

Best Practice Guidelines for Vehicle Refinishing for Repair Installations

PART 1: What you MUST do Required Practices for Vehicle Refinishing for Repair

Arising from the

**Limitation of Emissions of Volatile Organic Compounds
due to the Use of Organic Solvents
in Certain Paints, Varnishes and Vehicle Refinishing Products
Regulations 2007
Statutory Instrument No 199 of 2007**

PART 2: What you SHOULD consider doing

Excellent Practices for Vehicle Refinishing for Repair

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Guidelines:

These guidelines have been published by the Environmental Protection Agency as required by Article 5(4) of the Limitation of Emissions of Volatile Organic Compounds due to the use of Organic Solvents in certain Paints, Varnishes and Vehicle Refinishing Regulations 2007, henceforth referred to as the "2007 Regulations" or "Regulations" in this document. **Part 1 provides a description of the mandatory requirements against which a Vehicle Refinishing installation will be assessed in the course of an AIC inspection.** Part 2 of these guidelines outline what is considered (at time of publishing) current Best Practice for vehicle refinishing installations - promoting environmental protection and reducing operating costs. Such practices must be viewed as additional to the mandatory requirements specified in Part 1.

The guidelines are technical in nature having regard to current Best Environmental Options. Legal compliance in any given instance of dispute can only be definitively determined by due legal processes.

Best Practice Guidelines for Vehicle Refinishing for Repair

PART 1: What you MUST do

Arising from the 2007 Regulations

**Limitation of Emissions of Volatile Organic Compounds
due to the Use of Organic Solvents
in Certain Paints, Varnishes and Vehicle Refinishing Products
Regulations S.I. No. 199 of 2007**

A guide to the Vehicle Refinishing Products aspect of these Regulations

SUMMARY OF WHAT YOU MUST DO UNDER THE 2007 REGULATIONS

This page presents a brief summary list of requirements. More detail on each requirement is given within this document.

IF you carry out vehicle refinishing for repair on an industrial or commercial basis, no matter what the scale of operation is, YOU MUST:

1. Use only compliant products

- From 1 July 2007 you must only use compliant products. To do this – check the label, Material Safety Data Sheets (MSDS) or with your supplier.
- You are allowed to use non-compliant products up until 1 January 2008 but only where these were produced before 1 January 2007.
- You are allowed to use non-compliant products after 1 January 2008 only where the Minister¹ has specifically permitted the sale and purchase of these materials for restorative purposes of vintage vehicles.

2. Ensure the operational management requirements, e.g. process and staff supervision and staff training, are met.

3. Ensure **spray guns** with a documented, demonstrable minimum transfer efficiency of 65% and suitable **gunwashing equipment** are used.

4. Ensure **VOC-containing product handling and storage** requirements are met.

5. Ensure **VOC-containing waste storage, handling and disposal** requirements are met.

6. Compile and maintain **appropriate documentation** for inspection. There is a spreadsheet available to assist in compiling such records, on the EPA website, www.epa.ie.

7. Commission an **inspection** by an Accredited Inspection Contractor (AIC) who will produce a report. If, in the view of the AIC, the initial inspection uncovers any major non-compliance issues, these must be rectified and a further inspection or inspections undertaken.

8. Obtain a **Certificate of Approval before 1 March 2008**, by submitting the compliant AIC report to your local authority, along with completed registration form and registration fee. Certificates for all obligated businesses existing on 1 March 2008 will expire on 1 March 2010.

¹ Minister for the Environment, Heritage and Local Government.

Certificates issued for new businesses (i.e. commencing after 1 March 2008) need to be obtained prior to commencement and will last for two years from that date.

- 9 Mobile vehicle refinishing operators must submit a compliant AIC report to, and obtain a Certificate of Approval from, all local authorities in whose functional areas they carry out their vehicle refinishing activities.
- 10 **Renew** the Certificate of Approval every second year before its expiry date.

Do	Don't
<ul style="list-style-type: none"> - Use compliant products from 1 July 2007 - Get a compliant AIC inspection report before 1 March 2008 - Inform the EPA if supplied with improperly labelled or unauthorised non-compliant products after 1 January 2008 - Inform the local authority where a breach of the Regulations has occurred - Ensure staff are trained and adequately supervised - Store VOC-containing materials in suitable, clearly identified containers in dedicated areas - Use licensed/permitted waste companies for the collection recovery and disposal of VOC-containing wastes - Maintain all documentation needed for inspection - Renew your registration within 2 years of expiry by undertaking an AIC inspection 	<ul style="list-style-type: none"> - Operate after 1 March 2008 without a Certificate of Approval - Wash spray guns other than in gun washing equipment - Use spray guns with transfer efficiencies less than 65% - Leave containers with VOC materials open - Dispose of VOC-containing materials as part of domestic or municipal waste - Allow VOC-containing materials go to sewer, drains, watercourses or ground - Have drains in the vicinity of areas where VOCs are used - Operate a mobile vehicle refinishing premises without waste collection permit(s) from each local authority in whose functional area operating

1.1 Introduction

Part 1 of this Guidance document has been developed to help implement a European Directive² on the VOC content of vehicle refinishing products. The Directive has been brought into effect in Ireland through Regulations signed in May 2007³. Section 5(4) of these Regulations requires the Agency to publish best practice guidelines for vehicle refinishing installations following consultation with, and approval by, the Minister. The requirements set out under Part 1 of this document are, following ministerial approval, mandatory for installations carrying out vehicle refinishing for repair (see definition below). These requirements form the basis for the independent AIC inspections which vehicle refinishing installation operators must commission and submit to their local authority for approval.

For vehicle refinishing for repair installations, these 2007 Regulations replace the requirements that were set out under Regulations published in 2002⁴.

Please note: The 2002 Solvents Regulations still apply for the original coating of vehicles or trailers carried out above the solvent consumption threshold of 0.5 tonnes per year (defined as “the original coating of road vehicles as defined in Directive 70/156/EEC or part of them with refinishing-type materials, where this is carried out away from the original manufacturing line, or the coating of trailers including semi-trailers category O”). Separate best practice guidance applies to these installations (see www.epa.ie for information). N.B. if you carry out original coating of vehicles or coating of trailers, but are below the 0.5 tonnes per year threshold, you need to keep records to show that you are below the threshold.

1.2 Vehicle Refinishing covered by the 2007 Regulations

Vehicle refinishing covered by the 2007 Regulations is defined as:

“the coating of road vehicles as defined in Directive 70/156/EEC, or part of them, carried out as part of vehicle repair, conservation or decoration outside of manufacturing installations”.

A “vehicle refinishing installation” means any industrial or commercial activity and associated degreasing activities performing vehicle refinishing.

² Directive 2004/42/EC on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products and amending Directive 1999/13/EC. *OJ L 143, 30.4.2004, p. 87-96.*

³ Limitation of Emissions of Volatile Organic Compounds due to the Use of Organic Solvents in Certain Paints, Varnishes and Vehicle Refinishing Products Regulations 2007 (S.I. No. 199 of 2007).

⁴ Emissions of Volatile Organic Compounds from Organic Solvents Regulations 2002 (S.I. No. 543 of 2002).

