

MELLOR

TYPE APPROVAL

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What is it?

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- Many industrial sectors are subject to some form of approval or certification system but road vehicles are a special case, because of their importance to and impact upon society. EC Whole Vehicle Type Approval (ECWVTA) is based around EC Directives and provides for the approval of whole vehicles, vehicle systems, and separate components
- EC Whole Vehicle Type Approval is a way of making sure vehicles are safe to use on the road, (without having to inspect and test every single one)”

According to the DfT

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When will it be applied?

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- The regulation introducing EC Whole Vehicle Type Approval became UK law on 29th April 2009.
- Applied to New Vehicle Types from 29th October 2010
- To existing vehicle Types from 29th October 2011.

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What does it cover?

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- All significant aspects of the vehicle design.
- The manufacture of all vehicles must be controlled, regulated and recorded.

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“Vehicles must meet the technical and administrative requirements and capture the design”

“Manufacturers must ensure that subsequently produced vehicles are manufactured in conformance with the approved design”

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The implications to
Mellor Coachcraft

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Woodall Nicholson has been producing Type Approved Vehicles since it was introduced into the UK in 1996, so is experienced in all the administration aspects of Type Approval.

What we need to change is certain aspects of vehicle design to meet the new requirements.

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**Existing Mellor
Coachcraft Approvals**

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Mellor has already Type Approved the Fiat based Easy Access and Low Floor Vehicle.

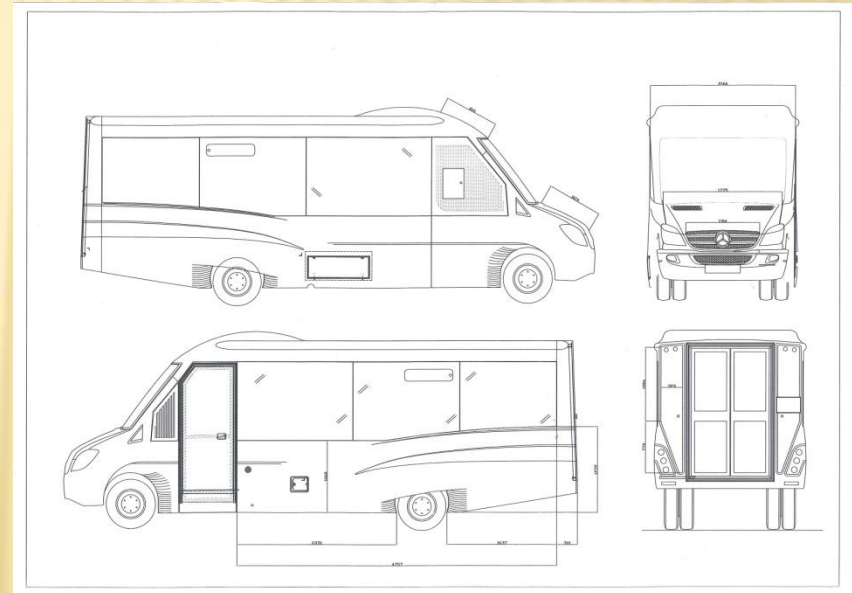
The Sprinter Crafter was designed four years ago to meet the requirements of Type Approval.

The Mercedes Vario and Iveco based products are undergoing some revision to meet the new regulations.

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Areas for review on Vario and Iveco products:

- ❑ Seat Spacing
- ❑ Gangways
- ❑ Doors and Exits
- ❑ Masses and Dimensions
- ❑ Strength of superstructure (R66)



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Seat Space

The requirements for seat space include:

- A minimum seat *width* 400 mm or 450mm (depending on vehicle size)
- Minimum *legroom* of 300mm
- Minimum *space between seats* (depending on the number of seats) of 650mm or 680 mm (was 605mm under COIF)
- A specified area for passenger's feet
- The seats now must be Type Approved, and must meet both the seat belt anchorage test and a rear impact test, both tests are difficult and have resulted in a total redesign of the seats in some cases.

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Gangways

Gangway *widths* have always been specified on larger vehicles, but these dimensions have been changed and apply to all M2 and M3 vehicles.

The *height* of the gangway is also specified for all passenger carrying vehicles.

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Doors and Exits

- Type Approval has different requirements for Doors and Exits, however most customer specifications offered by Mellor already comply.
- One requirement is to have a step to ease entry and exit through emergency doors if the floor *height* exceeds 700mm. This applies to the rear doors and emergency exits on some Mellor products.

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Masses and Dimensions

- The regulations limit the maximum dimensions of vehicles including *width, length and rear overhang*.
- The *weight* to be allowed for the driver and each passenger has increased from 65kg to 68kg
- Provision for 3kg of luggage for each passengers and 7kg for the driver must be made, either in the seating area or specified luggage pens.
- The *weight distribution* of the whole vehicle in operating order must be calculated and be both within the axle, tyre and gross vehicle *weight* limits specified by the manufacturer.

