

## IMICB06 Carry out complex fabrication/forming techniques for large commercial and passenger vehicles



### Overview

This standard is about complex fabrication/forming techniques used in the process of large commercial and passenger vehicle body building. This includes complex calculations to determine materials required and optimum methods and techniques.

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### Performance criteria

*You must be able to:*

- P1. use the appropriate personal protective equipment throughout all fabrication/forming activities
- P2. support your fabrication/forming activities by reviewing
  - P2.1. vehicle technical data, drawing and diagrams
  - P2.2. fabrication/forming procedures and techniques
  - P2.3. legal requirements
- P3. select, prepare and use correctly all the **tools and equipment** required following manufacturers' instructions
- P4. carry out all fabrication/forming activities following;
  - P4.1. manufacturers' data and instructions
  - P4.2. your workplace manuals and procedures
  - P4.3. health, safety, environmental and legal requirements
- P5. work in a way which minimises the risk of:
  - P5.1. damage to other vehicle systems, units 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/formed body panels and components conform to acceptable tolerances for the vehicle specification, quality standards, manufacturer's warranties
- P7. record and report any additional faults you notice during the course of your work promptly
- P8. use suitable testing methods to evaluate the performance of fabricated/formed body panels and components for compliance to vehicle specification and legal requirements
- P9. report any non-compliance of fabricated/formed body panels and components to the relevant person(s) promptly and 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

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- P11. complete all fabrication/forming activities within the agreed timescale
- P12. report any expected delays in completion to the relevant person(s) promptly

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### 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/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/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 reporting anticipated delays to the relevant person(s) promptly
- K10. The hazards associated with working on or near high voltage electric vehicle components

#### Use of technical information

- K11. how to find, interpret and use sources of relevant information to establish the fabrication/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/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/forming of vehicle body panels and components

#### Complex fabrication

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

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- K16. how to use calculations to determine the blank size of complex fabricated/formed body panels and components, including bending, folding, rolling and cutting allowances
- K17. the planning procedures for a range of complex fabricating/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/formed body panels and components for new, converted or modified vehicle bodywork
- K19. the critical stages for checking compliance in the cutting and fabrication/forming sequence
- K20. the effective and efficient techniques for the cutting and fabrication/forming of complex body panels and components
- K21. how to select fabrication/forming and cutting methods for vehicle body panels and components and the factors to consider
- K22. how to use **calculations** when using a range of woodworking machines to establish the optimum:
  - K22.1. cutter size and pitch
  - K22.2. feed rate
  - K22.3. cutting speed
  - K22.4. cutter pitch mark
- K23. the factors which determine the viability of using fabrication/forming and cutting **aids**
- K24. the factors related to the design of fabrication/forming and cutting aids
- K25. the methods and tests used to check cut and fabricated/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. cutting equipment
  - 2.2. bending rolls
  - 2.3. presses
  - 2.4. folders
  - 2.5. hand forming tools
  - 2.6. hammers
  - 2.7. mallets
  - 2.8. dollies
  - 2.9. spoons
  - 2.10. woodworking machines
  
3. **Aids** include:
  - 3.1. jigs
  - 3.2. fixtures
  - 3.3. formers
  - 3.4. stops
  - 3.5. fences
  - 3.6. guides
  - 3.7. templates
  - 3.8. patterns
  
4. **Testing methods** are:
  - 4.1. Sensory
  - 4.2. Functional
  - 4.3. Measurement

**Commented [CH1]:** Are all these relevant?

**Commented [CH2]:** Is 'woodworking machines' just at this higher level?

**Commented [CH3]:** Is this assessable or is it better in glossary?

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5. **Calculations** are for:
  - 5.1. cutter size and pitch
  - 5.2. feed rate
  - 5.3. cutting speed
  - 5.4. cutter pitch mark

**Commented [CH4]:** Is this assessable or is it better in glossary?

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### Glossary

**Agreed timescales:**

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

**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/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/forming sequence:**

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

**Large Commercial and Passenger 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



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**Woodworking machines:**

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

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