Test Report issued under the responsibility of:

TEST REPORT

IEC 60 898-1:2002

Circuit-Breakers for overcorrect protection for household and similar installation

Report reference No ..... :	C009-CB2012CQC-044407	
Tested by (printed name and signature) ..... :	Wang Yingchao	.....
Approved by (printed name and signature) ..... :	Yi Ying	.....
Date of issue ..... :	2012-12-5	
Testing Laboratory Name ..... :	Shanghai Testing & Inspection Institute for Electrical Equipment (STIEE)	
Address ..... :	505 Wu Ning Road Shanghai P. R. China	
Testing location /procedure ..... :	CBTL ☒ TMP ☐ WMT ☐ SMT ☐	
Applicant's Name ..... :	Zhejiang Denrom Electric Equipment Co., Ltd	
Address ..... :	No.12 Huifeng Road,Yueqing City, Zhejiang Province,P.R.China	
Test specification		
Standard ..... :	IEC 60 898:-1:2002 + Amendment 1:2002	
Test procedure ..... :	CB	
Procedure deviation ..... :	N/A	
Non-standard test method ..... :	N/A	
Test Report Form		
Test Report Form No. ..... :	IEC60898_1B	
TRF originator . ..... :	KEMA	
Master TRF ..... :	dated 2004-02	

Test item description ..... :	MCB's	
Trademark ..... :	DL	
Manufacturer	Zhejiang Denrom Electric Equipment Co., Ltd	
	No.12 Huifeng Road,Yueqing City, Zhejiang Province,P.R.China	

Series	:	DL7
Model and/or type reference	:	DL7
Rating(s).....	:	AC 240/415V; 6~63A

Test items particulars:	
Type of circuit-breaker ..... :	DL7
Number of poles ..... :	1P, 2P, 3P, 3P+N
Protection against external influences ..... :	Unenclosed
Method of mounting ..... :	Distribution board
Method of connection ..... :	Are not associated with the mechanical mounting
Instantaneous tripping current ..... :	C
Ambient air temperature (°C) ..... :	30
Energy limiting class ..... :	--
Rated short-circuit capacity (A) ..... :	10kA
Type of terminal ..... :	Pillar terminals
Value of rated operational voltage ..... :	AC 240/415V(1P), AC 415V(2P, 3P, 3P+N)
Value of rated current ..... :	6A, 10A, 16A, 20A, 25A, 32A, 40A, 50A, 63A
Value of rated frequency ..... :	50Hz
Test case verdicts	
Test case does not apply to the test object ... :	N/A
Test item does meet the requirement ..... :	P(ass)
Test item does not meet the requirement ..... :	F(ail)
Testing	
Date of receipt of test item ..... :	2012-09
Date(s) of performance of test ..... :	2012-11

General remarks

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

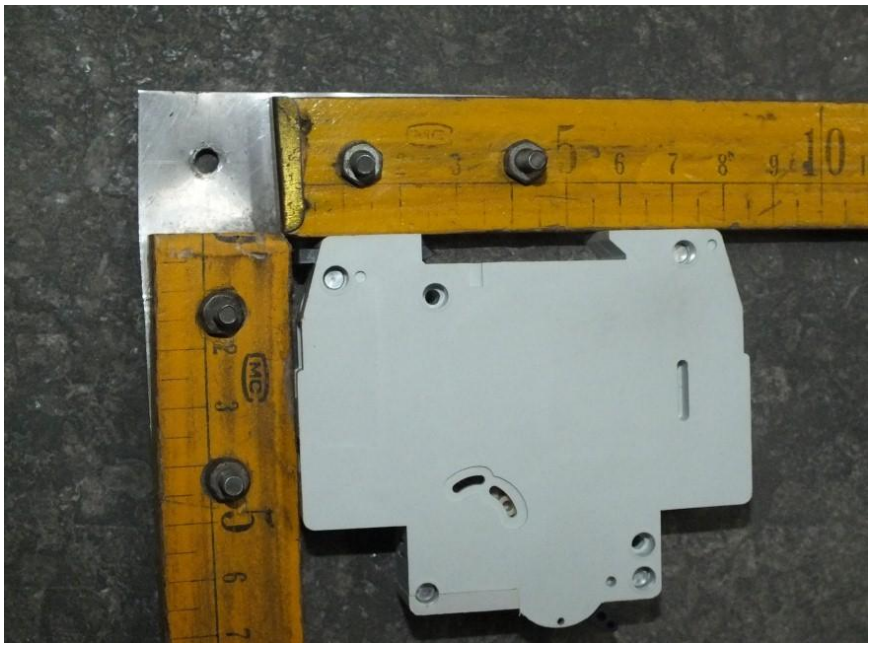
"(see Enclosure #)" refers to additional information appended to the report.
"(see appended table)" refers to a table appended to the report.

Throughout this report a comma (point) is used as the decimal separator.

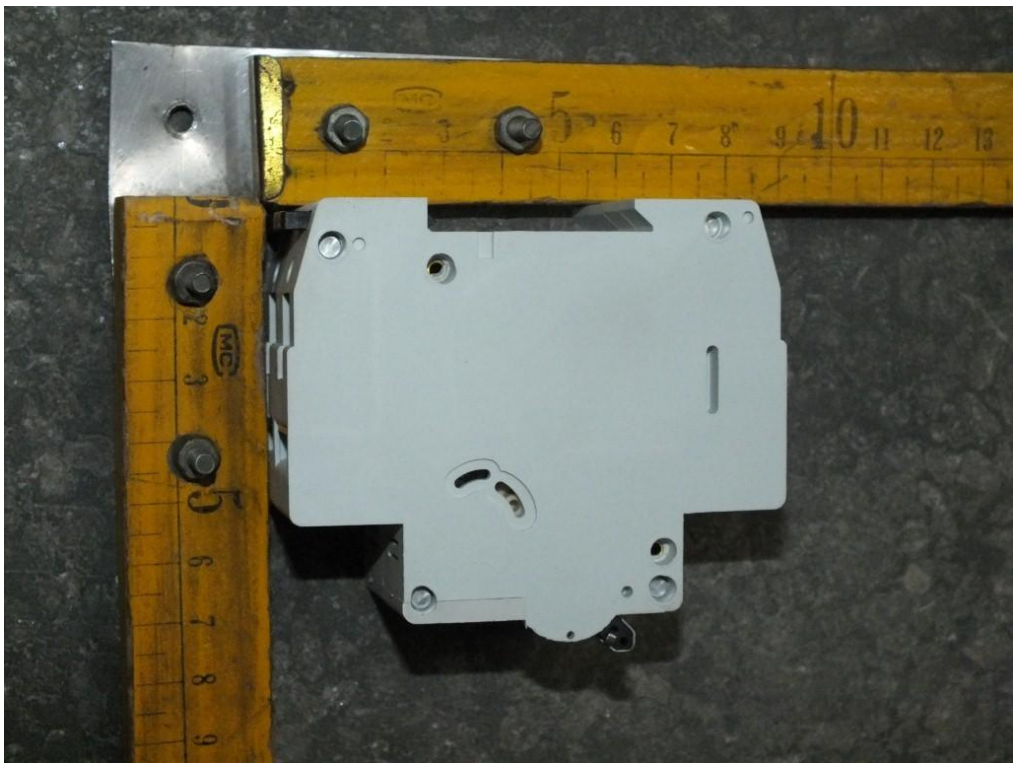
General product information

Type: DL7
Number of poles: 1P, 2P, 3P, 3P+N
Rated operational voltage: AC 240/415V(1P), AC 415V(2P,3P, 3P+N)
Rated current: 6A, 10A, 16A, 20A, 25A, 32A, 40A, 50A, 63A
Instantaneous tripping current: C
Rated short-circuit capacity: 10kA
Grid distance: 50mm

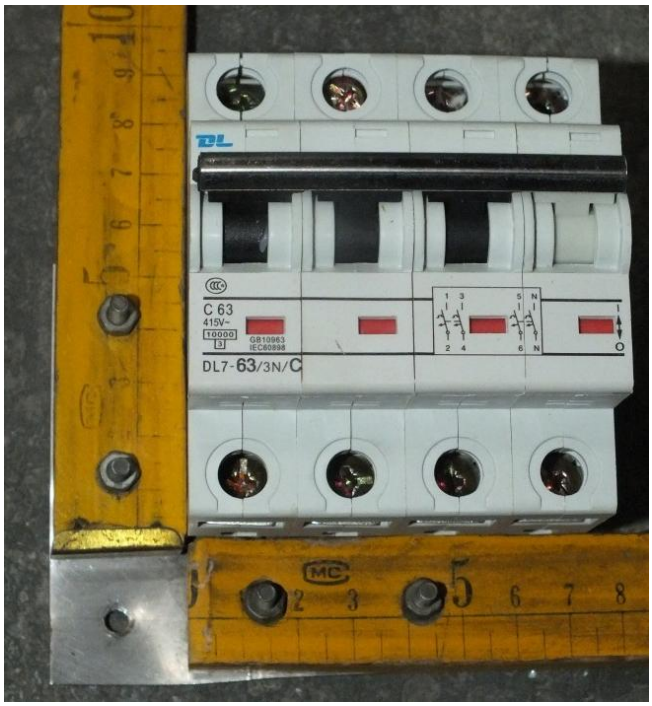
Pictures of product （1P）

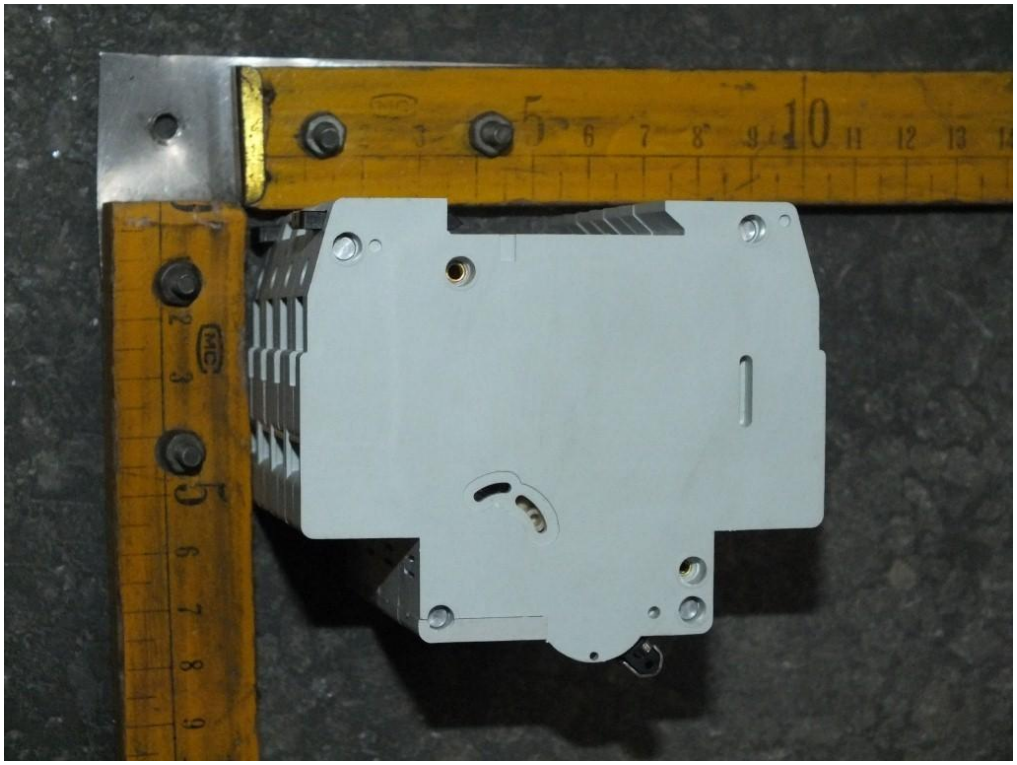


Pictures of product (2P)



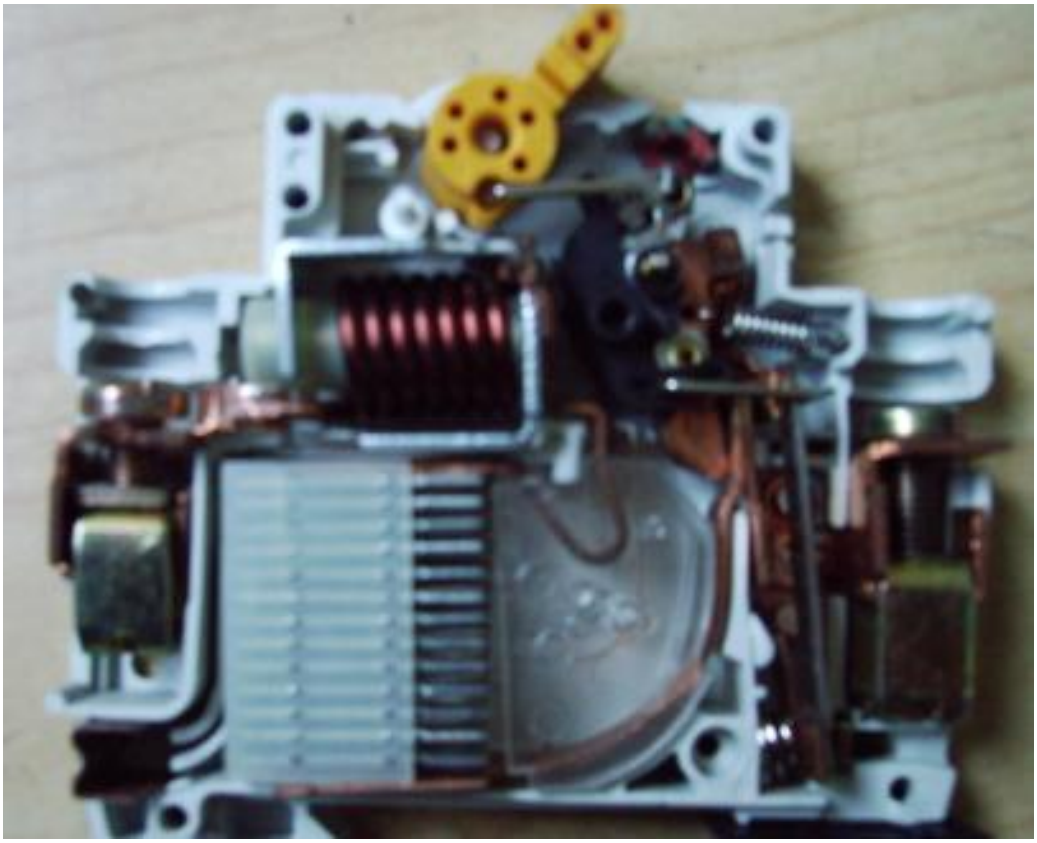
Pictures of product (3P+N)





Pictures of product (3P+N)

Pictures of product (Interior structure)



Remark:/

List of Attachments (including a total number of pages in each attachment): /

Summary of test results:

Type	Characteristics	Number of poles	Rated current	Test sequence
DL7	C	1P	63A	E_1, E_2
DL7	C	1P	6A	E_1, E_2
DL7	C	2P	63A	E_1, E_2
DL7	C	2P	6A	E_1, E_2
DL7	C	3P+N	63A	E_1, E_2
DL7	C	3P+N	6A	E_1, E_2
DL7	C	1P	63A	A, B, C_1, C_2, D_0+D_1,
DL7	C	1P	6A	D_0,
DL7	C	1P	10A	D_0
DL7	C	1P	16A	D_0
DL7	C	1P	20A	D_0
DL7	C	1P	25A	D_0
DL7	C	1P	32A	D_0
DL7	C	1P	40A	D_0
DL7	C	1P	50A	D_0
DL7	C	2P	63A	C_2,
DL7	C	3P+N	63A	A, B, C_1, C_2, D_0+D_1,

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
6	**MARKING AND OTHER INFORMATION (DL7 C63 1P)**		
	Circuit-breaker marked with:		
	a) Manufacturer's name or trade mark..... :	DENROM	P
	b) Type designation, catalogue number or other identification number ..... :	DL7-63/1/C	P
	c) Rated voltage (V) ..... :	240/415	P
	d) Rated current (A)..... :	63	P
	e) Rated frequency (Hz) ..... :		N/A
	f) Rated short circuit capacity (A) ..... :	10000	P
	g) Wiring diagram		N/A
	h) Ambient air temperature, if different from 30°C		N/A
	i) Degree of protection, if different from IP20		N/A
	j) For D-type circuit-breakers: the maximum instantaneous tripping current, if higher than 20 In(see table 2)		N/A
	k) Rated impulse withstand voltage Uimp if it is 2,5 kV		N/A
	Symbol for instantaneous tripping current	C	P
	Symbol for nature of supply		N/A
	Marking for rated current and for instantaneous tripping shall be readily visible when CB is installed		P
	Other marking shall be easily discernible		P
	The suitability for isolation, which is provided by all circuit-breakers of this standard, may be indicated by the symbol on the device		P
	Energy limiting class		N/A
	I^2t characteristic (documentation)		N/A
	Symbols on supply and load terminal		P
	Terminal for neutral conductor N		N/A
	Earthing terminal if any (IEC 60417-5019)		N/A
	On – off position shall be clearly indicated – 0 I -		P
	For push-button CB the off push-button shall either be red or be marked with the symbol ´0´		N/A
	Red not used for other push-button		N/A
	This symbol shall be easily discernible		N/A

