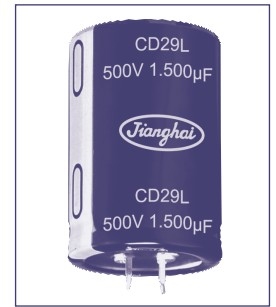
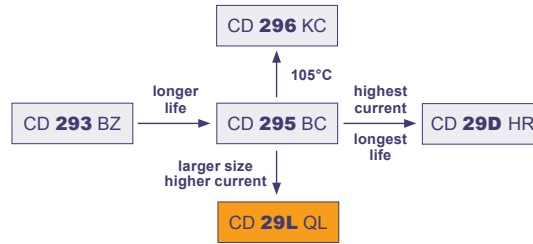


7000h at 85°C

- Larger Size Components
- Long Useful Life
- High Ripple Current
- Industrial Power Supplies



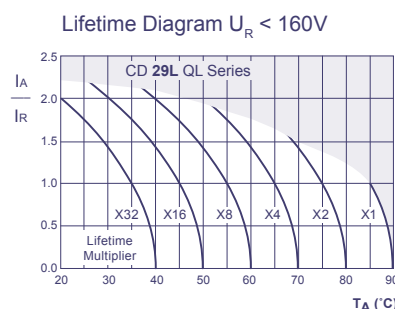
Item	Characteristics	
Operating Temperature Range (°C)	-40 ~ +85	-25 ~ +85
Voltage Range (V)	16 ~ 400	450 ~ 500
Capacitance Range (µF)	390 ~ 120 000	
Capacitance Tolerance (20°C, 120Hz)	± 20%	
Leakage Current (µA)	After 5 minutes at 20°C application of rated voltage, leakage current is not more than 0,01CV or 1,5mA, whichever is smaller C: Nominal Capacitance (µF) V: Rated Voltage (V)	
Dissipation Factor (20°C, 120Hz)	<b>Rated Voltage (V)</b>	<b>16 25 35 50 63~100 160~250 350~450 500</b>
	<b>Tan δ (max)</b>	0,60 0,50 0,40 0,30 0,20 0,15 0,15
Stability at Low Temperature (Impedance Ratio at 120Hz)	<b>Rated Voltage (V)</b>	<b>16~35 50~100 160~200 250~400 450 500</b>
	$Z_{-25°C} / Z_{+20°C}$	4 3 3 4
	$Z_{-40°C} / Z_{+20°C}$	15 10 6 8 -

	Useful Life		Load Life	Endurance Test	Shelf Life
<b>Lifetime</b>	<b>7000h</b>	>100 000h	5000h	5000h	1000h
<b>Leakage Current</b>	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
<b>Capacity Change</b>	Within ± 30% of initial value		Within ± 20% of initial value	Within ± 20% of initial value	Within ± 20% of initial value
<b>Dissipation Factor</b>	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 130% of specified value	Not more than 200% of specified value
<b>Condition:</b>	$U_R$	$U_R$	$U_R$	$U_R$	$U_R = 0$
<b>Applied Voltage</b>	$I_R$	$1,2 \times I_R$	$I_R$	$I_R = 0$	$I_R = 0$
<b>Applied Current</b>	85°C	40°C	85°C	85°C	85°C
<b>Applied Temperature</b>	≤ 1% Failure Rate	≤ 1% Failure Rate	guaranteed		After test: $U_R$ to be applied for 30min >24h before measurement
<b>Failure Rate Level</b>					

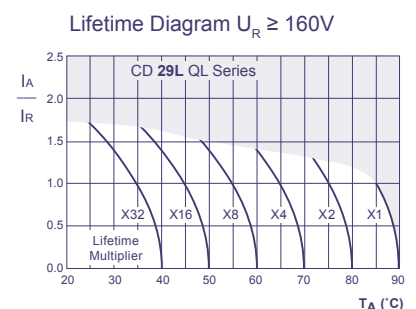
## Multiplier for Ripple Current

Frequency Coefficient

Rated Voltage (V)	Frequency				
	50Hz	120Hz	1kHz	10kHz	100kHz
≤ 50	0,95	1,00	1,10	1,15	1,15
63 ~ 100	0,90	1,00	1,16	1,30	1,33
≥ 160	0,85	1,00	1,20	1,35	1,40



