



**New Routemaster Aesthetic Mid-Life
Refurbishment**

Technical Requirements Specification

NRM Midterm Refurbishment Specification

1. Introduction

Background

- 1.1. The thousand New Routemasters (NRM) double deck buses are TfL assets, that are operated by the Bus Operating Companies to deliver TfL bus services. TfL requires all buses to be refurbished at least once in their life; the oldest NRM buses, which TfL are responsible for refurbishing, are now at the mid-point of their estimated 14-year operational lives
- 1.2. The operational life of TfL buses is estimated to be fourteen years, and at midterm (typically seven years) the buses must undergo an aesthetic internal and external refurbishment to ensure passenger safety and comfort is maintained for the remaining bus operational life. In addition, not refurbishing the buses would fail to deliver against the Mayor's Transport Strategy outcomes relating to quality of public transport customer service
- 1.3. The purpose of this document is to define the NRM midterm refurbishment specification, and the required standards on each completed refurbished bus. The standard of the finished refurbished bus shall be such that the defined items within the refurbishment scope, including fixtures, fittings, and operational systems (i.e., doors) are returned to a high standard of serviceable condition.
- 1.4. No extensive mechanical, structural and/or engineering design work is required during this midterm refurbishment and as such is not within the scope of this specification.
- 1.5. During the refurbishment of each vehicle, we are proposing to retrofit a Pedal Camera to each vehicle:

Pedal Camera

Where insufficient channels are available to both maintain the TfL CCTV minimum coverage standards, and to accommodate the new pedal camera, Channel 10 shall be used to support the new pedal camera position. All other camera positions, and system functionality must remain unchanged.

- 1.6. During the refurbishment of each vehicle, the following accessibility enhancements shall be carried out:

Priority Seating

Improve priority seating identification over standard saloon seating by introducing distinctly different colour/design moquette (TfL will provide the moquette design) to the four priority seats on each bus.

2. Bus Structure Overview

- 2.1. The NRM bus design is unique in that it has three doors with central and rear interconnecting stairs cases.

2.2. The main body structure extends from the front pillar to the vertical pillar directly behind the rear axle. The front framework is a combination of bolted and welded steel and aluminiques sections making up a safety barrier for driver protection. The rear module is a self-supporting composite structure bolted directly to the main body structure.

2.3. The New Routemaster masses and dimensions are:

Max Height (unladen)	<i>4420mm</i>
Width	<i>2520mm (excluding mirrors) 2970mm (with mirrors)</i>
Length	<i>11232mm</i>
Weight (unladen)	<i>12000kg</i>
Seating Maximum	<i>Top deck 40 - Lower deck 22</i>

SCOPE

3. Driver Seat

3.1. Check all seating adjustment mechanisms to ensure correct operation. Replace/fix as necessary.

3.2. All driver seats should have a replacement of seat trim and foam. The seating upholstered condition shall meet or exceed BS5852 Crib 7 - the **ignitability of upholstered seating by smouldering and flaming ignition sources assessment standard**. Every seat will undergo the following refurbishment:

- Remove the existing squab, cushion covers and foams
- Inspect the boards and replace or repair as required
- Fit new cushion and squab foams using original mould design
- Fit Crib 7 fire barrier
- Fit new Crib 7 leather covering

4. Passenger Seating

4.1. All passenger seats should have a replacement of seat trim and foam. **Seating in fully assembled upholstered condition shall meet or exceed BS5852 Crib 7 - the ignitability of upholstered seating by smouldering and flaming ignition sources assessment standard**. Every seat will undergo the following refurbishment:

- Remove the existing squab, cushion covers and foams
- Inspect the boards and replace or repair as required
- Fit new cushion and squab foams
- Fit Crib 7 fire barrier
- Fit new Crib 7 moquette (TfL to provide the moquette design)

4.2. The Service Provider must provide independent verification/certification that the fully assembled passenger and driver seats and all materials used meet BS5852 Crib 7 fire retardancy standards.

