

A rated short-circuit breaking capacity requires that the circuit-breaker shall be able to break any value of short-circuit current up to and including the value corresponding to the rated capacity at a power-frequency recovery voltage corresponding to the prescribed test voltage values and:

- for a.c., at any power factor not less than that of Table 11 (see 8.3.2.2.4);
- for d.c., with any time constant not greater than that of Table 11 (see 8.3.2.2.5).

For power-frequency recovery voltages in excess of the prescribed test voltage values (see 8.3.2.2.6), no short-circuit breaking capacity is guaranteed.

For a.c., the circuit-breaker shall be capable of breaking a prospective current corresponding to its rated short-circuit breaking capacity and the related power factor given in Table 11, irrespective of the value of the inherent d.c. component, on the assumption that the a.c. component is constant.

The rated short-circuit breaking capacities are stated as:

- rated ultimate short-circuit breaking capacity;
- rated service short-circuit breaking capacity.

4.3.5.2.1 Rated ultimate short-circuit breaking capacity (I_{cu})

The rated ultimate short-circuit breaking capacity of a circuit-breaker is the value of ultimate short-circuit breaking capacity (see 2.15.1) assigned to that circuit-breaker by the manufacturer for the corresponding rated operational voltage, under the conditions specified in 8.3.5. It is expressed as the value of the prospective breaking current, in kA (r.m.s. value of the a.c. component in the case of a.c.).

4.3.5.2.2 Rated service short-circuit breaking capacity (I_{cs})

The rated service short-circuit breaking capacity of a circuit-breaker is the value of service short-circuit breaking capacity (see 2.15.2) assigned to that circuit-breaker by the manufacturer for the corresponding rated operational voltage, under the conditions specified in 8.3.4. It is expressed as a value of prospective breaking current, in kA, corresponding to one of the specified percentages of the rated ultimate short-circuit breaking capacity, in accordance with Table 1, and rounded up to the nearest whole number. It may be expressed as a % of I_{cu} (for example $I_{cs} = 25 \% I_{cu}$).

Alternatively, when the rated service short-circuit breaking capacity is equal to the rated short-time withstand current (see 4.3.5.4), it may be stated as that value, in kA, provided that it is not less than the relevant minimum value of Table 1.

Where I_{cu} exceeds 200 kA for utilization category A (see 4.4), or 100 kA for utilization category B, the manufacturer may declare a value I_{cs} of 50 kA.

Table 1 – Standard ratios between I_{cs} and I_{cu}

Utilization category A % of I_{cu}	Utilization category B % of I_{cu}
25	50
50	75
75	100
100	

4.4 Utilization categories

The utilization category of a circuit-breaker shall be stated with reference to whether or not it is specifically intended for selectivity by means of an intentional time delay with respect to other circuit-breakers in series on the load side, under short-circuit conditions (see Figure A.3).

Attention is drawn to the differences of the tests applying to the two utilization categories (see Table 9 and 8.3.4, 8.3.5, 8.3.6 and 8.3.8).

Utilization categories are defined in Table 4.

Table 4 – Utilization categories

Utilization category	Application with respect to selectivity
A	Circuit-breakers not specifically intended for selectivity under short-circuit conditions with respect to other short-circuit protective devices in series on the load side, i.e. without an intentional short-time delay provided for selectivity under short-circuit conditions, and therefore without a short-time withstand current rating according to 4.3.5.4.
B	<p>Circuit-breakers specifically intended for selectivity under short-circuit conditions with respect to other short-circuit protective devices in series on the load side, i.e. with an intentional short-time delay (which may be adjustable), provided for selectivity under short-circuit conditions. Such circuit-breakers have a short-time withstand current rating according to 4.3.5.4.</p> <p>NOTE Selectivity is not necessarily ensured up to the ultimate short-circuit breaking capacity of the circuit-breakers (for example in the case of operation of an instantaneous release) but at least up to the value specified in Table 3.</p>
<p>NOTE 1 The power factor or time constant associated with each value of rated short-circuit current is given in Table 11 (see 8.3.2.2.4 and 8.3.2.2.5).</p> <p>NOTE 2 Attention is drawn to the different requirements for the minimum required percentage of I_{cs} for utilization categories A and B, in accordance with Table 1.</p> <p>NOTE 3 A circuit-breaker of utilization category A may have an intentional short-time delay provided for selectivity under conditions other than those of short circuit, with a short-time withstand current less than that according to Table 3. In that case, the tests include test sequence IV (see 8.3.6) at the assigned short-time withstand current.</p>	

4.5 Control circuits

4.5.1 Electrical control circuits

Subclause 4.5.1 of IEC 60947-1 applies, with the following addition:

If the rated control supply voltage is different from that of the main circuit, it is recommended that its value be chosen from Table 5.

Table 5 – Preferred values of the rated control supply voltage, if different from that of the main circuit

d.c. V	Single-phase a.c. V
24 – 48 – 110 – 125 – 220 – 250	24 – 48 – 110 – 127 – 220 – 230
NOTE The manufacturer should be prepared to state the value or values of the current taken by the control circuits at the rated control supply voltage.	