

TRANSPORTATION AND LOGISTICS

Car Painting



WorldSkills Occupational Standards

WorldSkills Occupational Standards (WSOS)

Occupation description and WSOS

The name of the occupation is

Car Painting

Description of the associated work role(s) or occupation(s)

Car painters (refinishers) are responsible for reinstating the pre-accident paint finish to cars after the structure and/or the panels have been repaired or replaced. They may also be asked to completely repaint a whole vehicle either to change its colour or reinstate its newness. Car painters may also become involved in matching colours to an original colour no longer available or to colours that prove difficult to match. A car painter must match the colour, shade, and texture of the adjoining panels that are not being painted.

Car painters can work in various work environments from an autobody repair shop to an aircraft hangar, dependent upon what vehicle or transport system they are painting. They work to apply paints inside an enclosed spray booth/oven in order to protect the environment from harmful products.

Car painters prepare panels or vehicles to receive paint. They may carry out minor panel repairs and apply undercoats, colour coats, and clear sealant coats which provide the high gloss levels required. They may be required to identify a colour code using various methods, mix the correct amount of colour to pre-determined formulae, and spray test cards to test the suitability of this colour match to the original colour and shade.

A car painter needs to be aware of time schedules and may often be working on several vehicles at one time while waiting for previously applied materials to dry.

Car painters (refinishers) may be required to refinish a wide range of items such as passenger cars, racing cars, vintage and classic vehicles, commercial goods vehicles, trains, aeroplanes, static structures or furniture. They may be required to refinish a wide variety of materials such as metals, plastics, composite materials, or wood.

General notes on the WSOS

The WSOS specifies the knowledge, understanding, and specific skills that underpin international best practice in technical and vocational performance. It should reflect a shared global understanding of what the associated work role(s) or occupation(s) represent for industry and business (www.worldskills.org/WSOS).

The skill competition is intended to reflect international best practice as described by the WSOS, and to the extent that it is able to. The Standard is therefore a guide to the required training and preparation for the skill competition.

In the skill competition the assessment of knowledge and understanding will take place through the assessment of performance. There will only be separate tests of knowledge and understanding where there is an overwhelming reason for these.

The Standard is divided into distinct sections with headings and reference numbers added.

Each section is assigned a percentage of the total marks to indicate its relative importance within the Standards. This is often referred to as the “weighting”. The sum of all the percentage marks is 100. The weightings determine the distribution of marks within the Marking Scheme.

Through the Test Project, the Marking Scheme will assess only those skills that are set out in the Standards Specification. They will reflect the Standards as comprehensively as possible within the constraints of the skill competition.

The Marking Scheme will follow the allocation of marks within the Standards to the extent practically possible. A variation of up to five percent is allowed, provided that this does not distort the weightings assigned by the Standards.

WorldSkills Occupational Standards

Section	Relative importance (%)
1 Work organization and management	5

The individual needs to know and understand:

- Current occupational Health, Safety, and Environmental regulations related to the car painting industry
- Correct use, storage and maintenance of personal protective equipment and clothing
- All recommendations and information published by the supplier or manufacturer of products and equipment
- The procedures and process for maintaining and using specialist equipment
- Terminology that relates to paint materials, processes, and applications
- The importance of the correct handling and disposal of environmentally harmful products
- The potentially harmful impact car painting products can have on the environment
- The impact that the environment and climate can have on paints and products

The individual shall be able to:

- Apply occupational Health, Safety, and Environmental regulations and best practice related to the car painting industry
- Use correctly and maintain personal protective clothing and equipment
- Set-up, use, adjust, and maintain all specialist application equipment
- Set up, adjust, and use all specialist preparation and drying equipment
- Promote health and safety in the workplace
- Apply all recommendations and guidance provided by suppliers and manufacturers of equipment or products
- Adhere to MSDS (Manufacturers Safety Data Sheets)
- Adopt correct procedures for handling and disposal of environmentally harmful products
- Only use products that are Volatile Organic Compound (VOC) compliant
- Adapt materials to take account of the impact of the environment and climate on paints and products
- Maintain clean spraying environment within paint areas

2 Communication and interpersonal skills	5
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The individual needs to know and understand:

- the range and purposes of documentation, including written and technical drawings, in paper and electronic forms
- the technical language associated with the occupation
- the industry standards required for quality control in oral, written, and electronic formats
- the required industry standards for customer service and care

Section	Relative importance (%)
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The individual shall be able to:

- read, interpret, and extract technical data and instructions from workshop manuals in any available format
- communicate in the workplace by written and electronic means, using standard formats
- communicate in the workplace by oral, written, and electronic means to ensure clarity, effectiveness, and efficiency
- use a standard range of communication technologies
- complete reports and respond to issues and questions arising
- Respond to customers' needs face to face and indirectly

3 Preparation for painting	14
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The individual needs to know and understand:

- The range, purpose, and application of products used in the car painting industry for the following procedures:
 - Cleaning
 - Removal of contaminants
 - Repairing minor panel and paint damage
 - Abrading and final cleaning
 - Other surface contaminants
 - Removal of dust from all areas to be finished
 - Protection of parts and areas not being painted

The individual shall be able to:

- Use appropriate cleaning products to remove contaminants
- Prepare surfaces to be coated with appropriate abrasive products
- Carry out minor panel repairs
- Carry out final cleaning of surfaces prior to paint application
- Remove dust from all areas to be refinished
- Suitably remove contaminants such as glues, labels, and seam-sealers
- Carry out masking procedures to protect surrounding areas

Section	Relative importance (%)
4 Application of adhesion promoters and primers	11

The individual needs to know and understand:

- The range of adhesion promoters and primers available
- The purpose of adhesion promoters and primers
- The context of where and when various adhesion promoters and primers are used
- Mixing and application techniques for each of the adhesion promoters and primers
- The preparation and application process for the full range of seam sealers, e.g. gap sealers, weld sealers, seam sealers, etc.
- Which materials to select for a particular application
- The drying characteristics of each adhesion promoter or primer

The individual shall be able to:

- Apply suitable primers and or fillers to the substrate and appropriate for the process being used:
 - Etch primers;
 - Primer surfaces;
 - Primer fillers;
 - Plastic primers;
 - UV primers.
- Apply the correct procedures for sanding (flatting) primer fillers
- Reinstate the corrosion protection of the panels being painted
- Apply seam sealers
- Follow the Original Engineering Manufacturer (OEM) or paint manufacturer's (Technical Data Sheet – TDS) recommendations
- Measure out materials carefully to minimize environmental effects and cost implications

5 Base coat and ground coat application	16
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The individual needs to know and understand:

- How to access information related to colour and application
- Types and specifications of car paints and their uses
- Warranty procedures applied to particular vehicles
- The correct use of equipment used in applying base coats and ground coats
- Specialist paint finishes
- The impact upon cost and environment of over mixing materials

Section	Relative importance (%)
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The individual shall be able to:

- Retrieve colour and application information from printed and electronic sources
- Use appropriate equipment and technology to access colour formulations (computer based and photo spectrometer)
- Use colour swatches/chips to identify the correct colour and shade and variant
- Apply the electronic information to mix required colour and shade
- Follow the correct procedure to spray out a test paint card and compare with the original standard, adjust as necessary
- Mix and apply straight/solid colours, metallic, pearls, multi-stage effect colours and special effect colours
- Apply base/ground coats to metal and non-metal parts
- Follow the Original Engineering Manufacturer (OEM) or paint manufacturer's (Technical Data Sheet – TDS) recommendations
- Measure materials to minimize the environmental and cost factors

6	Clear coat application	17
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The individual needs to know and understand:

- The purpose of a clear coat
- The process for identifying, mixing, and applying clear coats
- The importance of following manufacturer's instructions
- The need for flexible additives as required
- The spray gun set up and adjustment for clear coat materials
- The correct gun pressure, speed, distance, and overlap required to produce an excellent finish with clear coats and achieve high gloss levels

The individual shall be able to:

- Identify, mix, and apply clear coats correctly
- Adjust spray gun to achieve the correct outlet pressure, fan width and fan shape
- Apply clear coats to match existing finishes (matt clear coat, ceramic, and soft healing clear coat)
- Apply clear coats as per paint manufacturer's instructions to avoid defects such as runs, excessive orange peel, etc.
- Follow the Original Equipment Engineering Manufacturer (OEM) or paint manufacturer's (Technical Data Sheet – TDS) recommendations
- Dispose of unused clear coat in an environmentally safe manor
- Maintain organized and clean work areas
- Prevent over-use of products

Section	Relative importance (%)
7 Colour evaluation and colour adjustment	11

The individual needs to know and understand:

- Colour technology and colour adjustment techniques (Munsell Colour Wheel)
- Technical terms and definitions for colour descriptions
- The effects of colour miss-match in terms of face and flop tone
- The effects of varying strengths and values of toners
- The impact of light quality and type on colour
- The impact of spraying techniques upon colour match