4.3. Check all seat frames for corrosion, breakages, including cracked frame and separation in welded joints, paint chipped, where bare metal is exposed or

damage. Cracked frames must be replaced. Further inspection of the frame condition will be necessary when seat base and backs are removed

4.4. All repaired or replaced seating frames shall be recoated in original OEM colour (Metallic Black)

4.5. The following four seats are designated as 'priority' and will be fitted with a distinctly different moquette. Standards for priority seating will follow as stated in section 4.

5. Hand poles and Rails

5.1. Recoat high usage poles on the lower deck and stairs on every bus (there could possibly be some small colour variations) with the same bespoke gold colour.

5.2. Colour Reference: Polyurethane Matt Crackle – LX16179 / NCS 4030 Y 20R

6. Internal/External Customer Notices

6.1. All notices and legal markings shall be replaced. Please refer to the Bus Graphic Standards document.

7. Saloon Lighting

7.1. Replace all damaged coving inserts (light surrounds).

8. Step Edging

8.1. The aluminium step edging on the two staircases will only be replaced if heavily damaged and with prior agreement with TfL confirmed. The yellow infill on the two staircases and throughout the vehicle shall be replaced on all buses.

8.2. Step edging situated elsewhere on the bus will only be replaced if heavily damaged and with prior agreement with TfL confirmed.

All steps shall be inspected for flexing and deformation. Where there is a 6mm deflection in the centre of the step when subject to 100kg load this will be deemed as a failure.

8.3. Saloon Flooring

The original lower saloon floor is constructed from three composite materials:

- (i) Flooring at doors 1 and 2: 12mm & 15mm polyurethane based composite board. The composite floorboard has a Fire Retardancy Rating of EC95/28.
- (ii) Main saloon: 12mm high durability plywood with phenolic face manufactured to class 3 fire Retardancy top side and class 2 underside.
- (iii) Rear Gangway: 12mm high durability plywood with phenolic face manufactured to class 3 fire Retardancy top side and class 2 underside.
- (iv) Rear Platform: 40 mm Composite Board, with two skins of epoxy FRP covering foam core.
- (v) The upper saloon floor constructed from 12mm plywood

manufactured to class 3 fire Retardancy top and bottom.

- 8.4. Where polyurethane composite board or plywood is significantly damaged and/or worn and requires a large section or area to be replaced as a minimum the above material specification standard shall be used.
- 8.5. All interior damaged or worn surfaces, mouldings / finishers and floor covering shall be repaired to a new bus standard.
- 8.6. Where flooring is significantly damaged and/or worn, the entire section (e.g. aisle, doorway, under seating) must be replaced. All new flooring material shall meet a slip resistance of at least 36 PTV (Pendulum Test Value) and match the same colour as the existing flooring on NRMs.
- 8.7. All grooved Treadmaster flooring (at front and rear doors and stairs) shall be deep cleaned. If damaged, the grooved Treadmaster flooring must be replaced like-for-like in its entirety.
- 8.8. Where there is hinged flooring at the centre door forming a section of the access ramp, the aluminium edging shall be inspected for correct security and any damage and replaced where necessary. The rubber sealing strip shall be replaced.

9. Interior Panels

- 9.1. All panels and safety glass partitions shall be inspected for any damage and for correct security. All panels and glazing to be deep cleaned. All damaged including chipped / or cracked glazing panels shall be replaced with safety glazing standards as defined in UN/ECE Regulation 43 (this excludes scratch damage).

10. Driver Cab

10.1. The following shall be carried out:

- I. Check all screen attachment points for presence and security. Secure magnetic lock must be permanently closed
- II. Check cab door for correct operation and security
- III. Check driving controls dashboard, control panel, switches, gauges and safety systems for condition, correct operation, and security
- IV. Check condition of floor material and if damaged, replace with new enhanced slip resistant standards (refer to saloon flooring)
- V. Driver air conditioning inspection/service
- VI. Replace brake pedal rubber in accordance with the OEM specification

10.2. Driver Cab Assault Screen and Cab Screen Sealant

The polycarbonate door panel shall be replaced with a pre-manufactured single sheet maintaining all OEM dimensions, attachment methods, impact strength and scratch resistant properties, and approved to UNECE Regulation 43

standards. Approval markings shall be stamped/positioned to the lower right corner viewed from the entrance platform.