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
	For CB with multiple current ratings, the maximum value is marked, the adjusted value indicated without ambiguity		N/A
	Marking shall be indelible and easily legible (not on removable parts), 15 s with water, 15 s with hexane (see cl. 8.3)		P

8.	**REQUIREMENTS FOR CONSTRUCTION AND OPERATION (DL7 C63 1P)**		
8.1.1	**General**		
8.1.2	**Mechanism**		
	The moving contact shall be mechanically coupled so that all poles make and break together, whether operated manually or automatically, even if an overload occurs on one pole only		N/A
	The switched neutral shall close before and open after the protected pole (s)		N/A
	Neutral pole having adequate making and breaking capacity and CB with independent manual operation: all poles operate together including neutral pole		N/A
	CB shall have a trip free mechanism		P
	It shall be possible to switch the CB on and off by hand		P
	No intermediate position of the contacts		P
	Position of contacts shall be indicated		P
	Indication visible from the outside		P
	If the indication is on the actuating means, it shall, when released, automatically take up or stay in the position corresponding to that of the moving contacts; operating means shall have two different rest positions, except that, for automatic operation, a third distinct rest position may be provided		P
	If a separate mechanical indicator is used to indicate the position of the main contacts, colour red shall be used for the on position and green for the off position.		P
	The action of the mechanism shall not be influenced by the position of enclosures		P
	If the cover is used as a guiding means for push-button, it shall not be possible to remove this button from the outside		N/A

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
	Operating means securely fixed, not possible to remove them without a tool		P
	For the up-down operating means the contacts shall be closed by the up movement.		P
8.1.3	**Clearances and creepage distances**		
8.1.3	**Clearances [mm] see table 4**		
	1.between live parts (of the main circuits) which are separated when the CB is in off position ..... :		N/A
	2.between live parts of different polarity..... :		N/A
	3.between circuits supplied from different sources, one of which being PELV or SELV..... :		N/A
	4. between live parts and		
	- accessible surfaces of operating means ..... :	9,8mm	P
	- screws or other means for fixing covers..... :		N/A
	- surface on which the base is mounted ..... :	14,1mm	P
	- screws or other means for fixing the circuit breaker ..... :		N/A
	- metal covers or boxes ..... :		N/A
	- other accessible metal parts..... :	8,2mm	P
	- metal frames supporting the base (flush-type) . :		N/A
	5.between metal parts of mechanism and:		
	- accessible metal parts ..... :		N/A
	- screws or other means for fixing the circuit breaker..... :		N/A
	- metal frames supporting the base (flush type) . :		N/A
8.1.3	Creepage distances [mm] (see table 4)		
	Material group	IIIa ☒ II ☐ I ☐	--
	1.between live parts (of the main circuits) which are separated when the CB is in off position ..... :		N/A
	2.between live parts of different polarity..... :		N/A
	3.between circuits supplied from different sources, one of which being PELV or SELV..... :		N/A
	4. between live parts and		
	- accessible surfaces of operating means ..... :	10,4mm	P
	- screws or other means for fixing covers..... :		N/A

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
	- surface on which the base is mounted ..... :		N/A
	- screws or other means for fixing the circuit breaker ..... :		N/A
	- metal covers or boxes ..... :		N/A
	- other accessible metal parts..... :		N/A
	- metal frames supporting the base (flush-type) . :		N/A
	5.between metal parts of mechanism and:		
	- accessible metal parts ..... :		N/A
	- screws or other means for fixing the circuit breaker..... :		N/A
	- metal frames supporting the base (flush type) . :		N/A
8.1.4	**Screws, current-carrying parts and connections**		
8.1.4.1	Connections, withstand mechanical stresses occurring in normal use		
	Screws for mounting of the CB not of the thread-cutting type		
	Test according to cl. 9.4:		
	- 10 times (screw Ø / torque Nm)	Ø___mm___Nm (see table 10) Ø___mm___Nm	N/A
	- 5 times (screw Ø / torque Nm)	Ø 5 mm 2,0 Nm (see table 10) Ø___mm___Nm	P
	Plug in connections tested by plugging in and pulling out five times		N/A
	After test connections have not become loose nor electrical function impaired		P
8.1.4.2	Screws with a thread of insulating material ensured correct introduction		N/A
8.1.4.3	Electrical connection: contact pressure not transmitted through insulating material, unless there is sufficient resilience in the metallic parts		P
	- copper		P
	- alloy 58% copper for worked cold parts		N/A
	- alloy 50% copper for other parts		P
	- other metal		N/A
8.1.5	**Terminals for external conductors**		
8.1.5.1	Terminals ensure correct connection of conductors (Test acc. To cl. 9.5 or annex J or K)		P

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
9.5	Torque Ø 5 mm 2,0 Nm Ø___mm___Nm Ø___mm___Nm max. sect. _____ mm²		P
9.5.1	Pull test: min sect.____1 mm² max sect. __25 mm² Pull _____100 N for 1 min During the test conductor does not move noticeably		P
9.5.2	min sect._____1__ mm² Torque (2/3)= 1,33 Nm max sect. ____25 mm² The conductor shows no damage		P
9.5.3	Nominal cross-section from ____ 1 to 25 __ mm² No of wires ____ 7 Ø of wires ____ 2,14 mm Torque (2/3) = ___ 1,33Nm After the test no wire escaped outside		P
8.1.5.2	Terminals allow the connection of conductors of the following cross-sectional areas: (table 5)		

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
	Rated current (A) / Range of nominal cross sections to be clamped (mm²) ≤ 13: 1 to 2,5 > 13 ≤ 16: 1 to 4 > 16 ≤ 25: 1,5 to 6 > 25 ≤ 32: 2,5 to 10 > 32 ≤ 50: 4 to 16 > 50 ≤ 80: 10 to 25 > 80 ≤ 100: 16 to 35 > 100 ≤ 125: 25 to 50		
	It is required that, for current ratings up to and including 50 A terminals are designed to clamp solid conductors as well as rigid stranded conductors; the use of flexible conductors is permitted		P
	Nevertheless, it is permitted that terminals for conductors having cross-sections from 1 mm^2 up to 6 mm^2 are designed to clamp solid conductors only.	1 to 25 mm²	P
8.1.5.3	Means for clamping the conductors in the terminals not serve to fix any other component (See test sub-clause 9.5)		P
8.1.5.4	Terminals for $I_N \leq 32$ A allow the connection of conductors without special preparation		P
8.1.5.5	Terminals shall have adequate mechanical strength; ISO thread or equivalent (See tests of sub-clause 9.4 and 9.5.1)		P
8.1.5.6	Clamping of conductor without damage to the conductor (See test of sub-clause 9.5.2)		P
8.1.5.7	Clamping of conductor between metal surfaces (See tests of sub-clause 9.4 and 9.5.1)		P
8.1.5.8	Conductor shall not slip-out when the clamping screw or nuts are tightened (See test of sub-clause 9.5.3)		P
8.1.5.9	Terminals shall be properly fixed. No work loose when the clamping screws or nuts are tightened or loosened (See test of sub-clause 9.4)		P
8.1.5.10	Clamping screws or nuts of terminals for protective conductors adequately secured against accidental loosening		N/A
8.1.5.11	Screws and nuts of terminals for external conductors shall be in engagement with a metal thread, and the screws shall not be of tapping screw type		P

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
8.1.6	**Non interchangeability**		
	For circuit-breakers intended to be mounted on bases forming a unit therewith(plug-in or screw-in type) it shall not be possible, without the aid of a tool, to replace a circuit-breaker when mounted as for normal use by another of the same make having a higher rated current, compliance is checked by inspection		N/A
8.1.7	Plug-in type circuit-breakers, the holding in position of which does not depend solely on their plug-in connection(s), shall be reliable and have adequate stability		N/A
8.1.7.1	Plug-in type circuit-breakers, the holding in position of which does not depend solely on their plug-in connection(s) Compliance of the mechanical mounting is checked by the relevant test 9.13		N/A
8.1.7.2	Plug-in type circuit-breakers, the holding in position of which does depend solely on their plug-in connection(s) Compliance of the mechanical mounting is checked by the relevant test 9.13		N/A
8.2	**Protection against electric shock**		
	Live parts not accessible in normal use		P
	For CB, other than plug-in type, external parts, other than screws and other means for fixing covers, which are accessible shall be of insulating material		P
	Unless the live parts are within an internal enclosure of insulating material: Lining - reliable fixed, - adequate thickness and - mechanical strength		N/A
	Inlet openings for cables shall be in insulating material or be provided with bushings or similar devices in insulating material Such device - shall be reliable fixed - shall have adequate mechanical strength		N/A
	For plug-in CB, external parts, other than screws and other means for fixing covers, which are accessible shall be in insulating material		N/A
	Metallic operating means insulated from live parts		N/A

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
	Metal parts of the mechanism not accessible and insulated from accessible metal parts, metal frames (for flush-type), screws or other means for fixing the base		P
	Replacement of plug-in CB possible without touching live parts		N/A
	Lacquer or enamel not considered		N/A
9.6	**Test of protection against electric shock**		
	Use of test finger so designed that each jointed can be turned through an angle of 90° with respect to the finger		P
	Circuit-breaker with enclosures of thermoplastic material are additional tested at 35 °C for 1 min with a force of 75 N		P
8.10	Resistance to heat		
	CB sufficiently resistant to heat		P
9.14	**Test of resistance to heat**		
9.14.1	Test:		
	- without removable covers..... 1 h (100 ± 2) °C		P
	- removable covers..... 1 h (70 ± 2) °C		N/A
	After the test no access to live parts, marking still legible		P
9.14.2	Ball pressure test for external parts of insulating material (parts retaining current-carrying parts and parts of the protective circuit in position) T = 125°C Ø of impression ≤ 2 mm	Impression: <1,5 mm	P
9.14.3	Ball pressure test for external parts of insulating material (parts not retaining current-carrying parts and parts of the protective circuit in position T = (70 ± 2)°C or T = ___ °C = (40 ± 2)°C + max. temperature rise of sub-clause 8.8 Ø of impression ≤ 2 mm		N/A
8.11	Resistance to abnormal heat and to fire		
	External parts of insulating material shall not ignite or spread fire under fault or overload conditions		P
9.15	**Resistance to abnormal heat and to fire**		
	Glow wire test: No visible flame, no sustained glowing or flames and glowing extinguish within 30 s		P

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
	external parts retaining current-carrying parts and parts of the protective circuit in position..... (960 ± 15)°C		P
	all other external parts ..... (650 ± 10)°C		N/A
8.12	Resistance to rusting		
	Ferrous parts adequately protected against rusting		P
9.16	Test of resistance to rusting:		
	- 10 min immersed in a cold chemical degreaser such as methyl-chloroform or refined petrol		P
	- 10 min immersed in a 10% solution of ammoniur chloride in water at 20°C		P
	- 10 min at 95% humidity at 20°C		P
	- 10 min at 100°C		P
	No sign of rust		P

	TESTS „B“ 3 samples (DL7 C63 1P)	**B-1 B-2 B-3**	
8.3	**Dielectric properties and isolating capability**		
	CB shall have adequate dielectric properties and shall ensure isolation:		P
8.3.1	Dielectric strength at power frequency		P
	Compliance is checked by the tests 9.7.1, 9.7.2 and 9.7.3 on circuit-breaker in new condition		P
8.3.2	Isolating capability		P
	Circuit-breakers shall be suitable for isolation. Compliance is checked by the verification of compliance with the minimum clearances and creepage distances of item 1 of table 4 and by tests of 9.7.6.1 and 9.7.6.3.		P
8.3.3	Dielectric strength at rated impulse withstand voltage (Uimp)		P
	Circuit-breakers shall adequately withstand impulse voltages. Compliance is checked by the tests of 9.7.6.2.		P
9.7	**Test of dielectric properties and isolating capability**		
9.7.1	Resistance to humidity		P
9.7.1.1	Preparation of the circuit-breaker for test		P
	Inlet openings, if any, are left open; if knock-outs are provided, one of them is opened.		P
9.7.1.2	Test conditions		

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
	The humidity treatment is carried out in humidity cabinet 91% to 95% and the temperature of the air between 20 °C and 30 °C	Rf = 93 % T = 24 °C	P
9.7.1.3	Test procedure:		
	The sample is kept in the cabinet for 48 h.		P
9.7.1.4	Condition of the circuit-breaker after the test		
	After this treat, the sample show no damage within the meaning of this standard and shall withstand the tests of 9.7.2 and 9.7.3		P
9.7.2	Insulation resistance of the main circuit		
9.7.2	After an interval between 30 min and 60 min flowing this treatment, the insulation resistance is measured 5 s after application of a d.c. voltage of approximately 500 V, consecutively as follows:	[MΩ] [MΩ] [MΩ]	
	a) In off-position, between the terminals which are electrically connected together when the circuit-breaker is in the closed position ≥ 2 MΩ	>500 >500 >500	P
	b) in off-position, between each pole in turn and the others connected together ≥ 2 MΩ		N/A
	c) in on-position, between all poles connected together and the frame ≥ 5 MΩ	>500 >500 >500	P
	d) between metal parts of mechanism and the frame ≥ 5 MΩ		N/A
	e) between the frame and metal foil in contact with the inner surface of the internal enclosure or lining of insulating material ≥ 5 MΩ		N/A
9.7.3	Dielectric strength of the main circuit		
	After the circuit-breakers have passed the tests of 9.7.2 the test voltage specified in 9.7.5 is applied for 1 min between the parts indicated in 9.7.2		
	a) 2000 V		P
	b) 2000 V		N/A
	c) 2000 V		P
	d) 2000 V		N/A
	e) 2500 V		N/A
9.7.4	Dielectric strength of the auxiliary and control circuits		
	For these tests, the main circuit shall be connected to the frame. The test voltage specified in 9.7.5 shall be applied for 1 min as follows:		
	1) Between all the auxiliary or control circuits and the frame U = ____ V	U = ____ V	N/A

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
	2) Between each part of the auxiliary or control circuits which may be isolated from the other parts of the auxiliary or control circuits and these other parts connected together U = [1000 V if Ui ≤ 60 V or 2Ui + 1000 V if Ui > 60 V]	U = ____ V	N/A
9.7.6	Verification of the impulse withstand voltage (across clearances and across solid insulation) and leakage current across open contacts		
9.7.6.1	Verification of the impulse withstand voltage across open contacts (suitability for isolation)		
	The 1,2/50µs impulse voltage shall be applied three times for each polarity at intervals of 1s minimum		
	- rated impulse withstand voltage (kV) :	4kV	--
	- sea level of the laboratory:	12m	--
	- test Uimp on open main contacts (equipment suitable for isolating) (see table 13..... :	Utest = 6,2 kV	--
	- no unintentional disruptive discharge during the test's		P
9.7.6.2	Verification of impulse withstand voltage for the parts not test in 9.7.6.1		
	The 1,2/50µs impulse voltage shall be applied three times for each polarity at intervals of 1s minimum		
	- rated impulse withstand voltage (kV) :	4kV	--
	- sea level of the laboratory:	12m	--
	- test Uimp main circuits (see table 14) :	Utest = 4,9 kV	--
	Application of test voltage		--
	i) Between all the phase pole(s) connected together and to the neutral pole (or path) of the circuit-breaker		N/A
	ii) Between all the phase pole(s) and the neutral pole(or path) connected together and the metal support connected to the terminals intended for the protective conductor(s)		P
	- no unintentional disruptive discharge during the test's		P
9.7.6.3	Verification of leakage currents across open contacts(suitability for isolation)		
	For circuit-breakers suitable for isolation, the leakage current shall be measured. Each pole having been submitted to the test of 9.12.11.2, or 9.12.11.3, or 9.12.11.4.2 or 9.12.11.4.3 is supplied at a test voltage of 1,1 times its rated operational voltage, the circuit-breaker being in the open position	457 V	--
	The leakage current flowing across the open contacts is measured and shall not exceed 2 mA	<0,03 <0,03 <0,03	P
8.4	**Temperature rise**		
	Temperature rise does not exceed the limiting values stated in table V:	sect. 16 mm²	--

