

# ERH

High voltage, Long life  
 Endurance 2.500h to 5.000h at 105°C  
 Rated voltage range: 160V to 450V, Nominal capacitance range: 1,5µF to 470µF  
 Size range: Ø 10,0 x 12,7mm to Ø 18,0 x 36,5mm  
 RoHS compliant  
 Special types on request


**Specifications**

	Characteristics						
<b>Temperature range</b>	- 40°C to +105°C						
<b>Rated voltage range</b>	160V to 450V						
<b>Capacitance tolerance</b>	±20%, other on request (at 20°C, 100Hz)						
<b>Leakage current <math>I_{ra}</math></b>	$I_{ra}=0,015 \cdot C_R \cdot V_R + 10\mu A$ ( $I_{ra}$ [µA], $C_R$ : Rated capacitance [µF], $V_R$ : Rated voltage [V] (at 20°C, 5 minutes)						
<b>Dissipation factor <math>\tan \delta</math> (D.F.)</b>	Rated voltage ( $V_R$ )	160V	200V	250V	350V	400V	450V
	$\tan \delta_{max}$	0,10	0,10	0,10	0,14	0,17	0,17
<b>Low temperature - characteristics <math>Z_{max}</math>-faktor</b>	Rated voltage ( $V_R$ )	160V	200V	250V	350V	400V	450V
	$Z(-40^\circ C)/(20^\circ C)$	8	8	8	8	8	8
<b>Endurance</b>	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2.500 hours to 5.000 hours at 105°C.						
	Capacitance change	$\Delta C/C0 \leq \pm 20\%$					
	D.F. ( $\tan \delta$ )	$\Delta \tan \delta \leq +200\%$ of the initial specification value					
	Leakage current ( $I_{ra}$ )	$I_{ra} \leq$ the initial specified value					
<b>Shelf life</b>	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1.000 hours at 105°C without voltage applied.						
	Capacitance change	$\Delta C/C0 \leq \pm 20\%$					
	D.F. ( $\tan \delta$ )	$\Delta \tan \delta \leq +200\%$ of the initial specification value					
	Leakage current ( $I_{ra}$ )	$I_{ra} \leq +200\%$ of the initial specification value					
<b>Surge voltage test</b>	The capacitors shall be subjected to 1.000 cycles each consisting of charging with the specified surge voltage for 30±5 seconds through a protective resistor ( $R=0,1/C_R$ ) and open-circuiting for 330 seconds at 105°C. The following specifications shall be satisfied when the capacitors are restored to 20°C.						
	Rated voltage ( $V_R$ )	160V	200V	250V	350V	400V	450V
	Surge voltage ( $V_S$ )	184V	230V	288V	385V	440V	495V
	Appearance	No significant damage					
	Capacitance change	$\Delta C/C0 \leq \pm 10\%$					
	D.F. ( $\tan \delta$ )	$\Delta \tan \delta \leq$ the initial specified value					
	Leakage current ( $I_{ra}$ )	$I_{ra} \leq$ the initial specified value					

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**Aluminum-electrolytic capacitors, High voltage, Insulated, Polarized, Pulse proof  
Endurance at least 2.500h to 5.000h at +105°C**

