEGORY (*)	A	B	C, D
	2500	2500	2500

(*) For boilers classified in accordance with Executive Decree No. 26789-MTSS: Boiler Regulations, Official Journal *La Gaceta* N° 65 of April 2, 1998, as amended.

For indirect-type furnaces classified in accordance with Article 1, subsection B) of these Regulations. No concentrations of SO₂ in boilers and indirect-type furnaces exceeding 1500 milligrams per cubic meter (NTP), provided the sulfur content in the liquid fossil fuel, available in the national market, is equal to or under 1.0% in mass.

For values of sulfur content in the fuel that exceed 3.0% in mass, the emission limit is calculated by means of the following formula:

$$\text{Emission limit} = 2500 \times (\text{content of sulfur in fuel, \% in mass})/3,0.$$

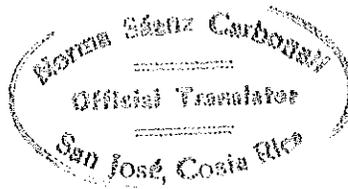
- B2) Use of solid fossil fuels in boilers and indirect-type furnaces. Mineral carbon and others: 1500 mg/m³ (NTP) for all sizes of boilers and indirect-type furnaces.

C) Nitrogen Oxides (NO_x)

- C.1) Use of liquid and gaseous fuels in boilers and indirect-type furnaces.

**Admitted emissions in mg/m³ (NTP) when using
gas, liquid and biomass fuels:**

Admitted emissions in mg/m³ (NTP) when using gas, liquid and biomass fuels:			
	LARGE	MEDIUM-SIZED	SMALL
CATEGORY (*)	A	B	C, D
Boilers and furnaces that use fossil fuels:			
Bunker	550	580	600
Diesel	200	200	220
Gasoil	420	420	420



	LARGE	MEDIUM-SIZED	SMALL
CATEGORY (*)	A	B	C, D
Kerosene	150	150	150
LPG	170	170	Exempted
Furnaces that use biomass fuels:	650	650	650

(*) For boilers classified in accordance with Executive Decree No. 26789-MTSS: Boiler Regulations, Official Journal *La Gaceta* N° 65 of April 2, 1998, as amended.
 For indirect-type furnaces classified in accordance with Article 1, subsection B) of these Regulations.

Values in function of a maximum concentration of 0.20 % of total nitrogen in mass in the bunker. For values exceeding 0.20% of nitrogen in mass, the acceptance value is increased at a rate of 100 mg/m³ (NTP) for each 0.10 in mass.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal, at the city of San José, on this the seventh day of September, two thousand and twelve. Legal tax stamps are added and cancelled.