IEC 60 898					
Cl.	Requirement – Test	Result			Verdict
9.8.2	Test current: I_N= (reach the steady-state value) Four-pole CB's: 1) three poles loaded 2) one pole and neutral pole loaded	$I_{N\,=}$ 63A			--
	Ambient air temperature ..... :	Tamb= 20 ℃			--
	Parts..... Temperature rise [K]	[K]	[K]	[K]	
	L1 L2 L3 L4(N) L3 N	_____ _____ _____ _____ _____ _____			N/A
	Terminals for external connections..... 60	38~39	36~37	36~39	P
	External parts liable to be touched during manual operation of the circuit-breaker, including operating means of insulating material and metallic means for coupling of insulating operating means of several poles..... 40	18	16	17	P
	External metallic parts of operating means..... 25	_____			N/A
	Other external parts, including that face of the circuit-breaker is in direct contact with the mounting surface 60	36	36	35	P
9.8.5	**Measurement of power losses**	B-1	B-2	B-3	
	Power loss do not exceed the values stated in table 15				
		B-1	B-2	B-3	
	Test current: I_N = 63 A (reach the steady state value)				
	Loaded one pole after the other	W	W	W	

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
		Max power loss: 13 W L1 6,93 6,74 6,68 L2 _____ L3 _____ L4(N) _____ L3 _____ N _____	P
8.5	Uninterrupted duty		
	Circuit-breakers operate reliable even after long service		P
9.9	**28 day test**		
	28 cycles - 21 h with current - 3 h without current cross sectional area. 16 mm²	I_N = 63 A	--
	During the test no tripping during the last period, temperature rise shall be measured		P
	Ambient air temperature ..... :	23 ° C	--
	Parts..... Temperature rise [K]	[K] [K] [K]	
	Terminals for external connections..... 60		N/A
	The temperature rise does not exceed the value measured during the temperature rise test (subclause 8.8) by more than 15 K	41~43 40~43 41~45	P
	Test current 1,45 I_N =63A	91,4 A	--
	- Tripping within	[s] [s] [s]	
	- 1h (≤ 63 A)	8min27s 10min19s 11min36s	P
	- 2h (> 63 A)		N/A

	TESTS “C” 3 samples (DL7 C63 1P)	**C_1-1 C_1-2 C_1-3**	
8.7	Mechanical and electrical endurance		
	Circuit-breaker shall be capable to perform an adequate number of cycles with rated current		P
9.11.1	General test conditions		

IEC 60 898					
Cl.	Requirement – Test	Result			Verdict
	Test: Test Voltage 240 V (rated voltage) Test Current 63 A (rated current) Power factor _____(0,85-0,9) Par. Resistor _____ Ohm Cross sect. area 16mm²	242V 63,2A 0,87			--
9.11.2	**Test procedure**				
	The circuit-breaker is submitted to 4000 operating cycles with rated current.				P
	- $I_N \leq 32$ A: 2 s on – 13 s off				N/A
	- $I_N > 32$ A: 2 s on – 28 s off				P
	During the test the circuit-breaker shall be operated as in normal use.				P
9.11.3	**Condition of the circuit-breaker after the test**				
	Following the test 9.11.2 the sample shall not show:				
	- undue wear				P
	- discrepancy between the position of the moving contacts and corresponding position of the Indicating device				P
	- damage to the enclosure permitting access to live parts by test finger (see 9.6)				P
	- loosening of electrical or mechanical connections				P
	- seepage of sealing compound				P
	Moreover test current.....2,55 I_N	161A			--
	Opening time not less 1 s or more than	[s]	[s]	[s]	
	- 60 s ($\leq$ 32 A)				N/A
	- 120 s ($>$ 32 A)	15	28	25	P
	Dielectric strength reduced to 900 V (1500 V acc. IEC 60898)				P
9.12.11.2	**Test at reduced short-circuit currents**				
9.12.11.2.1	Test on all circuit-breakers				
9.12.11.2.1	Test at reduced short-circuit currents: Fig. 3				
	Test current:	Obtained			
	- 500 A or 10 In	I test= 634A			--
	Test voltage 1,05 Un	U = 240V			--
	Power factor 0,93-0,98	0,98			--

IEC 60 898					
Cl.	Requirement – Test	Result			Verdict
9.12.9.1	Test in free air copper wire F': ☐ 0,12 mm / ☒ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☒ 1,5 Ohm	"a" = 35 mm 0,16mm 1,5 Ohm			--
9.12.9.2	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value	854A	867A	854A	P
	Sequence: 6 x "0" and 3 x "CO"	[kA^2s]	[kA^2s]	[kA^2s]	
	Max. $I^2t \leq$ _____kA^2s	3,43	3,61	3,23	P
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				
9.12.12	**Verification of the circuit-breaker after short-circuit tests**				
9.12.12.1	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				
	a) leakage current across open contacts, according to 9.7.6.3, each pole is supplied at a voltage 1,1 times Un.= 264 V. The circuit – breaker is in the open position	C_1-1 (mA)	C_1-2 (mA)	C_1-3 (mA)	
	The leakage current shall not exceed 2 mA L1	<0,01	<0,01	<0,01	P
	L2				N/A
	L3				N/A
	L4(N)				N/A
	Electric strength test:				
	Test voltage 1500 V (see 8.7.2)				
	a)				P
	b)				N/A
	c)				P
	d)				N/A
	e) 2000 V				N/A

9.12.11.2.2	**Short-circuit test on circuit-breakers rated 230 V, or 240 V or 230/400 V for verifying for use in IT systems (DL7 C63 1P)**	

IEC 60 898					
Cl.	Requirement – Test	Result			Verdict
	Test current:	Obtained			
	- 500 A or 1,2 times the upper limit of the standard range of instantaneous tripping (see table 2) whichever is the higher, but < 2500 A. When Itripping exceed 20 In the current adjusted at 1,2 times the upper limit even when higher 2500 A	I test= 766A			--
	Test voltage 1,05 Un	U = 436 V			--
	Power factor 0,93-0,98	0,95			--
9.12.9.1	Test in free air copper wire F': ☐ 0,12 mm / ☒ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☒ 1,5 Ohm	"a" = 35 mm 0,16mm 1,5 Ohm			--
9.12.9.2	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value	1000A	1000A	998A	P
	Sequence: "0" + "CO" on each protected pole	[kA^2s]	[kA^2s]	[kA^2s]	
	Shifted point 30 ° on the other protected pole	C_2-1	C_2-2	C_2-3	
	Max. $I^2t \leq$ _____kA^2s L1	3,97	3,83	3,65	P
	L2	___	___	___	
	L3	___	___	___	
	L4	___	___	___	
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				
9.12.12.1	**The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.**				
	a) leakage current across open contacts, according to 9.7.6.3, each pole is supplied at a voltage 1,1 times Un.= 456 V. The circuit – breaker is in the open position	C_2-1 [mA]	C_2-2 [mA]	C_2-3 [mA]	
	The leakage current shall not exceed 2 mA L1	<0,01	<0,01	<0,01	P
	L2				N/A
	L3				N/A
	L4(N)				N/A

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
	Electric strength test:		
	Test voltage 1500 V (see 8.7.2)		
	a)		P
	b)		N/A
	c)		P
	d)		N/A
	e) 2000 V		N/A

	TESTS „D“ 3 samples (DL7 C63 1P)				
8.6	**Automatic operation**				
8.6.1	Standard time-current zone				
	Tripping characteristic of CB ensures adequate protection of the circuit, without premature operation.				
9.10	**Tests: DO**	**D-1**	**D-2**	**D-3**	
	I_N (A)		63		
	Sect. (mm²)		16		
	Instantaneous tripping current	☐ B	☒ C	☐ D	
9.10.1	Test of time-current characteristic				
9.10.1.1	Test current 1,13 I_N (A) starting from cold for:		71,2 A		--
	- 1 h ($I_N \leq 63$ A)	>1	>1	>1	P
	- 2 h ($I_N > 63$ A)				N/A
	No tripping				P
	Then steadily increased within 5 s to 1,45 I_N (A)		91,4A		--
	- Tripping within	[min]	[min]	[min]	
	- 1h (≤ 63 A)	50min26s	43min13s	9min49s	P
	- 2h (> 63 A)				N/A
9.10.1.2	Test current 2,55 I_N (A) starting from cold for:		160 A		--
	opening time not less than 1 s or more than	[s]	[s]	[s]	
	- 60 s				N/A
	- 120 s	37	36	35	P
9.10.2	Teast of instantaneous tripping and of correct opening of the contacts				
9.10.2.1	General test conditions				
	For the lower values of the test current the test is made once, at any convenient voltage.				

IEC 60 898					
Cl.	Requirement – Test	Result			Verdict
	For the upper values of the test current the test is made at rated voltage Un(phase to neutral) with a power factor between 0,95 and 1.	242V 0,98			--
	The sequence of operation is : O-CO-CO-CO Interval time: > 3 min				
	The tripping time of the O operation is measured				
	After each operation the indicating means shall show the open position of the contacts				P
9.10.2.2	☐ For circuit-breakers of the B – Type				
	Test current $3I_N$ (A), starting from cold				
	Opening time:	[s]	[s]	[s]	
	- 0,1s ≤ t ≤ 45s (≤ 32A)				N/A
	- 0,1s ≤ t ≤ 90s (> 32A)				N/A
	Test current 5 I_N (A), starting from cold				N/A
	Tripping less than 0,1 s				N/A
9.10.2.3	☒ For circuit-breakers of the C – Type				
	Test current $5I_N$ (A), starting from cold		315A		--
	Opening time:	[s]	[s]	[s]	
	- 0,1s ≤ t ≤ 15s (≤ 32A)				N/A
	- 0,1s ≤ t ≤ 30s (> 32A)	8	9	8	P
	Test current 10 I_N (A), starting from cold		635A		--
	Tripping less than 0,1 s	6,32ms	11,5ms	10,0ms	P
9.10.2.4	☐ For circuit-breakers of the D – Type				
	Test current $10I_N$ (A), starting from cold				
	Opening time:	[s]	[s]	[s]	
	- 0,1s ≤ t ≤ 4s (≤ 32A)				N/A
	- 0,1s ≤ t ≤ 8s (> 32A)				N/A
	Test current 20 I_N (A) or to the maximum instantaneous tripping current(see cl. 6, item j), starting from cold				N/A
	Tripping less than 0,1 s				N/A
9.10.3	Test of effect of single pole loading on the tripping characteristic of multipole circuit-breakers:				
	Test current 1,1 It (A), (two pole) starting from cold				
	Tripping within	[min]	[min]	[min]	
	- 1h				N/A

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
	- 2h		N/A
	Test current 1,2 It (A), (three pole or four pole) starting from cold		
	Tripping within	[min] [min] [min]	
	- 1h		N/A
	- 2h		N/A
9.10.4	Test of effect of ambient temperature on the tripping characteristics		
	a) Ambient temperature of (-5 ± 2)°C below the ambient air reference temperature	T = -5°C	--
	Test current 1,13 I_N (A)	71,2A	--
	- Passed for 1h	>1h >1h >1h	P
	- Passed for 2h		N/A
	Current is then steadily increased to 1,9 I_N (A) within 5s	120A	--
	Tripping within	[min] [min] [min]	
	- 1h	4min04s 8min51s 3min09s	P
	- 2h		N/A
	b) Ambient temperature of (40 ± 2)°C	T = 40°C	--
	Test current I_N (A)	63,0A	--
	No tripping within		
	- 1h	>1h >1h >1h	P
	- 2h		N/A

	Tests: D1 (DL7 C63 1P)	**D-1 D-2 D-3**	
8.9	**Resistance to mechanical shock and impact**		
	CB shall have adequate mechanical behaviour so as to withstand the stresses imposed during installation and use		P
9.13.1	**Mechanical shock**		
	- 50 falls on two sides of vertical board C		P
	- Vertical board turned 90°		P
	- 50 falls on two sides of vertical board C		P
	During the test the circuit-breakers shall not open		P
9.13.2	Mechanical impact		
9.13.2.1	All types:		
	- Impact test: 10 blows-height 10 cm, no damage		P

IEC 60 898					
Cl.	Requirement – Test	Result			Verdict
9.13.2.2	Screw-in types:				
	- Torque 2,5 Nm for 1 min, no damage				P
9.13.2.3	CB intended to be mounted on a rail				
	- downward vertical 50 N for 1 min				P
	- upward vertical 50 N for 1 min, no damage				P
9.13.2.4	Plug-in types				
	The circuit-breaker are mounted in there normal position, complete with plug-in base but without cables and any cover plate				N/A
	A force of 20 N applied for 1min to the circuit-breaker (see fig 17).				N/A
	During this test the circuit-breaker part shall not become loose from the base and shall not show damage impairing further use.				N/A
9.12.11.3	**Test at 1500 A:**				
	Prospective current of 1500 A – power factor 0,93 to 0,98				
	Prospective current obtained (A)	1,54/1,56kA			--
	Power factor	0,96/0,97			--
	Test voltage 1,05 Un	252/436 V			--
	Test circuit: figure	3+5			--
	T (min)	3 min			--
9.12.9.1	Test in free air copper wire F': ☐ 0,12 mm / ☒ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☒ 1,5 Ohm	"a" = 35 mm 0,16mm 1,5 Ohm			--
9.12.9.2	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	Sequence	6 x O, 2 x CO, 1 x O			
	I_{Peak} (A) max. value	1,93kA	1,90kA	1,91kA	P
	$I^2t \leq$ _____ kA^2s	[kA^2s]	[kA^2s]	[kA^2s]	
	Max. $I^2t \leq$ _____kA^2s L1	8,98	8,35	8,85	P
	L2	___	___	___	
	L3	___	___	___	
	N	___	___	___	
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P

IEC 60 898					
Cl.	Requirement – Test	Result			Verdict
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				
9.12.12.1	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				P
	a) leakage current across open contacts, according to 9.7.6.3, each pole is supplied at a voltage 1,1 times Un.=456 V. The circuit –breaker is in the open position	D-1 [mA]	D-2 [mA]	D-3 [mA]	
	The leakage current shall not exceed 2 mA L1	<0,01	<0,01	<0,01	P
	L2				N/A
	L3				N/A
	L4(N)				N/A
	Electric strength test:				
	Test voltage 1500 V (see 8.7.2)				
	a)				P
	b)				N/A
	c)				P
	d)				N/A
	e) 2000 V				N/A
	Test current 0.85x non tripping current (1,13 I_N)	60,5A			--
	- Passed for 1h	> 1h	> 1h	> 1h	P
	- Passed for 2h				N/A
	Current is then steadily increased to 1,1 x tripping current (1,45 I_N) within 5s	100A			--
		D-1 [min]	D-2 [min]	D-3 [min]	
	Tripping within ☒ 1 hour / ☐ 2 hour	14min11s	5min09s	8min16s	P

9.10	**Tests: DO (DL7 C6 1P)**	**DO 1**	
	I_N (A)	6	
	Sect. (mm²)	1	
	Instantaneous tripping current	☐ B ☒ C ☐ D	
9.10.1	Test of time-current characteristic		
9.10.1.1	Test current 1,13 I_N (A) starting from cold for:	6,78 A	--
	- 1 h ($I_N \leq 63$ A)	>1	P

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
	- 2 h (I_N > 63 A)		N/A
	No tripping		P
	Then steadily increased within 5 s to 1,45 I_N (A)	8,70 A	--
	- Tripping within	[min]	
	- 1h (≤ 63 A)	3min55s	P
	- 2h (> 63 A)		N/A
9.10.1.2	Test current 2,55 I_N (A) starting from cold for:	15,3 A	--
	opening time not less than 1 s or more than	[s]	
	- 60 s	12	P
	- 120 s		N/A
9.10.2	Teast of instantaneous tripping and of correct opening of the contacts		
9.10.2.1	General test conditions		
	For the lower values of the test current the test is made once, at any convenient voltage.		
	For the upper values of the test current the test is made at rated voltage Un(phase to neutral) with a power factor between 0,95 and 1.	242V 0,99	--
	The sequence of operation is : O-CO-CO-CO Interval time: > 3 min		
	The tripping time of the O operation is measured		
	After each operation the indicating means shall show the open position of the contacts		P
9.10.2.2	☐ For circuit-breakers of the B – Type		
	Test current 3I_N (A), starting from cold		
	Opening time:	[s] [s] [s]	
	- 0,1s ≤ t ≤ 45s (≤ 32A)		N/A
	- 0,1s ≤ t ≤ 90s (> 32A)		N/A
	Test current 5 I_N (A), starting from cold		N/A
	Tripping less than 0,1 s		N/A
9.10.2.3	☒ For circuit-breakers of the C – Type		
	Test current 5I_N (A), starting from cold	30,0A	--
	Opening time:	[s]	
	- 0,1s ≤ t ≤ 15s (≤ 32A)	6	P
	- 0,1s ≤ t ≤ 30s (> 32A)		N/A
	Test current 10 I_N (A), starting from cold	61,2A	--
	Tripping less than 0,1 s	17,3ms	P