The following design changes shall be incorporated to provide a permanent sealing of the cab for enhanced protection measures:

- Removal of speech holes
- Removal of cash tray cut out to achieve minimum gap between cash tray base and screen (additional sealing measures will be required at cash tray / screen interface)

To further enhance protection measures additional cab sealing will be required. The entire polycarbonate outer edging which interfaces with body panel sections shall be permanently sealed using materials and fixing methods that achieve and maintain a zero gap at all points (including all gaps at the door edging and card reader). **Drilling into the polycarbonate sheet for the purpose of attaching outer edging sealing materials is not permitted.**

11. General Repairs

11.2. Vehicles shall be presented for refurbishment meeting the requirements of Schedule 12 from the vehicle lease agreement.

11.3. Any proposal for changes/deviations from the original design standards must have prior written approval from TfL. General repairs include:

- I. Draft excluders situated at the bottom of each set of doors
- II. Check and clean heater grill
- III. Passenger heating and ventilation system tested for optimum performance
- IV. Check and replace inner emergency door control panels (if damaged or missing)
- V. Put a sturdy lock on the conductor panel ('T' key lock)
- VI. Check and replace (if necessary) door rain channels on all doors
- VII. Check clamps on the glass partition screens are fitted correctly and secure. If allowing significant movement or poorly clamped, replace or adjust the clamp
- VIII. Replace paper blinds (like for like) only on agreement with TfL. Mechanisms/blind box should not be replaced unless damaged with notification and approval from TfL.
- IX. Replace Treadmaster Step Risers where damaged with the original Treadmaster Step Riser Solution.

12. Exterior Panels

12.2. The bus exterior design shall not be altered in any way from its original design, and all attachment/fixing methods shall remain unchanged. Where necessary the use of industry standard socket button head flange bolts or similar are permitted as replacement for the OEM panel bolts. To maintain a like-new exterior appearance, alternative bolts shall be used uniformly across all replaced/repaired panels. All marker lamps and

reflectors shall be returned to their original position. All panels required to be renewed shall be replaced with the same or similar specification grade aluminium.

- 12.3. The side skirt panelling is sectional, 2mm should be replaced only if damaged.
- 12.4. The wheel arches are manufactured from GRP with reinforcing at all stress points and attachment area. The wheel arches shall meet class 2 fire retardancy standards. The underside of each box shall be protected against tyre burst by a steel inner guard.
- 12.5. Buses shall be repainted in London Buses Red Reference ICI P498FPF3 maintaining the original NRM brand colour scheme.
- 12.6. Advert frames (where necessary) to be repaired/replaced.
- 12.7. Wheels are to be repainted to match HMG F2605
- 12.8. Exterior white roof panels to be surveyed for damage, and to ensure vehicle fleet number and identification codes are present and free from any peeling or missing numbers/lettering. Replace where required.

13. Mechanical/Electrical Inspection

- 13.2. Vehicles shall be presented for refurbishment meeting the requirements of Schedule 12 from the vehicle lease agreement.
- 13.3. On completion of the refurbishment the vehicle shall undergo a full mechanical/electrical inspection by the operator, and evidence of this shall be provided as part of assurance process.

14. Upgrades

It is anticipated that several upgrade works would be included at the point of pre-refurbishment stage.

- I. **ON HOLD:** Replacement of driver viewing mirrors at centre door to smaller mirrors.
- II. Upgrading fire suppression to comply with UNECE Regulation 107
- III. Foam covering to be fitted around the luggage rack pole

15. Deep Clean

- 15.2. On completion of all refurbishments works a full deep internal clean shall be carried out on all upper and lower deck panels including roof, coving, side panels, windows, floor covering, and driver cab area.