

*Note: While this material was originally prepared for presentation in February 1999, it has been updated to reflect the evolving technical requirements now applicable as of April 2003.*

**UL Topic III**

**Converting European “EEx” Certificates**

**Into**

**North American Division Certificates**

## **Converting Certificates – Zones to Divisions**

- Applicable European Norm “EEx” requirements
- Applicable North American Division requirements
- 3rd-Party Certification vs. Self-Declaration
- Converting EN Zone 0 to UL Class I, Division 1
- Converting EN Zone 1 to UL Class I, Division 1
- Converting EN Zone 1 to UL Class I, Division 2
- Converting EN Zone 2 to UL Class I, Division 2
- Overview of Class I, Division Protection Methods

## Applicable European Norm Requirements

- EN 50014: Electrical apparatus for potentially explosive atmospheres - General requirements
- EN 50015: Electrical apparatus for potentially explosive atmospheres - Oil immersion “o”
- EN 50016: Electrical apparatus for potentially explosive atmospheres - Pressurized apparatus “p”
- EN 50017: Electrical apparatus for potentially explosive atmospheres - Powder filling “q”
- EN 50018: Electrical apparatus for potentially explosive atmospheres - Flameproof enclosure “d”
- EN 50019: Electrical apparatus for potentially explosive atmospheres - Increased safety “e”
- EN 50020: Electrical apparatus for potentially explosive atmospheres - Intrinsic safety “i”
- EN 50021: Specification for electrical apparatus with type of protection “n”
- EN 50028: Electrical apparatus for potentially explosive atmospheres - Encapsulation “m”
- EN 50039: Electrical apparatus for potentially explosive atmospheres - Intrinsically safe electrical systems “i”
- EN 50284: Special requirements for construction, test and marking of electrical apparatus of equipment group II, category 1 G

# Applicable UL Requirements

<a href="#">UL 515</a>	Electric Resistance Heat Tracing for Commercial and Industrial Applications
<a href="#">ANSI/UL 525</a>	Flame Arresters
<a href="#">ANSI/UL 583</a>	Electric-Battery-Powered Industrial Trucks
<a href="#">ANSI/UL 674</a>	Electric Motors and Generators for Use in Division 1 Hazardous (Classified) Locations
<a href="#">ANSI/UL 698</a>	Industrial Control Equipment for Use in Hazardous (Classified) Locations
<a href="#">UL 698A</a>	Industrial Control Panels Relating to Hazardous (Classified) Locations
<a href="#">ANSI/UL 781</a>	Portable Electric Lighting Units for Use in Hazardous (Classified) Locations
<a href="#">ANSI/UL 783</a>	Electric Flashlights and Lanterns for Use in Hazardous (Classified) Locations
<a href="#">ANSI/UL 823</a>	Electric Heaters for Use in Hazardous (Classified) Locations
<a href="#">ANSI/UL 844</a>	Electric Lighting Fixtures for Use in Hazardous (Classified) Locations
<a href="#">ANSI/UL 877</a>	Circuit Breakers and Circuit-Breaker Enclosures for Use in Hazardous (Classified) Locations
<a href="#">ANSI/UL 886</a>	Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations
<a href="#">ANSI/UL 894</a>	Switches for Use in Hazardous (Classified) Locations
<a href="#">ANSI/UL 913</a>	Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations
<a href="#">ANSI/UL 1002</a>	Electrically Operated Valves for Use in Hazardous (Classified) Locations
<a href="#">ANSI/UL 1010</a>	Receptacle-Plug Combinations for Use in Hazardous (Classified) Locations
<a href="#">ANSI/UL 1203</a>	Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations
<a href="#">ANSI/UL 1207</a>	Sewage Pumps for Use in Hazardous (Classified) Locations
<a href="#">UL 1604</a>	Electrical Equipment for Use in Class I and II, Division 2, and Class III Hazardous (Classified) Locations
<a href="#">ANSI/UL 2208</a>	Solvent Distillation Units
<a href="#">UL 2225</a>	Metal-Clad Cables and Cable-Sealing Fittings for Use in Hazardous (Classified) Locations
<a href="#">SU 1836</a>	Electric Motors and Generators for Use in Class I, Division 2 and Class II, Division 2 Hazardous (Classified) Locations

## **3rd-Party Certification vs. Self-Declaration**

- “Risk of explosion” requirements
  - ✓ European Notified Bodies 3rd-party certify
  - ✓ North America requires 3rd-party certification
  
- “Risk of fire” & “Risk of electric shock” requirements
  - ✓ Referred to as “ordinary locations” requirements
  - ✓ European Notified Bodies allow self-declaration
  - ✓ North America requires 3rd-party certification

# Converting EN Zone 0 to UL Class I, Division 1

- “Risk of explosion” requirements
  - ✓ EN ‘ia’ / [ia] requirements typically cover UL Class I, Division 1 requirements
  - ✓ Exception is regarding U.S. Code markings (Class, Division, Group)
  
- “Risk of fire” & “Risk of electric shock” requirements
  - ✓ No significant issues for converting EN ‘ia’ to UL Class I, Division 1
  - ✓ Issues to consider for converting EN [ia] to UL Class I, Division 1 include:
    - Plastics used as an enclosure, insulation, or direct support
    - Internal component evaluations
    - Branch circuit protection
    - Overload & endurance testing
    - Product specific operational safety testing