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
9.10.2.4	☐ For circuit-breakers of the D – Type		
	Test current $10I_N$ (A), starting from cold		
	Opening time:	[s] [s] [s]	
	- 0,1s ≤ t ≤ 4s (≤ 32A)		N/A
	- 0,1s ≤ t ≤ 8s (> 32A)		N/A
	Test current 20 I_N (A) or to the maximum instantaneous tripping current(see cl. 6, item j), starting from cold		N/A
	Tripping less than 0,1 s		N/A
9.10.3	Test of effect of single pole loading on the tripping characteristic of multipole circuit-breakers:		
	Test current 1,1 It (A), (two pole) starting from cold		
	Tripping within	[min] [min] [min]	
	- 1h		N/A
	- 2h		N/A
	Test current 1,2 It (A), (three pole or four pole) starting from cold		
	Tripping within	[min] [min] [min]	
	- 1h		N/A
	- 2h		N/A
9.10.4	Test of effect of ambient temperature on the tripping characteristics		
	a) Ambient temperature of (-5 ± 2)°C below the ambient air reference temperature	T = -5°C	--
	Test current 1,13 I_N (A)	6,78 A	--
	- Passed for 1h	>1h	P
	- Passed for 2h		N/A
	Current is then steadily increased to 1,9 I_N (A) within 5s	11,4 A	--
	Tripping within	[min]	
	- 1h	3min12s	P
	- 2h		N/A
	b) Ambient temperature of (40 ± 2)°C	T = 40°C	--
	Test current I_N (A)	6,00A	--
	No tripping within		
	- 1h	>1h	P
	- 2h		N/A

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
9.10	**Tests: DO (DL7 C10 1P)**	**DO 2**	
	I_N (A)	10	
	Sect. (mm²)	1,5	
	Instantaneous tripping current	☐ B ☒ C ☐ D	
9.10.1	Test of time-current characteristic		
9.10.1.1	Test current 1,13 I_N (A) starting from cold for:	11,3 A	--
	- 1 h ($I_N \leq 63$ A)	>1	P
	- 2 h ($I_N > 63$ A)		N/A
	No tripping		P
	Then steadily increased within 5 s to 1,45 I_N (A)	14,5 A	--
	- Tripping within	[min]	
	- 1h (≤ 63 A)	7min42s	P
	- 2h (> 63 A)		N/A
9.10.1.2	Test current 2,55 I_N (A) starting from cold for:	25,5 A	--
	opening time not less than 1 s or more than	[s]	
	- 60 s	14	P
	- 120 s		N/A
9.10.2	Teast of instantaneous tripping and of correct opening of the contacts		
9.10.2.1	General test conditions		
	For the lower values of the test current the test is made once, at any convenient voltage.		
	For the upper values of the test current the test is made at rated voltage Un(phase to neutral) with a power factor between 0,95 and 1.	242V 0,99	--
	The sequence of operation is : O-CO-CO-CO Interval time: > 3 min		
	The tripping time of the O operation is measured		
	After each operation the indicating means shall show the open position of the contacts		P
9.10.2.2	☐ For circuit-breakers of the B – Type		
	Test current 3I_N (A), starting from cold		
	Opening time:	[s] [s] [s]	
	- 0,1s ≤ t ≤ 45s (≤ 32A)		N/A
	- 0,1s ≤ t ≤ 90s (> 32A)		N/A
	Test current 5 I_N (A), starting from cold		N/A
	Tripping less than 0,1 s		N/A

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
9.10.2.3	☒ For circuit-breakers of the C – Type		
	Test current $5I_N$ (A), starting from cold	50,0A	--
	Opening time:	[s]	
	- 0,1s ≤ t ≤ 15s (≤ 32A)	4	P
	- 0,1s ≤ t ≤ 30s (> 32A)		N/A
	Test current 10 I_N (A), starting from cold	102A	--
	Tripping less than 0,1 s	14,5 ms	P
9.10.2.4	☐ For circuit-breakers of the D – Type		
	Test current $10I_N$ (A), starting from cold		
	Opening time:	[s] [s] [s]	
	- 0,1s ≤ t ≤ 4s (≤ 32A)		N/A
	- 0,1s ≤ t ≤ 8s (> 32A)		N/A
	Test current 20 I_N (A) or to the maximum instantaneous tripping current(see cl. 6, item j), starting from cold		N/A
	Tripping less than 0,1 s		N/A
9.10.3	Test of effect of single pole loading on the tripping characteristic of multipole circuit-breakers:		
	Test current 1,1 It (A), (two pole) starting from cold		
	Tripping within	[min] [min] [min]	
	- 1h		N/A
	- 2h		N/A
	Test current 1,2 It (A), (three pole or four pole) starting from cold		
	Tripping within	[min] [min] [min]	
	- 1h		N/A
	- 2h		N/A
9.10.4	Test of effect of ambient temperature on the tripping characteristics		
	a) Ambient temperature of (-5 ± 2)°C below the ambient air reference temperature	T = -5°C	--
	Test current 1,13 I_N (A)	11,3 A	--
	- Passed for 1h	>1h	P
	- Passed for 2h		N/A
	Current is then steadily increased to 1,9 I_N (A) within 5s	19,0 A	--

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
	Tripping within	[min]	
	- 1h	4min17s	P
	- 2h		N/A
	b) Ambient temperature of (40 ± 2)°C	T = 40°C	--
	Test current I_N (A)	10,0A	--
	No tripping within		
	- 1h	>1h	P
	- 2h		N/A

9.10	**Tests: DO (DL7 C16 1P)**	**DO 3**	
	I_N (A)	16	
	Sect. (mm²)	2,5	
	Instantaneous tripping current	☐ B ☒ C ☐ D	
9.10.1	Test of time-current characteristic		
9.10.1.1	Test current 1,13 I_N (A) starting from cold for:	18,1 A	--
	- 1 h ($I_N \leq 63$ A)	>1	P
	- 2 h ($I_N > 63$ A)		N/A
	No tripping		
	Then steadily increased within 5 s to 1,45 I_N (A)	23,2 A	--
	- Tripping within	[min]	
	- 1h (≤ 63 A)	29s	P
	- 2h (> 63 A)		N/A
9.10.1.2	Test current 2,55 I_N (A) starting from cold for:	40,8 A	--
	opening time not less than 1 s or more than	[s]	
	- 60 s	13	P
	- 120 s		N/A
9.10.2	Teast of instantaneous tripping and of correct opening of the contacts		
9.10.2.1	General test conditions		
	For the lower values of the test current the test is made once, at any convenient voltage.		
	For the upper values of the test current the test is made at rated voltage Un(phase to neutral) with a power factor between 0,95 and 1.	242V 0,99	--
	The sequence of operation is : O-CO-CO-CO Interval time: > 3 min		
	The tripping time of the O operation is measured		

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
	After each operation the indicating means shall show the open position of the contacts		P
9.10.2.2	☐ For circuit-breakers of the B – Type		
	Test current $3I_N$ (A), starting from cold		
	Opening time:	[s] [s] [s]	
	- 0,1s ≤ t ≤ 45s (≤ 32A)		N/A
	- 0,1s ≤ t ≤ 90s (> 32A)		N/A
	Test current 5 I_N (A), starting from cold		N/A
	Tripping less than 0,1 s		N/A
9.10.2.3	☒ For circuit-breakers of the C – Type		
	Test current $5I_N$ (A), starting from cold	80,0A	--
	Opening time:	[s]	
	- 0,1s ≤ t ≤ 15s (≤ 32A)	4	P
	- 0,1s ≤ t ≤ 30s (> 32A)		N/A
	Test current 10 I_N (A), starting from cold	165A	--
	Tripping less than 0,1 s	8,11ms	P
9.10.2.4	☐ For circuit-breakers of the D – Type		
	Test current $10I_N$ (A), starting from cold		
	Opening time:	[s] [s] [s]	
	- 0,1s ≤ t ≤ 4s (≤ 32A)		N/A
	- 0,1s ≤ t ≤ 8s (> 32A)		N/A
	Test current 20 I_N (A) or to the maximum instantaneous tripping current(see cl. 6, item j), starting from cold		N/A
	Tripping less than 0,1 s		N/A
9.10.3	Test of effect of single pole loading on the tripping characteristic of multipole circuit-breakers:		
	Test current 1,1 It (A), (two pole) starting from cold		
	Tripping within	[min] [min] [min]	
	- 1h		N/A
	- 2h		N/A
	Test current 1,2 It (A), (three pole or four pole) starting from cold		
	Tripping within	[min] [min] [min]	
	- 1h		N/A
	- 2h		N/A

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
9.10.4	Test of effect of ambient temperature on the tripping characteristics		
	a) Ambient temperature of (-5 ± 2)°C below the ambient air reference temperature	T = -5°C	--
	Test current 1,13 I_N (A)	18,1 A	--
	- Passed for 1h	>1h	P
	- Passed for 2h		N/A
	Current is then steadily increased to 1,9 I_N (A) within 5s	30,4 A	--
	Tripping within	[min]	
	- 1h	19s	P
	- 2h		N/A
	b) Ambient temperature of (40 ± 2)°C	T = 40°C	--
	Test current I_N (A)	16,0A	--
	No tripping within		
	- 1h	>1h	P
	- 2h		N/A

9.10	**Tests: DO (DL7 C20 1P)**	**DO 4**	
	I_N (A)	20	
	Sect. (mm²)	2,5	
	Instantaneous tripping current	☐ B ☒ C ☐ D	
9.10.1	Test of time-current characteristic		
9.10.1.1	Test current 1,13 I_N (A) starting from cold for:	22,6 A	--
	- 1 h ($I_N \leq 63$ A)	>1	P
	- 2 h ($I_N > 63$ A)		N/A
	No tripping		
	Then steadily increased within 5 s to 1,45 I_N (A)	29,0 A	--
	- Tripping within	[min]	
	- 1h (≤ 63 A)	43s	P
	- 2h (> 63 A)		N/A
9.10.1.2	Test current 2,55 I_N (A) starting from cold for:	51,0 A	--
	opening time not less than 1 s or more than	[s]	
	- 60 s	11	P
	- 120 s		N/A

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
9.10.2	Teast of instantaneous tripping and of correct opening of the contacts		
9.10.2.1	General test conditions		
	For the lower values of the test current the test is made once, at any convenient voltage.		
	For the upper values of the test current the test is made at rated voltage Un(phase to neutral) with a power factor between 0,95 and 1.	242V 0,98	--
	The sequence of operation is : O-CO-CO-CO Interval time: > 3 min		
	The tripping time of the O operation is measured		
	After each operation the indicating means shall show the open position of the contacts		P
9.10.2.2	☐ For circuit-breakers of the B – Type		
	Test current $3I_N$ (A), starting from cold		
	Opening time:	[s] [s] [s]	
	- 0,1s ≤ t ≤ 45s (≤ 32A)		N/A
	- 0,1s ≤ t ≤ 90s (> 32A)		N/A
	Test current 5 I_N (A), starting from cold		N/A
	Tripping less than 0,1 s		N/A
9.10.2.3	☒ For circuit-breakers of the C – Type		
	Test current $5I_N$ (A), starting from cold	100A	--
	Opening time:	[s]	
	- 0,1s ≤ t ≤ 15s (≤ 32A)	5	P
	- 0,1s ≤ t ≤ 30s (> 32A)		N/A
	Test current 10 I_N (A), starting from cold	204A	--
	Tripping less than 0,1 s	8,55ms	P
9.10.2.4	☐ For circuit-breakers of the D – Type		
	Test current $10I_N$ (A), starting from cold		
	Opening time:	[s] [s] [s]	
	- 0,1s ≤ t ≤ 4s (≤ 32A)		N/A
	- 0,1s ≤ t ≤ 8s (> 32A)		N/A
	Test current 20 I_N (A) or to the maximum instantaneous tripping current(see cl. 6, item j), starting from cold		N/A
	Tripping less than 0,1 s		N/A
9.10.3	Test of effect of single pole loading on the tripping characteristic of multipole circuit-breakers:		

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
	Test current 1,1 It (A), (two pole) starting from cold		
	Tripping within	[min] [min] [min]	
	- 1h		N/A
	- 2h		N/A
	Test current 1,2 It (A), (three pole or four pole) starting from cold		
	Tripping within	[min] [min] [min]	
	- 1h		N/A
	- 2h		N/A
9.10.4	Test of effect of ambient temperature on the tripping characteristics		
	a) Ambient temperature of (-5 ± 2)°C below the ambient air reference temperature	T = -5°C	--
	Test current 1,13 I_N (A)	22,6 A	--
	- Passed for 1h	>1h	P
	- Passed for 2h		N/A
	Current is then steadily increased to 1,9 I_N (A) within 5s	38,0 A	--
	Tripping within	[min]	
	- 1h	18s	P
	- 2h		N/A
	b) Ambient temperature of (40 ± 2)°C	T = 40°C	--
	Test current I_N (A)	20,0A	--
	No tripping within		
	- 1h	>1h	P
	- 2h		N/A

9.10	**Tests: DO (DL7 C25 1P)**	**DO 5**	
	I_N (A)	25	
	Sect. (mm²)	4	
	Instantaneous tripping current	☐ B ☒ C ☐ D	
9.10.1	Test of time-current characteristic		
9.10.1.1	Test current 1,13 I_N (A) starting from cold for:	28,3 A	--
	- 1 h ($I_N \leq 63$ A)	>1	P
	- 2 h ($I_N > 63$ A)		N/A
	No tripping		P

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
	Then steadily increased within 5 s to 1,45 I_N (A)	36,3A	--
	- Tripping within	[min]	
	- 1h (≤ 63 A)	38s	P
	- 2h (> 63 A)		N/A
9.10.1.2	Test current 2,55 I_N (A) starting from cold for:	63,8 A	--
	opening time not less than 1 s or more than	[s]	
	- 60 s	13	P
	- 120 s		N/A
9.10.2	Teast of instantaneous tripping and of correct opening of the contacts		
9.10.2.1	General test conditions		
	For the lower values of the test current the test is made once, at any convenient voltage.		
	For the upper values of the test current the test is made at rated voltage Un(phase to neutral) with a power factor between 0,95 and 1.	242V 0,98	--
	The sequence of operation is : O-CO-CO-CO Interval time: > 3 min		
	The tripping time of the O operation is measured		
	After each operation the indicating means shall show the open position of the contacts		P
9.10.2.2	☐ For circuit-breakers of the B – Type		
	Test current 3I_N (A), starting from cold		
	Opening time:	[s] [s] [s]	
	- 0,1s ≤ t ≤ 45s (≤ 32A)		N/A
	- 0,1s ≤ t ≤ 90s (> 32A)		N/A
	Test current 5 I_N (A), starting from cold		N/A
	Tripping less than 0,1 s		N/A
9.10.2.3	☒ For circuit-breakers of the C – Type		
	Test current 5I_N (A), starting from cold	125A	--
	Opening time:	[s]	
	- 0,1s ≤ t ≤ 15s (≤ 32A)	7	P
	- 0,1s ≤ t ≤ 30s (> 32A)		N/A
	Test current 10 I_N (A), starting from cold	256A	--
	Tripping less than 0,1 s	14,1ms	P
9.10.2.4	☐ For circuit-breakers of the D – Type		
	Test current 10I_N (A), starting from cold		

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
	Opening time:	[s] [s] [s]	
	- 0,1s ≤ t ≤ 4s (≤ 32A)		N/A
	- 0,1s ≤ t ≤ 8s (> 32A)		N/A
	Test current 20 I_N (A) or to the maximum instantaneous tripping current(see cl. 6, item j), starting from cold		N/A
	Tripping less than 0,1 s		N/A
9.10.3	Test of effect of single pole loading on the tripping characteristic of multipole circuit-breakers:		
	Test current 1,1 It (A), (two pole) starting from cold		
	Tripping within	[min] [min] [min]	
	- 1h		N/A
	- 2h		N/A
	Test current 1,2 It (A), (three pole or four pole) starting from cold		
	Tripping within	[min] [min] [min]	
	- 1h		N/A
	- 2h		N/A
9.10.4	Test of effect of ambient temperature on the tripping characteristics		
	a) Ambient temperature of (-5 ± 2)°C below the ambient air reference temperature	T = -5°C	--
	Test current 1,13 I_N (A)	28,3A	--
	- Passed for 1h	>1h	P
	- Passed for 2h		N/A
	Current is then steadily increased to 1,9 I_N (A) within 5s	47,5A	--
	Tripping within	[min]	
	- 1h	13s	P
	- 2h		N/A
	b) Ambient temperature of (40 ± 2)°C	T = 40°C	--
	Test current I_N (A)	25,0A	--
	No tripping within		
	- 1h	>1h	P
	- 2h		N/A

