

Course code	LSP359
Course name	NR-13 - Safety Training in Process Units Operation - 40h
Duration	40 Hours
Target group	Professionals in operation of process units.
Prerequisites	<ul style="list-style-type: none"> <li>- RG and CPF;</li> <li>- Passport (Expatriate);</li> <li>- Secondary School Certificate.</li> </ul>
Objective	Qualify industry professionals to perform activities in process units.
Contents	<ul style="list-style-type: none"> <li>• Notions of applied physics;</li> <li>• Pressure;</li> <li>• Atmospheric pressure;</li> <li>• Gauge pressure and absolute pressure;</li> <li>• Internal pressure, external pressure and vacuum;</li> <li>• Pressure Units;</li> <li>• Heat transfer</li> <li>• General notions: what is heat, what is temperature;</li> <li>• Modes of heat transfer;</li> <li>• Specific heat and sensible heat;</li> <li>• Heat transfer at constant temperature;</li> <li>• Thermodynamics;</li> <li>• Concepts;</li> <li>• Saturated steam and superheated steam;</li> <li>• Fluid Mechanics;</li> <li>• Fundamental Concepts;</li> <li>• Pressure in Flow;</li> <li>• Types of flow: Laminar and turbulent;</li> <li>• Liquids flow: transfer by gravity, pressure difference, siphon;</li> <li>• Pressure drop: concept, roughness, accidents;</li> <li>• Principles of fluid pumping;</li> <li>• Notions of applied chemistry;</li> <li>• Density;</li> <li>• Solubility;</li> <li>• Diffusion of gases and vapors;</li> <li>• Characterization of Acid and Base (Alkali) - Definition of pH;</li> <li>• Basic principles about Corrosion;</li> <li>• Topics of inspection and maintenance of equipment and records.</li> <li>• Process equipment (workload established according to the complexity of the unit, where applicable);</li> <li>• Piping accessories;</li> <li>• Electrical accessories and other items;</li> <li>• Water heaters;</li> <li>• Pumps;</li> <li>• Boilers (basic knowledge);</li> <li>• Compressors;</li> <li>• Condenser;</li> <li>• Demineralizer;</li> <li>• Spheres;</li> <li>• Evaporators;</li> <li>• Filters;</li> <li>• Gas washer;</li> <li>• Reactors;</li> <li>• Coolers;</li> <li>• Dryers;</li> </ul>

- Silos;
- Storage tanks;
- Towers;
- Heat exchangers;
- Industrial piping;
- Steam turbines;
- Injectors and ejectors;
- Safety devices;
- Others;
- Instrumentation;
- Unit operation;
- Process description;
- Start and shutdown;
- Emergency procedures;
- Disposal of chemicals and environmental preservation;
- Evaluation and control of risks inherent to the process;
- Prevention of deterioration, explosion and other risk;
- Legislation and standardization;
- Regulatory Norm nº 13 (NR-13);
- Pressure vessel categories;

Total Contact Time: Theory: 40h

Technical Reference: NR-13.

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Exam	Multiple choice exam with minimum passing grade of 60%.
	Validity: N/A

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