

CLASSIFICATION OF OVERHEATING OR DAMAGE MODES

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OCPD = Overcurrent Protection Device (Properly sized)

IB = Insulation Breakdown

MODE OF OVERHEATING OR DAMAGE, (NFPA 921, 2001, REFERENCE)	CLASSIFICATION OF OVERHEATING MODES				BEST CONDITION AT FIRST INSTANT OF OVERHEATING MODE					
	PRIMARY CLASSIFICATION	SECONDARY CLASSIFICATION	TERTIARY CLASSIFICATION	SEQUENCE OF OVERHEATING MODES, IF ANY	POTENTIAL OF O.H. MODE TO CAUSE FIRE	PROTECTION DEVICE(S) WITH BEST CHANCE OF STOPPING OVERHEATING MODE/DAMAGE	QUALITY OF TYPICAL ELECTRICAL CONNECTIONS	CURRENT LEVEL (AS COMPARED WITH CONDUCTOR CAPACITY)	INSULATION QUALITY (Degradation could be through air, across surface, or through insulation)	MEDIUM OF CURRENT PATH
Poor and Overheating Connections, NFPA 921 6.9.2.3, 6.10.4	Overheating due to Poor Connection (OPC)			Single	YES	AFCI or GFCI with nearby grounded conductor	Poor	OK	OK	Conductors Only
High Resistance Faults, NFPA 6.9.6	OPC			IB-CC then OPC in same or other area	YES	AFCI or GFCI with nearby grounded conductor	Poor	OK	Absent	Conductors Only
Misdriven staple, Severed Wire, NFPA 6.11.8	OPC			Single	YES	AFCI or GFCI with nearby grounded conductor	Poor	OK	OK	Conductors Only
Series Parting arc, NFPA 921 6.9.4.3	OPC	Series Parting Arc (SPA)		Series parting arc in series with load (such as switch opening)	YES	AFCI or GFCI with nearby grounded conductor	Poor	OK	OK	Ionized Air
Overload, NFPA 921, 6.9.3, 6.10.5, Open Neutral Condition, 6.5.1, Voltage Surge or Triplen Harmonics (No NFPA 921 reference)	Overheating due to Excessive Current (OEC)			Single	YES	OCPD or temperature limiting device in conductor in question	OK	Excessive	OK	Conductors Only
Undersized Conductors, NFPA 921 6.11.4	OEC			Single	YES, if conductors are grossly undersized	OCPD	OK	Excessive	OK	Conductors Only
Short circuit, NFPA 921 6.10.2, 6.11.9	OEC			IB-CC-SC then leading to OEC	YES, if overcurrent protection is insufficient	OCPD	OK	Excessive	Absent	Conductors Only
Parting arc, NFPA 921 6.9.4.3 and Ground Fault Parting Arc, NFPA 921 6.10.2	Overheating due to Insulation Breakdown (OIB)	Conductor to Conductor Contact (CC)	Parallel Parting Arc (PPA)	IB-CC then OIB-CC-PPA Parting arc in parallel with load	Minimal	OCPD with AFCI or GFCI with nearby grounded conductor	OK	OK to High	Absent	Ionized Air
Sparks, NFPA 921 6.9.5	OIB	CC	Spark (SPK)	OIB-CC-PA then OIB-CC-SPK	YES at entry cables, otherwise unlikely	OCPD with AFCI or GFCI with nearby grounded conductor	OK	OK to High	Severely degraded	Conductors and/or Insulation
Leakage current, NFPA 921 6.9.4.4	OIB	Degraded Insulation System (DIS)	Leakage Current (LC)	Single	YES	OCPD with AFCI or GFCI with nearby grounded conductor	OK	OK	Severely degraded	Through or across surface of insulation
Arc tracking, NFPA 921 6.9.4.4	OIB	DIS	Arc Tracking (AT)	Single	YES	OCPD with AFCI or GFCI with nearby grounded conductor	OK	OK	Severely degraded	Through or across surface of insulation
High-Voltage Arcs, NFPA 921 6.9.4.1, Static electric discharge (includes Lightning), NFPA 921 6.12	OIB	DIS	Arc (HVA)	Lightning arrester or surge protection	YES for lightning, smaller discharges can also trigger explosions	OCPD with AFCI or GFCI with nearby grounded conductor and lightning arrester or surge protection	OK	OK to High	Severely degraded	Ionized Air
Semiconductor insulation breakdown, (No NFPA 921 reference)	OIB	DIS	Semiconductor (SEMI)	May lead to OEC	YES	OCPD with AFCI or GFCI with nearby grounded conductor	OK	OK	Severely degraded	Through or across surface of insulation
Overheating due to Induction, (No NFPA 921 reference)	Overheating due to Inductance (OI)			Single	YES	None	OK	OK to High	OK	Conductive member adjacent to conductor