



## *Bodybuilder guidelines*

**DAF LF, CF and XF105**

**Update: 2011-22**





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DAF Trucks N.V.**

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In the interest of continuing product development, DAF reserves the right to change specifications or products at any time without prior notice. DAF can in no way be held responsible for any incorrect information included in this manual and/or the consequences thereof.

This publication refers to chassis with FR, GR, PR or MX engine complying to the **Euro 3, Euro 4 and Euro 5 emissions**.

**Note**

For **Euro 3** chassis with CE, BE, PE or XE engine see the digital publication that is available under file number **BBG0541.zip** on the 'archive' page of the Bodybuilder's info website.

**June 2011**



GENERAL	1
CHASSIS INFORMATION	2
GENERAL INFORMATION ON SUPERSTRUCTURES	3
SUPERSTRUCTURES	4
CAB INFORMATION	5
PTO AND OTHER ENERGY CONSUMERS	6
ELECTRICAL SYSTEM GENERAL	7
DATA COMMUNICATION SYSTEMS	8
ELECTRICAL SYSTEM LF SERIES	9
ELECTRICAL SYSTEM CF SERIES	10
ELECTRICAL SYSTEM XF SERIES	11
APPLICATION CONNECTOR (CODE) NUMBER LIST	12
PART NUMBERS	13
REACTION FORM	14



## GENERAL

	<b>Page</b>	<b>Date</b>
1.1 Purpose . . . . .	7	201122
1.2 Addresses to contact . . . . .	7	201122
1.3 Verificaton of superstructure . . . . .	7	201122
1.4 Statutory requirements . . . . .	7	201122
1.5 Vehicle specification and layout drawings . . . . .	8	201122
1.6 Weight distribution . . . . .	8	201122
1.7 Period of bodying and storage . . . . .	9	201122
1.8 Painting the chassis and components . . . . .	9	201122
1.9 DAF vehicle range . . . . .	9	201122
1.10 Dimensions . . . . .	12	201122
1.11 Product modifications . . . . .	12	201122
1.12 Feedback form . . . . .	12	201122



# BODYBUILDERS' GUIDELINES

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General

1



## 1. GENERAL

### 1.1 PURPOSE

The purpose of these guidelines is to give the bodybuilder advice and assistance to enable him to obtain a homogeneous and optimally functioning assembly of superstructure and DAF chassis.

The manufacturer of the superstructure should make sure that moving parts of the vehicle chassis, in particular the propeller shafts, cannot be restricted in their operation by, for example, parts of the superstructure and/or mountings. All components must remain easily accessible for maintenance and repair! Work on the vehicle should at all times be done by qualified staff.

### 1.2 ADDRESSES TO CONTACT

In these guidelines the designation "DAF" refers to the responsible subsidiary or importer of DAF Trucks N.V. in the country concerned.

**The supplier of the superstructure will under all circumstances remain fully responsible for the product supplied by him and, in view of the safety of the user, he must deliver the product with clear information, instructions for use and/or documentation with respect to the superstructure and any additional equipment. Prior to delivery to the customer, the bodied vehicle should be inspected by the DAF dealer. DAF cannot be held liable for any consequences of the actions of third parties.**

### 1.3 VERIFICATION OF SUPERSTRUCTURE

In view of vehicle safety, product liability and the quality standards set by DAF, it is not permitted to make changes to the design of the vehicle without **prior consultation with and written permission from DAF**.

#### Machine directives and CE marking

If the superstructure (or parts of it) can be qualified as a machine, special attention should be paid to the machine directive and the CE marking. If necessary, consult the authorities concerned.

Superstructures fitted fully in keeping with these guidelines do not require verification. DAF is always willing to answer any questions in this field.

**For the integration of the superstructure with related vehicle systems, see Section 7: "Electrical system general".**

**Whenever these guidelines are not fully conformed to, and in all cases not provided for in these guidelines, consultation with and verification by DAF is required.**

### 1.4 STATUTORY REQUIREMENTS

Requests for such verifications can be submitted to DAF by sending **in duplicate**, functional description, drawings and engineering calculations of all systems that are affected by the intended modification. If found in order, one set will be returned by DAF with a declaration written down in letter of "**no objection**" (LONO) and possibly accompanied by some comments with regard to the construction to be used.