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
9.10	**Tests: DO (DL7 C32 1P)**	**DO 6**	
	I_N (A)	32	
	Sect. (mm²)	6	
	Instantaneous tripping current	☐ B ☒ C ☐ D	
9.10.1	Test of time-current characteristic		
9.10.1.1	Test current 1,13 I_N (A) starting from cold for:	36,2 A	--
	- 1 h ($I_N \leq 63$ A)	>1	P
	- 2 h ($I_N > 63$ A)		N/A
	No tripping		
	Then steadily increased within 5 s to 1,45 I_N (A)	46,4 A	--
	- Tripping within	[min]	
	- 1h (≤ 63 A)	1min17s	P
	- 2h (> 63 A)		N/A
9.10.1.2	Test current 2,55 I_N (A) starting from cold for:	81,6 A	--
	opening time not less than 1 s or more than	[s]	
	- 60 s	9	P
	- 120 s		N/A
9.10.2	Teast of instantaneous tripping and of correct opening of the contacts		
9.10.2.1	General test conditions		
	For the lower values of the test current the test is made once, at any convenient voltage.		
	For the upper values of the test current the test is made at rated voltage Un(phase to neutral) with a power factor between 0,95 and 1.	242V 0,98	--
	The sequence of operation is : O-CO-CO-CO Interval time: > 3 min		
	The tripping time of the O operation is measured		
	After each operation the indicating means shall show the open position of the contacts		P
9.10.2.2	☐ For circuit-breakers of the B – Type		
	Test current $3I_N$ (A), starting from cold		
	Opening time:	[s] [s] [s]	
	- 0,1s ≤ t ≤ 45s (≤ 32A)		N/A
	- 0,1s ≤ t ≤ 90s (> 32A)		N/A
	Test current 5 I_N (A), starting from cold		N/A
	Tripping less than 0,1 s		N/A

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
9.10.2.3	☒ For circuit-breakers of the C – Type		
	Test current $5I_N$ (A), starting from cold	160A	--
	Opening time:	[s]	
	- 0,1s ≤ t ≤ 15s (≤ 32A)	6	P
	- 0,1s ≤ t ≤ 30s (> 32A)		N/A
	Test current 10 I_N (A), starting from cold	326A	--
	Tripping less than 0,1 s	7,14ms	P
9.10.2.4	☐ For circuit-breakers of the D – Type		
	Test current $10I_N$ (A), starting from cold		
	Opening time:	[s] [s] [s]	
	- 0,1s ≤ t ≤ 4s (≤ 32A)		N/A
	- 0,1s ≤ t ≤ 8s (> 32A)		N/A
	Test current 20 I_N (A) or to the maximum instantaneous tripping current(see cl. 6, item j), starting from cold		N/A
	Tripping less than 0,1 s		N/A
9.10.3	Test of effect of single pole loading on the tripping characteristic of multipole circuit-breakers:		
	Test current 1,1 It (A), (two pole) starting from cold		
	Tripping within	[min] [min] [min]	
	- 1h		N/A
	- 2h		N/A
	Test current 1,2 It (A), (three pole or four pole) starting from cold		
	Tripping within	[min] [min] [min]	
	- 1h		N/A
	- 2h		N/A
9.10.4	Test of effect of ambient temperature on the tripping characteristics		
	a) Ambient temperature of (-5 ± 2)°C below the ambient air reference temperature	T = -5°C	--
	Test current 1,13 I_N (A)	36,2 A	--
	- Passed for 1h	>1h	P
	- Passed for 2h		N/A
	Current is then steadily increased to 1,9 I_N (A) within 5s	60,8 A	--

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
	Tripping within	[min]	
	- 1h	1min02s	P
	- 2h		N/A
	b) Ambient temperature of (40 ± 2)°C	T = 40°C	--
	Test current I_N (A)	32,0A	--
	No tripping within		
	- 1h	>1h	P
	- 2h		N/A

9.10	**Tests: DO (DL7 C40 1P)**	**DO 7**	
	I_N (A)	40	
	Sect. (mm²)	10	
	Instantaneous tripping current	☐ B ☒ C ☐ D	
9.10.1	Test of time-current characteristic		
9.10.1.1	Test current 1,13 I_N (A) starting from cold for:	45,2 A	--
	- 1 h ($I_N \leq 63$ A)	>1	P
	- 2 h ($I_N > 63$ A)		N/A
	No tripping		
	Then steadily increased within 5 s to 1,45 I_N (A)	58,0 A	--
	- Tripping within	[min]	
	- 1h (≤ 63 A)	32s	P
	- 2h (> 63 A)		N/A
9.10.1.2	Test current 2,55 I_N (A) starting from cold for:	102 A	--
	opening time not less than 1 s or more than	[s]	
	- 60 s		N/A
	- 120 s	11	P
9.10.2	Teast of instantaneous tripping and of correct opening of the contacts		
9.10.2.1	General test conditions		
	For the lower values of the test current the test is made once, at any convenient voltage.		
	For the upper values of the test current the test is made at rated voltage Un(phase to neutral) with a power factor between 0,95 and 1.	242V 0,98	--
	The sequence of operation is : O-CO-CO-CO Interval time: > 3 min		
	The tripping time of the O operation is measured		

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
	After each operation the indicating means shall show the open position of the contacts		P
9.10.2.2	☐ For circuit-breakers of the B – Type		
	Test current $3I_N$ (A), starting from cold		
	Opening time:	[s] [s] [s]	
	- 0,1s ≤ t ≤ 45s (≤ 32A)		N/A
	- 0,1s ≤ t ≤ 90s (> 32A)		N/A
	Test current 5 I_N (A), starting from cold		N/A
	Tripping less than 0,1 s		N/A
9.10.2.3	☒ For circuit-breakers of the C – Type		
	Test current $5I_N$ (A), starting from cold	200A	--
	Opening time:	[s]	
	- 0,1s ≤ t ≤ 15s (≤ 32A)		N/A
	- 0,1s ≤ t ≤ 30s (> 32A)	4	P
	Test current 10 I_N (A), starting from cold	405A	--
	Tripping less than 0,1 s	8,51ms	P
9.10.2.4	☐ For circuit-breakers of the D – Type		
	Test current $10I_N$ (A), starting from cold		
	Opening time:	[s] [s] [s]	
	- 0,1s ≤ t ≤ 4s (≤ 32A)		N/A
	- 0,1s ≤ t ≤ 8s (> 32A)		N/A
	Test current 20 I_N (A) or to the maximum instantaneous tripping current(see cl. 6, item j), starting from cold		N/A
	Tripping less than 0,1 s		N/A
9.10.3	Test of effect of single pole loading on the tripping characteristic of multipole circuit-breakers:		
	Test current 1,1 It (A), (two pole) starting from cold		
	Tripping within	[min] [min] [min]	
	- 1h		N/A
	- 2h		N/A
	Test current 1,2 It (A), (three pole or four pole) starting from cold		
	Tripping within	[min] [min] [min]	
	- 1h		N/A
	- 2h		N/A

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
9.10.4	Test of effect of ambient temperature on the tripping characteristics		
	a) Ambient temperature of (-5 ± 2)°C below the ambient air reference temperature	T = -5°C	--
	Test current 1,13 I_N (A)	45,2 A	--
	- Passed for 1h	>1h	P
	- Passed for 2h		N/A
	Current is then steadily increased to 1,9 I_N (A) within 5s	76,0 A	--
	Tripping within	[min]	
	- 1h	18s	P
	- 2h		N/A
	b) Ambient temperature of (40 ± 2)°C	T = 40°C	--
	Test current I_N (A)	40,0A	--
	No tripping within		
	- 1h	>1h	P
	- 2h		N/A

9.10	**Tests: DO (DL7 C50 1P)**	**DO 8**	
	I_N (A)	50	
	Sect. (mm²)	10	
	Instantaneous tripping current	☐ B ☒ C ☐ D	
9.10.1	Test of time-current characteristic		
9.10.1.1	Test current 1,13 I_N (A) starting from cold for:	56,5 A	--
	- 1 h ($I_N \leq 63$ A)	>1	P
	- 2 h ($I_N > 63$ A)		N/A
	No tripping		
	Then steadily increased within 5 s to 1,45 I_N (A)	72,5 A	--
	- Tripping within	[min]	
	- 1h (≤ 63 A)	33s	P
	- 2h (> 63 A)		N/A
9.10.1.2	Test current 2,55 I_N (A) starting from cold for:	128 A	--
	opening time not less than 1 s or more than	[s]	
	- 60 s		N/A
	- 120 s	12	P

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
9.10.2	Teast of instantaneous tripping and of correct opening of the contacts		
9.10.2.1	General test conditions		
	For the lower values of the test current the test is made once, at any convenient voltage.		
	For the upper values of the test current the test is made at rated voltage Un(phase to neutral) with a power factor between 0,95 and 1.	242V 0,98	--
	The sequence of operation is : O-CO-CO-CO Interval time: > 3 min		
	The tripping time of the O operation is measured		
	After each operation the indicating means shall show the open position of the contacts		P
9.10.2.2	☐ For circuit-breakers of the B – Type		
	Test current $3I_N$ (A), starting from cold		
	Opening time:	[s] [s] [s]	
	- 0,1s ≤ t ≤ 45s (≤ 32A)		N/A
	- 0,1s ≤ t ≤ 90s (> 32A)		N/A
	Test current 5 I_N (A), starting from cold		N/A
	Tripping less than 0,1 s		N/A
9.10.2.3	☒ For circuit-breakers of the C – Type		
	Test current $5I_N$ (A), starting from cold	250A	--
	Opening time:	[s]	
	- 0,1s ≤ t ≤ 15s (≤ 32A)		N/A
	- 0,1s ≤ t ≤ 30s (> 32A)	4	P
	Test current 10 I_N (A), starting from cold	512A	--
	Tripping less than 0,1 s	5,72ms	P
9.10.2.4	☐ For circuit-breakers of the D – Type		
	Test current $10I_N$ (A), starting from cold		
	Opening time:	[s] [s] [s]	
	- 0,1s ≤ t ≤ 4s (≤ 32A)		N/A
	- 0,1s ≤ t ≤ 8s (> 32A)		N/A
	Test current 20 I_N (A) or to the maximum instantaneous tripping current(see cl. 6, item j), starting from cold		N/A
	Tripping less than 0,1 s		N/A
9.10.3	Test of effect of single pole loading on the tripping characteristic of multipole circuit-breakers:		

IEC 60 898			
Cl.	Requirement – Test	Result	Verdict
	Test current 1,1 It (A), (two pole) starting from cold		
	Tripping within	[min] [min] [min]	
	- 1h		N/A
	- 2h		N/A
	Test current 1,2 It (A), (three pole or four pole) starting from cold		
	Tripping within	[min] [min] [min]	
	- 1h		N/A
	- 2h		N/A
9.10.4	Test of effect of ambient temperature on the tripping characteristics		
	a) Ambient temperature of (-5 ± 2)°C below the ambient air reference temperature	T = -5°C	--
	Test current 1,13 I_N (A)	56,5 A	--
	- Passed for 1h	>1h	P
	- Passed for 2h		N/A
	Current is then steadily increased to 1,9 I_N (A) within 5s	95,0 A	--
	Tripping within	[min]	
	- 1h	19s	P
	- 2h		N/A
	b) Ambient temperature of (40 ± 2)°C	T = 40°C	--
	Test current I_N (A)	50,0A	--
	No tripping within		
	- 1h	>1h	P
	- 2h		N/A

	TESTS „E“ 3 + 3 samples (DL7 C63 1P)				
8.12.11.4.2	**Test: E1(Test at service short-circuit capacity)**	**E_1-1**	**E_1-2**	**E_1-3**	
	Service short-circuit capacity ..... :	7500 A			--
	Test circuit: figure..... :	3			--
	Prospective current ..... :	7500 A			--
	Prospective current obtained ..... :	7520 A			--
	Power factor..... :	0,45~0,50			--
	Power factor obtained ..... :	0,50			--
	Sequence..... :	O - T – O - T – CO			--
	T (min)..... :	3 min			--
9.12.9.1	Test in free air copper wire F': ☐ 0,12 mm / ☒ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☒ 1,5 Ohm	“a” = 50 mm 0,16mm 1,5 Ohm			--
9.12.9.2	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value ..... :	4,96kA	4,85kA	4,69kA	P
	$I^2t \leq$ _____ kA^2s	[kA^2s]	[kA^2s]	[kA^2s]	
	Max. $I^2t \leq$ _____kA^2s L1	79,7	67,3	98,6	P
	L2	___	___	___	
	L3	___	___	___	
	N	___	___	___	
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				
9.12.12.1	**The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.**				
	a) leakage current across open contacts, according to 9.7.6.3, each pole is supplied at a voltage 1,1 times Un.= 264 V. The circuit – breaker is in the open position	E_1-1 [mA]	E_1-2 [mA]	E_1-3 [mA]	
	The leakage current shall not exceed 2 mA L1	0,005	0,005	0,005	P
	L2				N/A
	L3				N/A

	L4(N)				N/A
	Electric strength test:				
	Test voltage 1500 V (see 8.7.2)				
	a)				P
	b)				N/A
	c)				P
	d)				N/A
	e) 2000 V				N/A
	Test current 0.85x non tripping current (1,13 I_N)	60,5 A			--
	- Passed for 1h	> 1h	> 1h	> 1h	P
	- Passed for 2h				N/A
	Current is then steadily increased to 1,1 x tripping current (1,45 I_N) within 5s	100 A			--
		E_1-1 [min]	E_1-2 [min]	E_1-3 [min]	
	Tripping within ☒ 1 hour / ☐ 2 hour	1min04s	6min28s	2min42s	P

	TESTS „E“ 3 + 3 samples (DL7 C6 1P)				
8.12.11.4.2	**Test: E1(Test at service short-circuit capacity)**	**E_1-4**	**E_1-5**	**E_1-6**	
	Service short-circuit capacity ..... :	7500 A			--
	Test circuit: figure..... :	3			--
	Prospective current ..... :	7500 A			--
	Prospective current obtained ..... :	7520 A			--
	Power factor..... :	0,45~0,50			--
	Power factor obtained ..... :	0,50			--
	Sequence..... :	O - T – O - T – CO			--
	T (min)..... :	3 min			--
9.12.9.1	Test in free air copper wire F': ☐ 0,12 mm / ☒ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☒ 1,5 Ohm	"a" = 50 mm 0,16mm 1,5 Ohm			--
9.12.9.2	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value ..... :	2,35kA	2,97kA	2,91kA	P
	$I^2t \leq$ _____ kA^2s	[kA^2s]	[kA^2s]	[kA^2s]	
	Max. $I^2t \leq$ _____kA^2s L1	8,26	18,1	45,8	P
	L2	___	___	___	
	L3	___	___	___	
	N	___	___	___	
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				
9.12.12.1	**The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.**				
	a) leakage current across open contacts, according to 9.7.6.3, each pole is supplied at a voltage 1,1 times Un.= 264 V. The circuit – breaker is in the open position	E_1-4 [mA]	E_1-5 [mA]	E_1-6 [mA]	
	The leakage current shall not exceed 2 mA L1	0,005	0,005	0,005	P
	L2				N/A

	L3				N/A
	L4(N)				N/A
	Electric strength test:				
	Test voltage 1500 V (see 8.7.2)				
	a)				P
	b)				N/A
	c)				P
	d)				N/A
	e) 2000 V				N/A
	Test current 0.85x non tripping current (1,13 I_N)	5,76A			--
	- Passed for 1h	> 1h	> 1h	> 1h	P
	- Passed for 2h				N/A
	Current is then steadily increased to 1,1 x tripping current (1,45 I_N) within 5s	9,57 A			--
		E_1-4 [min]	E_1-5 [min]	E_1-6 [min]	
	Tripping within ☒ 1 hour / ☐ 2 hour	49s	2min10s	6min24s	P

	TESTS „E“ 3 + 3 samples (DL7 C63 2P)				
8.12.11.4.2	**Test: E1(Test at service short-circuit capacity)**	**E_1-7(F1)**	**E_1-8(F1)**	**E_1-9(F1)**	
	Service short-circuit capacity ..... :	7500 A			--
	Test circuit: figure..... :	4b			--
	Prospective current ..... :	7500 A			--
	Prospective current obtained ..... :	7530 A			--
	Power factor ..... :	0,45~0,50			--
	Power factor obtained ..... :	0,50			--
	Sequence ..... :	O - T – O - T – CO			--
	T (min)..... :	3 min			--
9.12.9.1	Test in free air copper wire F': ☐ 0,12 mm / ☒ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☒ 1,5 Ohm	“a” = 50 mm 0,16mm 1,5 Ohm			--
9.12.9.2	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value ..... :	4,02kA	4,00kA	5,62kA	P
	$I^2t \leq$ _____ kA^2s	[kA^2s]	[kA^2s]	[kA^2s]	
	Max. $I^2t \leq$ _____kA^2s L1	62,4	39,3	141	P
	L2	___	___	___	
	L3	___	___	___	
	N	___	___	___	
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				
9.12.12.1	**The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.**				
	a) leakage current across open contacts, according to 9.7.6.3, each pole is supplied at a voltage 1,1 times Un.= 264 V. The circuit – breaker is in the open position	E_1-7(F1) [mA]	E_1-8(F1) [mA]	E_1-9(F1) [mA]	
	The leakage current shall not exceed 2 mA L1	0,005	0,005	0,005	P
	L2	0,005	0,005	0,005	P
	L3				N/A
	L4(N)				N/A

