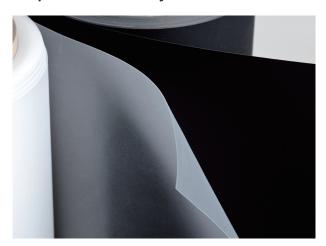


## dnpSolar Encapsulant Sheet: PV-FS Z68



The dnpSolar Encapsulants offer an optimum protection of photovoltaic modules against weathering, humidity and mechanical damage. The PV-FS Z68 has been designed especially for Thin Film PV modules addressing the specific needs imposed by Thin Film module manufacturers in terms of material durability. PV-FS Z68 provides excellent electrical insulation and is even less sensitive to heat and exposure to air than standard encapsulants. Important properties are good adhesiveness, compatibility with other materials and long shelf life. The dnpSolar Encapsulants requires no curing and thus enables fast and efficient production flow of the PV Modules. Photovoltaic modules encapsulated with dnpSolar's materials have been successfully tested by several module manufacturers and satisfy with external certification institutes.

PV-FS Z68	Test method	Unit	Test Conditions	Value
Basic Properties				
Material composition				Thermal PolyOlefin
Colour				Transparent/W
Standard thickness		mm		0,6
Maximum width		mm		2300
Physical Properties				
Tensile Strength	UL746A + ISO 527-3 +	MPa		MD = 32
	JIS-K7127			
Elongation to Break	UL746A + ISO 527-3 + JIS-K7127	%		MD = 4100
Water Vapor Permeability	ISO 15106-2 +	g/(m² *day)	40°C * 90%	0,9
	ASTM F 1249-90 + JIS-K7129			
Volume Resistivity	JIS-K6911	Ω*cm		1,2*10e15
Optical Properties				
Light Transmittance	ISO 14782 + JIS-K7136	%		86
Haze	ISO 13468-1 + JIS-K7361-1	%		26
UV Cut-off Wavelength	DNP Method	nm		< 340
Chemical Properties				
Acid components	Gas Chromatograph			Non
Durability Properties				
Shore hardness test	JIS-Z2246		Shore A	91
Shelf life			Storage at 20-30°C and 50% RH	24 months
Adhesion Properties				
Adhesion strenght to glass	DNP Method	N/15mm	Pealing angle 180°	67
	1	1		1

dnpSolar is a business unit within dnp denmark focussing on servicing the European market for Solar energy. dnpSolar is thus a part of Dai Nippon Printing Co. Ltd. (DNP), the worlds largest general printing company and the direct link to the DNP Energy Division where all development and manufacturing of materials for solar cells take place. Established in 1876, with more than 40.000 employees and with net-sales of more than 14 billion EUR, DNP has a proven track record of constant development and ground braking innovations in multiple business areas. Within recent years DNP has invested heavily in the development of components for green energy manufacturing including high-tech plastic sheets for solar cells. dnpSolar will market these product on the European market on behalf of DNP.

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