Republic of the Philippines
DEPARTMENT OF LABOR AND EMPLOYMENT
Intramuros, Manila

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DEPARTMENT ORDER NO. 15
Series of 2001

Pursuant to Article 162 of Presidential Decree No. 442, otherwise known as the Labor Code of the Philippines, as amended, the following Rules on Internal Combustion Engine and Power Piping Lines are hereby promulgated and issued as follows:

Rule 1180
INTERNAL COMBUSTION ENGINE

1181: Definition of Terms

1. "Internal Combustion Engine" can be a two or four stroke cycle piston engine wherein heat energy is developed by burning the air-fuel mixture (gas, diesel, oil, etc.) inside the combustion chamber which in turn produces mechanical energy in the form of reciprocating and rotating forces of expanding gases during combustion to drive a piston, shaft or propeller. Diesel engine is the principal internal combustion engine for stationary power plant.

2. "Horsepower" (hp) is the amount of energy or work required to raise, create or force a weight of 33,000 pounds to a height or distance of one-foot in one-minute time; a standard unit of power equivalent to 746 watts or 746 joules/second.

1181.01: Application/Coverage

The Rule on internal combustion engine shall cover or apply to the following:

1. Portable/mobile generating units which may be moved from site to site where electrical power is required.

2. Standby units, normally idle, which can be activated when there is a failure of central station power where an interruption would mean a financial loss or danger to life and property (such as in tunnel lighting, operating rooms, key industrial processes, etc.).

3. Engine driven generator units installed in power plants where they are the normal primary source of electrical power generated for industrial and general utilities services.

4. Prime movers for industrial manufacturing processes and services.

5. All internal combustion engines used in construction and agricultural services and other similar applications, except those engines used in transportation such as automobile, aircraft engine, gas or liquid compressor engine, marine or ship motor engines.

1182: General Provisions

1. No internal combustion engine shall be installed and/or operated in the Philippines without the permit issued for the purpose by the Secretary of Labor and Employment or his duly authorized representative.

2. Application for installation of an internal combustion engine shall be filed through the Regional Labor Office concerned for processing or verification, accompanied by the manufacturer's data sheets, working drawing, foundation with design computation, installation and site location plan and vicinity map, all in five (5) copies in white or blue print duly signed and sealed by a professional mechanical engineer and duly signed by the owner.

3. A permit to operate an internal combustion engine issued by the Secretary of Labor and Employment or his duly authorized representative shall be valid during the period covered by the permit unless revoked for justifiable reasons (e.g., unsafe to operate).

4. Any removal and/or change of location of an internal combustion engine shall be reported to the Regional Labor Office concerned and shall be considered as a new installation.

5. Change of ownership of an internal combustion engine shall be reported to and applied with the Regional Labor Office concerned.

6. The personnel requirement in the operation of internal combustion engine shall be in accordance with Republic Act No. 8495 (Mechanical Engineering Law).

1182.01: Standards Requirement

As a minimum requirement for purposes of installation, plan checking, inspection, and other considerations prior to the clearance of any installation and use of internal combustion engine, Chapter 2 of the Philippine Society of Mechanical Engineering (PSME) Code and Rule 1060 of the Occupational Safety and Health Standards shall be applied.

1182.02: Inspection

1. The Regional Labor Office through its duly authorized representative shall conduct inspection of internal combustion engine accompanied by the representative of the owner and/or the supervising plant mechanical engineer for operation and maintenance and those who installed the internal combustion engine on the following phases of work:

a. During the construction phase of the foundation and/or installation of the internal combustion engine;
b. Before being placed into service after installation;
c. Before being placed into service after modification; and
d. Periodically at intervals not exceeding 12 months.

2. Upon receipt of Notice of Annual Inspection, the owner or user shall order the responsible plant mechanical engineer for operation and maintenance to prepare the internal combustion engine and its surrounding facilities for the inspection.

3. While the internal combustion engine is running, the following shall be noted:
a. crack on base foundation;
b. noise level;
c. excessive vibration;
d. exhaust gas emission level;
e. heat level; and
f. ventilation system.

1183: Internal Combustion Engine Room/Building

1. All buildings, permanently or temporarily used, shall be structurally safe and sound to prevent their collapse.

2. Roof shall be of sufficient strength to withstand normal design load, typhoon and strong winds in addition to carrying suspended loads.