$I_A$  = actual ripple current at 120Hz,  
 $I_R$  = rated ripple current at 120Hz, 85°C  
 Multiplier of Useful Life as a function of ambient temperature and ripple current load



$I_A$  = actual ripple current at 120Hz,  
 $I_R$  = rated ripple current at 120Hz, 85°C  
 Multiplier of Useful Life as a function of ambient temperature and ripple current load

## Ratings for CD 29L QL Series

V <sub>DC</sub> (Surge Voltage) Code	Rated Capacitance	Max ESR 20°C, 120Hz	Typ ESR 20°C, 120Hz	Max Ripple Current 85°C, 120Hz	Size Ø D x L
(V)	(µF)	(mΩ)	(mΩ)	(Arms)	(mm)
16 (20) 1C	56 000	14,3	10,0	10,4	35 x 45
		14,3	10,0	9,8	40 x 40
	68 000	11,8	8,2	10,8	35 x 50
		11,8	8,2	11,5	40 x 50
	82 000	9,8	6,8	11,8	35 x 60
		9,8	6,8	11,8	40 x 50
	100 000	8,0	5,6	13,2	35 x 80
		8,0	5,6	13,5	40 x 60
	120 000	6,7	4,7	15,3	35 x 105
		6,7	4,7	14,8	40 x 80
25 (32) 1E	33 000	20,1	14,1	8,1	35 x 40
		20,1	14,1	8,7	40 x 40
	39 000	17,1	12,0	9,0	35 x 45
		17,1	12,0	9,6	40 x 40
	47 000	14,2	9,9	9,6	35 x 50
		11,9	8,3	10,3	35 x 60
	56 000	11,9	8,3	10,8	40 x 50
		9,8	6,9	11,3	35 x 80
68 000	9,8	6,9	11,8	40 x 60	
	8,1	5,7	13,5	40 x 80	
35 (44) 1V	27 000	19,7	13,8	8,2	35 x 45
		19,7	13,8	8,0	40 x 40
	33 000	16,1	11,3	8,7	35 x 50
		13,7	9,6	10,3	35 x 60
	39 000	13,7	9,6	9,6	40 x 50
		11,3	8,0	11,4	35 x 80
	47 000	11,3	8,0	10,8	40 x 60
		56 000	9,5	6,7	12,1
68 000	7,9	5,5	14,2	40 x 80	
	27,0	18,6	7,7	35 x 40	
50 (63) 1H	15 000	27,0	18,6	8,1	40 x 40
		23,0	15,5	8,3	35 x 45
	18 000	23,0	15,5	8,3	40 x 40
		18,1	12,7	9,1	35 x 50
	22 000	18,1	12,7	9,4	40 x 50
		14,8	10,4	11,2	35 x 80
	27 000	14,8	10,4	10,8	40 x 60
		33 000	12,1	8,5	11,0
39 000	12,1	8,5	14,4	40 x 70	
	10,3	7,2	12,8	40 x 80	
63 (79) 1J	12 000	23,0	15,5	8,7	35 x 50
		23,0	15,5	8,6	40 x 40
	15 000	17,7	12,4	10,2	35 x 70
		17,7	12,4	9,5	40 x 50
	18 000	14,8	10,4	11,2	35 x 80
		14,8	10,4	10,7	40 x 60
27 000	9,9	6,9	12,7	40 x 80	
80 (100) 1K	8 200	33,0	22,7	6,9	35 x 50
		27,0	18,6	8,7	35 x 60
	12 000	23,0	15,5	9,7	35 x 70
		23,0	15,5	9,0	40 x 50
	15 000	17,7	12,4	10,5	35 x 80
		17,7	12,4	10,2	40 x 60
18 000	14,8	10,4	12,3	40 x 80	
100 (125) 2A	5 600	48	34	7,0	35 x 45
		48	34	7,4	40 x 40
	6 800	40	28	8,0	35 x 50
		40	28	8,9	40 x 50
	8 200	33	23	9,6	35 x 70
		33	23	9,6	40 x 60
	10 000	27	19	10,4	35 x 80
		27	19	10,2	40 x 60
12 000	23	16	12,3	40 x 80	
160 (200) 2C	2 200	91	64	4,9	35 x 45
		74	52	5,3	35 x 50
	2 700	61	43	5,5	35 x 70
		61	43	5,5	40 x 60
	3 900	52	35	5,9	35 x 80
		43	30	7,3	40 x 80
200 (250) 2D	1 500	133	93	4,3	35 x 40
		111	78	4,7	35 x 45
	2 200	91	64	5,4	35 x 50
		91	64	5,4	40 x 40
2 700	74	52	5,9	35 x 60	
	74	52	5,9	40 x 50	

