

Film Capacitor design and Construction

薄膜电容器设计与结构

Plastic film capacitors can be subdivided into two main groups on the base of their construction: film-foil capacitors and metallized film capacitors.

有机薄膜电容器依据它们的结构主要分为膜箔结构电容器和金属化薄膜电容器。

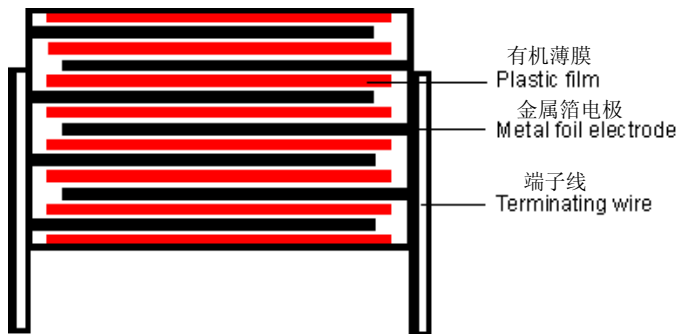
The combination of these two technologies brings to a third main group of capacitors, which gets the advantages of both the other groups.

混合这两种工艺技术就有了第三种金属箔+金属化结构薄膜电容器，它集合了这两种电容器的优点。

(I) Film-foil capacitors 膜箔式电容器

Typical film-foil capacitor consists of two metal foil electrodes with a plastic film between them, used as dielectric. Metal foils thickness is typically 5 to 9 μ m and the plastic film must be thick enough to guarantee the necessary capacitor reliability in terms of voltage withstanding and long term behaviour.

典型的膜箔式电容器由两层金属箔及有机薄膜组成，有机薄膜作为介质叠加在金属箔间。金属箔的厚度通常在5 μ m到9 μ m,同时有机薄膜的介质厚度应足够以充分保证电容器可长期可靠地承受施加的工作电压。



Film-foil capacitors, being not able to self-heal (refer to related paragraph) usually need a dielectric thickness higher than the equivalent metallized film capacitors one, having the same voltage ratings. It means that, considering the same dielectric type, capacitance and voltage rating, the typical dimensions of the film-foil capacitors are larger than metallized film capacitors ones.

由于膜箔式电容没有“自愈”性能（请参考相关此名词的解释），所以在相同的额定电压下，膜箔式电容的介质厚度比同电压等级下的金属化薄膜电容器更厚。也就意味着，相同的容量，电压下，膜箔式电容器远比金属化膜电容器的尺寸大。

The presence of metal foil electrodes ensures high insulation resistance, very good capacitance stability, low losses even at high frequency and excellent pulse handling capability. Film-foil capacitors don't have self healing properties.

这种金属箔作为电容器电极确保膜箔式电容器即使工作在高频时具有高绝缘电阻值，良好容量稳定性，低损耗特性，同时有优良的脉冲处理能力。

(II) Metallized film capacitors 金属化薄膜电容器

In metallized film capacitors, the metal electrodes are vacuum deposited directly onto the dielectric film surface. The different metal alloys, shape and thickness of the metal layer influence in a relevant way the characteristics, behaviour and typical usage destination of the capacitors.

在金属化薄膜电容器中，金属电极被直接真空蒸镀在有机薄膜表面。蒸镀镀层的合金成份，镀层形状，镀层厚度有与电容器的特性，性能及典型使用目标息息相关。

The outstanding advantage of metallized film capacitor technology is the self-healing property. The extremely thin metal layer obtained (typical thickness 0.02 to 0.05μm for “flat” metallization) and the availability of low thickness dielectric films allow the production of capacitors with smaller dimensions than film-foil ones, having the same voltage rating. The contacting of metallized film capacitors is made by spraying metal alloys onto the windings face ends and then welding the leads on these metal sprayed areas. This ensures a low inductance and low loss characteristics. there is the disadvantage of a limited current loading capacity as a result of the thin, vacuum-deposited metal layers.

金属化薄膜电容器突出的优点是具有“自愈”性能，极薄的镀层厚度（扁平型金属化镀层厚度典型值在0.02到0.05um),使金属化电容器可以在相同额定电压下采用更薄的介质厚度，其尺寸远小于膜箔式电容器。金属化薄膜电容器的连接是将金属合金喷涂在电容芯子两端，然后将导线焊接在焊接在喷涂层上引出。

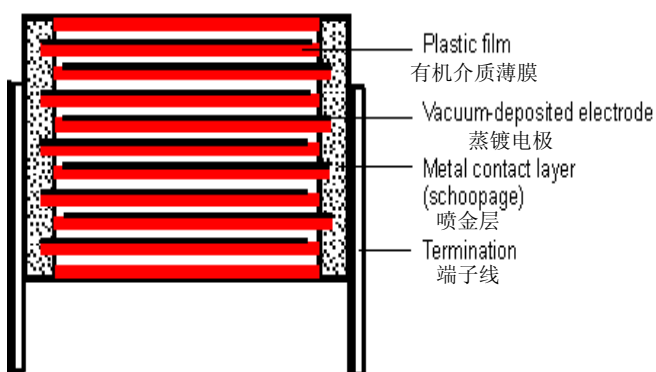
这样可以使金属化薄膜电容器有低自感和低损耗特性。但金属化薄膜电容器由于很薄的金属化镀层也限制器承受电流的能力。

Single-side metallized film capacitors do not typically guarantee high pulse withstanding capability.

