

PART 1

Most of us try to paint our vehicles in the proper colour scheme and embellish this with what we hope are appropriate markings to add to the authenticity of our restoration. The problem is finding reliable information that will be appropriate to our favoured restoration, but to copy a colour scheme of a similar vehicle seen at a show is a trap for the unwary. The colour scheme may be something of the owner's fancy or a multitude of markings, which may have been found on the vehicle. But a vehicle, during its service life, may have carried a wide range of markings, but not all at the same time! The basic colour of the vehicle would also change, not only because of its role, but because official painting requirements would also change. So, we have to decide on a particular role and era that the vehicle shall represent.

The purpose of this article is to give authoritative guidance by drawing only from official documents. I have quoted dates only where this appears in documents, but it is not to say that prior to the quoted date that a particular arrangement was not already in use. It is not often possible to collect a sequence of the documents to define when a change of policy occurred, particularly as painting and marking requirements have been defined in a range of publications, including FVDD/FVDE/FVRDE Specifications, Equipment Regulations, Materials Regulations, Joint Service Publications, Electrical & Mechanical Engineering Regulations, Army Equipment Support Publications, Air Publications etc. To save space I have mainly used note form and to avoid repetition I have tried to only list requirements where they differ from a previous policy. References to left or right, refer to the side of the vehicle with the driver sat in the vehicle facing forwards.

The official view of the purpose of painting was not only to preserve the equipment and provide a degree of camouflage, but also maintain the morale of the troops who would take pride in the equipment they were to use. Immediately after the Second World War, the War Office decided that in the interests of appearance and durability non-combat vehicles should have a glossy finish. Analysis of about twenty leading brands of air drying coach paints, revealed all but one were based on drying oil modified alkyd resins. CS Specifications were drawn up based on these paints, and were incorporated into Specification 2012 issued by the Fighting Vehicles Design Department (FVDD) in 1948:

Priming Paints

Red Oxide of Iron Specification CS1870 a quick drying primer for ferrous parts of armoured and non-armoured vehicles, but not trailers or transporters.

Red Oxide of Iron Specification CS2274 a stoving primer for phosphatized motorcycle components, and as an alternative to CS1870.

Brown Priming Specification CS1478 a lead based primer for chassis and components, which are stored in the open, or where colour coats are to be applied by another contractor. Also used on trailers and transporters.

Aluminium Specification CS1837 for the interior metalwork and woodwork of armoured vehicles, (except armoured command vehicles). No further finishing coat required.

Acid-Resisting Specification CS1837 for interiors of battery compartments, metal or wood. No further finishing coat required.

Cream Priming Specification CS1308 for interior or exterior metalwork or woodwork where an Arctic White finish specified.

Zinc Dust Welding Primer for use on surfaces to be spot welded, and adjacent surfaces, which cannot receive subsequent protective treatment.

Zinc Chromate Specification CS1454 for all aluminium and light alloy components with the exception of carburettors, fuel pumps, wireless sets and their components.

Oil Resisting, Air Drying, Nitro-cellulose Specification CS2157 for interiors of gearboxes, clutch housings etc. No further finishing coat required.

Oil Resisting, Stoving Black CS2158 an alternative to CS2157.

Priming Wood, GS Brushing, Specification CS2165 a lead based primer for woodwork on non-armoured vehicles.

Priming Wood, GS Spraying, Specification CS2166 a lead based primer for woodwork on non-armoured vehicles, where not exposed to weather prior to finishing painting. CS2165 is preferred.

Oil, Linseed, Raw Specification CS824 for use where teak has been specified because of its peculiar properties. Where teak was used purely just as a hardwood, then CS2165 or CS2166 were used.

Colour Paints, Finishing

Generally exterior surfaces required three coats; interior surfaces required two coats. Approved colour paints to British Standard colours, which are lead free within the meaning of the Lead Paint Act.

Finishing Paints for Armoured Fighting Vehicles

Dark Battleship Grey, BS Colour No.32, undercoat.

Deep Bronze Green, BS Colour No.24, high gloss finishing enamel.