	Electric strength test:				
	Test voltage 1500 V (see 8.7.2)				
	a)				P
	b)				N/A
	c)				P
	d)				N/A
	e) 2000 V				N/A
	Test current 0.85x non tripping current (1,13 I_N)	60,5 A			--
	- Passed for 1h	> 1h	> 1h	> 1h	P
	- Passed for 2h				N/A
	Current is then steadily increased to 1,1 x tripping current (1,45 I_N) within 5s	100 A			--
		E_1-7(F1) [min]	E_1-8(F1) [min]	E_1-9(F1) [min]	
	Tripping within ☒ 1 hour / ☐ 2 hour	12s	1min06s	37s	P

	TESTS „E“ 3 + 3 samples (DL7 C6 2P)				
8.12.11.4.2	**Test: E1(Test at service short-circuit capacity)**	**E_1-10**	**E_1-11**	**E_1-12**	
	Service short-circuit capacity ..... :	7500 A			--
	Test circuit: figure..... :	4b			--
	Prospective current ..... :	7500 A			--
	Prospective current obtained ..... :	7530 A			--
	Power factor ..... :	0,45~0,50			--
	Power factor obtained ..... :	0,50			--
	Sequence ..... :	O - T – O - T – CO			--
	T (min)..... :	3 min			--
9.12.9.1	Test in free air copper wire F': ☐ 0,12 mm / ☒ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☒ 1,5 Ohm	“a” = 50 mm 0,16mm 1,5 Ohm			--
9.12.9.2	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value ..... :	2,58kA	2,74kA	2,76kA	P
	$I^2t \leq$ _____ kA^2s	[kA^2s]	[kA^2s]	[kA^2s]	
	Max. $I^2t \leq$ _____kA^2s L1	11,0	19,0	13,5	P
	L2	___	___	___	
	L3	___	___	___	
	N	___	___	___	
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				
9.12.12.1	**The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.**				
	a) leakage current across open contacts, according to 9.7.6.3, each pole is supplied at a voltage 1,1 times Un.= 264 V. The circuit – breaker is in the open position	E_1-10 [mA]	E_1-11 [mA]	E_1-12 [mA]	
	The leakage current shall not exceed 2 mA L1	0,005	0,005	0,005	P
	L2	0,005	0,005	0,005	P
	L3				N/A
	L4(N)				N/A

	Electric strength test:				
	Test voltage 1500 V (see 8.7.2)				
	a)				P
	b)				N/A
	c)				P
	d)				N/A
	e) 2000 V				N/A
	Test current 0.85x non tripping current (1,13 I_N)	5,76A			--
	- Passed for 1h	> 1h	> 1h	> 1h	P
	- Passed for 2h				N/A
	Current is then steadily increased to 1,1 x tripping current (1,45 I_N) within 5s	9,57 A			--
		E_1-10 [min]	E_1-11 [min]	E_1-12 [min]	
	Tripping within ☒ 1 hour / ☐ 2 hour	1min24s	50s	3min10s	P

	TESTS „E“ 3 + 3 samples (DL7 C63 3P+N)				
8.12.11.4.2	**Test: E1(Test at service short-circuit capacity)**	**E_1-13**	**E_1-14**	**E_1-15**	
	Service short-circuit capacity ..... :	7500 A			--
	Test circuit: figure..... :	6			--
	Prospective current ..... :	7500 A			--
	Prospective current obtained ..... :	7520 A			--
	Power factor ..... :	0,45~0,50			--
	Power factor obtained ..... :	0,50			--
	Sequence ..... :	O - T – O - T – CO			--
	T (min)..... :	3 min			--
9.12.9.1	Test in free air copper wire F': ☐ 0,12 mm / ☒ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☒ 1,5 Ohm	“a” = 50 mm 0,16mm 1,5 Ohm			--
9.12.9.2	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value ..... :	6,47kA	4,55kA	4,49kA	P
	$I^2t \leq$ _____ kA^2s	[kA^2s]	[kA^2s]	[kA^2s]	
	Max. $I^2t \leq$ _____kA^2s L1	39,8	46,0	42,2	P
	L2	___	___	___	
	L3	___	___	___	
	N	___	___	___	
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				
9.12.12.1	**The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.**				
	a) leakage current across open contacts, according to 9.7.6.3, each pole is supplied at a voltage 1,1 times Un.= 264 V. The circuit – breaker is in the open position	E_1-13 [mA]	E_1-14 [mA]	E_1-15 [mA]	
	The leakage current shall not exceed 2 mA L1	0,005	0,005	0,005	P
	L2	0,005	0,005	0,005	P
	L3	0,005	0,005	0,005	P
	L4(N)	0,005	0,005	0,005	P

	Electric strength test:				
	Test voltage 1500 V (see 8.7.2)				
	a)				P
	b)				N/A
	c)				P
	d)				N/A
	e) 2000 V				N/A
	Test current 0.85x non tripping current (1,13 I_N)	60,5 A			--
	- Passed for 1h	> 1h	> 1h	> 1h	P
	- Passed for 2h				N/A
	Current is then steadily increased to 1,1 x tripping current (1,45 I_N) within 5s	100 A			--
		E_1-13 [min]	E_1-14 [min]	E_1-15 [min]	
	Tripping within ☒ 1 hour / ☐ 2 hour	26s	1min39s	4min28s	P

	TESTS „E“ 3 + 3 samples (DL7 C6 3P+N)				
8.12.11.4.2	**Test: E1(Test at service short-circuit capacity)**	**E_1-16(F1)**	**E_1-17(F1)**	**E_1-18(F1)**	
	Service short-circuit capacity ..... :	7500 A			--
	Test circuit: figure..... :	6			--
	Prospective current ..... :	7500 A			--
	Prospective current obtained ..... :	7520 A			--
	Power factor..... :	0,45~0,50			--
	Power factor obtained ..... :	0,50			--
	Sequence..... :	O - T – O - T – CO			--
	T (min)..... :	3 min			--
9.12.9.1	Test in free air copper wire F': ☐ 0,12 mm / ☒ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☒ 1,5 Ohm	“a” = 50 mm 0,16mm 1,5 Ohm			--
9.12.9.2	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value ..... :	2,38kA	2,26kA	2,28kA	P
	$I^2t \leq$ _____ kA^2s	[kA^2s]	[kA^2s]	[kA^2s]	
	Max. $I^2t \leq$ _____kA^2s L1	14,5	8,81	13,0	P
	L2	___	___	___	
	L3	___	___	___	
	N	___	___	___	
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				
9.12.12.1	**The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.**				
	a) leakage current across open contacts, according to 9.7.6.3, each pole is supplied at a voltage 1,1 times Un.= 264 V. The circuit – breaker is in the open position	E_1-16**(F1)** [mA]	E_1-17**(F1)** [mA]	E_1-18**(F1)** [mA]	
	The leakage current shall not exceed 2 mA L1	0,005	0,005	0,005	P
	L2	0,005	0,005	0,005	P
	L3	0,005	0,005	0,005	P
	L4(N)	0,005	0,005	0,005	P

	Electric strength test:				
	Test voltage 1500 V (see 8.7.2)				
	a)				P
	b)				N/A
	c)				P
	d)				N/A
	e) 2000 V				N/A
	Test current 0.85x non tripping current (1,13 I_N)	5,76A			--
	- Passed for 1h	> 1h	> 1h	> 1h	P
	- Passed for 2h				N/A
	Current is then steadily increased to 1,1 x tripping current (1,45 I_N) within 5s	9,57 A			--
		E_1-16**(F1)** [mA]	E_1-17**(F1)** [mA]	E_1-18**(F1)** [mA]	
	Tripping within ☒ 1 hour / ☐ 2 hour	46s	28s	11s	P

	TESTS „E2“ 3 or 4 samples (DL7 C63 1P)				
9.12.11.4.3	**Test: E2 (Test at rated short-circuit capacity)**	**E_2.1**	**E_2.2**	**E_2.3**	
	Service short-circuit capacity.....:	10000 A			--
	Test circuit: figure .....:	3			--
	Prospective current.....:	10000 A			--
	Prospective current obtained.....:	10300 A			--
	Power factor.....:	0,45~0,50			--
	Power factor obtained.....:	0,50			--
	Sequence.....:	O - T – CO			--
	T (min) .....:	3 min			--
9.12.9.1	Test in free air copper wire F': ☐ 0,12 mm / ☒ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☒ 1,5 Ohm	“a” = 50 mm 0,16mm 1,5 Ohm			--
9.12.9.2	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value.....:	3,90kA	4,75kA	3,56kA	P
	$I^2t \leq$ _____ kA^2s	[kA^2s]	[kA^2s]	[kA^2s]	
	Max. $I^2t \leq$ _____kA^2s L1	52,4	57,6	46,6	P
	L2	___	___	___	
	L3	___	___	___	
	N	___	___	___	
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				
9.12.12.1	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				
	a) leakage current across open contacts, according to 9.7.6.3, each pole is supplied at a voltage 1,1 times Un.= 264V. The circuit –breaker is in the open position	E_2-1 [mA]	E_2-2 [mA]	E_1-3 [mA]	
	The leakage current shall not exceed 2 mA L1	0,005	0,005	0,005	P
	L2				N/A
	L3				N/A
	L4(N)				N/A

	Electric strength test:				
	Test voltage 900 V (see 9.7.3)				
	a)				P
	b)				N/A
	c)				P
	d)				N/A
	e) 2000 V				N/A
	Test current 2,8 I_N	176 A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	
	- 60 s				N/A
	- 120 s	14	15	17	P

	TESTS „E2“ 3 or 4 samples (DL7 C6 1P)				
9.12.11.4.3	**Test: E2 (Test at rated short-circuit capacity)**	**E_2.4(F1)**	**E_2.5(F1)**	**E_2.6(F1)**	
	Service short-circuit capacity.....:	10000 A			--
	Test circuit: figure .....:	3			--
	Prospective current.....:	10000 A			--
	Prospective current obtained.....:	10200 A			--
	Power factor.....:	0,45~0,50			--
	Power factor obtained.....:	0,49			--
	Sequence.....:	O - T – CO			--
	T (min) .....:	3 min			--
9.12.9.1	Test in free air copper wire F': ☐ 0,12 mm / ☒ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☒ 1,5 Ohm	“a” = 50 mm 0,16mm 1,5 Ohm			--
9.12.9.2	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value.....:	1,62kA	1,93kA	1,89kA	P
	$I^2t \leq$ _____ kA^2s	[kA^2s]	[kA^2s]	[kA^2s]	
	Max. $I^2t \leq$ _____kA^2s L1	9,02	10,8	7,73	P
	L2	___	___	___	
	L3	___	___	___	
	N	___	___	___	
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				
9.12.12.1	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				
	a) leakage current across open contacts, according to 9.7.6.3, each pole is supplied at a voltage 1,1 times Un.= 264V. The circuit –breaker is in the open position	E_2.4(F1) [mA]	E_2.5(F1) [mA]	E_2.6(F1) [mA]	
	The leakage current shall not exceed 2 mA L1	0,005	0,005	0,005	P
	L2				N/A
	L3				N/A
	L4(N)				N/A

	Electric strength test:				
	Test voltage 900 V (see 9.7.3)				
	a)				P
	b)				N/A
	c)				P
	d)				N/A
	e) 2000 V				N/A
	Test current 2,8 I_N	16,8A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	
	- 60 s	12	10	10	P
	- 120 s				N/A

	TESTS „E2“ 3 or 4 samples (DL7 C63 2P)				
9.12.11.4.3	**Test: E2 (Test at rated short-circuit capacity)**	**E_2-7**	**E_2-8**	**E_2-9**	
	Service short-circuit capacity.....:	10000 A			--
	Test circuit: figure .....:	4b			--
	Prospective current.....:	10000 A			--
	Prospective current obtained.....:	10300 A			--
	Power factor.....:	0,45~0,50			--
	Power factor obtained.....:	0,50			--
	Sequence.....:	O - T – CO			--
	T (min) .....:	3 min			--
9.12.9.1	Test in free air copper wire F': ☐ 0,12 mm / ☒ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☒ 1,5 Ohm	“a” = 50 mm 0,16mm 1,5 Ohm			--
9.12.9.2	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value.....:	4,40kA	3,53kA	4,54kA	P
	$I^2t \leq$ _____ kA^2s	[kA^2s]	[kA^2s]	[kA^2s]	
	Max. $I^2t \leq$ _____kA^2s	38,4	30,2	40,6	P
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				
9.12.12.1	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				
	a) leakage current across open contacts, according to 9.7.6.3, each pole is supplied at a voltage 1,1 times Un.= 264V. The circuit –breaker is in the open position	E_2-7 [mA]	E_2-8 [mA]	E_1-9 [mA]	
	The leakage current shall not exceed 2 mA L1	0,005	0,005	0,005	P
	L2	0,005	0,005	0,005	P
	L3				N/A
	L4(N)				N/A
	Electric strength test:				
	Test voltage 900 V (see 9.7.3)				

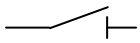
	a)				P
	b)				N/A
	c)				P
	d)				N/A
	e) 2000 V				N/A
	Test current 2,8 I_N	176 A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	
	- 60 s				N/A
	- 120 s	17	15	15	P

	TESTS „E2“ 3 or 4 samples (DL7 C6 2P)				
9.12.11.4.3	**Test: E2 (Test at rated short-circuit capacity)**	**E_2.10**	**E_2.11**	**E_2.12**	
	Service short-circuit capacity.....:	10000 A			--
	Test circuit: figure .....:	4b			--
	Prospective current.....:	10000 A			--
	Prospective current obtained.....:	10300 A			--
	Power factor.....:	0,45~0,50			--
	Power factor obtained.....:	0,49			--
	Sequence.....:	O - T – CO			--
	T (min) .....:	3 min			--
9.12.9.1	Test in free air copper wire F': ☐ 0,12 mm / ☒ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☒ 1,5 Ohm	“a” = 50 mm 0,16mm 1,5 Ohm			--
9.12.9.2	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value.....:	3,39kA	4,38kA	3,64kA	P
	$I^2t \leq$ _____ kA^2s	[kA^2s]	[kA^2s]	[kA^2s]	
	Max. $I^2t \leq$ _____kA^2s	18,7	42,0	17,7	P
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				
9.12.12.1	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				
	a) leakage current across open contacts, according to 9.7.6.3, each pole is supplied at a voltage 1,1 times Un.= 264V. The circuit –breaker is in the open position	E_2.10 [mA]	E_2.11 [mA]	E_2.12 [mA]	
	The leakage current shall not exceed 2 mA L1	0,005	0,005	0,005	P
	L2	0,005	0,005	0,005	P
	L3				N/A
	L4(N)				N/A
	Electric strength test:				
	Test voltage 900 V (see 9.7.3)				

	a)				P
	b)				N/A
	c)				P
	d)				N/A
	e) 2000 V				N/A
	Test current 2,8 I_N	16,8A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	
	- 60 s	14	20	16	P
	- 120 s				N/A

	TESTS „E2“ 3 or 4 samples (DL7 C63 3P+N)				
9.12.11.4.3	**Test: E2 (Test at rated short-circuit capacity)**	**E_2.13(F1)**	**E_2.14(F1)**	**E_2.15(F1)**	
	Service short-circuit capacity.....:	10000 A			--
	Test circuit: figure .....:	6			--
	Prospective current.....:	10000 A			--
	Prospective current obtained.....:	10300 A			--
	Power factor.....:	0,45~0,50			--
	Power factor obtained.....:	0,50			--
	Sequence.....:	O - T – CO			--
	T (min) .....:	3 min			--
9.12.9.1	Test in free air copper wire F': ☐ 0,12 mm / ☒ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☒ 1,5 Ohm	“a” = 50 mm 0,16mm 1,5 Ohm			--
9.12.9.2	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value.....:	3,45kA	3,87kA	3,63kA	P
	$I^2t \leq$ _____ kA^2s	[kA^2s]	[kA^2s]	[kA^2s]	
	Max. $I^2t \leq$ _____kA^2s	25,0	15,3	27,8	P
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				
9.12.12.1	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				
	a) leakage current across open contacts, according to 9.7.6.3, each pole is supplied at a voltage 1,1 times Un.= 264V. The circuit –breaker is in the open position	E_2-13(F1) [mA]	E_2-14(F1) [mA]	E_1-15(F1) [mA]	
	The leakage current shall not exceed 2 mA L1	0,005	0,005	0,005	P
	L2	0,005	0,005	0,005	P
	L3	0,005	0,005	0,005	P
	L4(N)	0,005	0,005	0,005	P
	Electric strength test:				
	Test voltage 900 V (see 9.7.3)				

	a)				P
	b)				N/A
	c)				P
	d)				N/A
	e) 2000 V				N/A
	Test current 2,8 I_N	176 A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	
	- 60 s				N/A
	- 120 s	11	15	12	P