The superstructure and any vehicle modifications connected with it must in all respects comply with the statutory requirements in the country concerned.

As DAF builds its commercial vehicle chassis fully in accordance with the statutory requirements in force, the responsibility for the **bodied** vehicle rests with the bodybuilder.

The manufacturer of the superstructure should in all cases ensure that the operations carried out on the vehicle fully comply with the applicable quality standards.

When the bodied vehicle is inspected, DAF is not responsible for problems caused by the superstructure or by parts fitted and/or modified by third parties.

# BODYBUILDERS' GUIDELINES

## General

### 1.5 VEHICLE SPECIFICATION AND LAYOUT DRAWINGS

1

In determining the right chassis and body specifications, it is essential that the three parties involved, **customer, bodybuilder and DAF**, should each bring in their own specialism.

Intensive consultation is the only way to obtain an optimum result. This consultation requires the availability of all Technical data, such as vehicle specifications and layout drawings (DAF bodybuilders' drawings), and the possibility of forming a quick assessment of all the technical possibilities with their specific advantages and disadvantages.

DAF's professional transport advice system, TOPEC, has been developed especially for this purpose and is also available to the bodybuilder. TOPEC enables fast calculation of the effects of particular vehicle dimensions on, for instance, weight distribution, coupling position, turning circle and axle load pattern during unloading. Requests for TOPEC calculations can be submitted to DAF.

#### Layout drawings

The chassis bodying possibilities can be determined on the basis of the very detailed cab/chassis layout drawings showing many dimensions and component positions. These drawings are available from DAF and they can be found as digital files on the internet ([www.daf.com](http://www.daf.com)).

Additionally, DAF can supply on request (chassis number specific) a CAD file in either the 3D-DXF or 3D-STEP 2.14 file format showing the main chassis longitudinal with full hole pattern. Contact DAF for applicable cases with complex superstructures like heavy cranes.

#### TOPEC availability to the bodybuilding industry

The TOPEC program is available in two versions: 'TOPEC View' and 'TOPEC Light', and can be ordered from DAF via a subscription system.

**TOPEC View:** A TOPEC View subscription provides for bodybuilders' access to an online archive of current and historical chassis layout drawings in the DXF and PDF file format. All chassis layout drawings can be read online, complemented with remarks and details, and printed using the regular Adobe PDF viewer. With the TOPEC view application the chassis height can be calculated based on the wide variety of front and rear axle suspension and tire types as supplied by DAF. The additional 2D-DXF format can be used in your own AutoCAD system or any other program capable of opening a DXF file.

**TOPEC Light:** On top of the above-mentioned digital file of component and chassis drawings, a TOPEC Light subscription includes the calculation modules required for making layout, weight, turning circle and chassis strength calculations.

### 1.6 WEIGHT DISTRIBUTION

When constructing the superstructure, make sure that weight is correctly distributed so that the permitted axle loads can be utilised, and take note of the following guidelines:

- The length of the body and consequently the position of the centre of gravity may vary within the axle load distribution tolerance limits permitted in the country concerned.
- To avoid excessive leaning of the vehicle to one side, the difference in weight between the LH and RH wheels on one and the same axle must not be more than 4%; see also the paragraph below on lateral stability.
- The weight under the front axle(s) must in all cases be at least 20% of the total vehicle weight when used solo or in combination with a conventional coupled trailer and at least 30% of the total vehicle weight when used in combination with a mid-axle trailer.
- The weight under the driven axle(s) must be at least 25% of the maximum total weight of the vehicle or vehicle combination.
- The centre of gravity of the total of superstructure, any loading/unloading equipment and vehicle load must at all times be within the theoretical wheelbase, because otherwise vehicle behaviour could be adversely affected.

**Chassis reinforcements and additional components, such as compressors, additional fuel tanks and loading and unloading equipment, affect the weight and therefore the weight distribution of the vehicle being bodied. It is therefore essential that the vehicle, including any extra equipment, should be weighed before the bodying is started. Only then will it be possible to establish in time the effect any such extra equipment may have on the location of the vehicle's centre of gravity.**

#### Lateral stability (dynamic)

High superstructures, whether or not in combination with a high centre of gravity of the load, are sensitive to side winds and may have an adverse effect on the lateral stability and therefore the driving characteristics of the vehicle. The same applies in the case of:

- asymmetric loading;
- specific load distribution;
- axle load shifts when the vehicle is partly laden;
- axle load shifts when the load is moving.