Finishing Paints for Non-Armoured Vehicles - Royal Navy

Dark Battleship Grey, BS Colour No.32, undercoat.

Dark Blue, BS Colour No.7, semi-gloss enamel.

White for painting of Admiralty numbers.

Finishing Paints for Non-Armoured Vehicles - Royal Air Force

Dark Battleship Grey, BS Colour No.32, undercoat.

RAF Blue, Grey, BS Colour No.33, high gloss enamel

Black, for chassis, valences and wings.

White, for painting RAF numbers.

Finishing Paints for Non-Armoured Vehicles – Army & Royal Marines

Dark Battleship Grey, BS Colour No.32, undercoat.

Deep Bronze Green, BS Colour No.24, high gloss finishing enamel.

White for WD numbers.

Services requiring a Grey, Semi-Gloss, Exterior Finish

Light Battleship Grey, BS Colour No.31, undercoat.

Dark Battleship Grey, BS Colour No.32, semi-gloss enamel.

Specialist Medical Vehicles – Royal Navy, Army, Royal Marines, Royal Air Force

White, for Geneva Red Cross Markings.

Signal Red, BS Colour No.37, for Geneva Red Cross Markings.

Pale Cream, BS Colour No.52, undercoat, for interior, except doors opening outwards & floors.

Middle Stone, BS Colour No.62, semi-gloss enamel, for interior, except doors opening outwards & floors.

Saloon Cars

Army & Royal Marines, all types, Deep Bronze Green, BS Colour No.24

Royal Air Force, all types, RAF Blue Grey, BS Colour No.33

Royal Navy, below 14 HP, Dark Blue, BS Colour No.7

Royal Navy, 14 HP & above, Black

Note the painting of WD Numbers and Admiralty Numbers relates to specifications dated 1st January 1948. This precedes the vehicle registration system of two digits, two letters, two digits introduced in 1949.

Painting of WD Numbers

These numbers are required to be painted on by the manufacturer, vehicle assembler (imported vehicles), or the body builder (imported chassis). WHITE paint to be used, with letters and figures $3\frac{1}{2} \times 2\frac{1}{2} \times \frac{5}{8}$ inches for vehicles and trailers, and $1\frac{3}{4} \times 1\frac{1}{4} \times \frac{5}{16}$ inches for motorcycles. The numbers should be painted as follows:

Motorcycles on each side of the petrol tank.

Staff Cars on registration plates at front and rear.

Trailers on off side of chassis frame near front and on the rear of chassis frame, or where most convenient if otherwise hidden once the trailer construction is completed.

Fighting vehicles on the nearside and offside of hull or turret as may be most visible and centralised, and at front and rear of vehicle near floor level.

All vehicles other than above on the offside of the bonnet or offside door panel, and on rear of body near floor level. Or painted on the numberplate where these are provided.

Painting of RAF Numbers

All prime movers and motorcycles are required to have their RAF Number painted in a similar manner as Army vehicles, except:

Prime Mover Vehicles in the centre of the offside cab door panel or on the bonnet or on the front of the scuttle dash, as may be most visible and centralised, and on the rear of the body near floor level.

Painting of Admiralty Numbers & Letters

Vehicles, trailers, and motorcycles to have their Admiralty Number, followed by the letters "RN" painted in WHITE.

Prime Mover Vehicles (except cars), on the front and rear number plates in $3\frac{1}{2} \times 2\frac{1}{2} \times \frac{5}{8}$ inches, and on the panel of both cab doors in 1 inch figures and letters. If numberplates are not provided, to be painted on both sides of the bonnet, or on the panel of both cab doors and on the rear of the body near floor level. Also the letters "RN" should be painted inside the windscreen in the nearside lower corners in $2 \times 1\frac{3}{4} \times \frac{5}{8}$ inch letters. The legal speed limit and unladen weight to be painted on the nearside of the chassis frame adjacent to the cab in 1 inch letters and figures.

Cars, the same as prime mover vehicles except the speed limit and weight are not displayed.

Trailers, on each side of the trailer in a convenient position and the unladen weight on the nearside, all in 1 inch figures and letters.

