Cairo Air Improvement Project

Vehicle Emissions Testing Component

Low Emissions Tune-Up (LETU) Capacity Building Strategy Document

Chemonics International, Inc.
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Proposed Additions to
the Executive Regulations for Law 4 of 1994
Concerning Egyptian Emission Standards
for New Vehicles at the Time of Manufacture or Importation

ARTICLE – XX: Emission Regulations for New Motor Vehicles

ARTICLE – XX.1: Definitions

a) **Passenger Car** means a road vehicle designed primarily for the transport of passengers, having a design capacity of six persons or less including the driver, with curb weight in excess of 680 kg and gross vehicle weight rating less than or equal to 2,500 kg, and which is not equipped for off-road operation.

b) **Light Commercial Vehicle** means a road vehicle having curb weight in excess of 680 kg and gross vehicle weight rating less than or equal to 3,500 kg; and which is primarily designed for the carriage of goods, or which is primarily designed for the carriage of passengers but does not meet the definition of a "Passenger Car". A vehicle having a gross vehicle weight rating between 3,500 kg and 4,536 kg and certifying under Option B of ARTICLE-XX.2 shall also be considered a light commercial vehicle for purposes of this regulation.

c) **Heavy-Duty Vehicle Engine** means any engine designed or actually used to provide motive power for a heavy-duty vehicle.

d) **Heavy-Duty Vehicle** means any road vehicle having a gross vehicle weight rating in excess of 3,500 kg, except vehicles having a gross vehicle weight rating of 4,536 kg or less and certifying under Option B of ARTICLE-XX.2, except combat vehicles used by the Egyptian Armed Forces.

e) **Urban Bus** means a heavy-duty vehicle designed for the transport of passengers, except vehicles designed primarily for intercity passenger transport as determined by the Director of EEAA or his designee.

f) **Remanufactured Heavy-Duty Vehicle** means a heavy-duty vehicle which has undergone a process of remanufacture, repair, or refurbishment intended to restore the vehicle to substantially new condition; and which includes the removal and replacement of the engine and two or more of the following: cab, transmission, rear axle, front axle, or body. Removal and replacement of components with others of the same design shall not be considered remanufacture for the purposes of this article.

g) **Motorcycle** means any motor vehicle with a headlight, taillight and stoplight and having two or more wheels and curb weight less than or equal to 680 kg.

h) **Gross Vehicle Weight Rating (GVWR)** means the value specified by the manufacturer as the maximum designed loaded weight of a single vehicle

i) **Model Year** means the manufacturer's annual production period which includes January 1 of such calendar year: Provided that if the manufacturer has no annual production period, the term model year shall mean the calendar year

j) **Test Weight** for vehicles certifying under Option A of ARTICLE-XX.2 means the curb weight plus 100 kg. Test weight for vehicles certifying under Option B of ARTICLE-XX.2 means the curb weight plus 136 kg, rounded to the nearest multiple of 250 pounds (113.4 kg).

k) **Curb weight** means the actual or the manufacturer's estimated weight of the vehicle in operational status with all standard equipment, and with the fuel tank filled to its nominal capacity.

ARTICLE – XX.2: Passenger Cars and Light Commercial Vehicles

Applicability - Passenger cars and light commercial vehicles produced outside of Egypt during or after model year 1999 must comply with these requirements in order to be sold or imported for sale in Egypt. Passenger cars and light commercial vehicles assembled in Egypt for sale in Egypt shall comply with these requirements according to the phase-in schedule shown below.

Engine Displacement	**Model Year of Applicability**
Gasoline engine	
1.70 liter and above	1999 and later
less than 1.70 liter	2000 and later
Diesel engine	
2.1 liter and above	1999 and later
less than 2.1 liter	2000 and later

Exhaust emission limits – New passenger cars and light commercial vehicles shall either comply with the Option A1 emission limits shown below when tested according to Option A2 of the Egyptian Standard No. XXX1-1998, Test Procedure for Measurement of Pollutant Emissions from Light-Duty Vehicles or they shall comply with the Option B3 emission limits shown below when tested according to Option B4 of the same standard.

