

SLICKLINE CONNECT

Slickline Topics

Zones

Wireline operations primarily use diesel powered or electric powered equipment. The equipment is operated in potentially explosive areas on rigs, production installations and well sites. The equipment contains a variety of potential ignition sources. The presence of an explosive atmosphere cannot be eliminated entirely whereas the diesel or electric power sources can be protected and fitted with systems that prevent and eliminate potential ignition sources.

Area Classification analyses and classifies environments in which explosive atmospheres may occur. Area Classification is based upon the probability of the occurrence, along with the extent and duration, and are either “hazardous” or “non-hazardous”.

Hazardous Area is a location where an explosive gas/air mix may be expected in significant quantities and where equipment and operations require specific safeguards. In the USA hazardous areas are either normally hazardous or not normally hazardous, according to the degree of risk, in Europe they are Zones 0, 1 or 2

Non-Hazardous Area is a location in which an explosive gas atmosphere is not likely to be present

Definitions of Zones and a Comparison to Divisions

CEC (Canada) CENELEC (Europe) NEC 505 (USA) IEC (Others)		USA - NEC 500	
Zone 0	Areas in which an explosive gas/air mix is continuously present for long periods of time, more than 1,000 hrs/year	Division 1	A location where the hazardous atmosphere is expected to be present during normal operations on a continuous, intermittent or periodic basis
Zone 1	Areas in which an explosive gas/air mixture is likely to occur during normal operations, between 10 and 1,000 hrs/year		
Zone 2	Areas in which an explosive gas/air mix is not likely to occur during normal operations. If it should occur, it will not exist for more than 10 hrs/year	Division 2	A location in which volatile flammable liquids or gases are handled, processed or used but in which they would normally be confined within closed containers or closed systems from which they can escape only in the event of an accidental rupture or breakdown of the containers or system

As a basic rule: -

- Zone 0 0 to 1.5m
- Zone 1 1.5 to 7.5m
- Zone 2 7.5 to 15m
- Rig-safe/non-zoned 15m +

The above must be treated as a rule of thumb only, every operation is different and clients will define the zone areas. Diesel powered units will typically be used in Zone 2 or Rig-safe areas.

Potential Ignition Sources considered in the construction of diesel and electric powered equipment

- Hot Surfaces
- Mechanically generated Sparks
- Electrical Apparatus and Systems
- Static Electricity
- Flames and Gases
- Diesel Engines

ATEX

ATEX (“ATmosphere EXplosible”) covers hazards arising from the use of both electrical and mechanical equipment in potentially explosive atmospheres.

- ATEX 95 equipment directive 94/9/EC, equipment and protective systems intended for use in potentially explosive atmospheres, replaced by directive 2014/34/EU, mandatory for manufacturers from April 2016
- ATEX 137 workplace directive 99/92/EC, states the minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres.

Slickline Unit Engines

Diesel and electric powered equipment are manufactured to comply with the zone rules, and, within Europe ATEX directives, there will be suitable marking on the equipment certification plates to reflect these requirements.

Diesel Engines

Non-zoned – a standard diesel engine with no safety modifications

Rig-Safe – diesel engines fitted with a basic set of safety modifications, including overspeed shut down, anti-static fan belts, hydraulic or air starter, manual shut down, exhaust spark arrestor

Zone Two – heavily modified diesel engine, including but not limited to, temperature shut downs for water, oil, exhaust high temperatures, flame trap, overspeed shut down, water cooled exhaust system, gas detector shut down, spark arrestor, anti-static fan belts, spring, air or hydraulic starter system, electrical system and components supplied to zone 2 specification

Electric Motors

Non-Zoned – a standard motor with no modifications

Zone 1 – An electric motor is the only power unit that can be used in a Zone 1 area. The electric motor is shielded and shrouded to remove the risk of sparking.

Certification

Much of the Zone Two related equipment requires recalibration and recertification on an annual basis, the documentation associated with this must be included in the wellsite document pack for the unit and powerpack.