Motor cycles, on the rear registration plate in $2\frac{1}{2} \times 1\frac{3}{4} \times \frac{3}{8}$ inches figures and letters. On each side of the petrol tank in $1\frac{3}{4} \times 1\frac{1}{4} \times \frac{5}{16}$ inches figures and letters.

Bicycles, the letters "RN" followed by the Admiralty letter and numbers painted on the rear down tube of the frame.

Geneva Red Cross markings of Specialist Medical Vehicles

Specialist Medical Vehicles are Motor Ambulances, X-Ray, Bacteriological, Laboratory and Hygiene Vehicles for the use of Medical Units, Refrigerator Vehicles for use with Transfusion Units and specially fitted vehicles including Trailers Lightweight 2 Stretcher, and Dental Trailers for use with Mobile Medical Units. The specifications for painting applied to all services.

A Red Cross on a circular WHITE background to be painted on:

The body side panels.

The roof of the body.

The roof of the driver's cab.

The door at the rear of the vehicle. If two doors, each door is to be marked with a Red Cross.

The Red Cross must not overlap windows but may include roof ventilators, door fasteners, hinges etc. The white background is the largest circle, which is possible to inscribe on an unobstructed surface. This background must not overlap doors or windows but may include roof ventilators. The width of the Red Cross to be $\frac{2}{7}$ of the diameter of the circle. The overall size of the Red Cross to be $\frac{6}{7}$ of the diameter of the white background.

The post-war paint scandal

With such authoritative guidance, it was a major setback for the Inspectorate of Fighting Vehicles (IFV) to find that complaints were being received from all three Services about defective painting of vehicles. By May 1952 complaints relating to several thousand vehicles had been received, implicating a wide range of manufacturers and vehicle types. The Director of IFV formed a special section of his Materials Branch to work with the Chemical Inspectorate (CI) to investigate. Part of the problem was that contracts called for one of three sets of requirements for painting, depending whether the vehicle was in the Combat, General Service, or Commercial class. This resulted in three painting standards:

1. In accordance with FVDD/FVRDE Specification 2012. (FVDD became FVDE in March 1948 to then be incorporated into FVRDE on 1st January 1953)
2. Manufacturer's standard primer, with finish paint either to body builder's specification, or to the requirements of Specification 2012.
3. Paint entirely to the manufacturers own specification.

The faults occurring included, blistering, rain spotting, lack of adhesion between coats, crazing, wrinkling, flaking, soft films, omission of one or more coats from the system, and complete breakdown of the painting system due to moisture content. The causes identified included, inadequate preparation of surfaces, poor painting techniques, inadequate painting facilities at various works, inadequate paint film thickness, use of incompatible materials, materials of doubtful quality, and a complete disregard for the importance of producing a good sound painting system.

During the period 1950-53 there was a general shortage of some of the basic raw materials for paint manufacture. Substitute materials were used, and specifications relaxed. But by 1953-54 there was an epidemic of problems due to peeling and blistering of topcoats. Despite the production problems that faced all paint manufacturers, a large proportion of the troubles was attributable to one manufacturer. It was not that a shoddy paint was being produced under a Service contract, as the problems for this manufacturer also extended into his proprietary paints.

In those days smog was a big problem, and combined with poor weather conditions, had a major bearing on the effectiveness of a paint finish. This was illustrated by a paint manufacturer who delivered a single bulk order of primer, undercoat and finish for the painting of a large order of Scammells. The first and last batches of Scammells were satisfactory, the middle batch blistered badly. The conclusion was that the weather was the critical factor.

Attempts by IFV Materials Branch to upgrade the requirements for Specification 1012 were opposed from several quarters, including the Production Branch of IFV itself. Industry was under great pressure to fulfil re-armament demands, and there was an attitude that painting was mainly a decorative procedure rather than a method of preservation. The customer would not accept a fall in production figures due to more stringent requirements nor was prepared to meet the extra costs involved. But IFV did prevail on manufacturers and body builders to improve their standards, by better care and skill, better techniques, better quality materials, and increasing the use of the systems laid down in Specification 2012. IFV and CI developed tests to determine which paint systems performed well, and drew up specifications in DEF1044 for vehicle paints which was published in 1953. It was to the great annoyance of the paint trade that most proprietary paints failed to comply with DEF1044, but IFV resisted all pressure to relax their requirements.