Option A Egyptian Emission Limits for Passenger Cars and Light Commercial Vehicles

Vehicle		Limit Values		
Class/Test Weight (kg)	Type	CO (g/km)	HC[1]+NOx (g/km)	PM (g/km)
Passenger Cars	Spark-Ignition Diesel	2.2 1.0	0.5 0.7	- 0.08
Light Commercial Vehicle <= 1250 kg	Spark-Ignition Diesel	2.2 1.0	0.5 0.7	- 0.08
Light Commercial Vehicle 1251 to 1700 kg	Spark-Ignition Diesel	4.0 1.25	0.6 1.0	- 0.12
Light Commercial Vehicle > 1700 kg	Spark-Ignition Diesel	5.0 1.5	0.7 1.2	- 0.17

[1] Total hydrocarbons by FID. Natural gas vehicles may substitute NMHC if desired

Option B Egyptian Emission Limits for Passenger Cars and Light Duty Trucks

	80,000 kilometers/5 years				160,000 kilometers/10 years			
Vehicle Type	NMHC (g/km)	CO (g/km)	NOx (g/km)	PM[1] (g/km)	NMHC (g/km)	CO (g/km)	NOx (g/km)	PM[1] (g/km)

1 Option A emission limits are similar to the European Union Directive Number 96/69/EC

2 Option A test procedure will be similar to that described in the European Union's "Consolidated Emissions Directive", ECE Directive 94/12/EC.

3 Option B emission limits are similar to U.S. Tier 1 Emission Standards

4 Option B test procedure will be similar to the U.S. FTP-75, 40 CFR 86, Part B

Passenger cars & Light Commercial Vehicles with test weight <= 1,703 kg	0.16	2.1	0.25	0.05	0.19	2.6	0.4	0.05
Light Commercial Vehicles with test weight > 1,703 kg	0.20	2.7	0.4	0.05	0.25	3.4	0.6	0.05

[1] Diesel vehicles only.

In addition to compliance with the Option A or Option B limits above, all new passenger cars and light commercial vehicles shall comply with exhaust pollutant concentration limits of 1.2% CO by volume and 200 PPM HC (measured as hexane) when tested according to the procedures in Egyptian Standard No. 2201-1992, Determination of Exhaust Carbon Monoxide Concentration at Idle Speed. The smoke opacity of the exhaust from new passenger cars and light commercial vehicles equipped with diesel engines shall not exceed 15% when tested under lug-down conditions and shall not exceed 20% when tested under free-acceleration conditions according to Egyptian Standard No. XXX2-19985.

Evaporative emission limits – New passenger cars and light commercial vehicle equipped with spark-ignition engines shall not produce evaporative hydrocarbon emissions exceeding 2.0 grams per test when tested according to Egyptian Standard No. XXX3-19986. Vehicles designed and equipped to use only compressed natural gas or hydrogen fuels shall be exempt from testing under this provision.

Crankcase emissions – New passenger cars and light commercial vehicles shall be designed so that they do not release emissions from the crankcase to the atmosphere. Vehicle equipped with turbocharged diesel engines are exempt from this requirement.

5 Smoke opacity measurement would be based on ISO 7644 and SAE J1667

6 Evaporative emissions would be measured using the 1-hour SHED test, similar to former U.S. and current European and Japanese practice. The current U.S. 2-day SHED test would be accepted as an alternative.

ARTICLE – XX.3: Heavy-Duty Vehicles and Engines

Applicability – New urban buses produced during or after model year 1999 and new or remanufactured heavy-duty vehicles of other types produced or remanufactured during or after model year 2000 must be equipped with engines meeting these requirements in order to be sold or imported for sale in Egypt. New or used heavy-duty vehicle engines, including engines classified as scrap, must meet these requirements in order to be imported into Egypt.

Emission limits - Heavy-duty vehicle engines shall either comply with the Option A7 emission limits shown below when tested according to Option A8 of the Egyptian Standard No. XXX4-1998, Test Procedure for Measurement of Pollutant Emissions for Heavy Duty Vehicle Engines or they shall comply with the Option B9 emission limits shown below when tested according to Option B10 of the same standard.