6	**MARKING AND OTHER INFORMATION (DL7 C63 3P+N)**		
	Circuit-breaker marked with:		
	a) Manufacturer's name or trade mark .....:	DENROM	P
	b) Type designation, catalogue number or other identification number.....:	DL7-63/3N/C	P
	c) Rated voltage (V).....:	415	P
	d) Rated current (A) .....:	63	P
	e) Rated frequency (Hz).....:		N/A
	f) Rated short circuit capacity (A).....:	10000	P
	g) Wiring diagram		P
	h) Ambient air temperature, if different from 30°C		N/A
	i) Degree of protection, if different from IP20		N/A
	j) For D-type circuit-breakers: the maximum instantaneous tripping current, if higher than 20 In(see table 2)		N/A
	k) Rated impulse withstand voltage Uimp if it is 2,5 kV		N/A
	Symbol for instantaneous tripping current	C	P
	Symbol for nature of supply		N/A
	Marking for rated current and for instantaneous tripping shall be readily visible when CB is installed		P
	Other marking shall be easily discernible		P
	The suitability for isolation, which is provided by all circuit-breakers of this standard, may be indicated by the symbol on the device		P
	Energy limiting class		N/A
	I^2t characteristic (documentation)		N/A
	Symbols on supply and load terminal		P
	Terminal for neutral conductor N		N/A
	Earthing terminal if any (IEC 60417-5019)		N/A
	On – off position shall be clearly indicated – 0 I -		P
	For push-button CB the off push-button shall either be red or be marked with the symbol ´0´		N/A
	Red not used for other push-button		N/A
	This symbol shall be easily discernible		N/A
	For CB with multiple current ratings, the maximum value is marked, the adjusted value indicated without ambiguity		N/A

	Marking shall be indelible and easily legible (not on removable parts), 15 s with water, 15 s with hexane (see cl. 8.3)		P

8.	**REQUIREMENTS FOR CONSTRUCTION AND OPERATION (DL7 C63 3P+N)**		
8.1.1	**General**		
8.1.2	**Mechanism**		
	The moving contact shall be mechanically coupled so that all poles make and break together, whether operated manually or automatically, even if an overload occurs on one pole only		N/A
	The switched neutral shall close before and open after the protected pole (s)		N/A
	Neutral pole having adequate making and breaking capacity and CB with independent manual operation: all poles operate together including neutral pole		N/A
	CB shall have a trip free mechanism		P
	It shall be possible to switch the CB on and off by hand		P
	No intermediate position of the contacts		P
	Position of contacts shall be indicated		P
	Indication visible from the outside		P
	If the indication is on the actuating means, it shall, when released, automatically take up or stay in the position corresponding to that of the moving contacts; operating means shall have two different rest positions, except that, for automatic operation, a third distinct rest position may be provided		P
	If a separate mechanical indicator is used to indicate the position of the main contacts, colour red shall be used for the on position and green for the off position.		P
	The action of the mechanism shall not be influenced by the position of enclosures		P
	If the cover is used as a guiding means for push-button, it shall not be possible to remove this button from the outside		N/A
	Operating means securely fixed, not possible to remove them without a tool		P
	For the up-down operating means the contacts shall be closed by the up movement.		P

8.1.3	**Clearances and creepage distances**		
8.1.3	**Clearances [mm] see table 4**		
	1.between live parts (of the main circuits) which are separated when the CB is in off position .....:		N/A
	2.between live parts of different polarity .....:	9,6mm	P
	3.between circuits supplied from different sources, one of which being PELV or SELV.....:		N/A
	4. between live parts and		
	- accessible surfaces of operating means .....:	9,8mm	P
	- screws or other means for fixing covers.....:		N/A
	- surface on which the base is mounted .....:	14,1mm	P
	- screws or other means for fixing the circuit breaker .....:		N/A
	- metal covers or boxes .....:		N/A
	- other accessible metal parts.....:	8,2mm	P
	- metal frames supporting the base (flush-type)..:		N/A
	5.between metal parts of mechanism and:		
	- accessible metal parts.....:		N/A
	- screws or other means for fixing the circuit breaker .....:		N/A
	- metal frames supporting the base (flush type)..:		N/A
8.1.3	Creepage distances [mm] (see table 4)		
	Material group	IIIa ☒ II ☐ I ☐	--
	1.between live parts (of the main circuits) which are separated when the CB is in off position .....:		N/A
	2.between live parts of different polarity .....:	5,2mm	P
	3.between circuits supplied from different sources, one of which being PELV or SELV.....:		N/A
	4. between live parts and		
	- accessible surfaces of operating means .....:	10,4mm	P
	- screws or other means for fixing covers.....:		N/A
	- surface on which the base is mounted .....:		N/A
	- screws or other means for fixing the circuit breaker .....:		N/A
	- metal covers or boxes .....:		N/A
	- other accessible metal parts.....:		N/A
	- metal frames supporting the base (flush-type)..:		N/A

	5.between metal parts of mechanism and:		
	- accessible metal parts.....:		N/A
	- screws or other means for fixing the circuit breaker .....:		N/A
	- metal frames supporting the base (flush type) ..:		N/A
8.1.4	**Screws, current-carrying parts and connections**		
8.1.4.1	Connections, withstand mechanical stresses occurring in normal use		
	Screws for mounting of the CB not of the thread-cutting type		
	Test according to cl. 9.4:		
	- 10 times (screw Ø / torque Nm)	Ø___mm___Nm (see table 10) Ø___mm___Nm	N/A
	- 5 times (screw Ø / torque Nm)	Ø 5 mm 2,0 Nm (see table 10) Ø___mm___Nm	P
	Plug in connections tested by plugging in and pulling out five times		N/A
	After test connections have not become loose nor electrical function impaired		P
8.1.4.2	Screws with a thread of insulating material ensured correct introduction		N/A
8.1.4.3	Electrical connection: contact pressure not transmitted through insulating material, unless there is sufficient resilience in the metallic parts		P
	- copper		P
	- alloy 58% copper for worked cold parts		N/A
	- alloy 50% copper for other parts		P
	- other metal		N/A
8.1.5	**Terminals for external conductors**		
8.1.5.1	Terminals ensure correct connection of conductors (Test acc. To cl. 9.5 or annex J or K)		P
9.5	Torque Ø 5 mm 2,0 Nm Ø___mm___Nm Ø___mm___Nm max. sect. _____ mm²		P

9.5.1	Pull test: min sect. ___1 mm² max sect. __25 mm² Pull_____100 N for 1 min During the test conductor does not move noticeably		P
9.5.2	min sect. ____1 __ mm² Torque (2/3)=_1,33 Nm max sect. ____25 mm^2 The conductor shows no damage		P
9.5.3	Nominal cross-section from ____ 1 to 25 ___mm² No of wires _____7 Ø of wires _____2,14 mm Torque (2/3) = ____1,33Nm After the test no wire escaped outside		P
8.1.5.2	Terminals allow the connection of conductors of the following cross-sectional areas: (table 5)		
	Rated current (A) / Range of nominal cross sections to be clamped (mm²): ≤ 13: 1 to 2,5 > 13 ≤ 16: 1 to 4 > 16 ≤ 25: 1,5 to 6 > 25 ≤ 32: 2,5 to 10 > 32 ≤ 50: 4 to 16 > 50 ≤ 80: 10 to 25 > 80 ≤ 100: 16 to 35 > 100 ≤ 125: 25 to 50		
	It is required that, for current ratings up to and including 50 A terminals are designed to clamp solid conductors as well as rigid stranded conductors; the use of flexible conductors is permitted		P
	Nevertheless, it is permitted that terminals for conductors having cross-sections from 1 mm^2 up to 6 mm^2 are designed to clamp solid conductors only.	1 to 25 mm²	P
8.1.5.3	Means for clamping the conductors in the terminals not serve to fix any other component (See test sub-clause 9.5)		P
8.1.5.4	Terminals for $I_N \leq 32$ A allow the connection of conductors without special preparation		P
8.1.5.5	Terminals shall have adequate mechanical strength; ISO thread or equivalent (See tests of sub-clause 9.4 and 9.5.1)		P

8.1.5.6	Clamping of conductor without damage to the conductor (See test of sub-clause 9.5.2)		P
8.1.5.7	Clamping of conductor between metal surfaces (See tests of sub-clause 9.4 and 9.5.1)		P
8.1.5.8	Conductor shall not slip-out when the clamping screw or nuts are tightened (See test of sub-clause 9.5.3)		P
8.1.5.9	Terminals shall be properly fixed. No work loose when the clamping screws or nuts are tightened or loosened (See test of sub-clause 9.4)		P
8.1.5.10	Clamping screws or nuts of terminals for protective conductors adequately secured against accidental loosening		N/A
8.1.5.11	Screws and nuts of terminals for external conductors shall be in engagement with a metal thread, and the screws shall not be of tapping screw type		P
8.1.6	**Non interchangeability**		
	For circuit-breakers intended to be mounted on bases forming a unit therewith(plug-in or screw-in type) it shall not be possible, without the aid of a tool, to replace a circuit-breaker when mounted as for normal use by another of the same make having a higher rated current, compliance is checked by inspection		N/A
8.1.7	Plug-in type circuit-breakers, the holding in position of which does not depend solely on their plug-in connection(s), shall be reliable and have adequate stability		N/A
8.1.7.1	Plug-in type circuit-breakers, the holding in position of which does not depend solely on their plug-in connection(s) Compliance of the mechanical mounting is checked by the relevant test 9.13		N/A
8.1.7.2	Plug-in type circuit-breakers, the holding in position of which does depend solely on their plug-in connection(s) Compliance of the mechanical mounting is checked by the relevant test 9.13		N/A
8.2	**Protection against electric shock**		
	Live parts not accessible in normal use		P
	For CB, other than plug-in type, external parts, other than screws and other means for fixing covers, which are accessible shall be of insulating material		P

	Unless the live parts are within an internal enclosure of insulating material: Lining - reliable fixed, - adequate thickness and - mechanical strength		N/A
	Inlet openings for cables shall be in insulating material or be provided with bushings or similar devices in insulating material Such device - shall be reliable fixed - shall have adequate mechanical strength		N/A
	For plug-in CB, external parts, other than screws and other means for fixing covers, which are accessible shall be in insulating material		N/A
	Metallic operating means insulated from live parts		N/A
	Metal parts of the mechanism not accessible and insulated from accessible metal parts, metal frames (for flush-type), screws or other means for fixing the base		P
	Replacement of plug-in CB possible without touching live parts		N/A
	Lacquer or enamel not considered		N/A
9.6	**Test of protection against electric shock**		
	Use of test finger so designed that each jointed can be turned through an angle of 90° with respect to the finger		P
	Circuit-breaker with enclosures of thermoplastic material are additional tested at 35 °C for 1 min with a force of 75 N		P
8.10	Resistance to heat		
	CB sufficiently resistant to heat		P
9.14	**Test of resistance to heat**		
9.14.1	Test:		
	- without removable covers ..... 1 h (100 ± 2) °C		P
	- removable covers..... 1 h (70 ± 2) °C		N/A
	After the test no access to live parts, marking still legible		P
9.14.2	Ball pressure test for external parts of insulating material (parts retaining current-carrying parts and parts of the protective circuit in position) T = 125°C Ø of impression ≤ 2 mm	Impression: 1.2 mm	P

9.14.3	Ball pressure test for external parts of insulating material (parts not retaining current-carrying parts and parts of the protective circuit in position T = (70 ± 2)°C or T = ___ °C = (40 ± 2)°C + max. temperature rise of sub-clause 8.8 Ø of impression ≤ 2 mm		N/A
8.11	Resistance to abnormal heat and to fire		
	External parts of insulating material shall not ignite or spread fire under fault or overload conditions		P
9.15	**Resistance to abnormal heat and to fire**		
	Glow wire test: No visible flame, no sustained glowing or flames and glowing extinguish within 30 s		P
	external parts retaining current-carrying parts and parts of the protective circuit in position ..... (960 ± 15)°C		P
	all other external parts ..... (650 ± 10)°C		N/A
8.12	Resistance to rusting		
	Ferrous parts adequately protected against rusting		P
9.16	Test of resistance to rusting:		
	- 10 min immersed in a cold chemical degreaser such as methyl-chloroform or refined petrol		P
	- 10 min immersed in a 10% solution of ammoniu chloride in water at 20°C		P
	- 10 min at 95% humidity at 20°C		P
	- 10 min at 100°C		P
	No sign of rust		P

	TESTS „B“ 3 samples (DL7 C63 3P+N)	**B-4 B-5 B-6**	
8.3	**Dielectric properties and isolating capability**		
	CB shall have adequate dielectric properties and shall ensure isolation:		P
8.3.1	Dielectric strength at power frequency		P
	Compliance is checked by the tests 9.7.1, 9.7.2 and 9.7.3 on circuit-breaker in new condition		P
8.3.2	Isolating capability		P

	Circuit-breakers shall be suitable for isolation. Compliance is checked by the verification of compliance with the minimum clearances and creepage distances of item 1 of table 4 and by tests of 9.7.6.1 and 9.7.6.3.		P
8.3.3	Dielectric strength at rated impulse withstand voltage (Uimp)		P
	Circuit-breakers shall adequately withstand impulse voltages. Compliance is checked by the tests of 9.7.6.2.		P
9.7	**Test of dielectric properties and isolating capability**		
9.7.1	Resistance to humidity		P
9.7.1.1	Preparation of the circuit-breaker for test		P
	Inlet openings, if any, are left open; if knock-outs are provided, one of them is opened.		P
9.7.1.2	Test conditions		
	The humidity treatment is carried out in humidity cabinet 91% to 95% and the temperature of the air between 20 °C and 30 °C	Rf = 93 % T = 24 °C	P
9.7.1.3	Test procedure:		
	The sample is kept in the cabinet for 48 h.		P
9.7.1.4	Condition of the circuit-breaker after the test		
	After this treat, the sample show no damage within the meaning of this standard and shall withstand the tests of 9.7.2 and 9.7.3		P
9.7.2	Insulation resistance of the main circuit		
9.7.2	After an interval between 30 min and 60 min flowing this treatment, the insulation resistance is measured 5 s after application of a d.c. voltage of approximately 500 V, consecutively as follows:	[MΩ] [MΩ] [MΩ]	
	a) In off-position, between the terminals which are electrically connected together when the circuit-breaker is in the closed position ≥ 2 MΩ	>500 >500 >500	P
	b) in off-position, between each pole in turn and the others connected together ≥ 2 MΩ	>500 >500 >500	P
	c) in on-position, between all poles connected together and the frame ≥ 5 MΩ	>500 >500 >500	P
	d) between metal parts of mechanism and the frame ≥ 5 MΩ		N/A
	e) between the frame and metal foil in contact with the inner surface of the internal enclosure or lining of insulating material ≥ 5 MΩ		N/A
9.7.3	Dielectric strength of the main circuit		

	After the circuit-breakers have passed the tests of 9.7.2 the test voltage specified in 9.7.5 is applied for 1 min between the parts indicated in 9.7.2		
	a) 2000 V		P
	b) 2000 V		P
	c) 2000 V		P
	d) 2000 V		N/A
	e) 2500 V		N/A
9.7.4	Dielectric strength of the auxiliary and control circuits		
	For these tests, the main circuit shall be connected to the frame. The test voltage specified in 9.7.5 shall be applied for 1 min as follows:		
	1) Between all the auxiliary or control circuits and the frame U = ____ V	U = ____ V	N/A
	2) Between each part of the auxiliary or control circuits which may be isolated from the other parts of the auxiliary or control circuits and these other parts connected together U = [1000 V if Ui ≤ 60 V or 2Ui + 1000 V if Ui > 60 V]	U = ____ V	N/A
9.7.6	Verification of the impulse withstand voltage (across clearances and across solid insulation) and leakage current across open contacts		
9.7.6.1	Verification of the impulse withstand voltage across open contacts (suitability for isolation)		
	The 1,2/50µs impulse voltage shall be applied three times for each polarity at intervals of 1s minimum		
	- rated impulse withstand voltage (kV) :	4kV	--
	- sea level of the laboratory:	12m	--
	- test Uimp on open main contacts (equipment suitable for isolating) (see table 13	Utest = 6,2 kV	--
	- no unintentional disruptive discharge during the test's		P
9.7.6.2	Verification of impulse withstand voltage for the parts not test in 9.7.6.1		
	The 1,2/50µs impulse voltage shall be applied three times for each polarity at intervals of 1s minimum		
	- rated impulse withstand voltage (kV) :	4kV	--
	- sea level of the laboratory:	12m	--
	- test Uimp main circuits (see table 14) :	Utest = 4,9 kV	--
	Application of test voltage		
	i) Between all the phase pole(s) connected together and to the neutral pole (or path) of the circuit-breaker		P
	ii) Between all the phase pole(s) and the neutral pole(or path) connected together and the metal support connected to the terminals intended for the protective conductor(s)		P