In all cases, ultimate responsibility rests with the supplier of the superstructure or the user of the vehicle.

## 1.7 PERIOD OF BODYING AND STORAGE

When a vehicle, for instance, because of a long period of bodying, is not being used for a prolonged time, measures should be taken to guarantee the continued high quality of the vehicle. These measures depend on the estimated duration of storage and/or bodying.

The measures that should normally be taken, may include the following:

- Closing windows and roof hatch.
- Checking fluid levels and, where necessary, topping-up reservoirs.
- Checking the tyre pressure.
- Removing, storing and charging the batteries.
- Checking the coolant antifreeze content.
- Patching up damaged spots in paintwork.

**For measures to be taken in the event of very long storage periods, DAF should be contacted.**

## 1.8 PAINTING THE CHASSIS AND COMPONENTS

In case the chassis (cab) and components must be (re)ainted then the under mentioned area's must thoroughly be masked before painting to avoid problems with electrical or mechanical vehicle systems.

- The contact area's between wheel hub and wheel rim and flanged nuts.
- Brake disks, brake calliper and pads.
- Breather valves placed on components, such as differential, EAS unit, ECAS valves, brake valves and so on.
- Air intake and outlet openings of the Power electronics carrier (PEC) unit on LF45 Hybrid chassis.
- The full length of all orange coloured high voltage wiring cables (LF45 Hybrid chassis).
- All warning labels on components and chassis.

- Air intake openings on filter units.
- NOx sensors and solenoid valves.
- Heat shield panels and heat isolated exhaust pipes (when fitted).
- Sealings and sliding joints on propeller shaft.
- Identification plates (on gearbox, drive axle and valves etc.).
- Door locks.
- Cab windows, head - brake - indicator lights and reflectors.



*NOTE: Many components and in particular cab panels are produced in a variety of material types each requiring a different specific (re)paint treatment. For obtaining the cleaning and (re)spraying guidelines (preparations), as published by the DAF After Sales/ Service department, please contact a DAF representative in your country. For applying the top coating always follow the manufacturer's instructions.*

## 1.9 DAF VEHICLE RANGE

DAF's vehicle range is composed of several tractor chassis in the weight category above 12 tonnes and an even wider variety of rigid's in the category of 6 tonnes GVW and over.

### DAF LF45 series



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This series offers gross vehicle weights from 7,5 to 12 tonnes. The trucks are intended for intensive use in urban and regional distribution transport and are powered by **4.5 litre four-cylinder FR diesel engines** generating outputs from 103 kW up to 152 kW, or by **6.7 litre six-cylinder GR diesel engines** with a power rating of 165 kW up to 184 kW.

# BODYBUILDERS' GUIDELINES

## General

1

### DAF LF55 series

This vehicle series, with gross vehicle weights from 14 to 19 tonnes, is intended for light to medium-weight transport in urban and regional goods distribution. These vehicles are also excellently suited for a wide range of applications in the field of public utility services. This series is equipped with **4.5 litre four-cylinder FR diesel engine** generating an output of 136 up to 152 kW or by **6.7 litre six-cylinder GR diesel engines** offering outputs from 165 kW up to 220 kW

### DAF CF series



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### DAF CF65 series

The DAF CF65 series underlines the importance of market segmentation and of medium line vehicles with specific features and characteristics for a huge diversity of applications, body types and operational conditions. The DAF CF65 series has been developed as a two-axle rigid for local and regional goods distribution and special transport applications, such as council cleaning services and fire services. With a maximum GVW of 19 tonnes, this series is powered by **6.7 litre GR diesel engines** generating outputs from 165 kW up to 220 kW.

### DAF CF75 series

The DAF CF75 series is a real all-rounder with a choice of chiefly two-axle and three-axle models. These vehicles are excellently suited for medium-weight to heavy regional and national distribution transport and for a wide range of applications in the field of public utility services, such as council cleaning services. The **9.2 litre PR diesel**

**engines** use a highly advanced combustion principle and they have four valves per cylinder. With power outputs from 183 kW up to 265 kW, they are suitable for gross combination weights up to 40 tonnes.