Option A Egyptian Emission Limits for Engines Used in Heavy-Duty Vehicles

Exhaust Emissions (g/kwh)							
Type Approval				Conformity of Production			
HC	NO_x	CO	PM	HC	NO_x	CO	PM
1.1	7.0	4.0	0.15	1.1	7.0	4.0	0.15

Option B Egyptian Emission Limits for Engines Used in Heavy-Duty Vehicles

Exhaust Emissions (g/kwh)				
HC	NMHC	NO_x	CO	PM
1.73	1.6[1]	6.7	20.7	0.13

[1] Engines may comply with either NMHC or HC standard

In addition to compliance with the Option A or Option B limits above, all new heavy-duty vehicles equipped with spark-ignition engines shall comply with exhaust pollutant concentration limits of 2.0% CO by volume and 400 PPM HC (measured as hexane) when tested according to the procedures in Egyptian Standard No. 2201-1992, Determination of Exhaust Carbon Monoxide Concentration at Idle Speed. The smoke opacity of the exhaust from new heavy-duty vehicles equipped with diesel engines shall not exceed 10% when tested under lug-down conditions and shall not exceed 20% when tested under free-acceleration conditions according to Egyptian Standard No. XXX2-1998.

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7 Option A emission limits are similar to the Euro 2 emission limits in the European Council "Clean Lorry" Directive "91/542/EEC"

8 Option A test procedure will be similar to that described in European Council Directive 91/542/EEC

9 Option B emission limits are similar to U.S. 1994 Emission Standards for Heavy-Duty Engines

10 Option B test procedure will be similar to the U.S. Heavy-Duty Transient Test, 40 CFR 86 Part N

ARTICLE – XX.4: Motorcycles

Applicability - Motorcycles produced outside of Egypt during or after calendar year 1999 must comply with these requirements in order to be sold or imported for sale in Egypt. Motorcycles assembled in Egypt for sale in Egypt shall comply with these requirements according to the phase-in schedule shown below.

Percentage of production	Calendar Year
50%	1999
100%	2000

Exhaust emission limits – New motorcycles shall comply with the emission limits11 shown below when tested according to Egyptian Standard No. XXX5-1998, Test Procedure for Measurement of Pollutant Emissions from Motorcycles. Compliance may be demonstrated by testing in accordance with either Option A12 or Option B13 of the standard, at the manufacturer's option.

Egyptian Emission Limits for Motorcycles

Exhaust Emissions (g/km)	
HC	CO
3.0	13.0

In addition to compliance with the emission limits above, all new motorcycles shall comply with exhaust pollutant concentration limits of 4.5% CO by volume and 900 PPM HC (measured as hexane) when tested according to the procedures in Egyptian Standard No. 2201-1992, Determination of Exhaust Carbon Monoxide Concentration at Idle Speed. The smoke opacity of the exhaust from new motorcycles equipped with two-stroke engines shall not exceed 15% when tested under free-acceleration conditions according to Egyptian Standard No. XXX6-199814.

11 Emission limits are similar to the Austrian Motorcycle Emission Standards. Four-stroke motorcycles meeting U.S., Japanese, or Taiwanese standards would also comply

12 Option A test procedure would be similar to that in ECE Regulation 40

13 Option B test procedure would be similar to the U.S. FTP-75 for motorcycles, 40 CFR 86 Subpart F

14 Smoke opacity measurement for two-stroke engines would be based on Taiwanese test procedure

ARTICLE – XX.5: Exemptions

The Director of the **[Responsible Government Agency]** or his designee may grant an exemption allowing the importation or sale of motor vehicles or motor vehicle engines not conforming with the requirements of this Article under any of the following circumstances:

(a) The Director finds that an imported vehicle or engine model is equipped with an effective emission control system and complies with emission requirements in its country of origin that are substantially equivalent to or more stringent than the requirements of this Article;

(b) During the first year of application of any new or modified emission standard, if the Director finds that compliance with the new or modified emission standard in the time available would be excessively costly or impractical for a specific vehicle or engine model;

(c) When a citizen or resident of Egypt has resided abroad for at least one year, and wishes to import a maximum of one personal vehicle purchased while living abroad;

(d) When a citizen or resident of another country has received permission to reside in Egypt for at least one year, and wishes to import a maximum of one personal vehicle purchased while living abroad;

(e) When the Director finds that a specific noncomplying vehicle or engine model fulfills special technical or social requirements15 not otherwise fulfilled by available compliant vehicle or engine models, and the noncomplying vehicle or engine will be produced or imported in quantities of less than 50 units per year.

