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## Overview

This standard is about complex fabrication and forming techniques used in the process of heavy goods and public service vehicle body building. This includes complex calculations to determine materials required and optimum methods and techniques.

## Performance criteria

- You must be able to:*
- P1. use the appropriate personal protective equipment throughout all fabrication and forming activities
  - P2. support your fabrication and forming activities by reviewing:
    - P2.1. vehicle technical data, drawing and diagrams
    - P2.2. fabrication and forming procedures and techniques
    - P2.3. legal requirements
  - P3. select, prepare and use all the **tools and equipment** required following manufacturers' instructions
  - P4. carry out all fabrication and forming activities following:
    - P4.1. manufacturers' data and instructions
    - P4.2. industry recognised methods
    - P4.3. your workplace manuals and procedures
    - P4.4. health, safety, environmental and legal requirements
  - P5. work in a way which minimises the risk of:
    - P5.1. damage to other vehicle systems, parts and components
    - P5.2. contact with leakage and hazardous substances
    - P5.3. damage to your working environment
    - P5.4. injury to self and others
  - P6. ensure fabricated or formed body panels and components conform to acceptable tolerances for the vehicle specification, quality standards and manufacturer's warranties
  - P7. promptly record and report any additional faults you notice during the course of your work
  - P8. use suitable **testing methods** to evaluate the performance of fabricated or formed body panels and components for compliance to vehicle specification and legal requirements
  - P9. promptly report any non-compliance of fabricated or formed body panels and components to the relevant person(s) in accordance with workplace procedures
  - P10. ensure your records are accurate, complete and passed to the relevant person(s) within the agreed timescale and in the format required
  - P11. complete all fabrication and forming activities within the agreed timescale
  - P12. promptly report any anticipated delays in completion to the relevant person(s)

## Knowledge and understanding

*You need to know and understand:*

*\*Legislative and organisational requirements and procedures \**

- K1. the legal requirements relating to the vehicle (including road safety requirements)
- K2. the implications on an Operator's Licence of not carrying out repairs and inspections correctly
- K3. the legislation and workplace procedures relevant to:

- K3.1. health and safety
- K3.2. the environment (including waste disposal)
- K3.3. appropriate personal and vehicle protective equipment
- K4. your workplace procedures for:

- K4.1. recording fabrication and forming information
- K4.2. the referral of problems
- K4.3. reporting delays to the completion of work
- K5. the work that needs to be done and the standard required
- K6. the importance of documenting fabrication and forming information
- K7. the importance of working to agreed timescales and keeping others informed of progress
- K8. the relationship between time, costs and productivity
- K9. the importance of promptly reporting anticipated delays to the relevant person(s)
- K10. the hazards associated with working on or near high voltage electrical vehicle components

### **Use of technical information**

- K11. how to find, interpret and use sources of relevant information to establish the fabrication and forming method and work sequence for a range of vehicle body work activities
- K12. the importance of using the correct sources of technical information

### **Tools and equipment**

- K13. how to select, prepare, check and use the correct **tools and equipment** used to cut **materials** prior to and during the complex fabrication and forming of vehicle body panels and components
- K14. how to select, prepare, check and use the correct **tools and equipment** used during the complex fabrication and

forming of vehicle body panels and components

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*Complex fabrication*

**K15. how to compare and select suitable \*materials** for the fabrication and forming of vehicle body panel and components

K16. how to use calculations to determine the blank size of complex fabricated or formed body panels and components, including bending, folding, rolling and cutting allowances

K17. the planning procedures for a range of complex fabricating and forming activities, considering:

K17.1. **materials** used

K17.2. **materials** and equipment availability, capacity and capability

K17.3. forming sequence

K17.4. standards and cost

K18. the stages in producing fabricated or formed body panels and components for new, converted or modified vehicle bodywork

K19. the critical stages for checking compliance in the cutting, fabrication and forming sequence

K20. the effective and efficient techniques for the cutting, fabrication and forming of complex body panels and components

K21. how to select cutting, fabrication and forming methods for vehicle body panels and components and the factors to consider

K22. how to use calculations when using a range of woodworking machines

K23. the factors which determine the viability of using cutting, fabrication and forming aids

K24. the factors related to the design of cutting, fabrication and forming aids

K25. the methods and tests used to check cut and fabricated or formed body panels and components for compliance including visual and tactile checks, measurement, operational and performance checks

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**Scope/range**

1. **Materials** include:

- 1.1. aluminium and its alloys
- 1.2. carbon and stainless steels
- 1.3. GRP
- 1.4. timber and timber composites
- 1.5. trimming materials

2. **Tools and equipment** include:

- 2.1. hand forming tools
- 2.2. advanced cutting equipment
- 2.3. woodworking machines

3. **Testing methods** are:

- 3.1. sensory
- 3.2. functional
- 3.3. measurement
- 3.4. alignment

## Glossary

\*This section contains examples and explanations of some of the terms used but does not form part of the standard.\*

**\*\*Agreed timescales\*\***

Examples include: manufacturer's recommended work times, job times set by your company or a job time agreed with a specific customer.

**\*\*Aids\*\***

Examples include: jigs, fixtures, formers, stops, fences, guides, templates, patterns

**\*\*Calculations\*\***

These are for: cutter size and pitch, feed rate, cutting speed, cutter pitch mark

**\*\*Cutting equipment\*\***

Examples include: guillotines, saws, shears, drills, snips, nibblers, punches and thermal cutting equipment

**\*\*Factors affecting cutting method selection\*\***

Examples include: design specification and geometry of panel or component, materials and material form, equipment availability, capacity and capability, stress raising features, strength required, fabrication and forming sequence, tolerance, quantity, customer requirements, legislation, manufacturer's warranties, maintenance requirements, company quality standards and costs

**\*\*Factors determining acceptable tolerance\*\***

Examples include. quality standards, manufacturer's warranties, equipment capabilities and capacities, material properties and form, critical and non-critical dimensions, function of body panel or component

**\*\*Factors influencing fabrication and forming sequence\*\***

Examples include. material properties and form, curing time, equipment capability, capacity and availability, build sequence and designing against corrosion

**\*\*Hand forming tools\*\***

Examples include: Mallets, hammers, dollies, spoons,

**\*\*Heavy goods and public service vehicles\*\***

These are medium and large goods vehicles, buses and coaches of 3500kgs gross vehicle mass (GVM) and above.

**\*\*Sources of technical information\*\***

Examples include detail drawings and diagrams, workshop manuals, manufacturer's manuals and data, company procedures

**\*\*Woodworking machines\*\***

Examples include: bandsaw, tablesaw, radial arm saw, pullover/crosscut saw, planer thicknesser and router

IMICB06

Carry out complex fabrication and forming techniques for heavy goods and public service vehicles



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