



FREIGHTLINER BODY BUILDER BOOK

FREIGHTLINER TECHNICAL INFORMATION

INTRODUCTION

This publication is designed to assist in meeting the need for changes in vehicle specifications while maintaining the design intent and required compliance with the legislated and regulatory controls in force at the time the vehicle was built. The publication is intended for body builder manufacturers located within Australia.

NATIONAL CODE INFORMATION

The Vehicle Standards Bulletin Number 6 (**VSB6**) is a National Code of Practice for Heavy Vehicle Modifications which was released by The Federal Office of Road Safety as a guide to the heavy vehicle industry, as amended from time to time. This document is to be used in conjunction with the VSB6 guidelines, which can be found using the link below.

Modifying a vehicle remains the responsibility of the vehicle modifier.

LEGAL DISCLAIMER

By using this publication, you acknowledge and agree that it is your responsibility to ensure that any modification you carry out or affix to your vehicle (as the case may be) complies with all applicable laws, regulations and any other relevant requirement of a regulator or an authority. You are responsible for ensuring that the modifications do not affect the vehicle's safety, or the safety of the driver, any passengers or other road users, roadworthiness or insurability.

Nothing contained in this document is to be regarded as providing instructions for the completion of vehicles or as an authority by Daimler Truck and Bus Australia Pacific Pty Ltd (**DTBAuP**) for the assembly, modification, alteration of, or addition to, any vehicle whether delivered by DTBAuP in a complete or incomplete state of manufacture. DTBAuP does not accept any liability or responsibility whatsoever for any assembly, modification or alteration of, or addition to, any vehicle which is carried out by any person, corporation or other legal entity other than DTBAuP. In addition, to the maximum extent permitted by law, DTBAuP assumes no responsibility for the accuracy, completeness, currency or reliability of the information provided, and all implied guarantees, warranties, conditions, and claims (whether express or implied) arising out of or connected with this publication are hereby excluded. All photographs and diagrams within the document are for illustrative purposes only.

DTBAuP reserves the right to discontinue models or change specifications or designs at any time without notice or obligation.

The contents of the publication are not and should not be regarded as legal advice; users should seek their own legal advice if and when appropriate. This document may be amended by DTBAuP from time to time.

LINKS

VSB6 | NHVR:

<https://www.nhvr.gov.au/safety-accreditation-compliance/vehicle-standards-and-modifications/vehicle-standards-bulletin-6>

Freightliner wiring information:

<https://daimlertrucks.com.au/bodybuilder.html>

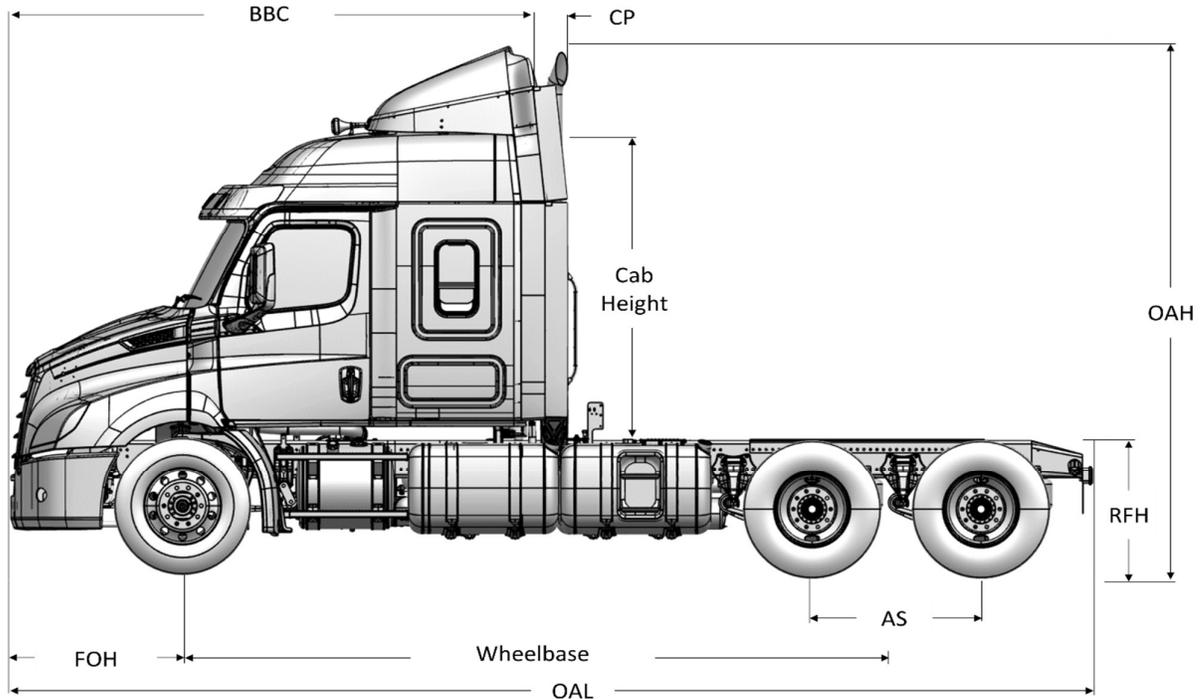
FREIGHTLINER TECHNICAL INFORMATION

VEHICLE DIMENSIONS

CASCADIA 116

48" XT Sleeper Tractor shown below

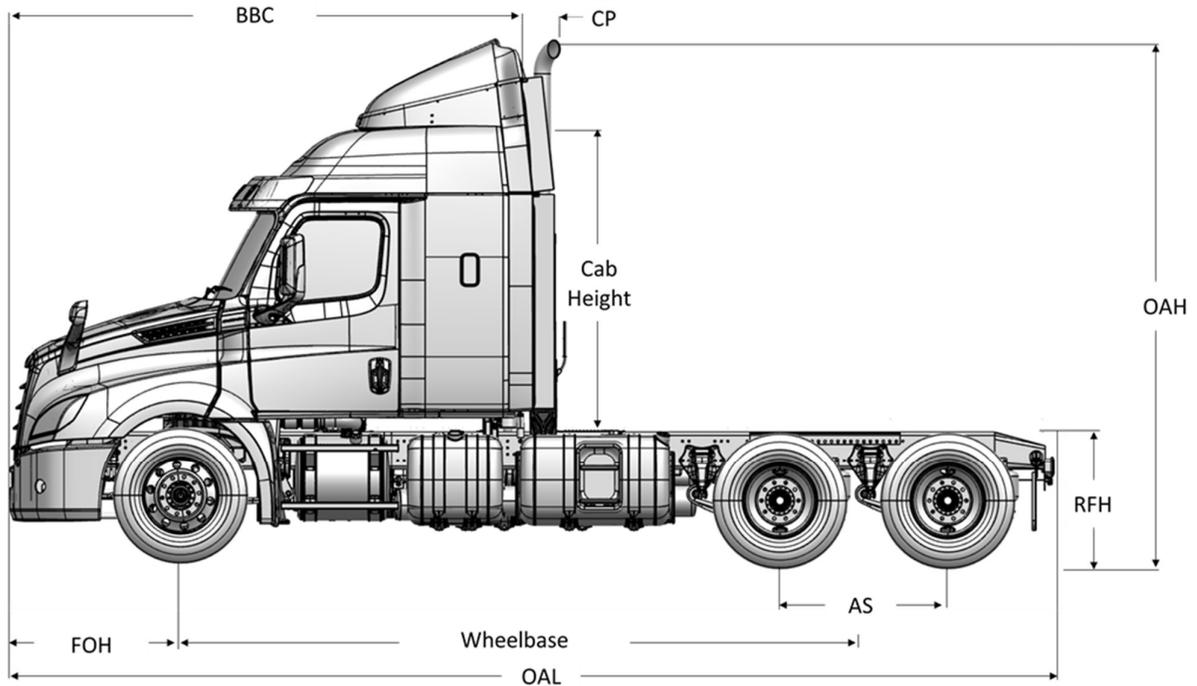
(Drawing is not to scale)