Nonconformance Penalties – Except for exemptions granted under paragraph (a) above, any exemption to the requirements of this Article shall be valid only upon payment of a non-conformance penalty by the manufacturer or importer for each exempt vehicle or heavy-duty vehicle engine sold in or imported to Egypt. Non-conformance penalties shall be paid to the Environmental Protection Fund created under Article 7 of these regulations. The amount of the non-conformance penalty shall be L.E. 4,000 (four thousand Egyptian pounds) for each passenger car, L.E. 5,000 for each light commercial vehicle, and L.E. 1,000 for each motorcycle imported or sold subject to such an exemption. For heavy-duty vehicle engines, the penalty shall be calculated by multiplying the maximum rated engine power output in kilowatts by 100 L.E., so that a 100 kW engine would pay a penalty of 10,000 L.E.

Any such exemption shall be rendered invalid, and the producer or importer shall be subject to the penalties established for violation of the Law on Environment if it is determined that such exemption was based, in whole or in part, on false or misleading information provided by the manufacturer or importer; or if any non-conformance penalty is not paid within 60 days of the sale or importation of the vehicle to which it applies.

15 For example, a special design of truck-mounted heavy equipment, or a special ambulance design only available with one type of engine.

ARTICLE – XX.6: Prohibition of Tampering

It shall be considered a violation of the Law on Environment for any person knowingly to remove, modify, disconnect, disable, or tamper with (except temporarily, for diagnostic or maintenance purposes) any emission control device or system installed on any motor vehicle or motor vehicle engine subject to the requirements this article, unless such person has a reasonable basis for believing that such action will not cause the subject motor vehicle or motor vehicle engine to produce pollutant emissions in violation of these regulations. Such a reasonable basis shall be considered to exist if:

(a) The subject actions are taken in substantial compliance with the written maintenance recommendations of the vehicle manufacturer, and/or any devices or components removed are replaced by devices or components substantially similar to those with which the vehicle was originally equipped, or with approved replacement parts; or

(b) The results of appropriate emission tests performed on vehicles or engines similarly modified show that the emissions from such modified vehicles or engines do not exceed the applicable Egyptian emission limits.

Proposed Emission Standards

- **Vehicle types covered**
  - **Passenger cars**
  - **Light commercial vehicles**
  - **Heavy duty vehicles/engines**
  - **Urban buses (as subset of heavy-duty vehicles)**

- **Emission limits**
  - **Pass. cars and light commercial**
    - **Option A (current European)**
    - **Option B (current U.S.)**
  - **Heavy-duty trucks**
    - **Option A (Euro 2)**
    - **Option B (U.S. 1994)**
  - **Motorcycles**
    - **Austrian standards (U.S., Taiwan, Japan 4 strokes also comply)**
    - **Two-strokes effectively prohibited**

Proposed Emission Standards

- Egyptian standard test procedures need to be adopted based on U.S. and E.U. procedures
- Aggressive Timetable for Compliance
  - Pass. Cars and Light Commercial
    - 1.7 liters and up – 1999
    - less than 1.7 liters – 2000
  - Heavy-Duty Vehicles
    - Urban buses – 1999
    - Others – 2000
  - Motorcycles
    - 50% of production - 1999
    - 100% of production – 2000
- Exemption process will allow manufacturers caught short to delay compliance by paying a financial penalty in return for being allowed to sell nonconforming vehicles for one year

Recommended Next Steps

- ❖ Review draft regulations inside EEAA
- ❖ Translate draft regulations to Arabic
- ❖ Minister of Environment circulates to other ministries for comment
- ❖ Public workshop for automotive industry in late July
- ❖ Finalize regulations and publish in the Gazette
- ❖ Work with ESO to adopt test procedures as Egyptian standards
- ❖ Develop implementing regulations
  - ➢ Emissions certification
  - ➢ Selective enforcement audit
  - ➢ Customs screening procedures
- ❖ CAIP technical support to responsible government agency during first years of certification and auditing