V <sub>DC</sub> (Surge Voltage) Code	Rated Capacitance	Max ESR 20°C, 120Hz	Typ ESR 20°C, 120Hz	Max Ripple Current 85°C, 120Hz	Size Ø D x L
(V)	(µF)	(mΩ)	(mΩ)	(Arms)	(mm)
200 (250) 2D	3 300	61	43	6,5	35 x 80
		61	43	6,5	40 x 60
		52	36	7,0	40 x 80
		43	30	9,2	40 x 90
250 (300) 2E	1 000	199	140	3,7	35 x 40
		1200	166	117	3,8
	1 500	133	93	4,4	35 x 50
		133	93	4,5	40 x 40
	1 800	111	78	5,0	35 x 70
		111	78	5,0	40 x 50
	2 200	91	64	5,4	35 x 70
		74	52	6,9	40 x 80
2 700	74	52	6,9	40 x 80	
	680	293	205	3,6	35 x 45
350 (400) 2V	680	293	205	3,6	40 x 40
		243	170	4,5	35 x 60
	820	243	170	4,3	40 x 50
		199	140	5,2	35 x 70
	1 000	199	140	4,9	35 x 70
		199	140	4,9	40 x 60
	1 200	166	117	5,6	35 x 80
		166	117	5,5	40 x 70
	1 500	133	93	6,5	40 x 80
		133	93	6,2	45 x 70
	1 800	111	78	7,9	40 x 100
		111	78	7,1	45 x 70
2 200	91	64	8,7	40 x 100	
	560	356	249	3,2	35 x 50
400 (450) 2G	560	356	249	2,8	40 x 40
		293	205	3,7	35 x 60
	680	293	205	3,8	40 x 50
		243	170	4,2	35 x 60
	820	243	170	4,1	40 x 50
		199	140	4,9	35 x 70
	1 000	199	140	4,8	40 x 60
		199	140	4,6	45 x 50
	1 200	166	117	5,8	35 x 80
		166	117	5,5	40 x 60
	1 500	133	93	6,6	40 x 80
		133	93	6,9	40 x 90
1 800	133	93	6,8	45 x 80	
	111	78	7,9	40 x 100	
111	78	7,3	45 x 80		
	470	424	297	3,0	35 x 50
450 (500) 2W	470	424	297	3,0	40 x 40
		356	249	3,0	35 x 50
	560	356	249	3,3	35 x 60
		356	249	3,4	40 x 50
	680	293	205	3,8	35 x 60
		293	205	4,1	35 x 70
	820	293	205	3,8	40 x 50
		243	170	4,6	35 x 80
	1 000	243	170	4,4	40 x 60
		199	140	5,7	35 x 80
	1 200	199	140	5,2	40 x 60
		166	117	5,9	40 x 70
1 500	166	117	5,9	45 x 70	
	133	93	7,3	40 x 100	
1 800	133	93	7,0	45 x 70	
	111	78	7,9	45 x 100	
500 (550) 2H	390	511	358	1,9	35 x 50
		470	424	2,3	35 x 60
	560	356	249	2,5	35 x 60
		356	249	2,4	40 x 60
	680	293	205	3,1	35 x 80
		293	205	2,8	40 x 70
	820	243	170	3,4	35 x 90
		243	170	3,3	40 x 70
	1 000	199	140	3,9	40 x 80
		199	140	3,3	45 x 70
	1 200	166	117	4,3	40 x 90
		1500	133	93	4,8

Snap-In

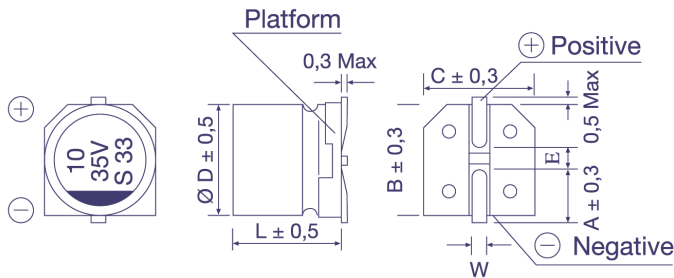
Custom products are available on request.