**ERH**

**Generic specification:**  
DIN EN 60384-1

**Sectional specification:**  
DIN EN 60384-4  
without quality assessment

**Operating temperature range:**  
- 40°C to +105°C

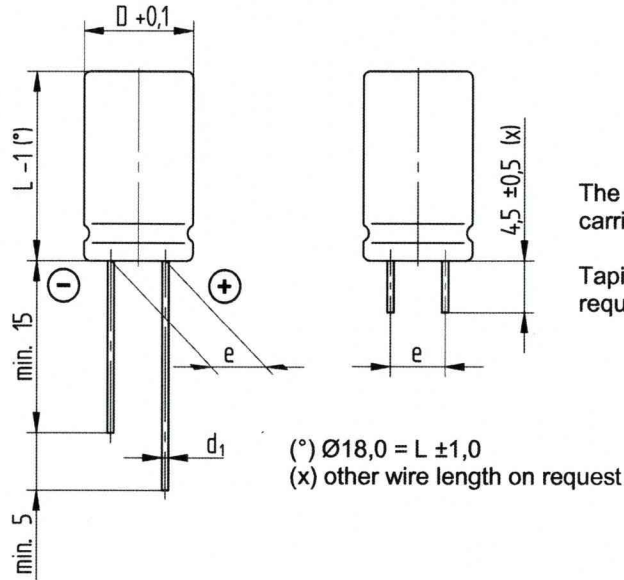
**Climatic category:**  
40/105/56

**Capacitance range:**  
±20%, other on request

**Surge voltage  $V_S$ :**  
 $V_S = 1,15 \cdot V_R$  ( $V_R \leq 315V$ )  
 $V_S = 1,10 \cdot V_R$  ( $V_R \geq 315V$ )

**Leakage current  $I_{ra}$ :**  
measured at  $V_R$  at +20°C  
 $I_{ra} \leq 0,030 \cdot C_R \cdot V_R + 10\mu A$   
(after 2 minutes)

$I_{ra} \leq 0,015 \cdot C_R \cdot V_R + 10\mu A$   
(after 5 minutes)  
 $C_R$ : Rated capacitance ( $\mu F$ )  
 $V_R$ : Rated voltage (V)



The identification of polarity is carried out by the stamp image.

Taping specifications on request

Dimensions (mm)				
D	10,0	12,5	16,5	18,0
d <sub>1</sub> wire Ø	0,6	0,8 (*)	0,8	0,8
e ±0,5	5,0	5,0	7,5	7,5
Endurance at least				
Ambient temperature	Ø 10,0 mm	Ø 12,5 mm	Ø 16,5 mm	Ø ≥ 18,0 mm
≤ +40°C	250.000 h	500.000 h	500.000 h	500.000 h
+85°C	10.000 h	20.000 h	20.000 h	20.000 h
+105°C	2.500 h	5.000 h	5.000 h	5.000 h

(\*) 0,6 mm on request

Dimensions Overview D x L						
Cap. $C_R$ [ $\mu F$ ]	Rated voltage $V_R$ [V]					
	160	200	250	350	400	450
1,5				10,0 x 12,7	10,0 x 12,7	10,0 x 12,7
2,2			10,0 x 12,7	10,0 x 12,7	10,0 x 12,7	10,0 x 12,7
3,3		10,0 x 12,7	10,0 x 12,7	10,0 x 12,7	10,0 x 16,5	10,0 x 16,5
4,7	10,0 x 12,7	10,0 x 12,7	10,0 x 12,7	10,0 x 16,5	10,0 x 16,5	10,0 x 21,0
6,8	10,0 x 12,7	10,0 x 12,7	10,0 x 16,5	10,0 x 16,5	10,0 x 21,0	12,5 x 21,0
10	10,0 x 12,7	10,0 x 12,7	10,0 x 16,5	10,0 x 21,0	12,5 x 21,0	12,5 x 25,0
15	10,0 x 12,7	10,0 x 16,5	10,0 x 21,0	12,5 x 21,0	12,5 x 25,0	12,5 x 30,0
22	10,0 x 16,5	10,0 x 21,0	12,5 x 21,0	12,5 x 30,0	16,5 x 26,0	16,5 x 30,0
33	10,0 x 21,0	12,5 x 21,0	12,5 x 25,0	16,5 x 26,0	16,5 x 30,0	16,5 x 30,0
47	12,5 x 21,0	12,5 x 25,0	16,5 x 22,0	16,5 x 30,0	16,5 x 30,0	16,5 x 36,5
68	12,5 x 30,0	12,5 x 30,0	16,5 x 30,0	16,5 x 30,0	16,5 x 36,5	18,0 x 36,5
100	16,5 x 26,0	16,5 x 30,0	16,5 x 30,0	16,5 x 36,5	18,0 x 36,5	
150	16,5 x 26,0	16,5 x 30,0	16,5 x 36,5	18,0 x 36,5		
220	16,5 x 30,0	16,5 x 36,5	18,0 x 36,5			
330	16,5 x 36,5	18,0 x 36,5				
470	18,0 x 36,5					

