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IEEE  
**C37.30h-1978**  
(Supplement to IEEE C37.30-1971)

**Allowable Short-Circuit Temperatures for Air Switches:  
Supplement to  
IEEE Standard Definitions and Requirements for  
High-Voltage Air Switches, Insulators, and  
Bus Supports**

Sponsor  
**Switchgear Committee of the  
IEEE Power Engineering Society**

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## Foreword

[This foreword is not a part of IEEE C37.30h-1978, Allowable Short-Circuit Temperatures for Air Switches: Supplement to IEEE Standard Definitions and Requirements for High-Voltage Air Switches, Insulators, and Bus Supports (ANSI).]

The allowable short-circuit temperatures for air-switch parts appear as starting ( $Q_1$ ) and final ( $Q_2$ ) temperature limits in the short-time current capability design guide formulas of 8.1.1 of ANSI C37.32-1972, Schedules of Preferred Ratings, Manufacturing Specifications, and Application Guide for High-Voltage Air Switches, Bus Supports, and Switch Accessories.\*

Short-time ratings and tests for air switches consist of a 10-cycle momentary (asymmetrical) current test and a 3 s (symmetrical) current test. The latter results in the thermal heating of switch current-carrying parts that may be detrimental. The IEEE High-Voltage Switch Subcommittee was charged to establish  $Q_1$  and  $Q_2$  temperature limitations that would not soften switch parts excessively, after the 3 s test, and be such that the switch would still meet the after-test conditions required by 5.8 of IEEE C37.34-1971 (Reaff 1987), Standard Test Code for High-Voltage Air Switches (ANSI).

After examining the technical literature and conducting equivalent 3 s short-time tests on representative sections of materials used as switch live parts, the HVS Subcommittee came to the following conclusions:

- (1) Copper, bronze, and aluminum alloy castings are not reduced significantly in tensile strength by the temperatures encountered.
- (2) Standard copper and heat-treated aluminum alloy tubings and sections may soften.
- (3) The starting temperature,  $Q_1$ , shall be equal to  $Q_{\max}$  of IEEE C37.30-1971, Table 3.
- (4) The final temperature,  $Q_2$ , shall be dependent upon the materials as follows:  
300 °C for hard-drawn copper parts  
260 °C for heat-treated aluminum alloy parts
- (5) The above values for  $Q_1$  and  $Q_2$  apply to the 3 s short-time current.

Therefore, these starting and final temperature limits are being added to 4.6.2 of IEEE C37.30-1971, the rated 3 s current, with a cross reference to the design formulas in 8.1.1 of IEEE C37.32-1972.

The latter, in turn, should be modified to enumerate these temperatures with a cross reference to 4.6.2 of IEEE C37.30-1971.

IEC 129 (1975), Alternating current disconnectors (isolators) and earthing switches,<sup>†</sup> for their 1 s (symmetrical) current test.

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\* This standard has been superseded by ANSI C37.32-1990.

† This standard has been superseded by IEC 129 (1984).