The definition of vehicle refinishing has been abbreviated in this document's title – Vehicle Refinishing for Repair but when in doubt the legal definition applies. The categories of vehicles in Directive 70/156/EEC are reproduced in Appendix 1.

The definition of "premises" in the legislation includes mobile plant. Thus mobile operators carrying out vehicle refinishing also come under the 2007 Regulations.

Please note: Unlike the 2002 Regulations, there is no threshold above which the 2007 Regulations apply – that is, if you carry out any level of vehicle refinishing on an industrial or commercial basis you come under the 2007 Regulations.

If you carry out the original coating of vehicles or the coating of trailers you will need to check if you come under the 2002 Regulations – see the Best Practice Guidelines for Vehicle Coating and Refinishing under the 2002 Regulations to determine this.

It is important to draw a distinction between:

- Original coating of road vehicles or part of them with refinishing-type materials, where this is carried out away from the original manufacturing line (over 0.5 tonnes) - comes under the 2002 Regulations.
- Coating of road vehicles or part of them carried out as conservation or decoration outside of manufacturing installations (any level of consumption) - comes under the 2007 Regulations.

Thus vehicles being re-coated or being decorated will fall into the latter. Only original vehicle coating will fall under the former.

If your process has a capacity to use at least 10,000 kg (10 tonnes) of organic solvents per year, you need to hold an Integrated Pollution Prevention and Control (IPPC) licence in order to operate. If this is the case, and you are not already IPPC licensed, you must notify the EPA immediately at EPA Headquarters, PO Box 3000, Johnstown Castle Estate, Co. Wexford Tel: 053-9160600). It is anticipated that vehicle refinishing operations in Ireland will not be above this threshold, but the onus is on the operator to ensure this.

1.3 Compliant Product Requirements

1.3.1 Effective Dates

From 1 July 2007 you must only use products placed on the market in accordance with the 2007 Regulations. To do this – check the label, the Material Safety Data Sheet (MSDS) or with your supplier (who is obliged to provide you with an MSDS for each product they sell).

Non-compliant products can still be placed on the market without a licence until 1 January 2008, provided it can be shown they have been produced

before 1 January 2007 or, in the case of products for restoring or maintaining vintage vehicles, have received a permit from the Minister for the Environment, Heritage and Local Government, (See 1.3.6). However, it is advisable to switch to compliant products as soon as possible and minimise stocks of non-compliant products.

1.3.2 Compliant Products

Compliant products are those that are at or below the following VOC content in grams per litre of ready for use product (g/l):

Category of product		Maximum VOC content ⁵ (g/l ready for use) (excluding water content of the product ready for use for categories b to e)
<i>a</i> Preparatory & cleaning	Preparatory (gunwash, paint strippers, degreasers and silicone removers)	850
	Pre-cleaner	200
<i>b</i> Bodyfiller/ stopper	All types	250
<i>c</i> Primer	Surface/filler & general (metal) primer	540
	Wash primer	780
<i>d</i> Top coat	All types (base coatings and clear coating)	420
<i>e</i> Special finishes	All types	840

The definitions for VOCs and for each of the above categories of product are set out in Appendix 2.

1.3.3 How to Ensure you are using Compliant Coatings

In short – check the label, MSDS or with your supplier. For vehicle refinishing products produced since 1 January 2007, manufacturers are required to label their products to show that they comply with the 2007 Regulations.

This label must show:

- Which category of product it is (primer, top-coat, etc.).
- The associated maximum VOC limit under the 2007 Regulations.
- The actual VOC content (g/l) of the product in a ready to use condition.

Therefore it should be straightforward to identify if a product is

⁵ As determined by ISO 11890-2 or ASTM 2369.

compliant or non-compliant. If in doubt, don't use the product before checking with your supplier.

In order to show compliance with these requirements, you must establish the following:

- A written procedure in place for checking product compliance.
- A list of all suppliers who supply you with VOC-containing vehicle refinishing products.
- A record of each vehicle refinishing product in use, its category of product, associated maximum VOC limit, actual VOC content (g/l) in a ready to use condition, litres purchased since 1 July 2007, and confirmation that each product has been checked for compliance.
- A record of each authorised, non-compliant vehicle refinishing product used or in use, quantity of each product used, authorisation reference and registration number of each vehicle for restoration of which non-compliant product(s) were authorised.

There is a spreadsheet available to compile such records (www.epa.ie) but any other format of records that contains the same information can be used. Using the recommended format will assist the AIC to expedite your inspection.

1.3.4 Dealing with Unauthorised Non-compliant Products

From 1 January 2008, if you are supplied with product that is unauthorised, incorrectly labelled or non-compliant, the 2007 Regulations (Article 20) require you to inform the Environmental Protection Agency and act as directed by the Agency.

The written procedure for checking product compliance must reflect the above requirements.

1.3.5 Existing Stocks of Products

Use of non-compliant products is prohibited from 1 July 2007 (with the exception of specifically permitted products for refinishing of vintage vehicles). Vehicle refinishing installations may use existing stocks of non-compliant products in the course of their business before 1 January 2008, once it is evident that they were produced before 1 January 2007, and supplied to the vehicle refinishing installation before the entry into force of the 2007 Regulations (S.I. No. 199 of 2007). Non-compliant products should be recovered or disposed of by a licensed/permitted waste company.

1.3.6 Vintage Vehicle Exemption

For restoring or maintaining vintage vehicles, you may be supplied with and use vehicle refinishing products that are not compliant, but the following conditions apply:

- A written permit must be obtained from the Minister for the Environment, Heritage and Local Government. In order to obtain such a permit, a documented, substantive case is required from experts as to why compliant products could not be used.
- There must be a real need for the particular non-compliant product that compliant products cannot meet.
- Only limited quantities of such products can be acquired and used. Records of these products along with corresponding quantities must be kept.
- While vintage vehicles are defined for the purposes of motor taxation as a vehicle that is 30 or more years old, only vintage vehicles that have particular historical and cultural value may be approved to be restored or maintained using non-compliant products. Determination of these issues is a matter for the Minister. Such applications should be sent to Air Quality and Climate Change Section, Department of the Environment, Heritage and Local Government, Custom House, Dublin 1.

1.4 Management and Supervision

Staff must be adequately supervised in the course of their work to ensure that proper procedures are adhered to and that training provided is applied correctly to avoid unnecessary emissions of VOCs to the environment.

There is also an obligation on the installation operator to inform the local authority where a breach of the 2007 Regulations has occurred (Article 10(1)). The operator shall take all necessary measures to ensure compliance is restored within the shortest possible time. Where any non-compliance poses immediate danger to human health, the operator shall suspend this operation until such situation is remedied and the local authority is satisfied that compliance is restored. It is imperative that any issue of nuisance solvent odours at sensitive receptors be resolved without delay.

There is a legal obligation on the operator to provide the enforcement authorities with compliance information and they must not obstruct or wilfully withhold information from them.

1.5 Staff Training Requirements

A record should be kept of the names of staff who are trained and deemed competent to carry out the following activities:

- operate spray equipment and carry out spray gun cleaning
- carry out paint mixing and preparation
- operate any on-site solvent recycling unit (if relevant).