## Order Code **SMD, Radial, Snap-In**

EC	R	1C	PT	101	M	FF	25	0611	JExxxxx
Technology	Terminal Type	Rated Voltage Code	Series Code	Capacitance Code (in $\mu\text{F}$ )	Capacitance Tolerance	Lead Form	Terminal/Pitch Size	Dimension	for Specials only
EC = Electrolytic Capacitor	SMD = V Radial = R	For coding please refer to the pages of ratings	CD <b>VS</b> = BS	0,47 = R47	$\pm 20\%$ = M	SMD:		4x7 = 0407	
			CD <b>VH</b> = VH	1,0 = 010	$\pm 10\%$ = K	<b>Taped</b> = FF	Terminal = T2	5x11,5 = 0511	
PC = Polymer Capacitor	Snap-In = S		CD <b>VZ</b> = VZ	2,2 = 2R2	+30 / -10% = Q	Radial:		6,3x11,5 = 0611	
			CD <b>261</b> = LK	100 = 101	+50 / -10% = T	<b>Long Lead</b> = LL	2,0mm = 20	35x80 = 3580	
			CD <b>261X</b> = QX	1000 = 102		Cut 5,0mm = CB	2,5mm = 25	45x100 = 45100	
			CD <b>262</b> = QM	10000 = 103		<b>Cut 4,5mm</b> = CC	3,5mm = 35		
			CD <b>263</b> = BK			Cut 4,0mm = CD	5,0mm = 50		
			CD <b>269</b> = PH			Cut 3,5mm = CE	7,5mm = 75		
			CD <b>281</b> = LL			Cut 3,0mm = CF	10,0mm = 10		
			CD <b>284</b> = XY			on request: alternative lead forms (axial, 90° - angle, others)		12,5mm = 12	
			CD <b>287</b> = GC			Snap-In:			
			CD <b>28L</b> = QL			4,0mm Pin Length = T4	2 Pin = P2		
			CD <b>293</b> = BZ			<b>6,3mm Pin Length</b> = T6	3 Pin = P3		
			CD <b>294</b> = BW			Soldering Pin = S4	4 Pin = P4		
			CD <b>295</b> = BC				5 Pin = P5		
			CD <b>296</b> = KC			preferred			
			CD <b>297</b> = BB						
			CD <b>299</b> = PG						
			CD <b>29D</b> = HR						
			CD <b>29H</b> = QH						
			CD <b>29L</b> = QL						
			<b>HCP</b> = CP						
			<b>HPM</b> = PM						
			<b>HVC</b> = VC						

## Technical Specification **SMD Type**

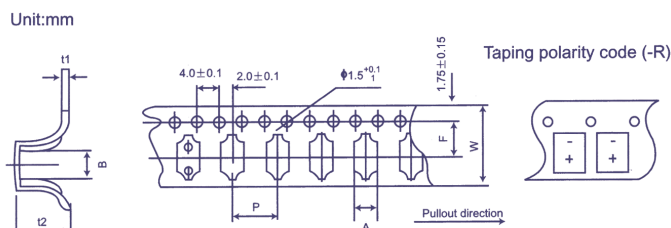
### Dimensions



Ø D x L	4x5,4	5x5,4	6,3x5,4	6,3x7,7	8x10,5	8x11,8	10x10,5	10x12,7
A	1,8	2,1	2,4	2,5	2,9	2,9	3,2	3,2
B	4,3	5,3	6,6	6,6	8,3	8,4	10,3	10,4
C	4,3	5,3	6,6	6,6	8,3	8,4	10,3	10,4
E	1,0	1,3	2,2	2,2	3,1	3,1	4,5	4,5
L	5,4	5,4	5,4	7,7	10,5	11,8	10,5	12,7
W	0,5 - 0,8				0,7 - 1,1			