Cascadia 116		Day	36"	48"
BBC	Bumper to Back of Cab	2,970	3,670	3,970
Wheelbase	Wheelbase, nominal	4,325	4,825	5,125
OAL	Overall Length			
AS	Axle Spread (AirLiner suspension)	1,295	1,295	1,295
RFH	Rear Frame Height, nominal Assumptions:-	1,025 mm laden. AirLiner 46K, 11R22.5 tyre & 11mm frame rail		
Cab Height	Cab Height - Day/XT	1,965	2,390	2,390
OAH	OAH -Day Cab -XT No aero -XT with aero	3,030	3,455 4,065	3,455 4,065
CP	Cab Protrusions - Exhaust - Horizontal Outlet - Vertical BOC - Vertical B Pillar	0 390 80	0 295 NA	0 295 NA
FOH	Front Over Hang	1,315	1,315	1,315

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CASCADIA 126
 36" XT Sleeper Tractor shown below
 (Drawing is not to scale)



Cascadia 126		Day	36"	48"	60"
BBC	Bumper to Back of Cab	3,220	3,920	4,220	4,520
Wheelbase	Wheelbase, nominal	4,425	4,925	5,425	5,875
OAL	Overall Length				
AS	Axle Spread (Airliner Suspen.)	1,295	1,295	1,295	1,295
RFH	Rear Frame Height, nominal Assumptions:-	1,025 mm laden. Airliner 46K, 11R22.5 tyre & 11mm frame rail			
Cab Height	Cab Height - Day/XT - Raised roof	1,965	2,390	2,390	2,390 3,000
OAH	OAH - Day/XT No Aero - XT with Aero - Raised roof	3,030 3,030	3,455 4,065	3,455 4,065	3,455 4,065
CP	Cab Protrusions - Exhaust Outlet				
	- Horizontal	0	0	0	0
	- Vertical BOC	340	295	295	295
	- Vertical B Pillar	80	NA	NA	NA
FOH	Front Over Hang	1,315	1,315	1,315	1,315

CHASSIS

WHEELBASE MODIFICATIONS

Refer to VSB6 section H.

FRAME DIMENSIONS

Frame Notes (applicable to all frame variations):-

- RBM = Resistive Bending Moment
- **Steel is heat treated and should not be welded or drilled.**
Top and bottom flanges should never be marked or touched.

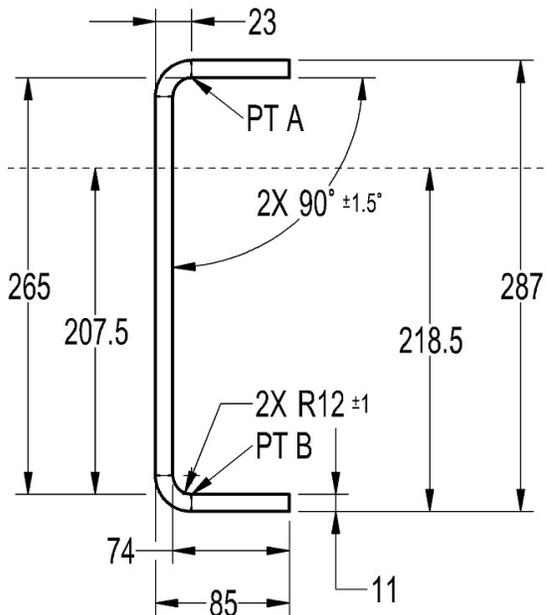
Frame Dimensions – Single Skin

11.0mm x 85.0 x 287.0 (7/16" x 3-11/32" x 11-19/64")

- RBM: 282 kNm (2,491,000 lb-in) per rail
- Weight 36.2 kg/m (2.03 lb/in)

