

Insulations and Jackets Chart

The choice of the material to use in insulation and jackets is based upon the environment. Just as with any other material, the materials listed here have definite strengths and weaknesses. No one material is resistant against all chemicals, solvents, etc. To chart all the chemical/polymer interactions would fill pages just for one category. The problem is further complicated by the fact that formulations for insulations and jackets are often a cable manufacturer's custom blend, especially true for medium voltage cables.

For convenience, the ratings shown below have been reported into two classifications—insulations and jackets. They are typical values relative to the other materials listed.

- PVC Polyvinyl chloride
- XLP Crosslinked polyethylene
- FRXLP Flame retardant XLP
- EP/CSP Composite insulation of ethylene propylene and chlorosulphonated polyethylene
- FREP Flame retardant ethylene propylene
- SR Silicone rubber
- PE Polyethylene
- EP Ethylene propylene
- PVC-LT PVC specially compounded for low temperatures
- CPE Chlorinated polyethylene
- CPE-SC Chlorinated polyethylene—semiconducting
- TPE Thermoplastic elastomer
- PCP Polychloroprene (neoprene)
- SCP Chlorosulphonated polyethylene (hypalon)

INSULATIONS									
	Low voltage cables						Medium voltage cables		
	PVC	XLP	FRXLP	EP/CSP	FREP	SR	PE	XLP	EP
Base polymer:									
Insulation rating:									
Voltage rating	600 v—0 through 2 kv						15 through 35 kv		
Thermal rating									
Wet C	60-75	75	75	75	90	A	75	90	
Dry C	60-105	90	90	90	90	90-125	75	90	
Emergency overload C	NA	NA	NA	NA	NA	NA	90	130	
Short circuit	NA	NA	NA	NA	NA	NA	110	250	
ELECTRICAL PROPERTIES									
Power factor,	2	4	4	5	5	5	5	5	5
SIC	3	4	4	4	5	4	5	5	5
IRK	2	3	3	3	5	3	5	5	5
Impulse strength	NA	NA	NA	NA	NA	NA	5	5	4
Dielectric strength	3	5	5	4	4	5	5	5	4
Corona resistance	NA	NA	NA	NA	NA	NA	3	3	5
Electrical stability (wet locations)	3	4	4	4	5	A	4	4	5
PHYSICAL PROPERTIES									
Toughness	4	5	5	4	5	3	5	5	3
Flexibility	3	1	1	5	3	5	1	1	5
Ease of installations	5	1	1	4	5	3	1	1	5
THERMAL PROPERTIES									
Thermal stability	3	3	3	5	5	5	1	3	5
Heat resistance	2	4	4	3	4	5	1	4	4
Low temperature	2	4	4	4	4	5	4	4	4
CHEMICAL RESISTANCE									
Acids	5	4	4	5	4	3	4	4	5
Alkalines	5	4	4	5	4	3	4	4	5
Organic solvents	2	3	3	4	3	2	3	3	4
Oil	2	2	2	4	3	3	1	2	2
Water	4	5	5	5	5	4	5	5	5
SPECIAL PROPERTIES									
Flame resistance	4	3	4	4	5	5	1	1	3
Radiation resistance	3	5	5	5	5	4	5	5	5
Weather resistance	4	5	5	5	5	5	NA	NA	NA

A = Normally used for dry locations SIC = Specific inductive capacitance
 NA = Not applicable IRK = Insulation dc resistance constant

JACKETS										
Type	Thermoplastic						Thermosetting			
	PE	PVC	PVC-LT	CPE	CPE-SC	TPE	PCP HD	PCP XHD	CSP HD	CSP XHD
Thermal rating C dry	75	60-90	60-75	90	90	75-90	90	75	90	75
PHYSICAL PROPERTIES										
Toughness	5	4	3	5	5	3	4	5	4	5
Flexibility	1	3	4	2	2	4	5	5	5	5
Ease of installation	1	5	5	4	4	4	4	4	4	4
THERMAL PROPERTIES										
Thermal stability	1	3	3	4	4	4	5	5	5	5
Heat resistance	3	5	4	5	5	5	4	4	5	4
Low temp flexibility	4	2	3-4	4	4	5	3	4	4	4
CHEMICAL RESISTANCE										
Acids	5	5	5	4	4	4	5	5	5	5
Alkalines	5	5	5	4	4	4	5	5	5	5
Organic solvents	5	2	2	4	4	3	4	4	4	4
Oil	1	2	2	3	3	3	4	4	4	4
Water	5	4	4	4	4	4	3	3	3	2
SPECIAL PROPERTIES										
Flame resistance	1	3	3	5	5	3	5	5	5	5
Radiation resistance	5	2	2	4	4	2-4	3	3	4	4
Weather resistance	5	4	4	5	5	4	5	5	5	5

Key: 1 - 5 (1 = Poor, 5 = Excellent)