### DAF CF85 series

The DAF CF85 vehicles are equipped with **12.9 litre MX diesel engines**, which use a highly advanced combustion principle and have four valves per cylinder. With engine outputs from 265 kW up to 375 kW, this truck is made for heavy work. It can be specified as a two-axle, three-axle or four-axle vehicle with one or two driven axles. A robust truck for intensive medium-range transport requiring high gross combination weights (over 40 tonnes), for transport in the building industry and/or heavy special transport.

### DAF XF series



G000392

### XF105 series

The DAF XF is the flagship of the DAF range. With the XF105 series, DAF has again moved a step forward in the ever continuing development of vehicle and engine technology. The XF chassis is fitted with **12,9 litre MX diesel engines**, which use a highly advanced combustion principle and have four valves per cylinder. With engine outputs from 300 kW up to 375 kW, these vehicles are ideal for long-distance (international) haulage requiring gross combination weights of 40 tonnes.

With the Super Space Cab, the driver virtually has a mobile residence, complete with all the conveniences required for lengthy journeys (away from home for on average 1 to 3 weeks). The DAF XF series makes no concessions. It combines a very high level of driver comfort with optimum transport performance and the lowest possible costs of ownership for the transport operator.

1

Designation	Type	Sort of chassis	DAF-series					
			LF45	LF55	CF65	CF75	CF85	XF105
FA	4x2	Truck chassis	■	■	■	■	■	■
FAR	6x2	Truck chassis with single-wheel trailing axle				■	■	■
FAS	6x2	Truck chassis with twin-wheel trailing axle				■	■	■
FAN	6x2	Truck chassis with rear steered axle		■		■	■	■
FAG	6x2	Truck chassis with second steered axle				■	■	
FAT	6x4	Truck chassis with double-drive tandem axle				■	■	■
FAC	8x2	Truck chassis with 2 front axles, single drive axle and twin-wheel trailing axle					■	
FAX	8x2	Truck chassis with 2 front axles, single drive axle and rear steered single-wheel trailing axle					■	
FAK	8x2	Truck chassis with three rear axles, including twin-wheel trailing axle					■	■
FAD	8x4	Truck chassis with 2 front axles and double-drive tandem axle				■	■	■
FT	4x2	Tractor chassis		■		■	■	■
FTR	6x2	Tractor chassis with single-wheel trailing axle					■	■
FTS	6x2	Tractor chassis with twin-wheel trailing axle					■	■
FTG	6x2	Tractor chassis with second steered axle					■	■
FTP	6x2	Tractor chassis with non-steered second axle					■	■
FTT	6x4	Tractor chassis with double-drive tandem axle					■	■
FTM	8x4	Tractor chassis with three rear axles; a steered axle in front of a double-drive tandem axle						■

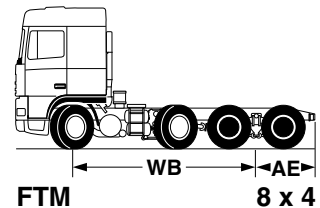
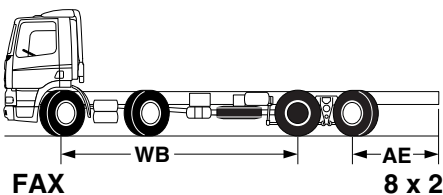
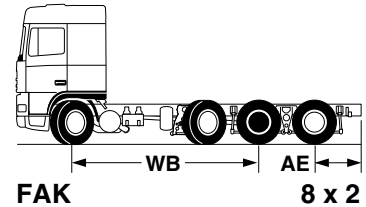
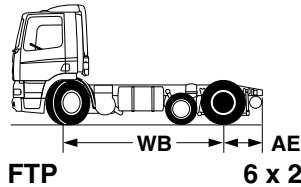
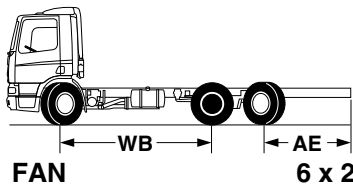
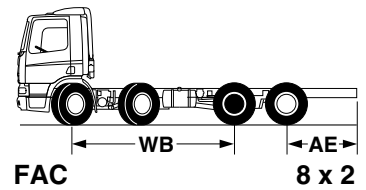
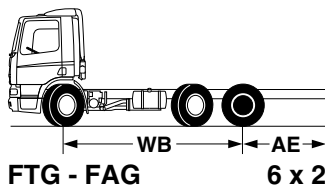
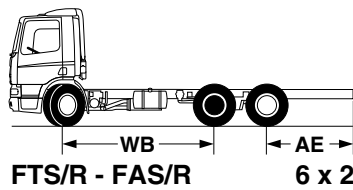
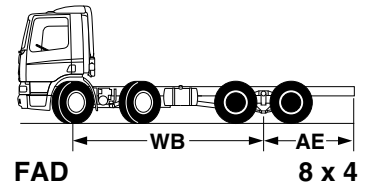
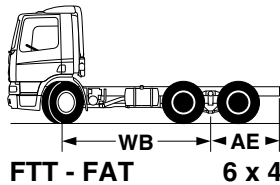
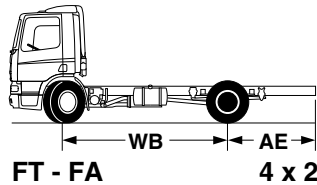
# BODYBUILDERS' GUIDELINES