# Converting EN Zone 1 to UL Class I, Division 1

## ➤ “Risk of explosion” requirements

- ✓ EN Zone 1 protection methods are typically not able to be converted to UL Class I, Division 1 protection methods
- ✓ Exception is direct-entry flameproof, ‘d’, which can be converted into Division 1 explosion-proof, but with significant additional testing and constructional evaluation
- ✓ In addition, the following are still issues:
  - U.S. wiring methods (conduit vs. cable)
  - Sealing of entry
  - Grounding (sizing of terminals)
  - Metric entry thread marking
  - Code markings (Class, Division, Group)

## ➤ “Risk of fire” & “Risk of electric shock” requirements

- ✓ Issues to consider for converting EN Zone 1 to UL Class I, Div. 1 include:
  - Plastics used as an enclosure, insulation, or direct support
  - Internal component evaluations
  - Branch circuit protection
  - Overload & endurance testing
  - Product specific operational safety testing

## Converting EN Zone 1 to UL Class I, Division 2

- “Risk of explosion” requirements
  - ✓ EN Zone 1 protection methods are able to be converted to UL Class I, Division 2 protection methods, but there is some additional testing
  - ✓ EN Zone 1 protection methods that have first been converted into UL Zone 1 protection methods are allowed to be marked for Div. 2 with no further evaluation (per Section 501-1 of the 1999 NEC)
  - ✓ Code marking issues (Class, Division, Group) still apply
  
- “Risk of fire” & “Risk of electric shock” requirements
  - ✓ If the EN Zone 1 certificate has already been converted into a UL Zone 1 certificate, then there are no additional issues associated with the Division 2 marking

## Converting EN Zone 2 to UL Class I, Division 2

- “Risk of explosion” requirements
  - ✓ EN Zone 2 protection methods are typically converted to UL Class I, Division 2 protection methods with minimal additional evaluation
  - ✓ EN Zone 2 protection methods that have first been converted into UL Zone 2 protection methods are allowed to be marked for Div. 2 with no further evaluation (per Section 501-1 of the 1999 NEC)
  - ✓ Code marking issues (Class, Division, Group) still apply
  
- “Risk of fire” & “Risk of electric shock” requirements
  - ✓ If the EN Zone 1 certificate has already been converted into a UL Zone 1 certificate, then there are no additional issues associated with the Division 2 marking

# Overview of Class I, Division Protection Methods

Area	Protection Methods	Applicable Certification Documents	
		USA	Canada
Division 1	<i>Explosionproof – enclosures</i>	<a href="#">UL 1203</a>	<a href="#">CSA 30</a>
	<i>Explosionproof – motors and generators</i>	<a href="#">UL 674</a>	<a href="#">CSA 145</a>
	<i>Explosionproof – industrial control equipment</i>	<a href="#">UL 698</a>	<a href="#">CSA 30</a>
	<i>Explosionproof – portable lighting units</i>	<a href="#">UL 781</a>	<a href="#">CSA 137</a>
	<i>Explosionproof – flashlights and lanterns</i>	<a href="#">UL 783</a>	<a href="#">CSA 157</a>
	<i>Explosionproof – heaters</i>	<a href="#">UL 823</a>	<a href="#">CSA 30</a>
	<i>Explosionproof – lighting fixtures</i>	<a href="#">UL 844</a>	<a href="#">CSA 137</a>
	<i>Explosionproof – circuit breakers and enclosures</i>	<a href="#">UL 877</a>	<a href="#">CSA 30</a>
	<i>Explosionproof – outlet boxes and fittings</i>	<a href="#">UL 886</a>	<a href="#">CSA 30</a>
	<i>Explosionproof – switches</i>	<a href="#">UL 894</a>	<a href="#">CSA 30</a>
	<i>Explosionproof – valves</i>	<a href="#">UL 1002</a>	<a href="#">CSA 30</a>
	<i>Explosionproof – receptacle-plug combinations</i>	<a href="#">UL 1010</a>	<a href="#">CSA 159</a>
	<i>Explosionproof – sewage pumps</i>	<a href="#">UL 1207</a>	<a href="#">CSA 145</a>
	<i>Explosionproof – MC cables and sealing fittings</i>	<a href="#">UL 2225</a>	<a href="#">CSA 174</a>
	<i>Explosionproof – other electrical equipment</i>	<a href="#">UL 1203</a>	<a href="#">CSA 30</a>
	<i>Intrinsic safety (2 fault)</i>	<a href="#">UL 913</a>	<a href="#">CSA 157</a>
<i>Purged/Pressurized (Type X or Y)</i>	<a href="#">NFPA 496</a>	<a href="#">NFPA 496</a>	
Division 2	<i>Hermetically sealed</i>	<a href="#">UL 1604</a>	<a href="#">CSA 213</a>
	<i>Nonincendive – circuits, components &amp; equipment</i>	<a href="#">UL 1604</a>	<a href="#">CSA 213</a>
	<i>Non-Sparking</i>	<a href="#">UL 1604</a>	<a href="#">CSA 213</a>
	<i>Purged/Pressurized (Type Z)</i>	<a href="#">NFPA 496</a>	<a href="#">NFPA 496</a>
	<i>Any Class I, Division 1 method</i>	----	---
	<i>Any Class I, Zone 0, 1 or 2 method</i>	<a href="#">UL 60079 series</a>	<a href="#">CSA E60079 series</a>