Frame Width

- Inside-to-inside of rail 834 mm
- Outside-to-outside of rail 856 mm



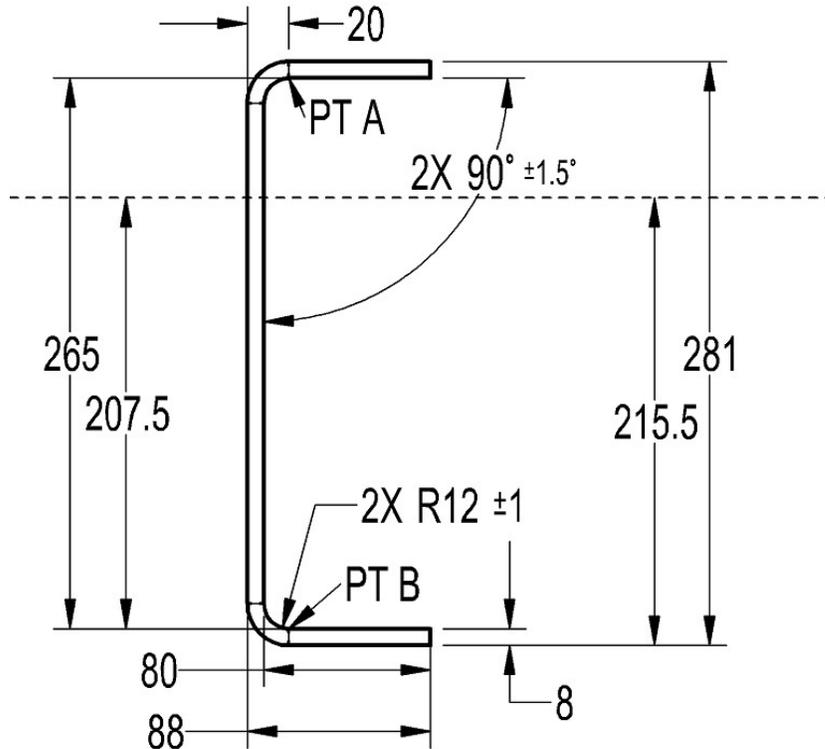
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8.0mm x 88.0 x 281.0 (5/16" x 3-15/32" x 11-1/16")

- RBM: 213 kNm (1,885,679 lb-in) per rail
- Weight 26.8kg/m (1.5lb/in)

Frame Width

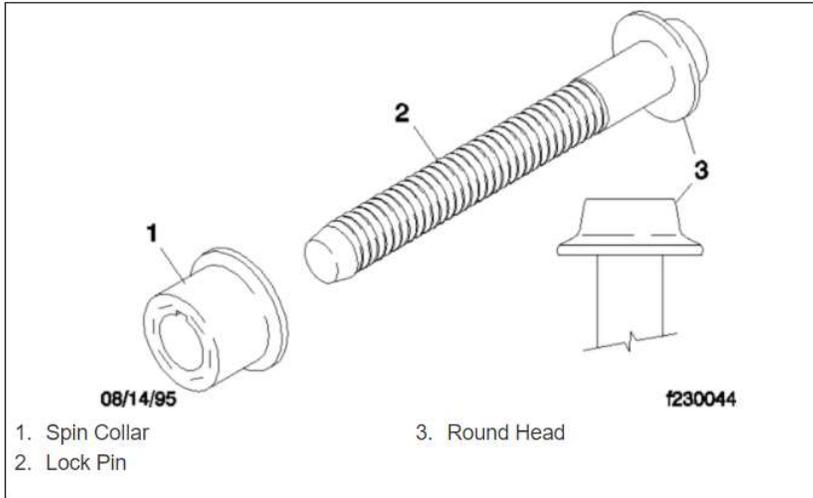
- Inside-to-inside of rail 834 mm
- Outside-to-outside of rail 850 mm