## General

### Wheelbase and rear overhang indications

The indications for wheelbase and rear overhang (WB/AE) used in these bodybuilders' guidelines and in general at DAF can be found for each vehicle type in the following survey:

1



G000307

## 1.10 DIMENSIONS

All dimensions in these bodybuilders' guidelines are shown in millimetres, unless stated otherwise.

## 1.11 PRODUCT MODIFICATIONS

In the interest of continuing product development, DAF reserves the right to make changes in the specifications or the designs of the vehicles without prior notice.

Furthermore, vehicle specifications may vary from country to country, depending on local conditions and legislation. For exact and up-to-date information, please contact the local DAF sales organisation.

## 1.12 FEEDBACK FORM

In view of the importance of maintaining the present level of quality and user-friendliness of the DAF Bodybuilders' Guidelines, your recommendations and/or suggestions will be highly appreciated.

Use the : "Feedback form" you will find on the last page(s) to communicate your findings to us.

### CHASSIS INFORMATION

	<b>Page</b>	<b>Date</b>
2.1 Levelling the chassis . . . . .	15	201122
2.2 Drilling of holes . . . . .	15	201122
2.3 Welding on the chassis . . . . .	16	201122
2.4 Modifying the rear overhang . . . . .	17	201122
2.5 Wheelbase modifications . . . . .	20	201122
2.6 Attachment of components to the chassis . . . . .	21	201122
2.7 Replacing rivets by bolts . . . . .	22	201122
2.8 Inlet and exhaust systems . . . . .	23	201122
2.9 Fuel system . . . . .	27	201122
2.10 Chassis and cabine related dimensions . . . . .	28	201122
2.11 Drawbar cross member . . . . .	33	201122
2.12 Rear light brackets . . . . .	39	201122
2.13 Wheel mounting . . . . .	39	201122
2.14 Wheel clearance . . . . .	40	201122
2.15 Location of the mudguards . . . . .	43	201122
2.16 EC-approved rear underrun protection . . . . .	44	201122
2.17 Automatic lubrication . . . . .	45	201122

# BODYBUILDERS' GUIDELINES

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Chassis Information

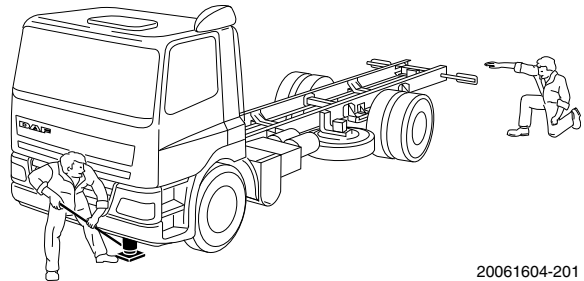
2



## 2. CHASSIS INFORMATION

### 2.1 LEVELLING THE CHASSIS

It is essential for the quality and durability of the bodied vehicle that the chassis should be in a completely level position when it is being bodied. The side members should be parallel and the chassis frame must not be twisted. Frame height differences on the left/right of  $\leq 1.5\%$  of the distance from ground to the frame upper flange are within the limits. Variations  $> 1.5\%$  must be notified to DAF Trucks, before any work are carried out.