3. Floors over which any person is likely to walk shall be sufficiently even to afford safe walking.

4. Floors shall be free from holes and splinters, improperly fitted gutters or conduits, protruding nails and bolts, projecting valves or pipes or other obstructions which create stumbling hazards.

5. Floors shall not be slippery under any condition.

6. Engine room shall be at a minimum of 3.0 meters in height or as specified by the manufacturers.

7. Adequate spaces shall be provided between engine or equipment to allow normal operation, maintenance and repair. Clearance around the engine to the engine room wall or any equipment shall be at a minimum of 1.0 meter. Engine room shall have two independent doors for easy access.

8. Engine room/building shall be suitably or adequately lighted for the operation and other type of work performed.

9. Normal atmospheric conditions shall be maintained in the engine room by natural or artificial ventilation to avoid insufficient air supply, stagnancy of air, excessive heat, toxic gases, excessive dryness and other objectionable odors.

10. Engines with "weatherproof" housings which are installed outdoors or on roofs of structures shall be located at a minimum of 1.5 m from openings in walls and at least 1.0 m from structures having combustible adjacent walls.

11. Engines rated at more than 50 hp shall be located in accordance with no. 10 or shall be installed in detached structures reserved exclusively for the purpose with equipment and processes having similar hazard, or in rooms within or attached to other structures.

12. Detached structures shall be of noncombustible or fire-resistive construction. Provision shall be made for venting a fuel explosion with minimum structural damage. Ventilation adequate to prevent a hazardous accumulation of flammable vapors or gases shall be provided both when the engine is operating or shut down.

13. Rooms located within structures shall have interior walls, floors and ceilings of at least one hour fire resistance rating. (The ceiling of such a room located on the top floor of a structure need not be fire-resistive but shall be non combustible or protected with automatic sprinklers).
    a. These rooms shall have provision for venting a fuel explosion with minimum structural damage; or, ventilation adequate to prevent a hazardous accumulation of flammable vapors or gases shall be provided both when the engine is operating or shut down.
    b. Openings in the engine room that open into other sections of the structure shall be provided with automatic or self closing fire doors or dampers to confine a fire to the engine room.

14. Rooms attached to structures shall comply with no. 12 except that the common wall shall have a fire resistance rating of at least one hour. Openings in the engine room shall preferably be in outside walls, but if they open into other sections of the structure, they shall be provided with automatic or self-closing fire doors or dampers.

15. In areas where flammable gases or liquids, combustible dusts or flying normally exists, engines not compressing a flammable gas or not pumping a flammable liquid shall be installed in an enclosure of fire-resistive construction, with outside access only and well ventilated from a non-hazardous outside area.

16. Gasoline or liquefied petroleum gas fueled engines shall not be installed in rooms or locations containing fired equipment or open flames.

17. Appropriate fire protection equipment shall be provided for the engine and the location. e.g. fire extinguishers, fire hoses and pumps.

18. Appropriate exhaust silencer shall be provided to minimize or maintain noise level.

19. All exhausts from internal combustion engine shall be directed outside to a safe area in accordance with the requirements of the Department of Natural Resources (DENR).

20. Safety signages shall be posted on prominent position at strategic location and, as far as practicable, be in the language understandable to all the workers.

1183.01: Internal Combustion Engine Foundation Requirements

1. Foundations shall be of sufficient strength, structurally designed to sustain safely the loads for which they are designed. Under no condition shall they be overloaded.

2. Floor slabs or building footings shall be isolated from foundation base by at least 25 mm. around its perimeter to eliminate transmission of vibration. Opening shall be filled with watertight insulation.

3. Foundation shall be concrete, at least class A mixture of 1 part cement, 2 parts sand and 4 parts broken stone or gravel (50 mm. max.) or at least 211.36 kg/cm2 (3000 psi).

4. Foundation shall be poured monolithically, with no interruption, for spading and ramming purposes.

5. Engine should be placed on the foundation only after seven days have elapsed from pouring of base and should be operated only after 20 days have elapsed from placement or as per specifications of the manufacturer/installer.

6. Additional vertical and horizontal steel bars shall be placed on concrete foundations as reinforcement to avoid thermal cracking.

7 Specified size of foundation bolts shall be used and surrounded by a pipe sleeve.

8. Minimum foundation bolts shall be at least 12 mm. in diameter.

9. The weight of the engine plus the weight of the concrete foundation shall be distributed over a sufficient soil base area large enough to cause a bearing stress within the safe bearing capacity of the soil with a factor of safety of five (5), as minimum.