By October 1957, what was now FVRDE Specification 2012 had been significantly enhanced. In addition DEF Specification paints were used rather than the less demanding CS Specification originally specified. CS Specifications were tested as individual coats, whereas DEF Specifications also required a test of the complete paint system. This combined with the newer FVRDE Specification ensured that manufacturers did not use paints in a system from different manufacturers. Other requirements had a beneficial effect, minimum film thickness of 0.001 inch per coat, minimum paint shop temperature of 60°F, and prohibition of painting in the open. Throughout all this it seems extraordinary that the Production Branch of IFV seemed to exhibit such poor co-operation with the Materials Branch and much of the time open hostility existed within the same organisation. Despite this, by 1957 an 80% reduction in complaints had been achieved.

However just as the problem seemed to be going away there was an unexpected upsurge in complaints relating to the painting on Daimlers and Ebro Tippers. The reasons for this was not substandard products from a dubious manufacturer, but in fact a highly reputable manufacturer who had been successful in developing paint that dried so hard, that it was deficient in inter-coat adhesion. The composition of paint, with its relationship to complex colouring pigments, and its behaviour in a system of paints, was a problem that also affected civilian vehicles, the Nuffield Group and Rolls Royce were particularly troubled. Although paint had been regarded as a seasonal product, manufacturers would use slack periods to fulfil Service contracts. The desire to keep paint factories running allowed fierce price-cutting to attract a Service contract. The lower cost of Service paint did sometimes fuel the belief that the product was inferior to the proprietary product. Most proprietary paints of the time were in fact identical to the service counterpart.

The result of all this was that IFV felt that properly applied paints, under normal use would give the vehicle protection for at least three or probably four years.

Vehicle Marking Requirements as defined in 1950-54

Formation Signs

On nearside from mudguard or equivalent position.
On rear of vehicle in a prominent position.
Not on motorcycles.

Unit Signs

Approximately 9½ inches high and 8½ inches wide.
Vehicles – on front on offside, on tailboard on offside.
Motor cycles – on each forward end of fuel tank.
Trailers – not marked

Unit signs of vehicles in field force units consist of a serial number painted in WHITE (signals units in RED) centrally and as large as possible on a coloured background. Vehicles of other units would be marked similarly, but with a WHITE bar above the sign with the abbreviated title of the unit painted in BLACK. Schools and establishments not under the control of the War Office, consist of a square sign divided into quarters with the abbreviated title, as above. The first and fourth square will be RED, and the second and third quarters WHITE. Schools and establishments under War Office control conform to normal unit markings.

Coloured backgrounds:

Formation HQ	BLACK
HQ Brigade	RED
HQ Brigade	GREEN
HQ Brigade	BROWN
RAC	RED & YELLOW diagonal
Household Cavalry	BLUE & RED diagonal
RA	RED & BLUE horizontal
RE	BLUE
Infantry	RED
AAC	MAROON
RASC	BLUE & YELLOW diagonal
RAMC	BLACK
RAOC	RED, BLUE, & RED vertical
REME	BLUE, YELLOW, & RED horizontal
RAPC	BLACK
RPC	RED & GREEN horizontal
CRMP	BLACK
WRAC	BLACK
Air Liason Sections	RED & BLUE vertical
Miscellaneous	BLACK

Serial Numbers

Serial numbers, to be superimposed on the coloured background, were allocated from 2 to 100. The number allocated for a basic Corps Troop would vary according to the Division to which they belonged.