	- no unintentional disruptive discharge during the test's				P
9.7.6.3	Verification of leakage currents across open contacts(suitability for isolation)				
	For circuit-breakers suitable for isolation, the leakage current shall be measured. Each pole having been submitted to the test of 9.12.11.2, or 9.12.11.3, or 9.12.11.4.2 or 9.12.11.4.3 is supplied at a test voltage of 1,1 times its rated operational voltage, the circuit-breaker being in the open position	457V			--
	The leakage current flowing across the open contacts is measured and shall not exceed 2 mA	<0,03	<0,03	<0,03	P
8.4	**Temperature rise**				
	Temperature rise does not exceed the limiting values stated in table V:	sect. 16 mm²			--
9.8.2	Test current: I_N= (reach the steady-state value) Four-pole CB's: 1) three poles loaded 2) one pole and neutral pole loaded	I_N = 63A			--
	Ambient air temperature .....:	Tamb= 22 ℃			--
	Parts .....Temperature rise [K]	[K]	[K]	[K]	
	L1 L2 L3 L4(N) L3 N	_____ _____ _____ _____ _____ _____			P
	Terminals for external connections 60	37~44	37~44	38~46	P
	External parts liable to be touched during manual operation of the circuit-breaker, including operating means of insulating material and metallic means for coupling of insulating operating means of several poles.....40	18	16	21	P
	External metallic parts of operating means 25	_____			N/A
	Other external parts, including that face of the circuit-breaker is in direct contact with the mounting surface 60	36	36	37	P
9.8.5	**Measurement of power losses**	B-4	B-5	B-6	
	Power loss do not exceed the values stated in table 15				
		B-4	B-5	B-6	

	Test current: I_N = 63 A (reach the steady state value)				
	Loaded one pole after the other	W	W	W	
		Max power loss: 13 W			
	L1	6,99	6,68	7,31	P
	L2	6,80	6,55	6,68	
	L3	7,24	6,62	7,37	
	L4(N)	7,18	6,80	7,18	
	L3	_____			
	N	_____			
8.5	Uninterrupted duty				
	Circuit-breakers operate reliable even after long service				P
9.9	**28 day test**				
	28 cycles - 21 h with current - 3 h without current cross sectional area. 16 mm²	I_N = 63 A			--
	During the test no tripping during the last period, temperature rise shall be measured				P
	Ambient air temperature .....:	23 ° C			--
	Parts .....Temperature rise [K]	[K]	[K]	[K]	
	Terminals for external connections 60				N/A
	The temperature rise does not exceed the value measured during the temperature rise test (subclause 8.8) by more than 15 K	32~45	38~46	39~45	P
	Test current 1,45 I_N = 63A		91,4 A		--
	- Tripping within	[s]	[s]	[s]	
	- 1h (≤ 63 A)	2min19s	1min56s	3min19s	P
	- 2h (> 63 A)				N/A

	TESTS „C“ 3 samples (DL7 C63 3P+N)	**C_1-4**	**C_1-5**	**C_1-6**	
8.7	Mechanical and electrical endurance				
	Circuit-breaker shall be capable to perform an adequate number of cycles with rated current				P
9.11.1	General test conditions				

	Test: Test Voltage 415 V (rated voltage) Test Current 63 A (rated current) Power factor _____(0.85-0,90) Par. Resistor _____ Ohm Cross sect. area 16mm²	416V 63,3A 0,86			--
9.11.2	**Test procedure**				
	The circuit-breaker is submitted to 4000 operating cycles with rated current.				P
	- $I_N \leq 32$ A: 2 s on – 13 s off				N/A
	- $I_N > 32$ A: 2 s on – 28 s off				P
	During the test the circuit-breaker shall be operated as in normal use.				P
9.11.3	**Condition of the circuit-breaker after the test**				
	Following the test 9.11.2 the sample shall not show:				
	- undue wear				P
	- discrepancy between the position of the moving contacts and corresponding position of the Indicating device				P
	- damage to the enclosure permitting access to live parts by test finger (see 9.6)				P
	- loosening of electrical or mechanical connections				P
	- seepage of sealing compound				P
	Moreover test current.....2,55 I_N	161A			--
	Opening time not less 1 s or more than	[s]	[s]	[s]	
	- 60 s ($\leq$ 32 A)				N/A
	- 120 s ($>$ 32 A)	26	24	24	P
	Dielectric strength reduced to 900 V (1500 V acc. IEC 60898)				P
9.12.11.2	**Test at reduced short-circuit currents**				
9.12.11.2.1	Test on all circuit-breakers				
9.12.11.2.1	Test at reduced short-circuit currents: Fig. 3				
	Test current:	Obtained			
	- 500 A or 10 In	I test= 634A			--
	Test voltage 1,05 Un	U = 240V			--
	Power factor 0,93-0,98	0,98			--
9.12.9.1	Test in free air copper wire F': ☐0,12 mm / ☒ 0,16 mm resistor R' : ☐0,75 Ohm / ☒ 1,5 Ohm	"a" = 35 mm 0,16mm 1,5 Ohm			--

9.12.9.2	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value	882A	863A	867A	P
	Sequence: 6 x "0" and 3 x "CO"	[kA^2s]	[kA^2s]	[kA^2s]	
	Max. $I^2t \leq$ _____kA^2s	6,88	4,07	3,58	P
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				
9.12.12	**Verification of the circuit-breaker after short-circuit tests**				
9.12.12.1	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				
	a) leakage current across open contacts, according to 9.7.6.3, each pole is supplied at a voltage 1,1 times Un.= 456 V. The circuit – breaker is in the open position	C_1-4 (mA)	C_1-5 (mA)	C_1-6 (mA)	
	The leakage current shall not exceed 2 mA L1	<0,01	<0,01	<0,01	P
	L2	<0,01	<0,01	<0,01	P
	L3	<0,01	<0,01	<0,01	P
	L4(N)	<0,01	<0,01	<0,01	P
	Electric strength test:				
	Test voltage 1500 V (see 8.7.2)				
	a)				P
	b)				P
	c)				P
	d)				N/A
	e) 2000 V				N/A

9.12.11.2.2	**Short-circuit test on circuit-breakers rated 230 V, or 240 V or 230/400 V for verifying for use in IT systems (DL7 C63 3P+N)**		
	Test current:	Obtained	

	- 500 A or 1,2 times the upper limit of the standard range of instantaneous tripping (see table 2) whichever is the higher, but < 2500 A. When Itripping exceed 20 In the current adjusted at 1,2 times the upper limit even when higher 2500 A	I test= 766A			--
	Test voltage 1,05 Un	U = 436V			--
	Power factor 0,93-0,98	0,95			--
9.12.9.1	Test in free air copper wire F': ☐ 0,12 mm / ☒ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☒ 1,5 Ohm	"a" = 35 mm 0,16mm 1,5 Ohm			--
9.12.9.2	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value	987A	1010A	1000A	P
	Sequence: "0" + "CO" on each protected pole	[kA^2s]	[kA^2s]	[kA^2s]	
	Shifted point 30 ° on the other protected pole	C_2-6 L1	C_2-6 L2	C_2-6 L3	
	Max. $I^2t \leq$ _____kA^2s	3,85	4,08	3,73	P
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				
9.12.12.1	**The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.**				
	a) leakage current across open contacts, according to 9.7.6.3, each pole is supplied at a voltage 1,1 times Un.= 456 V. The circuit – breaker is in the open position	C_2-6 [mA]			
	The leakage current shall not exceed 2 mA L1	<0,01			P
	L2	<0,01			P
	L3	<0,01			P
	L4(N)	<0,01			P
	Electric strength test:				
	Test voltage 1500 V (see 8.7.2)				
	a)				P
	b)				P
	c)				P
	d)				N/A

	e) 2000 V		N/A

	TESTS „D“ 3 samples (DL7 C63 3P+N)				
8.6	**Automatic operation**				
8.6.1	Standard time-current zone				
	Tripping characteristic of CB ensures adequate protection of the circuit, without premature operation.				
9.10	**Tests: D0**	**D-4(F01)**	**D-5(F01)**	**D-6(F01)**	
	I_N (A)		63		
	Sect. (mm²)		16		
	Instantaneous tripping current	☐ B	☒ C	☐ D	
9.10.1	Test of time-current characteristic				
9.10.1.1	Test current 1,13 I_N (A) starting from cold for:		71,2 A		--
	- 1 h ($I_N \leq 63$ A)	>1	>1	>1	P
	- 2 h ($I_N > 63$ A)				N/A
	No tripping				
	Then steadily increased within 5 s to 1,45 I_N (A)		91,4A		--
	- Tripping within	[min]	[min]	[min]	
	- 1h (≤ 63 A)	1min03s	59s	47s	P
	- 2h (> 63 A)				N/A
9.10.1.2	Test current 2,55 I_N (A) starting from cold for:		160 A		--
	opening time not less than 1 s or more than	[s]	[s]	[s]	
	- 60 s				N/A
	- 120 s	34	32	35	P
9.10.2	Teast of instantaneous tripping and of correct opening of the contacts				
9.10.2.1	General test conditions				
	For the lower values of the test current the test is made once, at any convenient voltage.				
	For the upper values of the test current the test is made at rated voltage Un(phase to neutral) with a power factor between 0,95 and 1.	420V 0,98			--
	The sequence of operation is : O-CO-CO-CO Interval time: > 3 min				
	The tripping time of the O operation is measured				
	After each operation the indicating means shall show the open position of the contacts				P
9.10.2.2	☐ For circuit-breakers of the B – Type				
	Test current $3I_N$ (A), starting from cold				

	Opening time:	[s]	[s]	[s]	
	- 0,1s ≤ t ≤ 45s (≤ 32A)				N/A
	- 0,1s ≤ t ≤ 90s (> 32A)				N/A
	Test current 5 I_N (A), starting from cold				N/A
	Tripping less than 0,1 s				N/A
9.10.2.3	☒ For circuit-breakers of the C – Type				
	Test current 5I_N (A), starting from cold		315A		--
	Opening time:	[s]	[s]	[s]	
	- 0,1s ≤ t ≤ 15s (≤ 32A)				N/A
	- 0,1s ≤ t ≤ 30s (> 32A)	14	13	14	P
	Test current 10 I_N (A), starting from cold		635A		--
	Tripping less than 0,1 s	8,75ms	13,4ms	8,64ms	P
9.10.2.4	☐ For circuit-breakers of the D – Type				
	Test current 10I_N (A), starting from cold				
	Opening time:	[s]	[s]	[s]	
	- 0,1s ≤ t ≤ 4s (≤ 32A)				N/A
	- 0,1s ≤ t ≤ 8s (> 32A)				N/A
	Test current 20 I_N (A) or to the maximum instantaneous tripping current(see cl. 6, item j), starting from cold				N/A
	Tripping less than 0,1 s				N/A
9.10.3	Test of effect of single pole loading on the tripping characteristic of multipole circuit-breakers:				
	Test current 1,1 It (A), (two pole) starting from cold				
	Tripping within	[min]	[min]	[min]	
	- 1h				N/A
	- 2h				N/A
	Test current 1,2 It (A), (three pole or four pole) starting from cold		110A		--
	Tripping within	[min]	[min]	[min]	
	- 1h	3min34s	4min25s	6min09s	P
	- 2h				N/A
9.10.4	Test of effect of ambient temperature on the tripping characteristics				
	a) Ambient temperature of (-5 ± 2)°C below the ambient air reference temperature	T = -5°C			--
	Test current 1,13 I_N (A)		71,2A		--
	- Passed for 1h	>1h	>1h	>1h	P

	- Passed for 2h		N/A
	Current is then steadily increased to 1,9 I_N (A) within 5s	120A	--
	Tripping within	[min] [min] [min]	
	- 1h	1min26s 2min45s 4min07s	P
	- 2h		N/A
	b) Ambient temperature of (40 ± 2)°C	T = 40°C	--
	Test current I_N (A)	63,0A	--
	No tripping within		
	- 1h	>1h >1h >1h	P
	- 2h		N/A
	Tests: D1 (DL7 C63 3P+N)	**D-4(F01) D-5(F01) D-6(F01)**	
8.9	**Resistance to mechanical shock and impact**		
	CB shall have adequate mechanical behaviour so as to withstand the stresses imposed during installation and use		P
9.13.1	**Mechanical shock**		
	- 50 falls on two sides of vertical board C		P
	- Vertical board turned 90°		P
	- 50 falls on two sides of vertical board C		P
	During the test the circuit-breakers shall not open		P
9.13.2	Mechanical impact		
9.13.2.1	All types:		
	- Impact test: 10 blows-height 10 cm, no damage		P
9.13.2.2	Screw-in types:		
	- Torque 2,5 Nm for 1 min, no damage		P
9.13.2.3	CB intended to be mounted on a rail		
	- downward vertical 50 N for 1 min		P
	- upward vertical 50 N for 1 min, no damage		P
9.13.2.4	Plug-in types		
	The circuit-breaker are mounted in there normal position, complete with plug-in base but without cables and any cover plate		N/A
	A force of 20 N applied for 1min to the circuit-breaker (see fig 17).		N/A
	During this test the circuit-breaker part shall not become loose from the base and shall not show damage impairing further use.		N/A

9.12.11.3	**Test at 1500 A:**				
	Prospective current of 1500 A – power factor 0,93 to 0,98				
	Prospective current obtained (A)	1560 A			--
	Power factor	0,97			--
	Test voltage 1,05 Un	436V			--
	Test circuit: figure	5			--
	T (min)	3 min			--
9.12.9.1	Test in free air copper wire F': ☐ 0,12 mm / ☒ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☒ 1,5 Ohm	"a" = 35 mm 0,16mm 1,5 Ohm			--
9.12.9.2	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	Sequence	6 x O - 3 x CO			
	I_{Peak} (A) max. value	1,78kA	1,77kA	1,73kA	P
	$I^2t \leq$ _____ kA^2s	[kA^2s]	[kA^2s]	[kA^2s]	
	Max. $I^2t \leq$ _____kA^2s	9,96	9,78	8,92	P
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				
9.12.12.1	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				P
	a) leakage current across open contacts, according to 9.7.6.3, each pole is supplied at a voltage 1,1 times Un.=456V. The circuit – breaker is in the open position	D-4(F01) [mA]	D-5(F01) [mA]	D-6(F01) [mA]	
	The leakage current shall not exceed 2 mA L1	<0,01	<0,01	<0,01	P
	L2	<0,01	<0,01	<0,01	P
	L3	<0,01	<0,01	<0,01	P
	L4(N)	<0,01	<0,01	<0,01	P
	Electric strength test:				
	Test voltage 1500 V (see 8.7.2)				
	a)				P
	b)				P

	c)				P
	d)				N/A
	e) 2000 V				N/A
	Test current 0.85x non tripping current (1,13 I_N)	60,5A			--
	- Passed for 1h	> 1h	> 1h	> 1h	P
	- Passed for 2h				N/A
	Current is then steadily increased to 1,1 x tripping current (1,45 I_N) within 5s	100A			--
		D-4(F01) [min]	D-5(F01) [min]	D-6(F01) [min]	
	Tripping within ☒ 1 hour / ☐ 2 hour	16s	20s	17s	P

	TESTS „E2“ 3 or 4 samples (DL7 C6 3P+N)				
9.12.11.4.3	**Test: E2 (Test at rated short-circuit capacity)**	**E_2.16**	**E_2.17**	**E_2.18**	
	Service short-circuit capacity.....:	10000 A			--
	Test circuit: figure .....:	6			--
	Prospective current.....:	10000 A			--
	Prospective current obtained.....:	10300 A			--
	Power factor.....:	0,45~0,50			--
	Power factor obtained.....:	0,50			--
	Sequence.....:	O - T – CO			--
	T (min) .....:	3 min			--
9.12.9.1	Test in free air copper wire F': ☐ 0,12 mm / ☒ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☒ 1,5 Ohm	“a” = 50 mm 0,16mm 1,5 Ohm			--
9.12.9.2	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value.....:	2,63kA	3,92kA	2,47kA	P
	$I^2t \leq$ _____ kA^2s	[kA^2s]	[kA^2s]	[kA^2s]	
	Max. $I^2t \leq$ _____kA^2s	20,4	17,9	13,9	P
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				
9.12.12.1	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				
	a) leakage current across open contacts, according to 9.7.6.3, each pole is supplied at a voltage 1,1 times Un.= 264V. The circuit –breaker is in the open position	E_2.10 [mA]	E_2.11 [mA]	E_2.12 [mA]	
	The leakage current shall not exceed 2 mA L1	0,005	0,005	0,005	P
	L2	0,005	0,005	0,005	P
	L3	0,005	0,005	0,005	P
	L4(N)	0,005	0,005	0,005	P
	Electric strength test:				
	Test voltage 900 V (see 9.7.3)				

	a)				P
	b)				N/A
	c)				P
	d)				N/A
	e) 2000 V				N/A
	Test current 2,8 I_N	16,8A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	
	- 60 s	19	17	18	P
	- 120 s				N/A