

Class II: Combustible dusts

North American Protection Techniques Comparison			
Area	Protection Techniques	Applicable Certification Documents	
		USA	Canada
Div 1	• Intrinsic safety	UL 913	CSA 157
	• Dust-ignitionproof	UL 1203	CSA 25 or CSA E61241-1-1
	• Pressurized	NFPA 496	NFPA 496
Div 2	• Dusttight	ISA 12.12.01 or UL 1604	CSA 157 or CSA E61241-1-1
	• Hermetically-sealed	ISA 12.12.01 or UL 1604	---
	• Nonincendive	ISA 12.12.01 or UL 1604	---
	• Pressurized	NFPA 496	NFPA 496
	• Any Class II, Division 1 technique	See above	See above

Class II, Division 1

Intrinsically Safe Apparatus: Apparatus in which all the circuits are intrinsically safe.

Intrinsically Safe Circuit: A circuit in which any spark or thermal effect is incapable of causing ignition of a mixture of combustible material in air under prescribed test conditions.

Intrinsically Safe System: An assembly of interconnected intrinsically safe apparatus, associated apparatus, and interconnecting cables, in that those parts of the system that may be used in hazardous (classified) locations are intrinsically safe circuits.

Dust-Ignitionproof: Equipment enclosed in a manner that excludes dusts and does not permit arcs, sparks, or heat otherwise generated or liberated inside of the enclosure to cause ignition of exterior accumulations or atmospheric suspensions of a specified dust on or in the vicinity of the enclosure.

Pressurized: The process of supplying an enclosure with a protective gas with or without continuous flow at sufficient pressure to prevent the entrance of a combustible dust or an ignitable fiber.

Class II, Division 2

Dusttight: Enclosures constructed so that dust will not enter under specified test conditions.

Hermetically Sealed: Equipment sealed against the entrance of an external atmosphere where the seal is made by fusion, for example, soldering, brazing, welding, or the fusion of glass to metal.

Nonincendive Circuit: A circuit, other than field wiring, in which any arc or thermal effect produced under intended operating conditions of the equipment is not capable, under specified test conditions, of igniting the dust–air mixture.

Nonincendive Equipment: Equipment having electrical/electronic circuitry that is incapable, under normal operating conditions, of causing ignition of a specified dust–air mixture due to arcing or thermal means.

Pressurized: See definition of “Pressurized” under Class II, Division 1.

International Protection Techniques Comparison					
Area	Protection Techniques	Applicable Certification Documents			
		USA	Canada	IECEx Scheme	Europe
Zone 20	• Enclosures, “tD”	---	---	IEC 61241-1	EN 61241-1
	• Intrinsic safety, “iaD”	ISA 61241-11	---	IEC 61241-11	EN 61241-11
	• Encapsulation, “maD”	ISA 61241-18	---	IEC 61241-18	EN 61241-18
	• Class II, Div 1 intrinsic safety method	UL 913	---	---	---
	• Class II, Div 1 dust-ignitionproof method	UL 1203	---	---	---
Zone 21	• Enclosures, “tD”	ISA 61241-1	---	IEC 61241-1	EN 61241-1
	• Pressurization, “pD”	ISA 61241-2	---	IEC 61241-4	EN 61241-4
	• Intrinsic safety, “ibD”	ISA 61241-11	---	IEC 61241-11	EN 61241-11
	• Encapsulation, “mbD”	ISA 61241-18	---	IEC 61241-18	EN 61241-18
	• Any Zone 20 technique	See above	---	See above	See above
	• Any Class II, Div 1 technique	See USA Class II, Div 1 techniques	---	---	---
Zone 22	• Enclosures, “tD”	ISA 61241-1	---	IEC 61241-1	EN 61241-1
	• Any Zone 20 or 21 technique	See above	---	See above	See above
	• Any Class II, Div 1 or 2 technique	See USA Class II, Div 1 or 2 techniques	---	---	---
Note: Zone 20, 21 and 22 general requirements are contained in ISA 61241-0 (USA) and IEC/EN 61241-0 (IECEx Scheme & Europe).					

Zone 20

Protection by Enclosure “tD”: Type of protection for explosive dust atmospheres where electrical apparatus is provided with an enclosure providing dust ingress protection and a means to limit surface temperatures.

Protection by Intrinsic Safety “iD”: Type of protection where any spark or thermal effect is incapable of causing ignition of a mixture of combustible dust, fibers, or flyings in air under prescribed test conditions.

Protection by Encapsulation “mD”: Type of protection where electrical parts that could cause ignition of a mixture of combustible dust or fibers/flyings in air are protected by enclosing them in a compound in such a way that the explosive atmosphere cannot be ignited.

Zone 21

Protection by Enclosure “tD”: See definition of “Protection by Enclosure” under Zone 20 above.

Protection by Pressurization “pD”: Type of protection that guards against the ingress of a mixture of combustible dust or fibers/flyings in air into an enclosure containing electrical equipment by providing and maintaining a protective gas atmosphere inside the enclosure at a pressure above that of the external atmosphere.

Protection by Intrinsic Safety “iD”: See definition of “Protection by Intrinsic Safety” under Zone 20 above.

Protection by Encapsulation “mD”: See definition of “Protection by Encapsulation” under Zone 20 above.

Zone 22

Protection by Enclosure “tD”: See definition of “Protection by Enclosure” under Zone 20 above.