	<u>Armoured Div</u>	<u>Infantry Div</u>	<u>Airborne Div</u>	<u>Basic Corp Troop</u>
HQ	40	40	40	17
RAC	45, 46	41	41	2, 44
RA	25, 73, 74, 75, 78	25, 42 – 47	42 – 47	10, 14, 25
RE	41, 42	48, 49	48, 49	33, 34, 35, 36
RASC	81, 82, 83, 85	70, 71, 72	70, 71, 72	50 – 55
RAMC	89, 90, 93	75, 76, 77, 88	75, 76, 77, 82	65, 66, 67
RAOC	92, 97	52, 92	92	18–21, 74, 75, 77, 78
REME	98, 99, 100	88, 89, 90	88, 89, 90	70 – 73
RAPC	91	78	78	76
Provost Corps	43	79	79	83
Postal	44	80	80	84

Royal Signals units adopt the serial number, on the Royal Signals coloured background, of the unit which they serve.

RAOC Stores Section adopt the serial number, on the RAOC coloured background, of the unit to which they are attached.

LADs (Light Aid Detachments) adopt the serial number, on the REME coloured background, of the unit to which they are attached.

Tactical Signs

Tactical signs may be placed at the discretion of formation commanders. The use of the sign is for ‘teeth’ units on operational duties, or units engaged in training where the use of tactical signs is essential.

Armoured Units

AFVs – on front/hull sides and rear of turret.

‘A’ vehicles without turrets & ‘B’ vehicles – on front, sides, & rear.

Other Units

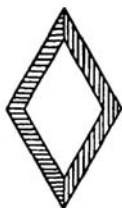
On front & rear but not to interfere with other signs.

The signs to be painted in colours as follows:

Senior Regiment or Battalion	RED
Second Regiment or Battalion	YELLOW
Third Regiment or Battalion	BLUE
Fourth Regiment or Battalion	RED & YELLOW (see example)
Motor Battalion	GREEN
Unbrigaded units	WHITE

The signs to be used are:

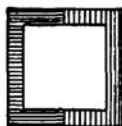
Regimental or Battalion H.Q.
& H.Q. Squadron or company.



"A" squadron or company.



"B" squadron or company.



"C" squadron or company.



"D" company.



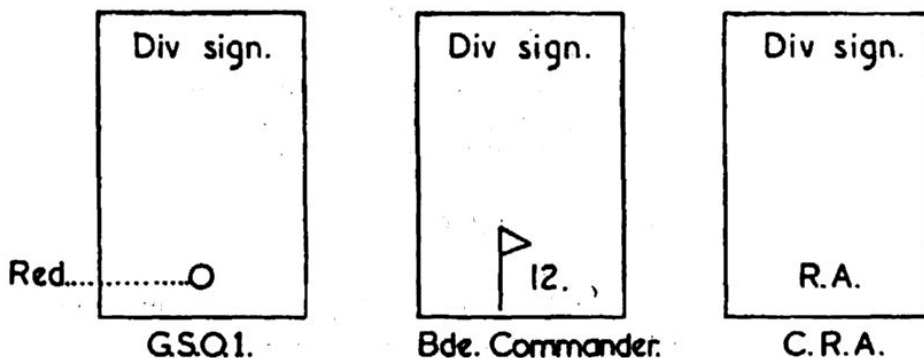
Legend -  Yellow.  Red

Troop, platoon, section, or tank numbers will be painted in the allotted colour inside or beside the signs. Brigade and divisional headquarters will not carry tactical markings. One red flag, 2 feet square will be carried by all AFVs and flown to indicate firing on ranges or out of action for any reason.

Commanders & Staff Cars

Fitted on the rear offside of body, 6 inches above rear wing. Approximate size, 10 x 6 x 4½ inches, the signs may be improvised from 1-gallon oil tins or similar to provide a mica window front & rear. It is illuminated internally from an independent switch on the dashboard. At the top is shown the divisional sign, and beneath the formation flag and/or serial number or lettering indicating the occupant of the vehicle.

Examples:



General Officer's & Brigadier's Vehicles

All general Officers & officers holding the appointment of brigadier will carry stars at the front & rear of military vehicles in which they are travelling:

Field Marshall	Five stars in a horizontal line.
General	Four stars in a horizontal line.
Lieutenant-General	Three stars in a horizontal line.
Major-General	Two stars in a horizontal line.
Brigadier	One star.

The War Office holds sealed patterns of these emblems. Local production is not authorised.

