Engineering Standard

SAES-K-511 30 June, 2002

Diesel Engines

Saudi Aramco DeskTop Standards

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1 Scope

1.1 This Standard defines the minimum mandatory requirements governing the design and installation of diesel engines for industrial and generator drive applications. This Standard may not be attached to or made a part of purchase orders.

1.2 Diesel engines below 50 kW (67 HP) site continuous rating and diesel engines for automotive use and for marine propulsion systems are excluded from the scope of this Standard.

2 Conflicts and Deviations

2.1 Any conflicts between this Standard and other applicable Saudi Aramco Engineering Standards (SAESs), Materials System Specifications (SAMSSs), Standard Drawings (SASDs) or industry standards, codes and forms shall be resolved in writing by the Company or Buyer Representative through the Manager, Consulting Services Department, Saudi Aramco, Dhahran.

2.2 Direct all requests to deviate from this Standard in writing to the Company or Buyer Representative, who shall follow internal company procedure SAEP-302 and forward such requests to the Manager, Consulting Services Department, Saudi Aramco, Dhahran.

3 References

The selection of material and equipment and the design, construction, maintenance and repair of equipment and facilities covered by this Standard shall comply with the latest edition of the references listed below, unless otherwise noted.

3.1 Saudi Aramco References

Saudi Aramco Engineering Procedure

SAEP-302	*Instructions for Obtaining a Waiver of a Mandatory Saudi Aramco Engineering Requirement*

Saudi Aramco Engineering Standard

SAES-B-068	*Electrical Area Classification*

Saudi Aramco Materials System Specifications

17-SAMSS-518	*Diesel Generator Sets*
30-SAMSS-001	*Diesel Engines*

Saudi Aramco Forms and Data Sheets

6237-ENG & 6237-M-ENG	*Diesel Engines*

3.2 Industry Codes and Standards

National Fire Protection Association

NFPA 70	*National Electric Code*

Society of Automotive Engineers

SAE J 1349	*Engine Power Test Code - Spark Ignition and Compression Ignition - Net Power Rating*

4 Design

4.1 General

4.1.1 Diesel engines for industrial application shall comply with 30-SAMSS-001. Diesel engines for electric generator drive shall comply with 17-SAMSS-518.

4.1.2 Single lift packaged units shall be specified whenever possible.

4.1.3 Unit responsibility for the diesel engine/driven equipment shall be assigned to the driven equipment manufacturer or packager.

4.2 Rating

The diesel engine continuous rating at site ambient conditions shall be derived from the continuous rating at standard ambient conditions per SAE J 1349. The continuous rating at site ambient conditions shall be 110% of the maximum required power of the driven equipment, including the power losses in any intermediate transmissions. The derating for diesel engines shall be based on SAE J 1349. The worst conditions shall be used for temperature, altitude and humidity.

4.3 Flameproofing

Particular attention shall be given to the flameproofing of diesel engines running in classified areas where hydrocarbon gases can be ignited by hot components of the engine, sparks from metal parts or from the exhaust. Since flameproofed diesel engines are expensive (up to three times the cost of standard engines), all efforts shall be made to locate the diesel engine in a non-classified area.

4.4 Cooling System

Radiator cooling shall not be used for engines above 500 kW (670 HP) continuous site rating, which are located indoors. For these engines, either water cooling by means of a heat exchanger or an air fan cooler, located outside the building, shall be used.

4.5 Torsional Vibration Analysis

For diesel driven packages which have not been previously manufactured identically, a torsional analysis of the train shall be specified. Otherwise, the Vendor shall submit the analysis of an identical train.

4.6 Controls and Instrumentation

Diesel engines driving firewater pumps and in other services not having any standby equipment to take over automatically in the event of failure, shall not be equipped with automatic shutdown devices, with the exception of an overspeed device. Alarm devices shall be provided.

4.7 Barring Device

Diesel engines having a site continuous rating above 500 kW (670 HP) shall be equipped with a manufacturer's standard barring device, to facilitate easy maintenance in the crankcase.

5 Installation

5.1 The electrical area classification shall be established in accordance with NFPA 70 and SAES-B-068.

5.2 Diesel engine packages installed on offshore platforms shall be mounted on vibration isolators when the vibration of surrounding equipment can be harmful to the bearings of an engine which is not operating for long periods of time such as a firewater pump driver.

5.3 Vibration isolators shall also be provided for engines located adjacent to living quarters, or when required to isolate the free forces and moments from the deck structure. Isolators shall be sized to produce a transmissibility of 0.1 at the engine rated speed.

6 Testing

6.1 Standard Shop Tests

Standard shop tests are required for all diesel engines having a site continuous rating of 200 kW (268 HP) or less. Requirements for witnessed testing shall be specified on the Data Sheet. All diesel engines manufactured by Vendors with whom Saudi Aramco has no previous experience shall be witness tested.

6.2 Performance Tests

Performance tests are required for all diesel engines having a site continuous rating of 500 kW (670 HP) and above. For engines rated between 200 kW (268 HP) and 500 kW (670 HP), only the first engine supplied on a Purchase Order needs to be performance tested. Subsequent engines may be tested in accordance with Vendor's standard shop test. The performance tests shall always be witnessed.

6.3 Overspeed Trip Device Test

An overspeed trip device test is required for all engines. Test certificates shall be provided.

Revision Summary

30 June 2002	Revised the "Next Planned Update". Reaffirmed the contents of the document, and reissued with editorial changes.