The following training must be carried out:

- All staff carrying out spraying for vehicle refinishing must be effectively trained in:
 - o the correct operation of spray equipment and spray techniques to minimise overspray, and
 - o spray gun cleaning that minimises VOC emissions including correct operation of enclosed gun cleaning unit(s).
- All staff involved in paint mixing and preparation must be trained in the correct operation of preparation and mixing equipment.
- If relevant, all staff operating any on-site solvent recycling unit must be trained in the correct operation of this equipment.
- Storage and handling of waste products.

All of the above training can have been obtained:

- as part of apprenticeship training, or
- from equipment suppliers, or
- from training in-house from another member of staff who has already been trained.

For training obtained through apprenticeship, you should have a copy of the employee's qualification.

You need to have written records of any training carried out either in-house or by equipment suppliers (otherwise such training activity is just a rumour or hearsay and **cannot** be taken into account for inspection purposes). This should include dates of training, what the training consisted of, and the staff (providing the training and those being trained) names and signatures. These records should be retained while the staff member remains at these duties and afterwards for at least two years. Periodic reviews of training should be made by management to introduce any advances in products or equipment and their correct use to avoid excessive VOC emissions. Both new staff and staff already trained should be given instruction on these advances as appropriate. Updated training records should be provided to staff members on completion of new/additional training.

Please note: the training described here is additional to any health and safety training required.

Training may need to be repeated where employees perform duties only intermittently or where supervision shows that significant deviations are occurring from required behaviours or skill levels.

There is a spreadsheet available to compile records, including training records, (www.epa.ie) but any other format of records that contains the same information can be used.

1.6 Equipment Requirements

You will have to meet the following requirements in relation to equipment used:

- **Spray guns** with a documented, demonstrable minimum transfer efficiency⁶ of 65% should only be used.
- Gun washing activities using VOC-containing products must be confined to gun washing equipment only. This can be manual or automatic. Gun washing equipment is taken to mean equipment for cleaning of guns using fluid at ambient temperature and air/mechanical means. This does not infer use of an associated solvent recycler (distillation/evaporation unit).
- All spray guns and gun-cleaning units must be properly operated and maintained in accordance with manufacturer's specifications. Written procedure for proper operation of both spray gun(s) and gun-cleaning equipment should be made available to personnel using such equipment.
- All of the above must be operated in such a manner as to avoid VOC emissions.

1.7 VOC-containing Product Handling and Storage Requirements

1.7.1 General Requirements

You will have to meet the following requirements in relation to storage of VOC-containing product:

- Only containers suitable for storing such chemical products should be used.
- All vessels used to contain such chemicals should be inspected for leaks and corrosion (e.g. closures, integrity of seams, rims, walls checked).
- Containers holding VOC materials (including waste materials) should be clearly labelled, easily identified and distinguished from other containers holding materials not containing VOC.
- There should be no drains to sewer or externally that could be affected by any accidental spillage in the vicinity of areas where VOC-containing liquids are stored, handled and used such as the paint storage area, the

⁶ Transfer Efficiency in this document is defined as the ratio of the mass of the dried film to the mass of paint solids delivered by the atomiser expressed as a percentage and determined by EN 13966-1:2003.

paint mixing area, the refinishing area, any gun-wash units or recycling units, and the VOC-containing liquid waste storage area.

- Keep all VOC-containing containers closed when not in use and during transport around the premises, and instruct/supervise all employees on this practice. This includes containers holding VOC-containing waste and containers that are partially filled.
- VOC-containing material storage area(s) (including waste) must be:
 - Adequately ventilated,
 - Secured against vandalism or unauthorised access,
 - Arranged to avoid any damage from collisions or spills from trips as far as practicably possible.
 - Equipped with spill containment and clean-up kits with people trained to use them correctly. All materials collected following accidental spillages should be stored in a suitable, enclosed container pending its collection by a correctly licensed waste collection operator.

1.7.2 Requirements for on-site solvent recycling units

On-site solvent recycling units evaporate waste gun-wash and condense it for reuse in the gun-wash equipment. They can be stand-alone units or integrated into gun-cleaning equipment. If using an on-site solvent recycling unit you must ensure that associated VOC emissions are not significant, i.e. that the condenser on the unit is efficient. Ensure the following:

- The quantities of waste gun-wash recycled through the unit and percentage yield are recorded.
- The unit is operated correctly according to written operating instructions.
- The unit is properly maintained in accordance with manufacturer's requirements.

1.8 VOC-containing Waste Requirements

1.8.1 Requirements for all operators

You will have to meet the following requirements in relation to VOC-containing wastes:

- VOC-containing waste streams:
 - o VOC-containing *liquid* wastes should be collected in appropriate, closed containers for recovery or disposal. This includes:
 - waste gun-wash.
 - leftover paints.

- VOC-containing *solid* wastes should be collected in dedicated closed containers⁷ for recovery or disposal. This includes:
 - waste cloths/rags/paper containing VOCs.
 - any unused bodyfiller.
 - waste paint solids containing VOCs.
 - waste filters from gun-wash equipment.
 - liners from recyclers containing solids and VOCs.
 - waste spray booth filters.
- Maximise the amount of VOC-containing waste streams that are sent for recovery for reuse rather than disposal. This can be achieved through segregation of VOC-containing waste streams that may be suitable for recovery for reuse such as gun-wash and not mixing with other waste streams such as paints. Discussions with waste companies about services they supply can be of assistance in this respect.
- Provide suitable facilities and instruct employees on the arrangements at your installation in relation to these waste streams.
- Only use waste contracting companies who are correctly licensed/permitted. You must check that their licence/permit is current and allows them to handle this type of waste. You must also check that they have a current waste collection permit that allows them to collect this type of waste within your local authority area.
- Obtain and keep on file documentation from waste contractors for each shipment of VOC-containing waste collected since 1 July 2007. This should detail how much waste was collected and when, what company collected it, its final destination, and whether it was recovered or disposed. Remember, you are responsible for this potentially hazardous waste and must be able to show, when requested, that it has been properly treated by a correctly licensed/permitted operator.
- Do not dispose of any VOC-containing materials as part of domestic or municipal waste.
- Do not allow VOC-containing materials to enter any drains, sewers or watercourses, or be discarded on the ground.

Also, some solid waste containing dried paint should be considered hazardous materials, for example masking paper, protective clothing or booth filters, where topcoats containing lead or primers containing zinc chromate have been used. These wastes should be stored appropriately and collected by a

⁷ Improperly stored materials such as cloths, paper or rags soaked with VOCs under certain conditions can lead to spontaneous combustion. Steps to avoid this risk include using small storage containers, emptying these daily, not compressing the material, not mixing with ordinary waste, and keeping at an ambient temperature below 25 °C.

correctly licensed/permitted waste operator. Such waste should be considered hazardous unless specifically proven otherwise.

Please Note: The practice of allowing cans with VOC-containing waste to dry either in the open or in drying ovens, does not guarantee that the residues are VOC-free and is potentially damaging both to human health and the environment. All such waste must still be considered hazardous.