### Technical specifications

Rated cap. C <sub>R</sub> [μF]	Rated voltage V <sub>R</sub> [V]	Size D x L [mm]	tan δ 100Hz +20°C (max)	ESR [Ω] 100Hz +20°C (typical)	Z [Ω] 100kHz		I <sub>~</sub> [mA]* 100Hz +105°C	I <sub>~</sub> [mA]* 100kHz +105°C
					+20°C (max)	- 25°C (max)		
4,7	160	10,0 x 12,7	0,10	13,50	15,00	225,00	64	96
6,8	160	10,0 x 12,7	0,10	11,50	12,00	180,00	82	122
10	160	10,0 x 12,7	0,10	8,10	9,00	135,00	96	144
15	160	10,0 x 12,7	0,10	4,20	6,00	90,00	120	180
22	160	10,0 x 16,5	0,10	2,90	4,00	60,00	154	231
33	160	10,0 x 21,0	0,10	1,90	2,50	38,00	189	284
47	160	12,5 x 21,0	0,10	1,40	1,50	23,00	242	363
68	160	12,5 x 30,0	0,10	0,95	1,20	18,00	312	468
100	160	16,5 x 26,0	0,10	0,65	0,42	7,00	402	603
150	160	16,5 x 26,0	0,10	0,52	0,39	5,85	501	752
220	160	16,5 x 30,0	0,10	0,37	0,36	5,40	612	918
330	160	16,5 x 36,5	0,10	0,25	0,33	4,95	801	1 201
470	160	18,0 x 36,5	0,10	0,18	0,30	4,50	983	1 474
3,3	200	10,0 x 12,7	0,10	19,60	12,50	187,50	58	87
4,7	200	10,0 x 12,7	0,10	13,40	10,50	157,50	69	104
6,8	200	10,0 x 12,7	0,10	9,50	8,50	128,00	81	122
10	200	10,0 x 12,7	0,10	6,50	6,50	98,00	98	147
15	200	10,0 x 16,5	0,10	4,20	4,50	68,00	127	191
22	200	10,0 x 21,0	0,10	2,90	2,50	38,00	153	230
33	200	12,5 x 21,0	0,10	1,90	1,50	23,00	202	303
47	200	12,5 x 25,0	0,10	1,40	1,00	15,00	252	378
68	200	12,5 x 30,0	0,10	0,95	0,70	11,00	312	468
100	200	16,5 x 30,0	0,10	0,65	0,45	7,00	402	603
150	200	16,5 x 30,0	0,10	0,52	0,40	6,00	505	758
220	200	16,5 x 36,5	0,10	0,37	0,35	5,25	654	981
330	200	18,0 x 36,5	0,10	0,25	0,30	4,50	983	1 474
2,2	250	10,0 x 12,7	0,10	29,40	12,50	187,50	44	66
3,3	250	10,0 x 12,7	0,10	19,00	10,50	158,00	56	84
4,7	250	10,0 x 12,7	0,10	13,50	8,50	128,00	67	101
6,8	250	10,0 x 16,5	0,10	9,50	6,50	98,00	86	129
10	250	10,0 x 16,5	0,10	6,50	4,50	68,00	104	156
15	250	10,0 x 21,0	0,10	4,20	3,00	45,00	127	191
22	250	12,5 x 21,0	0,10	2,90	2,00	30,00	165	248
33	250	12,5 x 25,0	0,10	1,90	1,50	23,00	210	315
47	250	16,5 x 22,0	0,10	1,40	0,80	12,00	260	390
68	250	16,5 x 30,0	0,10	0,95	0,65	10,00	332	498
100	250	16,5 x 30,0	0,10	0,65	0,50	8,00	402	603
150	250	16,5 x 36,5	0,10	0,52	0,45	6,75	540	811
220	250	18,0 x 36,5	0,10	0,37	0,40	6,00	672	1 008
1,5	350	10,0 x 12,7	0,14	42,00	16,00	240,00	32	48
2,2	350	10,0 x 12,7	0,14	36,00	13,50	203,00	36	54
3,3	350	10,0 x 12,7	0,14	24,00	10,50	158,00	44	66
4,7	350	10,0 x 16,5	0,14	17,00	7,00	105,00	55	83
6,8	350	10,0 x 16,5	0,14	11,70	6,50	98,00	66	99
10	350	10,0 x 21,0	0,14	8,00	4,80	72,00	80	120
15	350	12,5 x 21,0	0,14	5,30	3,50	53,00	106	159
22	350	12,5 x 30,0	0,14	3,60	2,50	38,00	137	206
33	350	16,5 x 26,0	0,14	2,40	2,00	30,00	179	269
47	350	16,5 x 30,0	0,14	1,70	1,40	21,00	214	321
68	350	16,5 x 30,0	0,14	1,50	1,20	18,00	287	431
100	350	16,5 x 36,5	0,14	1,40	1,00	15,00	372	559
150	350	18,0 x 36,5	0,14	1,30	0,85	12,75	469	704

