Electrical Installations in Petroleum Processing Plants

API RECOMMENDED PRACTICE 540 FOURTH EDITION, APRIL 1999 REAFFIRMED, AUGUST 2013





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Electrical Installations in Petroleum Processing Plants

Downstream Segment

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FOREWORD

This recommended practice provides information on electrical installations in petroleum facilities. It is intended for all individuals and organizations concerned with the safe design, installation, and operation of electrical systems in petroleum facilities.

This recommended practice has been developed by individuals with many years' experience in the petroleum industry. Although of interest to anyone seeking information on electrical systems in petroleum facilities, it is primarily intended to be used by individuals knowledgeable in engineering fundamentals who require specific guidance concerning currently accepted practices in the petroleum industry.

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Certain serious adverse health effects are associated with asbestos, among them the serious and often fatal diseases of lung cancer, asbestosis, and mesothelioma (a cancer of the chest and abdominal linings). The degree of exposure to asbestos varies with the product and the work practices involved.

Consult the most recent edition of the Occupational Safety and Health Administration (OSHA), U.S. Department of Labor, Occupational Safety and Health Standard for Asbestos, Tremolite, Anthophyllite, and Actinolite, 29 *Code of Federal Regulations* Section 1910.1001; the U.S. Environmental Protection Agency, National Emission Standard for Asbestos, 40 *Code of Federal Regulations* Sections 61.140 through 61.156; and the U.S. Environmental Protection Agency (EPA) rule on labeling requirements and phased banning of asbestos products (Sections 763.160-179).

There are currently in use and under development a number of substitute materials to replace asbestos in certain applications. Manufacturers and users are encouraged to develop and use effective substitute materials that can meet the specifications for, and operating requirements of, the equipment to which they would apply.

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Electrical Installations in Petroleum Processing Plants

SECTION 1—INTRODUCTION

1.1 PURPOSE

This recommended practice provides information on electrical installations in petroleum facilities. Petroleum processing requires specialized equipment that continually processes, often at high rates and elevated temperatures and pressures, liquids, and gases that undergo both chemical and physical changes. Consequently, it is necessary that electrical installations and equipment in petroleum facilities be designed to prevent accidental ignition of flammable liquids and gases.

To maintain safety and operating continuity, requirements for the electrical systems in petroleum facilities are more stringent than those for most other manufacturing facilities. This recommended practice addresses specific requirements for those electrical systems.

1.2 SCOPE

This recommended practice is limited to electrical installations in petroleum facilities. It provides a basis for specifications included in engineering and construction contracts. Electrical equipment test standards are excluded from the scope of this recommended practice. Operation and maintenance are addressed only insofar as they affect electrical system design and electrical equipment selection. The subject of energy conservation is reviewed.

1.3 REFERENCES

1.3.1 The following standards, codes, and specifications are cited in this recommended practice:

API

RP 14F	Design and Installation of Electrical Sys-
	tems for Offshore Production Platforms
RP 500	Recommended Practice for Classification
	of Locations for Electrical Installations at
	Petroleum Facilities Classified as Class I,
	Division 1 and Division 2
RP 505	Recommended Practice for Classification
	of Locations for Electrical Installations at
	Petroleum Facilities Classified as Class I,
	Zone 0, Zone 1, and Zone 2
Std 541	· Form-Wound Squirrel-Cage Induction
	Motors—250 Horsepower and Larger
Std 546	Brushless Synchronous Machines—500
	kVA and Larger
RP 552	Recommended Practice for Transmission
	Systems

Std 610	Centrifugal Pumps for Petroleum, Heavy
0:1(14	Duty Chemical and Gas Industry Service
Sta 614	Lubrication, Snaff-Sealing, and Control-Ou
	Systems and Auxiliaries for Petroleum,
DD (51	Chemical and Gas Industry Service
RP 651	Cathodic Protection of Aboveground Stor-
DD 2001	age lanks
RP 2001	Fire Protection in Refineries
RP 2003	Protection Against Ignitions Arising out of Static Lightning and Stray Currents
	State, Eighnang, and Siray Carrents
AEIC ¹	
CS1	Specification for Impregnated Paper-Insu-
	lated, Lead-Covered Cable, Solid Type
CS5	Specifications for Thermoplastic and
	Crosslinked Polyethylene Insulated Shielded
	Power Cables Rated 5 Through 46 kV
CS6	Specifications for Ethylene Propylene Rub-
	ber Insulated Shielded Power Cables
	Rated 5 Through 69 kV
AGMA ²	
6019-E	Gearmotors Using Spur, Helical, Herring-
	bone, Straight Bevel, or Spiral Bevel Gears
ANSI3	
	Specification for Rigid Steel Conduit Tine
000.1	Coated
C80.5	Specification for Rigid Aluminum Conduit
C84.1	Electric Power Systems and Equipment
	Voltage Ratings (60 Hz)
ASTM ⁴	
D877	Standard Test Method for Dielectric Break-
	down Voltage of Insulating Liquids Using
	Disk Electrodes
CSA5	

Canadian Electrical Code

¹Association of Edison Illuminating Companies, P.O. Box 2641, Birmingham, Alabama 35291.

²American Gear Manufacturers Association, 1500 King Street, Suite 201, Alexandria, Virginia 22314.

³American National Standards Institute, 1430 Broadway, New York, New York 10018.

⁴American Society of Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428-2959.

⁵Canadian Standards Association, 178 Rexdale Boulevard, Rexdale, Ontario M9W 1R3, Canada.