Speed Limit Signs

On all 'B' vehicles, if required by law, must display on rear panel, in RED: $\frac{20}{\text{M.P.H.}}$

Figures – 4 inches high, ½ inch wide.

Letters – 2 inches high, ¼ inch wide.

W.D. Registration Numbers - Vehicles

Numbers will be inscribed on numberplates in WHITE with BLACK background, in a single line.

Dimensions of letters & numbers:

Height – 3½ inches.

Breadth of every part of each letter or figure – 5/8 inches.

Total width of space taken by each letter or figure - 2½ inches.

Space between original figures & between adjoining letters – ½ inch.

Margins allowed:

Between top of number & top of black surface – ½ inch at least.

Between bottom of number & bottom of black surface – ½ inch at least.

In front & at end of numbers – 1 inch.

Space between the letters & numbers – 1 inch.

W.D. Registration Numbers – Motor Cycles

Front numberplates – All dimensions half of those for vehicles.

Rear numberplates – An oblong plate with the number expressed in three lines, e.g.:

0 1

EN

4 6

Dimensions of figures & letters:

Height 2½ inches.

Breadth of every part of each letter or figure 3/8 inch.

Total width taken by each letter or figure 1¾ inches

Space between adjoining figures and between adjoining letters – ½ inch.

Space between lines of letters & figures – ½ inch.

Margins between edge of plate & letters and figures – ½ inch.

Left-hand Drive Signs

Vehicles not fitted with trafficators; the following will be painted in WHITE 2 inch lettering on the tailboard on the rear of vehicles:

“CAUTION – LEFT-HAND DRIVE – NO SIGNALS”

If trafficators are later fitted to the vehicle, the words “NO SIGNALS” will be deleted.

Convoy Signs (not after 1952)

Vehicles in convoy, under issue to formation and/or at the discretion of Officers Commanding issuing depots, have front & rear a 10-inch metal disc painted Royal Blue with a 2-inch white diagonal to enable convoy drivers to recognise vehicles of their convoy.

Tyre Pressures

Authorised tyre pressures will be painted in WHITE figures not exceeding 2-inches high, on the edge of each mudguard or equivalent position, above the centre of the wheels on all 'B' vehicles. Amended 1952 to exclude vehicles where tyre pressures would depend on the task ie scrapers (towed & motorised) and rubber tyred rollers.

Geneva Red Cross

The definition of “specialist medical vehicles” now includes troop-carrying vehicles of ambulance convoys.

Recognition From Air Markings

A standard vehicle marking for recognition from the air under consideration.

Bridge Classification Signs (Overseas Only- now suspended in United Kingdom)

Bridges will be marked with a number representing the maximum 'Class' of vehicle that may safely cross. The numbers allocated to the bridges themselves are: 5, 9, 12, 18, 24, 48, 50, 60, 70.

Vehicles will be classified and marked according to the equivalent loads they impose on the bridge. Classes are in multiples of 1 ton upwards and are calculated from load capacity, tyre sizes etc. The classification number comprises BLACK figures painted on a YELLOW disc. No sizes are given but the figures must be visible at 50 feet by day. The disc should be mounted the offside between radiator and outer edge of the mudguard or in equivalent position. Not fitted to motor cycles.

Towing vehicles will be given a double classification, e.g.: 9

7

The upper number indicates the class of the complete train, the lower the class of the towing vehicle alone.

Trailers will also be given a double classification, e.g.: 2

5

The upper number indicates the increase to the load class of the towing vehicle that the loaded trailer will cause when in tow. This number must be added to the *lower number of the towing vehicle* to determine the classification of the complete train. The lower number on the trailer is the classification of the trailer alone, in case it is required to manoeuvre the trailer across the bridge by hand or winching.

In an emergency a vehicle towing another vehicle assumes a classification which is the sum of the classifications of the two vehicles e.g. a Class 9 vehicle towing a Class 3 vehicle assumes a classification of 12, and may cross any bridge of Class 12 or above.

