

## **COURSE: NR-10 – ELECTRICAL INSTALLATIONS IN HAZARDOUS AREAS – SPECIFIC TRAINING**

### **SCOPE AND APPLICABILITY:**

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Establish the minimum requirements and conditions aiming to the implementation of control measures and prevention systems, in order to ensure the safety and health of workers who directly or indirectly interact with electrical equipment in hazardous areas.

### **REGULATION & STANDARDS:**

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- NBR IEC 60079;
- NR10;
- NBR 14639.

### **COURSE CONTENT:**

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| 1. Identification and assessment of risks at the workplace; | 12. Constructive aspects and operating principles;   |
| 2. Fire theory and Flammability Limits;                     | 13. Description of all equipment;  |
| 3. Physical Properties of gases;                            | 14. Example of changing the classification of Zones by modifying the physical arrangement; |
| 4. Ignition Sources and static electricity;                 | 15. Influence of ventilation on the classification of areas;                               |
| 5. Risk Volumes;  | 16. Examples of Interference on board.   |
| 6. The NEC Criterion;                                       | 17. Labeling of Ex Equipment;  |
| 7. The Division Concept;                                    | 18. Standardization, and Certification of Ex Equipment.                                    |
| 8. The IEC Criterion;                                       |  |
| 9. O Zone Concept;  |  |
| 10. Supply Units;   |  |
| 11. Combustible Dust;                                       |  |

### **COURSE DESIGN:**

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**TOTAL:** 16 hours

### **PREREQUISITE(S):**

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None.

### **MINIMUM/MAXIMUM NUMBER OF DELEGATES**

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This course requires a minimum of 1, and a maximum number of 12 trainees.

To offshore trainings, the course number of trainees will comply with the vessels/rig necessity.

### **MAIN SAFETY ISSUES:**

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- What makes a place, a classified area;
- Signaling hazardous areas;
- Certification and marking of an explosion-proof equipment;
- Correct use of equipment;
- Special care with hot works.

## **REQUIRED EQUIPMENT:**

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- Signs about hazardous areas;
- Map of classified areas of the vessel;
- At least two different EX equipment to be identified according to the technical rule;

## **PROCEDURE FOR CONTENT FIXING AND DYNAMICS ACTIVITIES:**

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- Description the hazardous areas onboard;
- Identification and choice of the right equipment according the hazardous area presented;
- If it is necessary to visit a hazardous area, the safety officer must be advised and the procedures of the client must be communicated to the students;
- It's forbidden to take pictures with a non-Ex machine and even in this case, a Work Permit must be fulfilled.

## **CERTIFICATION:**

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Training certificate signed by responsible Engineer accredited by Brazilian CREA.

## **CERTIFICATE VALIDITY PERIOD:**

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2 years.