1.8.2 Additional Requirements for Mobile Operators

Mobile vehicle refinishing installations are, due to the nature of their operation, involved in transporting VOC-containing waste materials (waste paint, waste gun-wash, VOC-containing solid waste).

Under the Waste Management Act "collection" means "the gathering, sorting or mixing of waste for the purpose of its being transported, and includes the transport of waste and the acceptance of control of waste".

The Waste Management (Collection Permit) Regulations 2001 require those who, during the course of business, are involved in the collection of waste to obtain waste collection permits for the areas in which such waste is collected.

Thus all mobile vehicle refinishing operators require a waste collection permit for the areas in which they carry out their mobile activities.

1.9 The Process to Obtain Certificate of Approval

1.9.1 Certificate of Approval

After 1 March 2008 you will need a **Certificate of Approval, issued by your local authority**, in order to operate a vehicle refinishing installation within the law. It is an offence under S.I. 199 of 2007 to operate without a valid Certificate of Approval after this date and to do so leaves you open to prosecution.

To obtain your Certificate of Approval, you must first have an Accredited Inspection Contractor (AIC) review your operations and issue you with a compliant AIC report. The cost of the AIC inspection must be borne by the operator. If you undergo an AIC audit and are found to be non-compliant, you must correct any non-compliance immediately and achieve a compliant audit result before applying to the local authority for a Certificate of Approval. For installations set up after 1 March 2008, a certificate of approval is required before commencing operations. These requirements are additional to any planning permission(s) required.

For mobile vehicle refinishing operators a compliant AIC report must

be submitted to, and a Certificate of Approval obtained from, each local authority in whose functional areas they carry out their mobile activities.

1.9.2 The Accredited Inspection Contractor (AIC)

The inspection contractor contracted to prepare the AIC Report must be accredited by the Irish National Accreditation Board (INAB) to ISO 17020 under the 2002 Regulations⁸. A current list of accredited AICs is available on the INAB website at www.inab.ie or by contacting INAB at Wilton Park House, Wilton Place, Dublin 2. Phone +353(0)1 607 3003.

1.9.3 The AIC Report

The AIC Report demonstrates whether or not your facility complies with the requirements of the 2007 Regulations.

The AIC report will recommend whether a Certificate of Approval should be granted or refused and the reasons for the decision. The report may also indicate minor non-compliances or contain observations to be addressed to ensure compliance, including time frames where relevant. Failure to address such minor non-compliances or observations within the appropriate time frames might result in a major non-compliance. Where a non-compliant report is issued, any major non-compliance will relate to an issue that has actually resulted in a non-compliance with the requirements. You must rectify these major non-compliances and submit to a further AIC inspection or inspections.

1.9.4 Obtaining the Certificate of Approval

To obtain your Certificate of Approval, submit the following to your local authority:

- completed registration form in Appendix 1.3 of these Guidelines.
- the compliant AIC report.
- a fee of €50.

Contact your local authority environment section to check their procedure for registration.

If the local authority is satisfied that the Regulations are being complied with it must issue the Certificate of Approval within 21 days of an application being submitted. Any minor non-compliances or observations in the AIC report will be attached to the Certificate of Approval.

If the local authority considers that the Regulations are not being complied with, it will notify you of its refusal to issue a certificate. The local authority can inspect premises themselves or commission AICs to do so on their

⁸ Emissions of Volatile Organic Compounds from Organic Solvents Regulations 2002 (S.I. No. 543 of 2002).

behalf. The local authority can pursue prosecution for an offence under the Regulations if considered necessary.

The local authority can also look for further information if it is not satisfied with the AIC Report.

1.9.5 Renewing the Certificate of Approval

The frequency of inspection by an AIC depends on the expiry date of your Certificate of Approval. Certificates of Approval are granted by the local authority and will be valid for 2 years before expiry. For all obligated businesses in existence on 1 March 2008, the Certificate of Approval will expire on 1 March 2010. For renewal of a Certificate of Approval, another AIC inspection must be carried out and the associated compliant AIC report, along with completed renewal application form and registration fee, should be submitted to the local authority not less than 28 days before the expiry date of the current Certificate of Approval. For businesses commencing after the 1 March 2008, the Certificate of Approval must be obtained prior to commencement and will last two years from that date.

1.9.6 Offences under the 2007 Regulations

Either the EPA or local authorities can prosecute persons accused of committing offences under the 2007 Regulations. Failure to comply with the Regulations can lead to a fine of up to €3,000, or 12 months imprisonment, or both.

Offences can include operating without a Certificate of Approval or not complying with the requirements of the Certificate of Approval.

Where non-compliance with the requirements of the Regulations poses an immediate danger to human health, the local authority can require suspension of the operation for so long as the non-compliance continues and until it is satisfied the installation complies with the Regulations. Odour from solvents, for example, is a particular situation that might require management in this regard.

1.9.7 Avoiding Nuisance

Operating a vehicle refinishing installation in compliance with the requirements of the Regulations should normally avoid nuisance being caused to neighbouring premises. However, Solvents/VOCs have particular odour properties which require any exhaust or fugitive gasses to be adequately dispersed. Complaints of solvent odours will need to be competently assessed to ensure that human health is not endangered.

1.9.8 Enforcement

The main onus to comply lies with the operator and it shall be an offence to operate from 1 March 2008 other than in compliance with a valid Certificate

of Approval. There is a legal obligation on the operator to inform the authorities where non-compliant or incorrectly labeled product is supplied or where non-compliant conditions have arisen at their installation. They must cease operations where human health is in immediate danger. Operators must not obstruct or wilfully withhold information from competent bodies.

The local authorities are the competent bodies responsible for the enforcement of the Regulations within their functional areas. The EPA is the Competent Authority for the purposes of the Directive and these Regulations and will exercise general supervision and offer guidance as necessary. The EPA Office of Environmental Enforcement will support the local authorities' enforcement activities through the Environmental Enforcement Network. Additionally, AICs may inform the authorities where they suspect non-registration is occurring.

All Vehicle Refinishing customers are being urged to use only registered operators including insurance companies, public and private sector procurement as well as the general public.

Vehicle Refinishing operators that do not register can expect escalating enforcement action including inspection, formal warning and legal action.

1.10 AIC Inspection

1.10.1 Preparing for the AIC Inspection

You will need to do a certain amount of work before you bring an AIC in to inspect your operations. There is a spreadsheet available to assist in compiling such records (www.epa.ie) but any other appropriate format of records that contains the same information can be used. You will need to gather the following:

- 1 A list of all vehicle refinishing products in use at the installation since 1 July 2007 (or for the relevant period in the case of subsequent audits), broken down into the categories of product shown in the table in section 3.2.
- 2 Confirmation that each vehicle refinishing product purchased since 1 July 2007 (or within the relevant period for subsequent audits) was produced since 1 January 2007 meets the stated VOC limits and was/is appropriately labelled.
- 3 Records of the total volumes, in litres, purchased per month for each refinishing product since 1 July 2007 (or for the relevant period in the case of subsequent audits).
- 4 Documentation showing spray guns and associated equipment and gun wash equipment are operated and maintained in accordance with manufacturers requirements.
- 5 For VOC-containing waste sent off-site since 1 July 2007 (or for the relevant period in the case of subsequent audits), the documentation obtained from the waste company. This is for VOC-containing liquid

waste (e.g. gunwash) and VOC-containing solid waste (e.g. solvent containing rags, solvent containing paint solids, etc).