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For the levelling of an air-suspended chassis, at least three adjustable supports must be used. These supports must not be removed during the bodying of the vehicle.



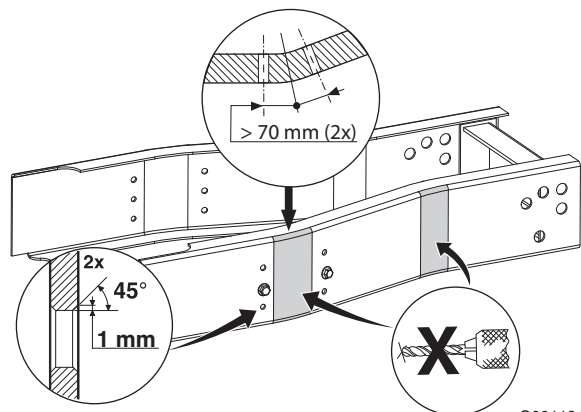
**WARNING!** Each time the vehicle is moved, the chassis must be levelled again!

### 2.2 DRILLING OF HOLES

When mounting components, use the existing holes in the chassis whenever possible, preferably the holes according to **BAM 1 and 3** (see section: 3.2: "BAM's - body attachment methods"), which are factory-made and exclusively intended for the superstructure. The location of these holes is therefore indicated on the bodybuilders' drawings.

Adhere to the following instructions when drilling holes:

- NEVER drill holes in the flanges of the side members.
- NEVER drill holes in the tapered ends of a tractor chassis frame.
- NEVER weld filler pieces into any unused holes of the chassis frame.
- To prevent the forming of cracks from the drilled holes, these holes must always be deburred - by 45° countersinking (on two sides!) - and subsequently treated with primer/paint.
- The drilling of holes less than 70 mm away from a bend in the chassis frame is not permitted.
- A hole drilled by mistake close to the radii of (or within) the tapered section of the chassis must always be protected against fatigue cracks at its edges by fitment of the largest (and accordingly tightened) flange bolt and nut possible.



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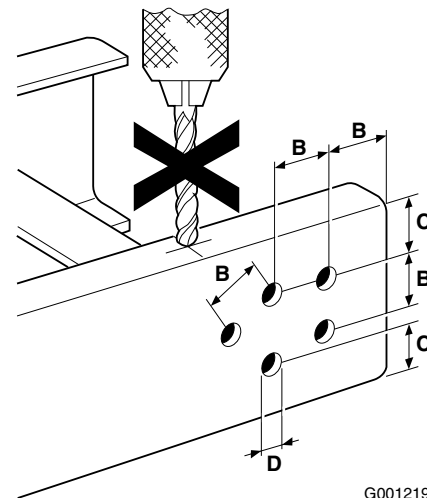
# BODYBUILDERS' GUIDELINES

## Chassis Information

### Dimensions for holes drilled in side members:

- B > 3 x D (D = diameter of largest hole, at most 18 mm)
- C > 70 mm (tractor chassis), 50 mm (truck chassis)

For deviations from the above-mentioned dimensions, DAF should be consulted.



G001219  
Minimum distances for drilling of holes

2

## 2.3 WELDING ON THE CHASSIS



**WARNING!** *Welding on the chassis is not permitted without a written permission from DAF, with the exception of welding operations required for rear overhang extensions.*

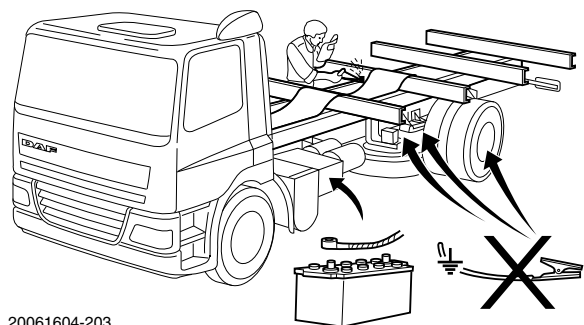


**WARNING!** *For the LF45 hybrid chassis extra welding guidelines are applicable; see section: 7.20: "Hybrid system LF45" for more information.*

The following **DAF welding instructions** should be observed at all times:

### Welding on the chassis

- Disconnect the connectors of electrical and electronic equipment (sensors and actuators) and the battery terminals if they are less than 1 metre away from the chassis part to be welded or the earth terminal of the welding equipment.
- If the battery terminals have to be disconnected, all electronic units mounted on the chassis and the bulkhead lead-through connectors should be disconnected, too.