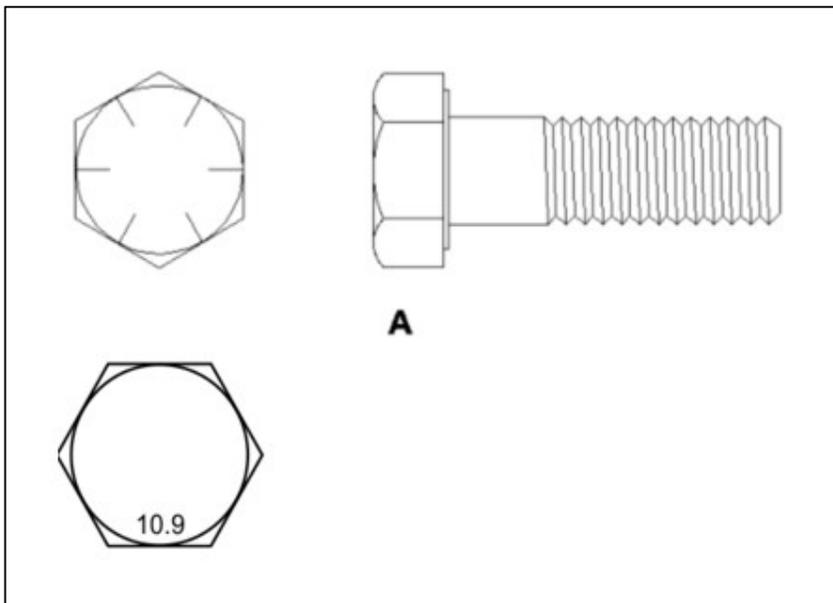
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FASTENERS

Either Huck® fasteners or US grade 8/ Metric grade 10.9 hexhead bolts, hardened washers and prevailing torque locknuts are used for frame attachments. See below.



Huck Spin fastener

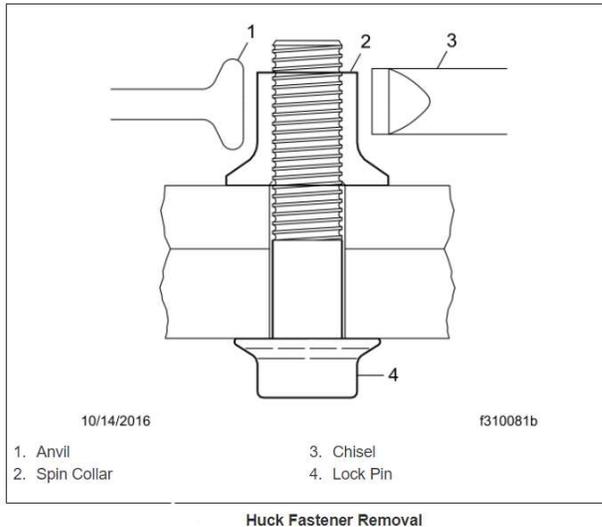


US Grade 8 (top), Metric Grade 10.9 bottom

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Huck Fastener Removal

The collar for Huck fasteners is spun on when they are installed, but it cannot be unscrewed. Use the Huck Collar Cutter to remove Huck fasteners. If the Collar Cutter isn't available, split the collar with an air chisel while supporting the opposite side of the collar with an anvil. See below. Then, drive out the lock pin with a punch.

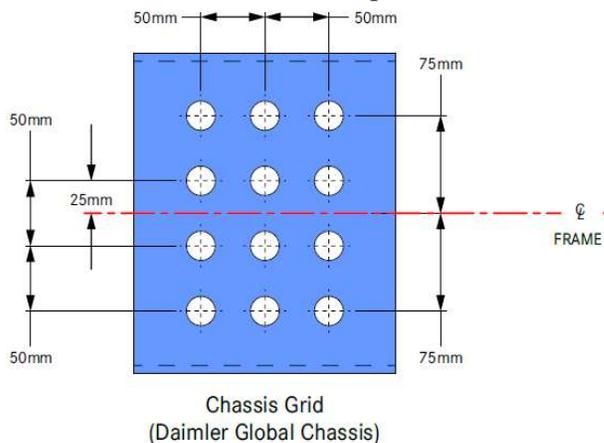


Discard the fastener after removing it. Install new Huck fasteners or if not available, install standard min US Grade 8 threaded fasteners, and hardened washers to replace the removed Huck fasteners.