in mm

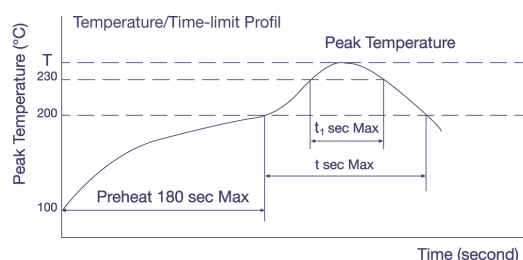
### Taping Dimensions



Size (DxL)	w ± 0,3	A ± 0,2	B ± 0,2	P ± 0,1	t2 ± 0,2	F ± 0,1	t1 ± 0,1
4 x 5,4	12,0	5,0	5,0	8,0	5,8	5,5	0,4
5 x 5,4	12,0	6,0	6,0	12,0	5,8	5,5	0,4
6,3 x 5,4	16,0	7,0	7,0	12,0	5,8	7,5	0,4
6,3 x 7,7	16,0	7,0	7,0	12,0	8,4	7,5	0,4
8 x 10,5	24,0	8,7	8,7	16,0	11,0	11,5	0,5
8 x 11,8	24,0	8,7	8,7	16,0	12,3	11,5	0,5
10 x 10,5	24,0	10,7	10,7	16,0	11,0	11,5	0,5
10 x 12,7	24,0	10,7	10,7	16,0	14,0	11,5	0,5

in mm

### Soldering Profile (Aluminium Electrolytic Capacitors)

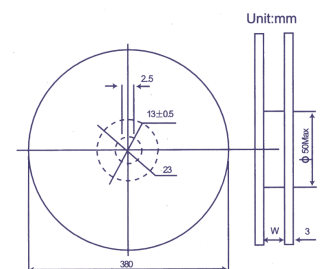


### Allowable Range of Peak Temperature

Size	T (°C)	t (second)	t <sub>1</sub> (second)
Ø 4 ~ 6,3	250	90	40
Ø 8 x 10,5	240	90	30
Ø 10 x 10,5	235	60	30

Diameter	w	D
4; 5	14 ± 1	50 ± 1
6,3	18 ± 1	50 ± 1
8; 10	25 ± 1	50 ± 1
Polymer	25 ± 1	80 ± 1

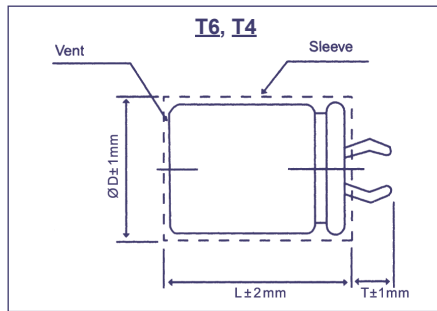
in mm



For more details or Soldering Profiles of Radials or Polymer-Capacitors please contact our local Sales Offices.

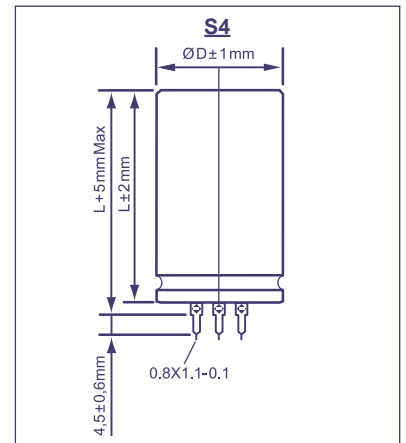
## Technical Specification **Snap-In Type**