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Strength of Superstructure Regulation 66

- Mellor products are always designed to be safe, and a basic concept of the structural design was to integrate roll hoops. A test and approval for roll-over strength is now mandatory under Type Approval for all large passenger carrying vehicles over 5 tonnes GVW.

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The implications on small coach built

- Few on the 16 seat vehicle, mostly confined to the rear step requirement

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The implications on large coach built

On large coach built, there are several implications, including

- Current seat pitch does not meet seat spacing requirements.
- Rear Step required
- The new passenger *weights* combined with the new seat pitch requirements mean that the *weight* distribution is based too much towards the rear of the current vehicle ranges.
- Gangway *headroom* is currently acceptable, but with only a small margin.
- Strength of superstructures (R66 Roll Over) approval needed to meet Type Approval.

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To overcome these problems Mellor has reviewed all engineering and manufacturing processes.

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Seats

Problem:

- We cannot fit the required number of seats in the space available using any currently available seat. We cannot increase the space available for seats since under the new regulations we cannot increase the rear *overhang* and it is undesirable to increase the vehicle *wheelbase*.

Solution:

- We have been working with seating specialists to develop a special compact seat which will meet the dimensional requirements and allow the installation of the required number of seats in the space available. The seat is based on the lightweight Aluminium seat and is available either fixed or detachable (on the lightweight NMI leg).
- The manufacturers are currently gaining Type Approval for the seat.

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Gangway Changes

- The Gangway dimensions already meets Type Approval, but any change to reduce *height* or *width* may result in a failure. The proposals to reduce *weight* and provide a rear step also raise the floor level, hence to maintain the gangway *dimension* it is proposed that the rear roof level will be raised 50mm.

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Doors and Exits Proposals

- In most respects all the doors and exits already meet Type Approval. However in order to meet the step *height* entry requirement for the rear doors it is proposed to lower the bottom of the doors to encompass the step (and tail lift).

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Masses and Dimensions Proposals

- The problems of increased passenger *mass*, added luggage *mass*, combined with more stringent seat spacing resulted in the *weight* distribution being unacceptable. In order to address this, every aspect of the vehicle design has been scrutinised.

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Flooring and Tracking

- In order to save *weight* we plan to use a lighter *weight* floor (with the same durability)
- Lighter *weight* tracking (Unwin Heavy duty- same approval and with a very good reputation)
- Floor covering – cannot be changed without impairing quality and durability!

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Glass and Glazing

- The rubber gasket glazing will be replaced by direct bonding to save *weight*.
- A larger glass area had negligible effect on *weight*.
- The glass thickness will be reduced to 4 mm (as on most other Mellor products). 3 mm glass was considered insufficiently durable and of inferior optical quality.

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Exterior Panels

- This is already made from composite, and therefore light weight, however a minor change to composition will yield weight saving while offering similar properties

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Interior Linings and Exterior Panels

- Alternative substrates have been considered and are undergoing trials, though it is thought that significant savings cannot be gained without unacceptable reduction in durability

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Doors

- We have been working with suppliers to provide lighter doors, however the prototypes produced so far have not passed our durability tests, and therefore cannot be used

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Heating and Air Conditioning

- The Roof mounted Air Conditioning can be repositioned towards the front of the vehicle, with a revised lighter mounting system

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Seats and Mountings

- As discussed previously a special new seat will be used. It is our understanding that this is the lightest and most compact Type Approved seat available in the UK at this time

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Vehicle Structure

All aspects of the vehicle structure has come under scrutiny with a result that there are many changes. These include:

- The frame to be made from a grade of stainless steel to give a structure which is lighter with increased strength
- Body and equipment mountings changed.
- Body reinforcements change from folded sections to tubes
- The rear dog-leg extension changed to lightweight straight extension, as used previously on many Mellor products.

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Structural Analysis

- All changes are based on experience with other vehicles, or being proved by simulation.
- We are completing a Full Finite Element Analysis of the vehicle structure which as well as providing compliance to R66, will also prove the changes made to the structure. Our partner for this work is highly experienced and respected professional who has completed similar work previously with other manufacturers.

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Costs

- If a vehicle is being built to the existing construction and use regulations and is not completed by 29th October 2011, additional costs will be incurred in getting the vehicle to a compliant standard and this could involve specification changes and increased costs.
- When considering the purchase of a new minibus after 29 October 2011, you should ensure it is built to the ECWVTA standard.

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Mellor are committed to Type Approval

- We want to promote Type Approval, and are leading the industry in the Introduction of Type Approval into accessible buses.
- Type Approval is the only up to date regulation which offers the best, most comprehensive rule book for building safe vehicles.
- We see the 31 seat Vario as a niche market area where we plan to offer something that our competitors cannot.
- We believe we can offer value added benefits which shall improve fleet residual values and offer drivers and passengers a safer environment to travel in.

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