- 6 Where you are using the exemption for vehicle refinishing products for vintage vehicles: since 1 July 2007 you must provide the written permit from the Minister for the Environment, Heritage and Local Government, list the vehicle refinishing product names, the category of refinishing products, the VOC content of such products, the quantities used, and the make, model and vehicle registration number of each of the vintage vehicles refinished.
- 7 A list of the personnel who operate spray equipment, who carry out paint mixing and preparation, and, where applicable, who operate any on-site solvent recycling unit.
- 8 Written records of all relevant training carried out either in-house or by equipment suppliers.
- 9 Written procedure(s) for the acceptance (goods inwards) of VOC containing products checking for compliance with labelling and VOC content, and what to do in the event of non-compliance.
- 10 Written procedures for all activities involving the use and handling of any VOC-containing substances and waste.
- 11 Where original coating of vehicles or coating of trailers is carried out, records to show usage is below the consumption threshold of 0.5 tpa.

Your supplier(s) will be able to provide you with a lot of the above information in items 1 to 3, but it is up to you to ensure all the refinishing products in your storeroom are on your list and are compliant by the dates specified.

Non-compliant products (except those explicitly permitted for vintage vehicle restoration but not including those surplus to requirements following vintage vehicle restoration) should not be retained beyond the end of 2007. If they are not used up in the course of refinishing by the end of 2007, they should be treated by an appropriately licensed waste company. If they are still available in your storeroom after 1 January 2008 the AIC can only assume that they are "in use". Permitted non-compliant products should be stored separately and their use subjected to appropriate controls.

N.B. there is a Microsoft Excel spreadsheet available on the EPA website, www.epa.ie, that can be used to record the above information.

The checklist in the following section can be used as an aid before having an AIC inspection carried out.

1.10.2 CHECKLIST BEFORE UNDERTAKING AN AIC INSPECTION

Y/N	QUESTION
Compliant Product Requirements	
	Is a written procedure available for checking compliance of VOC-containing products with the 2007 Regulations on delivery of products to premises?

	Have all suppliers who supply the premises with VOC-containing vehicle refinishing products been listed?
	Are all vehicle refinishing products listed and categorised into the category of product?
	Has the actual VOC content (g/l) of the product in a ready to use condition been listed?
	Is evidence available for all existing stocks of non-compliant products to show that they were produced before 1 January 2007? (inspections prior to 1 Jan 2008 only)
	Are all products compliant with the relevant maximum VOC content limit for the category of product? (from 1 January 2008)
	Are all product containers labelled with the category of product, associated maximum VOC content limit, and actual VOC content?
	Has the quantity of each of the vehicle refinishing products purchased since 1 July 2007 been listed?
Vintage Vehicle Exemption	
	Is refinishing of vintage vehicles carried out? (if not, ignore the rest of the questions in this "vintage vehicle exemption" section).
	Have you obtained a permit from the Minister for the Environment, Heritage and Local Government?
	Is the permit available for inspection by the AIC?
	Can you show that you complied with the conditions attached to the permit?
	Do you have a list of the names of such vehicle refinishing products used since 1 July 2007? (or for the relevant period in the case of subsequent audits)
	Have you categorised them into the type of coating?
	Have you listed the associated VOC content of each product?
	Have you listed the quantities of each product purchased and used since 1 July 2007 (or for the relevant period in the case of subsequent audits)?
	Have you listed the make, model and vehicle registration number of each of the vintage vehicles refinished since 1 July 2007 (or for the relevant period in the case of subsequent audits)?
	Are materials designated for vintage vehicle restoration stored in a clearly defined location away from compliant product?
Management and Supervision	
	Are staff adequately supervised to ensure procedures are adhered to?
Staff Training Requirements	
	Have you a written list of the names of all staff who: <ul style="list-style-type: none"> - operate spray equipment and carry out spray gun cleaning? - carry out paint mixing and preparation? - operate any on-site solvent recycling unit (where present)?

	<p>Have the following staff been trained as part of apprenticeship training, documented training from equipment suppliers, or documented in-house training from a trained staff member?</p> <ul style="list-style-type: none"> - staff who carry out spraying trained in the correct operation of spray equipment and gun cleaning equipment? - staff who carry out paint mixing and preparation trained in the correct operation of preparation and mixing equipment? - staff who operate any on-site solvent recycling unit trained in the correct operation of this equipment? - staff who handle VOC-containing materials and waste trained in what to do in the event of a spill?
	<p>Has all training that has been provided in-house or provided by equipment suppliers been documented with dates of training, what the training consisted of, and the staff names, trainers' names and signatures?</p>
	<p>Are all staff familiar with the standard operating procedures for the activities in which they are involved? Are staff supervised adequately in the course of their work to ensure that procedures are followed and training correctly applied?</p>
<p>Equipment Requirements</p>	
	<p>Are spray guns with a documented, demonstrable minimum transfer efficiency of 65% only in use?</p>
	<p>Is there documented evidence of spray gun transfer efficiency according to the appropriate standard for each type/model of spray gun used?</p>
	<p>Are all spray guns operated and maintained in accordance with manufacturer's requirements?</p>
	<p>Are there written operational procedures for the use of spray guns employed?</p>
	<p>Are there spray gun maintenance records for gun washing activities available for inspection by the AIC?</p>
	<p>Is gun washing carried out only in gun washing equipment?</p>
	<p>Is gun washing equipment operated and maintained in accordance with manufacturer's requirements?</p>
	<p>Are there written operating procedures available for gun-washing equipment?</p>
<p>VOC-containing Product Handling and Storage Requirements</p>	
	<p>Are all VOC containers suitable for the products being stored (no corrosion, mis-fitting closures, etc.)?</p>
	<p>Are containers holding VOC materials easily identifiable and distinguishable from other non-VOC-containing materials?</p>
	<p>Are containers holding VOC-containing wastes labelled to indicate they contain VOC-containing waste?</p>
	<p>Are there any drains that could be affected by an accidental spillage in the vicinity of areas where VOC-containing liquids are stored, handled and used?</p>

