

TECHNICAL REPORT



Fire prevention measures on converters for high-voltage direct current (HVDC) systems, static var compensators (SVC) and flexible ac transmission systems (FACTS) and their valve halls

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**FIRE PREVENTION MEASURES ON CONVERTERS FOR
HIGH-VOLTAGE DIRECT CURRENT (HVDC) SYSTEMS, STATIC
VAR COMPENSATORS (SVC) AND FLEXIBLE AC TRANSMISSION
SYSTEMS (FACTS) AND THEIR VALVE HALLS**

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IEC TR 62757 edition 1.1 contains the first edition (2015-07) [documents 22F/347/DTR and 22F/353A/RVC] and its amendment 1 (2019-07) [documents 22F/520/DTR and 22F/526/RVDTR].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

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IEC/TR 62757, which is a technical report, has been prepared by subcommittee 22F: Power electronics for electrical transmission and distribution systems, of IEC technical committee 22: Power electronic systems and equipment.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of the base publication and its amendment will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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FIRE PREVENTION MEASURES ON CONVERTERS FOR HIGH-VOLTAGE DIRECT CURRENT (HVDC) SYSTEMS, STATIC VAR COMPENSATORS (SVC) AND FLEXIBLE AC TRANSMISSION SYSTEMS (FACTS) AND THEIR VALVE HALLS

1 Scope

IEC TR 62757, which is a technical report, deals with fire prevention measures on converters and their valve halls for high voltage direct current (HVDC) systems, static VAR compensators (SVC) and flexible AC transmission systems (FACTS). It is intended to be primarily for the use of the utilities and consultants who are responsible for issuing technical specifications for new converter valves and valve halls. It concerns fire incidents in HVDC projects using line commutated converters (LCC) or voltage sourced converter (VSC) technology and it is from these projects that most examples of fires and fire incidents are taken. This technical report also addresses converter valves and valve halls for SVC and FACTS.

This technical report provides general recommendations to be considered while preparing specifications for these systems. Specific requirements for a particular project need to be clearly specified and mutually agreed upon between the supplier and the purchaser.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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3 Terms and definitions

For the purpose of this document the following terms and definitions apply.

3.1

alarm system

installation for initiating a fire alarm

3.2

automatic fire detector

device that detects abnormally high temperature, rate of temperature rise, visible or invisible particles, infra-red or visible radiation, or gases produced by a fire

3.3

automatic fire extinguishing system

any system designed and installed to detect a fire and subsequently discharge an extinguishing agent without the necessity of human intervention

3.4

burn, intransitive verb
undergo combustion

[SOURCE: ISO 13943:2008, 4.28]

3.5

burn, transitive verb
cause combustion

[SOURCE: ISO 13943:2008, 4.29]

3.6

ignite, intransitive verb
catch fire with or without the application of an external heat source

[SOURCE: ISO 13943:2008, 4.184]

3.7

ignite, transitive verb
initiate combustion

[SOURCE: ISO 13943:2008, 4.185]

3.8

char, noun
carbonaceous residue resulting from pyrolysis or incomplete combustion

[SOURCE: ISO 13943:2008, 4.38]

3.9

char, verb
form char

[SOURCE: ISO 13943:2008, 4.39]

3.10

combustion
exothermic reaction of a substance with an oxidizing agent

Note 1 to entry: Combustion generally emits fire effluent (4.105) accompanied by flames (4.133) and/or glowing (4.168).

[SOURCE: ISO 13943:2008, 4.46]

3.11

exit
designated point of departure from a building

[SOURCE: ISO 13943:2008, 4.86]

3.12

explosion
abrupt expansion of gas that can result from a rapid oxidation (see 4.245 of ISO 13943:2008), decomposition reaction or other means, with or without an increase in temperature

[SOURCE: ISO 13943:2008, 4.87]

3.13

extinguishing medium
extinguishing agent
solid, liquid or gaseous substance especially suited to the extinction of fires

3.14

fire

process of combustion characterized by the emission of heat accompanied by smoke and/or flame

3.15

fire alarm

alarm

alarm signal for alerting the fire service or people endangered by fire

3.16

fire alarm box

call box

pull station

part of a fire alarm system from which a fire call is made, either by hand or automatically

3.17

fire barrier

fire separation

separating element which provides, for a stated period of time, simultaneous integrity and thermal insulation under specified test conditions

[SOURCE: ISO 13943:2008, 4.99]

3.18

fire control system

system which provides integrated control of fire detection, fire alarm, fire suppression, smoke management and other services as part of a total fire protection scheme

3.19

fire damper

smoke damper

mechanical plate or shutter which is closed to restrict the passage of fire/smoke in a flue or duct

3.20

fire department connection

connection through which the fire department can pump supplemental water into the sprinkler system, standpipe, or other system furnishing water for fire extinguishment to supplement existing water supplies

3.21

fire door

door of at least 30 min fire resistance which is prescribed for fire safety reasons and which has to be kept closed in accordance with the authorities instructions

3.22

fire hazard

physical object or condition with a potential for an undesirable consequence from fire

[SOURCE: ISO 13943:2008, 4.112]

3.23

fire load

quantity of heat which can be released by the complete combustion of all the combustible materials in a volume, including the facings of all bounding surfaces

[SOURCE: ISO 13943:2008, 4.114, modified – The notes have been deleted.]

3.24

fire suppression system

any system provided for the extinguishing of a fire

3.25

fire wall

partition wall of specified fire resistance rating

3.26

fire-fighting

all measures involved in the combat against fire

3.27

flame, noun

rapid, self-sustaining, sub-sonic propagation of combustion in a gaseous medium, usually with emission of light

[SOURCE: ISO 13943:2008, 4.133]

3.28

flame, verb

produce flame

[SOURCE: ISO 13943:2008, 4.134]

3.29

flammable

capable of flaming combustion (see 4.148 of ISO 13943:2008) under specified conditions

[SOURCE: ISO 13943:2008, 4.153]

3.30

foam

emulsive extinguishing agent, consisting of water, bubbles of gas or air, and a foam stabilizer (foam compound which is used to extinguish burning liquids)

3.31

heat release rate

burning rate (deprecated)

rate of burning (deprecated)

rate of thermal energy production generated by combustion

Note 1 to entry: The typical units are watts (W).

[SOURCE: ISO 13943:2008, 4.177]

3.32

ignite, intransitive verb

catch fire with or without the application of an external heat source

[SOURCE: ISO 13943:2008, 4.184]

3.33

ignite, transitive verb

initiate combustion, light

[SOURCE: ISO 13943:2008, 4.185]