The individual shall be able to:

- Locate and document vehicle manufacturers paint codes
- Determine types and colours of paint using manufacturers' paint codes and vehicle information
- Evaluate spray-out cards against the standards to identify colour miss-matches in terms of hue, chroma, saturation, lightness, and darkness
- Select and apply suitable procedures to adjust colour to match the given standards
- Select toners to correct colour miss-matches
- Identify and use the correct lighting to match colours
- use the correct gun speeds, distance, and overlap to produce quality spray out cards
- Maintain organized and clean work areas
- Use spectrophotometer
- Use mixing scales to produce ready to spray products
- Prevent overuse of products

8 Design, layout, and measurement	13
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The individual needs to know and understand:

- Basic geometry
- Appropriate materials for masking different areas for two-tones
- Uses of different types of masking materials
- How to select and use of specialist measuring and marking out equipment e.g. rules, straight edges etc.
- Techniques for applying decals/transfers
- Techniques for applying covering vinyl (carbone or matt) to given locations without creases, bubbles, cuts, etc.

Section	Relative importance (%)
<p>The individual shall be able to:</p> <ul style="list-style-type: none"> Mask areas of vehicle panels for the prevention of overspray between colours for painting Mask and protect adjacent panels that will not be refinished Apply vinyl decals/transfers to specified locations without creases, bubbles, cuts, etc. Apply covering vinyl (carbone or matt) to given locations without creases, bubbles, cuts, etc. Mask door jambs and other moveable panels Mask for design painting and two-tone finishes Apply a range of special effect coatings, including blended colours 	
<p>9 Remove minor damage and defects from painted and non-painted surfaces</p>	<p>8</p>
<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> Types of paint-related defects The correct repair procedures to rectify minor paint damage or defects The procedures and materials required to rectify minor panel damage Techniques and materials for removal and repair of minor paint defects Techniques to invisibly perform a spot repair or blend paint in confined areas 	
<p>The individual shall be able to:</p> <ul style="list-style-type: none"> Identify the types of defects that may occur on a painted surface such as dirt nibs, pin holes, runs, environmental effects, etc. Apply correct repair procedures to remove or repair paint defects Carry out 'smart' repairs to small areas of damage Evaluate the extend of minor panel damage and plan work accordingly to rectify this damage Wet and dry sand clear coat to remove and rectify defects Apply polyester and epoxy fillers to repair small stone chip damage to panel surfaces Prepare and blend invisibly scratch and scuff damage Reinstate original gloss levels using polishing techniques and materials 	
<p>Total</p>	<p>100</p>

References for industry consultation

WorldSkills is committed to ensuring that the WorldSkills Occupational Standards fully reflect the dynamism of internationally recognized best practice in industry and business. To do this WorldSkills approaches a number of organizations across the world that can offer feedback on the draft Description of the Associated Role and WorldSkills Occupational Standards on a two-yearly cycle.

In parallel to this, WSI consults three international occupational classifications and databases:

- ISCO-08: (<http://www.ilo.org/public/english/bureau/stat/isco/isco08/>)
- ESCO: (<https://ec.europa.eu/esco/portal/home>)
- O*NET OnLine (www.onetonline.org/)

This WSOS appears most closely to relate to *Painters, Transportation Equipment*:
<https://www.onetonline.org/link/summary/51-9122.00>

and/or *Transportation Equipment Painter*:
<http://data.europa.eu/esco/occupation/a784b063-89cf-441b-9624-deed9dbdea6>

These links can also be used to explore adjacent occupations.

The following table indicates which organizations were approached and provided valuable feedback for the Description of the Associated Role and WorldSkills Occupational Standards in place for WorldSkills Shanghai 2022.

Organization	Contact name
BASF Coatings GmbH (Global)	Andreas Jansen, STAMPP Manager, STimulate and revAMp the Paint Professions
Festool GmbH (Global)	Stefan Langenberg, Training Manager International Automotive
PPG (global)	Jessica Neri, Commercial Territory Manager
PPG Industries Australia/New Zealand	John Hristias, Business Support Manager, Technical, Product, Training and Sales - Technical, Product, Training and Sales
SATA GmbH & Co. KG (Global)	Jörn Stöver, Export Sales Manager
The National Institute for Automotive Service Excellence – ASE (United States of America)	Teresa Bolton, Director, Collision Repair Test Development