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Measures to be taken when welding!

### Welding on the cab

- Always disconnect the batteries (starting with the negative lead).

- Disconnect the connectors between chassis and cab (bulkhead lead-through).
- Disconnect the connectors of electrical and electronic equipment if they are less than 50 cm away from the cab part to be welded or the earth terminal of the welding equipment.

### Welding on the superstructure

- Adhere to the above instructions for 'welding on the chassis', supplemented by specific bodybuilders' instructions.

### General

- The earth terminal should never be attached to vehicle components such as engine, axles and springs. Arcing on these parts is not permitted either, because of the risk of damage to bearings, springs, etc.
- The earth terminal must make good contact and be placed as close as possible to the part to be welded.
- Plastic pipes, rubber parts and parabolic springs should be well protected against welding spatter and temperatures higher than 70°.
- The contact switch must not be in the accessory or contact position. The contact key should be removed.
- Reconnect in reversed order of disconnecting. Ensure that a good earth connection is made between chassis, engine and cab.



**WARNING! If the connectors are not disconnected, serious damage may be caused to the electronic control units (ECU's) of various vehicle systems.**

See section: 7.13: "Connection points and permitted power loads" for the connection points on LF, CF and XF vehicles.

## 2.4 MODIFYING THE REAR OVERHANG

**For the chassis material to be used for rear overhang extensions (if they are necessary), see section 13: "Part numbers".**

### Extending/shortening the rear overhang

When extending the rear overhang, take note of the following:

- The maximum rear overhang (AE) extension is 500 mm, provided that the maximum rear overhang (AE) length of 60% of the wheelbase (WB) is not exceeded.

## BODYBUILDERS' GUIDELINES

### Chassis Information

- The rearmost cross member must be retained when the chassis frame is made longer or shorter.
- When the rear overhang is shortened, at least 30 mm must be left behind the rear spring brackets (leaf-sprung chassis) or the stabiliser bracket (air-sprung chassis).
- The distances between the cross members in the chassis frame should be not more than 1200 mm.

2



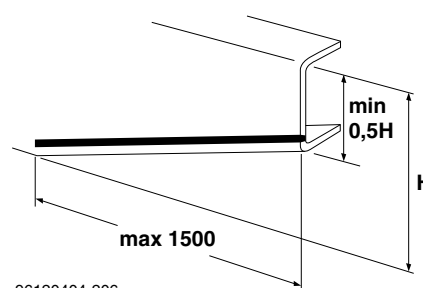
**WARNING!** The rear overhang of tractor chassis and of vehicles with side members of KF 600 material must NOT be changed

#### Tapering of chassis side member rear ends

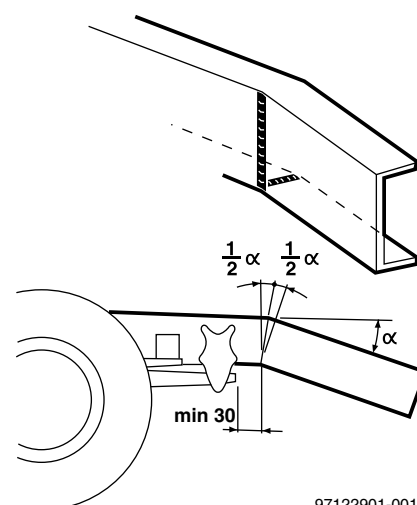
On vehicles used for (high-)volume transport (lower position of drawbar cross member) and/or equipped with under-chassis tail lifts, the rear ends of the side members may be tapered in accordance with the dimensions shown in the opposite drawing.

For certain applications, for instance for plant bodies, it is permitted to make a bend in the rear overhang. To do this, remove a sector from the side member, starting from the underside and ensuring that the upper flange is left intact and that, after the bending of the chassis, both the web and the lower flange can be welded together again. See the opposite drawing.

**When doing this, the welding instructions must always be adhered to.**



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