

Overview

This standard covers the application of core land-based engineering principles: cooling and lubrication. It provides an understanding of the generation and dissipation of heat and the purpose of cooling mediums, e.g. fuel, oil, water, air and convection, friction and insulation materials, their types, uses and properties and the effect of heat.

It also covers lubrication, the purpose, types, characteristics, properties and additives in oils and greases. The types of lubrication systems and their ventilation, e.g. wet and dry sump, forced, drip, splash and self-lubricated.

This standard is for those who work in land-based engineering and is appropriate for persons working under supervision.

Note: due to current regulations an approved electrician should be involved when working with mains electricity.

Apply core land-based engineering principles: cooling and lubrication

Performance criteria

You must be able to:

1. apply core land-based engineering principles to test, maintain, monitor and adjust cooling and lubrication systems, their circuits and components
2. select coolants and lubricants against required specifications for stated applications
3. test cooling and lubricant samples and interpret findings
4. apply insulation to heating or cooling elements

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Knowledge and understanding

You need to know and understand:

1. the **reasons for the control of temperature** in land-based engineering applications
2. the methods and types of **heat control and dissipation**
3. the **symptoms** of a lack of cooling and lubrication
4. the construction, purpose and function of components used in typical cooling systems including air- and liquid-cooled systems
5. the **causes** for impaired cooling efficiency
6. how to **test and maintain** cooling systems and their components
7. the **reasons for lubrication**
8. the fundamental operating principles of lubrication systems and their components, wet/dry sump, drip, splash, gravity, self-lubricating, force fed, automatic greasing
9. the properties of friction materials and their lubrication requirements
10. the types, characteristics, properties and application of lubricants, oils, greases, additives, antifreeze and coolants, particulate suspension, sealing
11. how to collect cooling and lubricant samples in a way that maintains the integrity of the sample
12. methods of testing cooling and lubricant samples

Glossary

causes for impaired cooling efficiency - e.g. obstructions, poor circulation, air locks, ambient temperature, system pressures, overload

methods and types of **heat control and dissipation** - e.g. liquid, forced air, convection/conduction, radiation, heat sinks and insulation materials

reasons for lubrication - e.g. reduce friction, reduce wear, cooling

reasons for the control of temperature - e.g. expansion, vaporisation, efficiency, combustion, longevity, oil viscosity

symptoms of lack of cooling and lubrication - e.g. distortion, glazing, wear, expansion, seizure, heat spots, friction welding, scoring, vaporisation, combustion

test and maintain cooling systems and their components - e.g. levels, weights, ratios and volumes, thermostats, fan speeds, input and output temperatures, pressure tests, draining, flushing and bleeding procedures

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