1183.02: Machine Guarding

All moving parts of the engines, transmission equipment and all dangerous parts of driven machinery shall be effectively guarded in accordance with the provisions of Rule 1200 of the Occupational Safety and Health Standards.

Hot surfaces shall be provided with insulation or guarding.

1183.03: Personal Protective Equipment

On-duty personnel for engines requiring regular attendants shall be provided with personal protective equipment appropriate for the hazard present.

1184: Requirements in the Preparation of Internal Combustion Engine Installation Plan

Before an internal combustion engine (diesel, gasoline, gas or oil, etc.) is installed, the owner/manager or his authorized representative shall file with the Regional Labor Office concerned an application for internal combustion engine installation, accompanied by each sheet of plans in blue or white print, all in five (5) copies.

The following shall be incorporated in the plans.

1. Vicinity and Location Plans:

   Site of the establishment indicating any known landmarks, such as street, private or public place or building and an arrow indicating NORTH direction drawn not necessarily to scale.

2. Room Layout:

   a. The detail room drawn to scale indicating the position of the engine to the surrounding walls or any machinery/equipment in the room. There shall be at least two independent doors.
   b. The type of materials used for the room walls, may either be concrete, adobe, hollow blocks or other type of fire-resistive wall and noise-proof walling.

3. Installation and Foundation Plans:

   a. The front and side views of the engine installation with the foundation. This shall include the detail of anchorage or setting of the engine to the concrete foundation. The dimensions of the concrete foundation shall also be indicated.
   b. The detail layout of the equipment/machinery to be shown powered by the engine.
   c. The method of the main drive, whether belt/s or others must be presented.
   d. The piping installation especially those within a height of 2.13 meters from the floor line.
   e. Guarding of moving or power transmission parts.

4. Internal Combustion Engine Data and Specification:

   a. BHP (Factory Catalog Rating)
   b. Manufacturer or make, kind of internal combustion engine
   c. Type and model, serial number
   d. Bore and stroke, number of cylinders
   e. Cycle stroke and revolution per minute (rpm)
   f. Method of fuel injection
   g. Type of cooling
   h. Type of lubrication
   i. Type of governor
   j. Method of starting
   k. Method of drive
   l. Internal Combustion Engine application/use

5. Foundation Design Computation:

   a. The gross weight of the machine engine and its accessories.
   b. The base area and volume of concrete foundation.
   c. The type of concrete mixture used and density of concrete.
   d. The soil bearing capacity in the locality where the engine is to be installed.
   e. The factor of safety of the concrete foundation shall be at least five.

6. Size of Plans:

   All sheets of plans to be submitted shall be of the following sizes:

   375 cm. x 530 cm ---------- Minimum
   530 cm. x 750 cm.
   750 cm. x 1065 cm ---------- Maximum

7. Title Block:

   The size shall be 7.62 cm. in width, while the total length of the lower part of the plan will be occupied by the title block to contain:

   a. Name in print, signature and seal of professional mechanical engineer indicating his/her registration number, PTR number, place and date issued and Tax Identification Number.
   b. Initials of the draftsman, date of plan prepared, sheet number and scale used. Minimum scale of 1:100 except for small and minute parts/details where a convenient scale may be used to show clearly the parts/details.
   c. Title of the plan.
   d. Name in print and signature of owner/manager of the establishment indicating his/her Tax Identification Number.
   e. Name and address of establishment.

1185: Portable/Mobile Internal Combustion Engines

1. Application for installation of a portable/mobile internal combustion engine shall be filed with the Regional Labor Office concerned for the processing or verification accompanied by the manufacturers data sheets, working drawing showing the mounting of the unit in white or blue print, all in five (5) copies.

2. All plans shall be drawn in standard metric scale. Minimum scale shall be 1:100 except for small and minute parts/details where a convenient scale may be used to show clearly the parts/details.

3. All pertinent papers/documents required shall be signed by the owner/manager of the unit and signed and sealed by a professional mechanical engineer.

4. The necessary annual inspection shall be conducted on or before the expiration date of the permit to operate issued by the Regional Labor Office concerned and the inspection fee shall be paid for the issuance of a new permit.

5. The new permit shall be valid for one-year operation regardless of the subsequent transfer of location of operation of such unit, provided that such permit is available at the location of operation.