\* I<sub>~</sub> (Rated ripple current) refers to an increase in temperature of 3K, special requirements or special types on request

### Technical specifications

Rated cap. C <sub>R</sub> [μF]	Rated voltage V <sub>R</sub> [V]	Size D x L [mm]	tan δ 100Hz +20°C (max)	ESR [Ω] 100Hz +20°C (typical)	Z [Ω] 100kHz		I~ [mA]* 100Hz +105°C	I~ [mA]* 100kHz +105°C
					+20°C (max)	-25°C (max)		
1,5	400	10,0 x 12,7	0,17	63,60	18,50	278,00	26	39
2,2	400	10,0 x 12,7	0,17	43,40	13,50	203,00	31	47
3,3	400	10,0 x 16,5	0,17	29,00	9,50	143,00	41	62
4,7	400	10,0 x 16,5	0,17	20,30	7,00	105,00	48	72
6,8	400	10,0 x 21,0	0,17	14,00	5,00	75,00	58	87
10	400	12,5 x 21,0	0,17	9,50	3,70	56,00	76	114
15	400	12,5 x 25,0	0,17	6,30	3,00	45,00	97	146
22	400	16,5 x 26,0	0,17	4,30	2,50	38,00	128	192
33	400	16,5 x 30,0	0,17	2,90	1,80	27,00	157	236
47	400	16,5 x 30,0	0,17	2,00	1,40	21,00	187	281
68	400	16,5 x 36,5	0,17	1,70	1,30	19,50	279	418
100	400	18,0 x 36,5	0,17	1,55	1,20	18,00	347	521
1,5	450	10,0 x 12,7	0,17	63,60	34,00	510,00	26	39
2,2	450	10,0 x 12,7	0,17	43,40	27,00	405,00	31	47
3,3	450	10,0 x 16,5	0,17	29,00	15,00	225,00	41	62
4,7	450	10,0 x 21,0	0,17	20,30	9,00	135,00	48	72
6,8	450	12,5 x 21,0	0,17	14,00	6,00	90,00	62	93
10	450	12,5 x 25,0	0,17	9,50	4,50	68,00	79	119
15	450	12,5 x 30,0	0,17	6,30	3,50	53,00	100	150
22	450	16,5 x 30,0	0,17	4,30	2,50	38,00	128	192
33	450	16,5 x 30,0	0,17	2,90	2,00	30,00	157	236
47	450	16,5 x 36,5	0,17	2,00	1,80	27,00	232	349
68	450	18,0 x 36,5	0,17	1,70	1,60	24,00	287	431

\* I~ (Rated ripple current) refers to an increase in temperature of 3K, special requirements or special types on request

### Ordering information for FROLYT electrolytic capacitors

- Series
- Rated capacitance/ Rated voltage
- Capacitance tolerance
- Dimensions (Diameter x Length)
- Additional requirements

Ordering example: ERH 47μF 200V ±20%, 12,5 x 25,0mm, cut 4,5mm

**Special types or special requirements on request**

All information provided in printed form requires a written confirmation in order to be legally binding within the meaning of §§463 and 480 II BGB (German Civil Code). Hence, the given data imply exclusively a product description and are not to be understood as assured qualities.