	Are all VOC-containing containers, including waste containers, kept closed when not in use?
	Are employees instructed to close all containers containing VOC materials when not in use?
	Have VOC-containing material storage area(s) been clearly designated?
	Is each VOC-containing material storage area appropriately ventilated?
	Is each VOC-containing material storage area secured against vandalism or unauthorised access?
	Is each VOC-containing material storage area arranged to avoid any damage from collisions or spills from trips as far as possible?
	Is there an adequate spill containment and clean-up kit available at each VOC-containing material storage area?
	Is there a Standard Operating Procedure for actions in the event of accidental spillages available in each VOC-containing material storage area?
	Where an on-site recycling unit is in use, have you: <ul style="list-style-type: none"> - Recorded the quantities of waste gun-wash recycled through each unit? - Written operating instructions for each unit? - Carried out maintenance of each unit in accordance with manufacturer's requirements with records to show this?
VOC-containing Waste Requirements	
	Have you maximised the amount of VOC-containing waste streams that are sent for recovery for reuse rather than disposal?
	Have you set up adequate arrangements for the handling, storage and recovery/disposal of: <ul style="list-style-type: none"> - VOC-containing <i>liquid</i> wastes (gun-wash and waste liquid products)? - VOC-containing <i>solid</i> wastes (waste cloths/rags/paper containing VOCs and waste paint solids containing VOCs)?
	Have you checked that the companies you use for removal of VOC-containing waste are currently licensed/permitted to take this waste?
	Have you instructed employees on these arrangements for VOC-containing solid and liquid wastes?
	Have you retained waste transfer documentation for all VOC-containing waste shipments since 1 July 2007 (or for the relevant period in the case of subsequent audits)?
	Have you checked that such documentation contains: <ul style="list-style-type: none"> - how much waste was collected, - when waste was collected, - what company collected it, - the company collection permit number, - the final destination of the waste,

	- information as to whether the waste was recovered or disposed.
	For mobile operators: have you obtained a waste collection permit from the designated local authority for each of the areas in which you carry out mobile vehicle refinishing activities?

Please Note: Accredited Inspection Contractor personnel are not obliged to initiate, or proceed with, an inspection where they have reason to suspect that all current, applicable health and safety regulations (e.g. storage of hazardous substances, provision of appropriate, adequate and checked fire extinguishing equipment, etc.) are not being complied with by the operator.

1.10.3 The Inspection Process

The Accredited Inspection Contractor (AIC) inspector may ask for your documentation in advance of the day of the inspection.

On the day of the inspection, the AIC inspector will:

- Review the documentation that you have compiled:
 - o The list of suppliers.
 - o The list of all vehicle refinishing products in use at the installation from 1 July 2007 (or for the relevant period in the case of subsequent audits), broken down into the categories, and confirmation that they meet the limits set for each category.
 - o Training documentation.
 - o Waste documentation.
 - o Procedure for checking product compliance.
 - o Procedure for spills.
 - o For mobile operators: copies of waste collection permits.
 - o For on-site recyclers: quantities recycled, written procedures, and maintenance records.
- Carry out spot checks on the back up documentation for these figures (e.g. against labelling on product cans, invoices, material safety data sheets (MSDSs), waste certificates of recovery/disposal, etc.).
- Carry out spot checks on vehicle refinishing product container labelling.
- Tour areas of the premises relevant to the refinishing operation – spray booths/ovens, paint mix rooms, vehicle preparation areas where solvents are used, solvent recycling units (where used), paint and thinners storage areas, waste solvent storage areas, location of booth/oven stack outlets, etc.
- Interview relevant employees – e.g. sprayers, purchasing personnel, paint mixing personnel, operator(s) of recycling unit(s) (if used), and any other handlers of VOC-containing materials and waste.
- Ask for the legal identity/name of the installation.

It should be noted that the inspector is looking for documented and observable evidence that you have complied and are complying with the requirements of this guidance. There is a spreadsheet available on the EPA website, www.epa.ie, to assist in compiling such records, and its use is recommended to expedite your AIC inspection.

It may be the case that follow up AIC inspection visits are required depending on the outcome of any previous inspection(s) and the professional judgement of the AIC inspector. NB: the National Protocol that the AIC inspector uses, and which contains the AIC report template, is available on the EPA website at www.epa.ie

Appendix 1.1 Categories of Vehicles from Directive 70/156/EEC as amended

Category M: Motor vehicles with at least four wheels, designed and constructed for the carriage of passengers.

Category M₁: Vehicles designed and constructed for the carriage of passengers and comprising no more than eight seats in addition to the driver's seat.

Category M₂: Vehicles designed and constructed for the carriage of passengers, comprising more than eight seats in addition to the driver's seat, and having a maximum mass not exceeding 5 tonnes.

Category M₃: Vehicles designed and constructed for the carriage of passengers, comprising more than eight seats in addition to the driver's seat, and having a maximum mass exceeding 5 tonnes.

Category N: Motor vehicles with at least four wheels designed and constructed for the carriage of goods.

Category N₁: Vehicles designed and constructed for the carriage of goods and having a maximum mass not exceeding 3.5 tonnes.

Category N₂: Vehicles designed and constructed for the carriage of goods and having a maximum mass exceeding 3.5 but not exceeding 12 tonnes.

Category N₃: Vehicles designed and constructed for the carriage of goods and having a maximum mass exceeding 12 tonnes.

Category O: Trailers (including semi-trailers)

Category O₁: Trailers with a maximum mass not exceeding 0.75 tonne.

Category O₂: Trailers with a maximum mass exceeding 0.75 tonne but not exceeding 3.5 tonnes.

Category O₃: Trailers with a maximum mass exceeding 3.5 but not exceeding 10 tonnes.

Category O₄: Trailers with a maximum mass exceeding 10 tonnes.

'Maximum mass' means technically permissible maximum laden mass.

Taken from Council Directive 70/156/EEC of 6 February 1970 on the approximation of the laws of the Member States relating to the type-approval of motor vehicles and their trailers, *Official Journal L 042, 23/02/1970* as amended.

Appendix 1.2 Definitions

These definitions are taken from the Limitation of Emissions of Volatile Organic Compounds due to the Use of Organic Solvents in Certain Paints, Varnishes and Vehicle Refinishing Products Regulations 2007 (S.I. No. 199 of 2007).

The definition of "**Volatile organic compound**" (VOC) is as follows:

any organic compound with an initial boiling point less than or equal to 250°C measured at a standard pressure of 101.3 kPa.

The definition of "**VOC content**" is as follows:

the mass of VOCs, expressed in grams/litre (g/l)⁹, in the formulation of the product in its ready to use condition. The mass of VOCs in a given product which react chemically during drying to form part of the coating are not considered part of the VOC content.

A definition of each of the **categories of products** is as follows:

- (a) "**preparatory and cleaning**" means products designed to remove old coatings and rust, either mechanically or chemically, or to provide a key for new coating:
 - (i) preparatory products include gunwash (a product designed for cleaning spray-guns and other equipment), paint strippers, degreasers (including anti-static types for plastic) and silicone removers.
 - (ii) "**precleaner**" means a cleaning product designed for the removal of surface contamination during preparation for and prior to the application of coating materials.
- (b) "**bodyfiller/stopper**" means heavy-bodied compounds designed to be applied to fill deep surface imperfections prior to the application of the surface/filler.
- (c) "**primer**" means any coating that is designed for application to bare metal or existing finishes to provide corrosion protection prior to application of primer surfacer:
 - (i) "**surfacers/filler**" means a coating designed for application immediately prior to the application of topcoat for the purpose of corrosion resistance, to ensure adhesion of the topcoat, and to promote the formation of a uniform surface finish by filling in minor surface imperfections.
 - (ii) "**general metal primer**" means a coating designed for application as primers, such as adhesion promoters, sealers, surfacers, under-coats, plastic primers, wet-on-wet, non-sand fillers and spray fillers.
 - (iii) "**wash primer**" means coatings containing at least 0.5% by weight of phosphoric acid designed to be applied directly to bare metal surfaces to provide corrosion resistance and adhesion; coatings used as weldable primers, and mordant solutions for galvanised zinc surfaces.
- (d) "**topcoat**" means any pigmented coating that is designed to be applied either as a single-layer or as a multiple-layer base to provide gloss and durability. It includes all products involved such as base coatings and clear coatings:

⁹ As determined by ISO 11890-2 or ASTM D 2369.