Tropicalised Vehicles

'B' Vehicles that have been tropicalised are marked in WHITE, with the letter 'T' of $\frac{3}{4}$ inch thickness, within a $\frac{1}{4}$ inch thick ring 6 inches in diameter. This marking to be on the nearside door or where no front door exists, on the nearside of driver's cab. On motor cycles and trailers the marking to be on the front portion of the front mudguard.

Corps of Royal Military Police Vehicles

CRMP vehicles bear a signboard $23\frac{3}{4} \times 4\frac{3}{4}$ inches with the words 'MILITARY POLICE' in RED letters, $2\frac{1}{2} \times 1\frac{1}{2}$ inches on a WHITE background in a prominent position on front and rear of the vehicle.

Wading (temporarily suspended 1952)

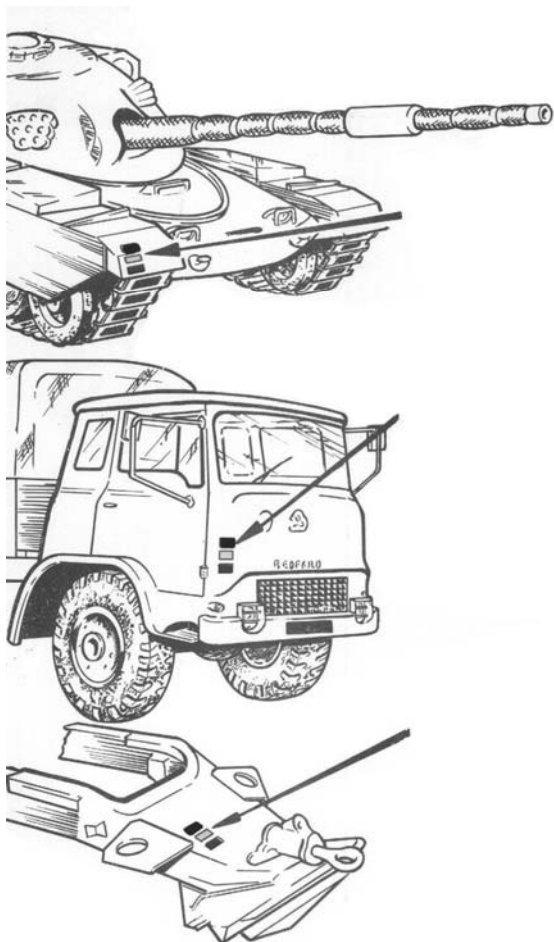
Before waterproofing is begun, the maximum allowable wading depth will be painted in WHITE figures 2 inches high. As the various stages of waterproofing progress, a coloured mark 3 x 1 inches will be provided at the completion of each stage:

- | | |
|-------------------------------------|--|
| 'A' vehicles | On top of offside mud shield. |
| 'B' vehicles, trailers, RE eqpt etc | On top of off side front wing. |
| Artillery eqpt | On top of left-hand trail leg near towing eye. |

- | | |
|-----------------------------------|--------|
| Stage 1 waterproofing completed | BLUE |
| Stage 2 passed for embarkation | YELLOW |
| Stage 3 passed for disembarkation | RED |
| Vehicle cannot be waterproofed | WHITE |

Unless a vehicle bears the maximum allowable wading depth, together with the colours blue and yellow, it will not be accepted for embarkation. The coloured marks may be provided in advance but masked with tape, on completion of the various stages of waterproofing the tape is removed.

Position of markings:



Vehicle Painting Requirements as defined in 1959

The main changes were that now weapons (except 4.2 inch mortars) and general stores were to have a matt finish usually of olive drab, whilst all other equipment continued with high gloss, usually deep bronze green.

Gloss finish

Primer	1 coat brushing or 2 coats spraying.
Undercoat	1 coat brushing or 2 coats spraying.
Gloss finish	1 coat brushing or 2 coats spraying.

Matt finish

Primer	1 coat brushing or 2 coats spraying
Undercoat	Not used
Matt finish	2 coats brushing or 3 coats spraying

Gloss finish needing repainting

Lightly rub down then repaint.	
Gloss paint	1 coat brushing or 2 coats spraying

To be continued.....

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