**Pin Type: Snap-In**  
Order Code: T6, T4

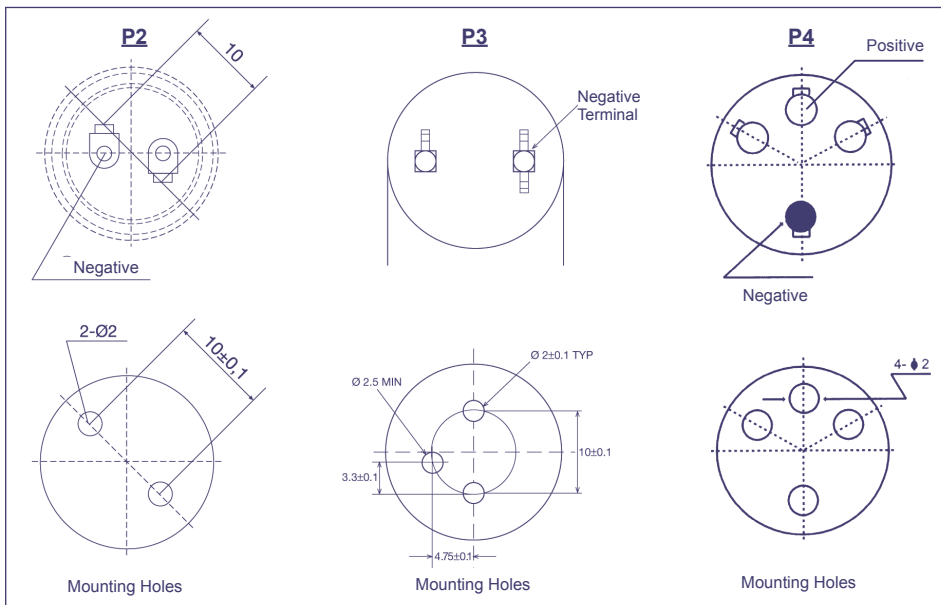


Terminal	T6	T4
Pin Length T	6,3	4,0

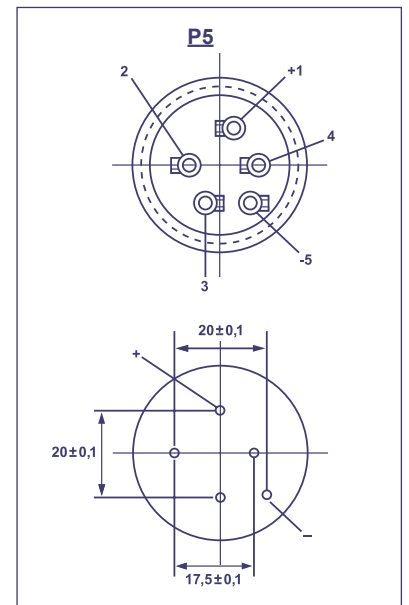
**Pin Type: Soldering**  
Order Code: S4



**Snap-In Terminal**  
Order Code: P2, P3, P4



**Soldering Terminal**  
Order Code: P5



P3 only T4 Terminal

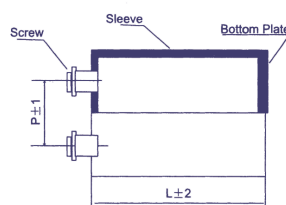
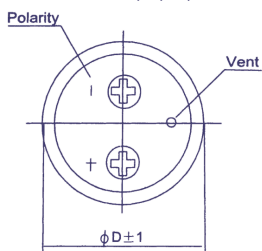
## Order Code **Screw Type**

EC	G	1C	BP	101	M	B	E	160	A361	JExxxxx
Technology	Terminal Type	Rated Voltage Code	Series Code	Capacitance Code	Capacitance Tolerance	Mounting	Diameter	Length	For Terminal Code see tables below	for Specials only
EC = Electrolytic Capacitor	Screw = G	For coding please refer to the pages of ratings	CD <b>135</b> = BP	100 = 101	<b>±20%</b> = M	Bolt = B	36 = A	53 = 053		
			CD <b>136</b> = PK	1000 = 102	±10% = K	No double sleeve = N	40 = B	65 = 065		
			CD <b>137</b> = PX	10000 = 103	+30 / -10% = Q	2 stoppers bracket+double sleeve* = I	51 = C	96 = 096		
			CD <b>138</b> = PC		+20 / -0% = R	3 stoppers bracket+double sleeve* = Y	64 = D	100 = 100		
			CD <b>139</b> = BL		+50 / -10% = T	No bracket, but double sleeve* = D	77 = E	115 = 115		
					<b>preferred</b>	* Double sleeve for diameter ≥ 51 only	90 = F	236 = 236		
							101 = G			

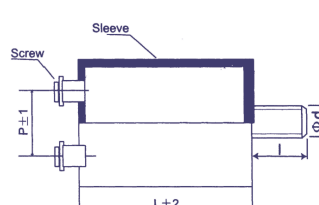
## Technical Specification **Screw Type**

### Dimensions

**Standard Housing**  
Order Code: I, Y, D, N



**Bolt Housing**  
Order Code: B



Ø D	Ø d	l
Ø 36	M8	12
≥ Ø 51	M12	16

in mm