- (i) "**base coatings**" means pigmented coatings designed to provide colour and any desired optical effects, but not the gloss or surface resistance of the coating system.
- (ii) "**clear coating**" means a transparent coating designed to provide the final gloss and resistance properties of the coating system.
- (e) "**special finishes**" means coatings designed for application as topcoats requiring special properties, such as metallic or pearl effect, in a single layer, high-performance solid-colour and clear coats, (e.g. anti-scratch and fluorinated clear-coat), reflective base coat, texture finishes (e.g. hammer), anti-slip, under-body sealers, anti-chip coatings, interior finishes; and aerosols.

Appendix 1.3 Application Form for the Certificate of Approval

LIMITATION OF EMISSIONS OF VOLATILE ORGANIC COMPOUNDS DUE TO THE USE
OF ORGANIC SOLVENTS IN CERTAIN PAINTS, VARNISHES AND VEHICLE
REFINISHING PRODUCTS REGULATIONS 2007

Application for Certificate of Approval/Renewal of Certificate of Approval

Name and address of the operator of the vehicle refinishing installation:

Address of the vehicle refinishing installation if different from above:

I am applying for a certificate of approval/renewal of certificate of approval
(delete as appropriate) for the above named installation under article 13/article
14 (delete as appropriate) of the above-named Regulations.

I enclose the report of the accredited inspection contractor for the above install-
lation, together with the registration fee of €50.00.

Signature.....

Date.....

Best Practice Guidelines for Vehicle Refinishing for Repair

PART 2: What you should consider doing

Excellent Practices for Vehicle Refinishing for Repair

**A guide to what is considered current best practice for vehicle refinishing
for repair**

Part 2

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2.1 Introduction

Part 1 of this document deals with mandatory requirements for vehicle refinishing for repair under the 2007 Regulations. This section of the document, Part 2, outlines what is considered "state-of-the-art" or "World Class" for the vehicle refinishing for repair sector, particularly in relation to VOC-material use and emissions. These techniques are not current requirements under the 2007 Regulations, but may be practices which you could consider implementing at your facility. In many cases these will reduce costs long-term and improve work quality as well as protecting employee health and the environment.

2.2 Choice of Repair Method

There are techniques which can be used in certain instances which can avoid the need for spraying in such cases. Using such alternatives will help free up the booth for other spray work:

- Dry guide coat. Guide coats are used to show up imperfections in fillers and primers prior to sanding. A dry product is available which can be used instead of aerosols or paint. This avoids VOC emissions and waiting time for the guide coat to dry.
- Scratch/chip repair systems. These systems can be used in certain instances for minor scratches or chips. They allow mixing of very small amounts of paint. These systems use much less paint and less masking is required. You may have to ensure quality of finish is sufficient for the job required.
- Paintless dent repair. Used for very small dents where paintwork is not damaged and is not located at the edge of a panel. A massaging tool massages out the dent from the inside out. A series of tools is used which allow the massaging tool to work in more awkward areas.

2.3 Choice of Coatings

2.3.1 Evaluate Products in Use

Carry out a written assessment of all refinishing products in use to identify those that contain the following substances:

- VOCs - list actual VOC content against the VOC content limit for the category of product in question.
- substances which are hazardous to health or to the environment. The material safety data sheets of refinishing products in use should be reviewed to identify what risk phrases have been assigned, if any.

Determine and record at what level such substances are present.

Undertake regular assessments of such refinishing products to identify potential for substitution with alternative materials that:

- result in reduced VOC emissions
- contain substances which are less hazardous to health or to the environment than those currently in use.

By tracking the usage of each product, you can prioritise high use products for substitution.

2.3.2 Current Alternatives

The final VOC content limits that were adopted in the Directive (2004/42/EC) are actually more generous in some of the categories than the levels originally identified by an EU study¹⁰.

Hence there are products commercially available for some of the categories of coatings that go beyond the compliant coating VOC content limits, i.e. they have even lower solvent content than that specified in the 2007 Regulations.

Such products should be used where feasible, taking into account effects of using additional energy as applicable.

2.3.3 Future Alternatives

There are alternative coatings used in other areas but being developed for the refinishing sector which may be used in future including:

- UV-A curing technology. Will reduce energy costs associated with curing coatings.
- Use of supercritical carbon dioxide instead of VOCs as the solvent in paint systems. The use of supercritical carbon dioxide also provides superior atomisation during spraying.

2.4 Choice of Equipment

2.4.1 Application Equipment

Excellent practice for the use of spray guns include:

- Use of gravity cups rather than siphon cups in High Volume Low Pressure (HVLP) guns which give reduced paint wastage and are easier to clean.

¹⁰ Reducing VOC emissions from the vehicle-refinishing sector (Entec UK Limited and the Paint Research Association, August 2000).

- Use of roller application of coatings for areas that will not be visible such as internal areas that will not be on display. This gives higher transfer efficiency than spraying.
- For large single colour paint jobs use of pumped remote paint feed. This minimises potential wastage through mixing, residual paint in containers, etc. Using a pumped remote paint feed also allows use of equipment that mixes the two components just before the spray gun. This minimises wastage due to mixing too much material or through delays in the spraying operation.

2.4.2 Spray Booths

Excellent practice for spray booths includes:

- Use of spray booths for carrying out all spraying activities.
- Ensuring spray booths are designed with optimal air flow rates and minimum air turbulence. Design should aim to minimise overspray landing on lighting and walls.
- Ensuring booths are designed to minimise energy use through recirculating air-flow during curing phase, heat exchange between the exhaust/incoming air, programmable painting and curing times, automatic switching to idling mode when not spraying, and variable speed drive motors on the extraction system.
- Ensuring spray booth lighting is designed for the optimal level of lighting and kept at this through regular cleaning of light fixtures and walls and planned lamp replacement at fixed intervals. Ensuring the booth walls have been coated white will increase the effectiveness of the lighting.
- Establishing the optimal air flow-rate for the spray booth, in conjunction with the supplier if necessary, and operating the booth at this flow-rate when spraying.
- Regularly replacing spray booth filters for particulate removal according to the manufacturers instructions. Establishing the frequency at which filters should be replaced and implementing this. Newer models have filter pressure drop monitoring which indicates when replacement is needed.
- Keeping spray booths clear of any clutter to minimise air turbulence.