RULE 1240
POWER PIPING LINES

1241: Definition of Terms

1. "Power Piping Line" shall include all steam, water, air, gas, hazardous substances, oil piping and the component parts such as the pipe, flanges, bolting, gaskets, valves, fittings and other components related to steam generating plants, central heating plants and industrial plants.

2. "Installation" shall mean assemblance or connection of power piping in a given location, designed for safety operation in accordance with the prescribed standards.

3. "Cleared" shall mean acceptance by the Regional Labor Office concerned after verification and checking of the applications, plans and other pertinent documents showing compliance with prescribed installation requirements.

1242: General Provisions

1. Application for installation of a power pipeline shall be filed with the Regional Labor Office concerned for processing and evaluation. Application shall be accompanied by the working drawings showing location plant piping layout and piping specifications, all in five (5) copies (white/blue print) duly signed by the owner and signed and sealed by a professional mechanical engineer.

2. No power piping line shall be connected/installed without the plans cleared by the Regional Labor Office concerned.

3. No power piping line shall be operated until the necessary documents are submitted and final inspection conducted, the safety permit is issued upon payment of the corresponding inspection fee.

4. Any repair work done on power pipeline shall be documented and shall be made available during the conduct of periodic inspection.

1243: Standards Requirements

For purposes of design installation, inspection and other considerations prior to the clearance of any installation of the power piping connection system, Chapter 11 on Power Piping System of the Philippine Society of Mechanical Engineering (PSME) Code shall be applied as a minimum requirement.

1244: Construction

1. Power piping shall be designed to be of sufficient strength suitable for their intended use.

2. Power pipeline shall be provided with safety and or relief valves, indicating and controlling devices to ensure their safe operation. The safety devices shall be accessible, installed and maintained in good operating condition.

3. The discharge capacity of safety valves provided on power pipelines shall be sufficient for the size and pressure at which the power pipeline is operated.

4. Outlets of safety valves on power pipeline shall be installed on location so that hazards to personnel shall be avoided.

5. In the absence of appropriate provisions in the PSME Code, the manner of installation of approved pressure relief devices such as rupture discs shall be in accordance with the code of practice for mechanical engineering under the supervision of a professional mechanical engineer.

6. Indicating and recording devices on power pipeline shall be protected against breakage or clogging and shall be clearly visible.

7. Where pressure reducing valves are used, one or more relief or safety valves shall be provided on the low pressure side of the reducing valve, in case the piping or equipment on the low pressure side does not meet the requirements for the full initial pressure. The relief or safety valve shall be located adjoining or as close as possible to the reducing valve. The vents shall be of ample size and as short and direct as possible.

8. Pressure gauge in power pipeline shall be installed on the low pressure side of a reducing valve.

9. Flange connections for their respective pressures and temperatures shall conform to the specifications set forth by the PSME Code.

10. Piping lines must be provided with loops and bends and expansion joints to avoid:

    a. failure because of excessive stresses;
    b. excessive thrusts or moments at connected component; or
    c. leakage at joint because of expansion of the pipe.

11. Welding in power piping lines whether in the shop or at the job site must be done by qualified welders.

12. All power pipelines shall follow the standard color code as required in Rule 1230 of the Occupational Safety and Health Standards.

13. All power pipelines shall have appropriate supports or hangers and guard provision against bumps.

14. All other provisions on bolting, flanges, fittings, gaskets, hangers, supports, anchors, pipe sleeves, drains, drips and steam traps requirement in the power pipeline shall be in accordance/conformity with the provisions in Chapter 11 (Power Piping System) of the PSME Code as a minimum requirement.

1245: Non-Destructive Test

All newly installed and repaired pipelines are required to be subjected to a random Non-Destructive Testing prior to its operation, by either Radiographic Examination (RT) or Ultrasonic Test (UT).

1246: Hydrostatic Test

After installation, all piping line connection shall be hydrostatically tested and shall observe the following:

a. The ends of the pipelines and any equipment are blanked off, such as, pressure reducing valve diaphragms is removed or protected to avoid over pressure.

b. Applied hydrostatic test is equal to 1.5 times the service operating pressure for a minimum of 24 hrs. for new installation and 4 hours for existing repaired/installation.

For strict compliance of all concerned.

Manila, Philippines, December 18, 2001

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Secretary