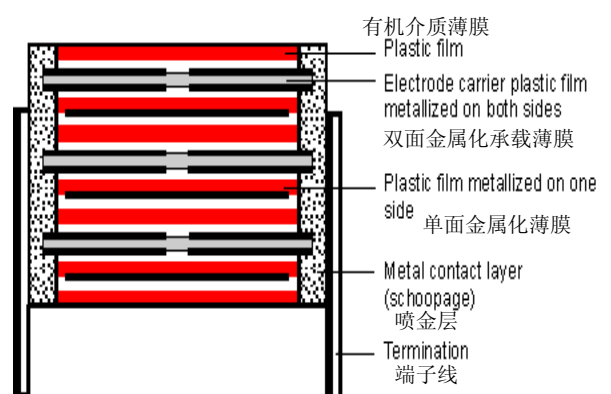
In order to counter the disadvantage of the limited current loading capacity of single-sided metallized capacitors, Kwoktran has developed double-side metallized versions for high pulse applications, in which the electrodes are not directly metallized on the dielectric film. Aluminium is vacuum-deposited on both sides of a the two metal layers on the carrier film are joined together as a conductor. Thanks to the metallization on both sides, this type has the same good self-healing properties as a capacitor which is metallized on one side only, the conducting capacity of a double thickness metallized layer and the advantage of better contacts.

These capacitors can stand up to very high pulse currents and have only a slightly larger volume than single-sided metallized capacitors. They offer high operating safety in critical applications.

单面金属化薄膜电容器没有承受高脉冲电流的能力。为了克服单面金属化电容器承载电流限制的缺点，国灿开发了应用于高脉冲应用场合的双面金属化工艺。电极镀层不是直接蒸镀在介质薄膜上，而是蒸镀在载体薄膜的两面，载体膜连接在一起形成导体，这样在实际应用中载体膜不但单面有金属化薄膜电容器的“自愈”性能，而且由于双面金属化使电容器镀层具有双倍的导电能力及与喷金层更好的接触，这种双面金属化电容器可以承受高脉冲电流。在关键的应用场合，它们能够提供高安全使用性能。



Single-side metallized film capacitor
单面金属化薄膜电容器



Double-side metallized film capacitor
双面金属化薄膜电容器

(III) Mixed film-foil and metallized film capacitor technology

膜箔&金属化有机薄膜复合式电容器

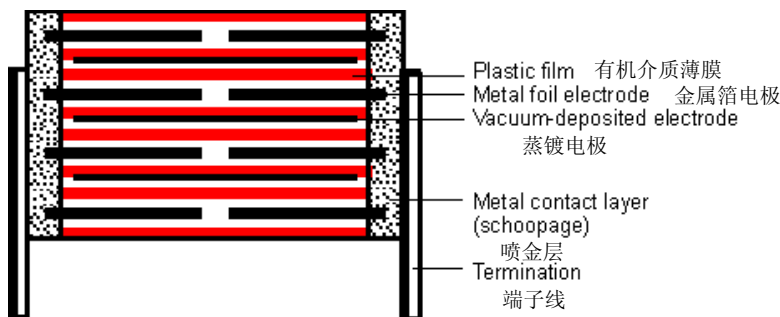
The combination of film-foil and metallized film technology typically offers the advantages of the two above described types, obtaining self-healing property, high current and pulse capability and low losses with extended frequency ranges.

Thanks to the series connection, the value of the corona inception voltage is doubled.









Capacitors constructed in this way are suitable for very high rated currents with a maximum of operating safety.


膜箔&金属化有机薄膜复合式电容器有上述两种结构电容器的优点，既有金属化薄膜电容器的“自愈”性能，同时也要箔膜式电容器耐大电流，高脉冲能力和高频范围低损耗的特性。

由于采用内部串联结构，电容器的起始电晕放电电压也是双倍于膜箔式电容器，正是因为这种复合结构，使这种电容器工作在高额定电流下具有最大的安全性能。




(IV) Film capacitor basic construction 薄膜电容器的基本结构

			
<ul style="list-style-type: none"> MPX(CBB62) MTF(CL21X), MTB(CL21B) MEH(CL21X), MEF(CL21) MEC(CL23), MSC(CL23B) MSF(CL21S), MMT(CL21S) MEA(CL20), MET(CL20) MPF(CBB21), MPB(MKP21) MPH(C37), MPD(C37F) MPC(MKP25), MPV(C32E) MPA(CBB20), MPT(CBB20) MEK(CL61), MPK(CBB61) 	<p>PPS(CBB81)</p> 	<p>DPC(MKP21) DPS(CBB21) MEV(C32E)</p> 	<p>PPN(CBB13) PEN(CL12)</p>
	 <p>DMB(MMKP82) DMS(MMKP82D)</p>	 <p>DMB(MMKP82) DMS(MMKP82D)</p>	


金属化薄膜
Metallized film


金属箔
Metal foil


双面金属化膜
Double sided metallized film


有机薄膜
Plastic Film

 If you need a further information , please contact to technical division.