2.4.3 Compressed Air Supply System

Excellent practice for compressed air includes:

- Ensuring a design and layout of the compressed air delivery lines that minimises pressure drop.
- Use of an air supply system that removes moisture, oil, and dust.
- Ensuring the compressor is sized correctly to minimise energy costs.
- Use of pressure gauges on the system and ensuring they are working.

- Maintenance: draining the air compressor daily, or use of an automated drainage timer on the system.

2.5 Benchmarking

Benchmarking your use of vehicle refinishing products against your level of activity.

Litres of coatings and gun wash used per month or Litres per individual sprayer per month etc.	versus	Number and type of jobs in the month or Number of painting hours in the month or Monthly turnover etc.
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This can be used to track your own performance over time, or can be used to compare your operation with other refinishing operators willing to share data. There is benchmarking data available on gun-wash and pre-cleaner use per painting hour sold for UK refinishers compiled by Envirowise (www.envirowise.gov.uk).

2.6 Surface Preparation

Appropriate surface preparation to ensure optimal coating and minimise reworks. Excellent practice includes:

- Washing off dirt using detergent and water followed by a water rinse before using any pre-cleaners.
- Use of pre-cleaners that can be diluted with water, where possible. Waterborne products based on alcohol and detergents below the compliant limit of 200 g/l are available.
- Use of spray bottles for pre-cleaners to spray a mist of pre-cleaner on the surface which is then wiped with a cloth. This uses less solvent than soaking or pouring liquid solvent on cloths. Alternatively, use cans with plunger/piston pumps for pre-cleaners.
- Use of a rental service for cloths instead of disposing of them. This service provides clean cloths, collects used cloths, and launders them for reuse while recovering the solvents.
- Use of dispensing units for fillers that give out the exact amount required to reduce wastage.
- Removing parts from vehicles before coating where feasible – this will reduce masking requirements.

2.7 Paint Mixing

Accurate estimation of, and mixing of, the amount of coating needed. Excellent practice includes:

- Measuring the area to be painted accurately.
- Use of paint manufacturers' charts and specifications to mix the right quantity. Use of a colorimeter or spectrophotometer could be considered.
- Use of an electronic precision scales. Ensure this is calibrated on a periodic basis, mounted on a stable platform, levelled properly and kept clean. Enclosing the scales in a sealed plastic bag to prevent spillages from causing weighing inaccuracies.
- Use of an automated paint dispenser.
- Use of a computerized precision paint mixing system which allows paint use by individual sprayers to be logged, improves work scheduling, and assists with stock control.
- Use of software for calculating material requirements for each job based on the type of repair and the repair area. This makes it easier to mix small amounts and reduces wastage.
- Use of colour matching software.
- Use of software for job colour scheduling to minimise frequency of gun cleaning.
- Use of a system of preparing small metal test blanks along with every job to aid future colour matching.
- Establishing a process of comparing estimated and actual paint used to refine estimation techniques.

2.8 Refinishing Operation

Excellent practice for each time spraying is carried out includes:

- Choosing spray gun nozzle size to match refinishing product; choosing air hose recommended by the spray gun manufacturer.
- Ensuring air passages in the gun are not clogged.
- Ensuring air pressure matches that recommended by the spray gun manufacturer, and air is not too hot (causes solvent to evaporate before reaching the surface).
- Setting up the spray gun correctly (lowest air pressure chosen that will still provide the required atomisation; optimal fan width suitable for the specific job and fluid flowrate) with a test spray of the pattern before beginning work.
- Ensuring booth air flow and temperature are at the required levels.

- Operating the spray gun correctly (gun to workpiece distance, spray gun held perpendicular to the surface, constant speed, timing of start and end triggering, spray pattern, overlap previous stroke by 50%, visual feedback, edge painting techniques).

Use of a laser guidance device on the spray gun to ensure optimal distance is maintained could be considered. This uses two laser beams that form a single dot when the spray gun is at the optimum distance. Too close, too far, or angled, the beams separate into two dots. Allows for high efficiency spraying and accurate 50% overlap.

2.9 Drying

Infrared drying lamps can be used for curing small painted areas, reducing energy costs by avoiding heating the entire booth and freeing up the spray booth at the same time.

2.10 Spray Gun Cleaning

Excellent practice for spray gun cleaning includes:

- Cleaning equipment immediately after use and before paint hardens.
- Storing left over primer and basecoat for reuse.
- Pouring excess paint into a separate container before cleaning the spray gun. Such waste paint should be disposed of appropriately for recovery or disposal.
- Use of a spatula to scrape out paint residue from the gun cup before cleaning to reduce contamination of the gun-wash.
- Pre-cleaning the gun-cup before putting it into the gun cleaner to prolong gun-wash life.
- Use of gun wash with lower VOC content.
- Use of gun cleaning equipment which:
 - o Is automated. Automation minimises the amount of solvent used and reduces the man-hour requirements. Use of the manual option in gun cleaning equipment should be minimised.
 - o Re-circulates, filters and reuses gun-wash during the cleaning operation.
 - o Recovers spray out rather than let it vent to the extraction system.
 - o Sends spent solvent to an enclosed container for eventual off-site recovery and reuse.
 - o Is covered.
 - o Is ventilated but where ventilation is kept to the minimum

required for occupational health.

- In addition to sending waste gun-wash off-site for recovery and reuse as specified in Part 1, use of:
 - o spray gun wash that has already been recovered from other industries and purified/recycled.
 - o low VOC content solvents.
- If using an on-site recycling unit, ensuring associated VOC emissions are not significant, i.e. that the condenser on the unit is efficient.

2.11 Material Handling

Excellent practice for materials handling includes:

- Use of enclosed containers for local dispensing of thinners, precleaners, degreasers, etc. such as spray bottles, small plunger cans that dispense small amounts of solvents onto a cloth, or containers with sealed nozzles.
- Minimising the amount of single use aerosols as these prove expensive and are wasteful in terms of empty packaging. Alternatively use bulk material with refillable sprays or refillable aerosols that can be pressurised with the compressed air supply.
- Keeping a spill kit to hand to wipe up any significant solvent spillages and training of workers in its use – **mandatory requirement (see Part 1)**.
- Use of a bunded area or bunded pallet for storage of VOC-containing liquid material and liquid waste.
- Use of a temperature controlled storage area to keep viscosity at optimum levels.
- Air extraction of solvent-using gun washing equipment and the paint storage area – mandatory requirement (see Part 1).

2.12 Maintenance

Excellent practice for maintenance includes:

- Regular replacement of spray gun parts to ensure they are not worn.
- Regular inspection of air supply system(s) for leaks and fixing of them as soon as possible.
- Regular replacement of filters in spray booths and exhausts at the frequencies specified by the manufacturer and keeping a written log as to when they are replaced.
- Regular inspection of spray booth filters to ensure they are fitting correctly, are not damaged, and are not excessively clogged.
- Regular cleaning the filters in the gun-washing equipment.

- Regular inspection of gun-washing equipment for any leaking hoses or poor fitting lids and replacement as soon as possible.

2.13 Training

Excellent practice is to carry out regular refresher training on all of the above for all relevant employees.

2.14 Avoiding nuisance

Noise from fans, operations, equipment and traffic movements need to be managed to ensure harmony with local conditions and environments.