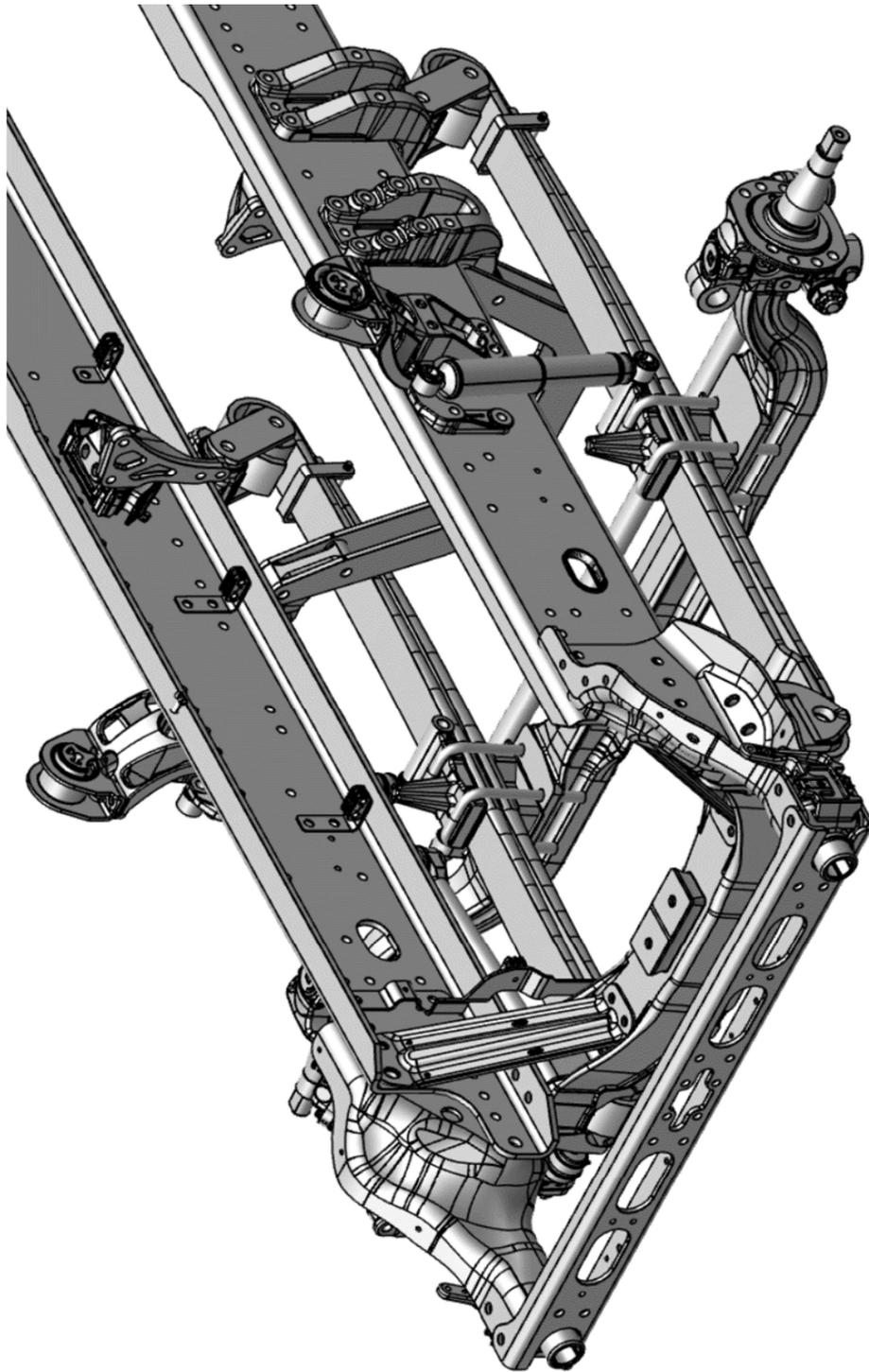
A hardened flatwasher is required to prevent the bolt head or nut from embedding in the part. In general, hardened washers are used to distribute the load, and to prevent localized overstressing of the frame rails, brackets, and other parts.

DRILLING OF ADDITIONAL HOLES

Drill holes no less than 50mm apart.



CASCADIA FRAME LAYOUT



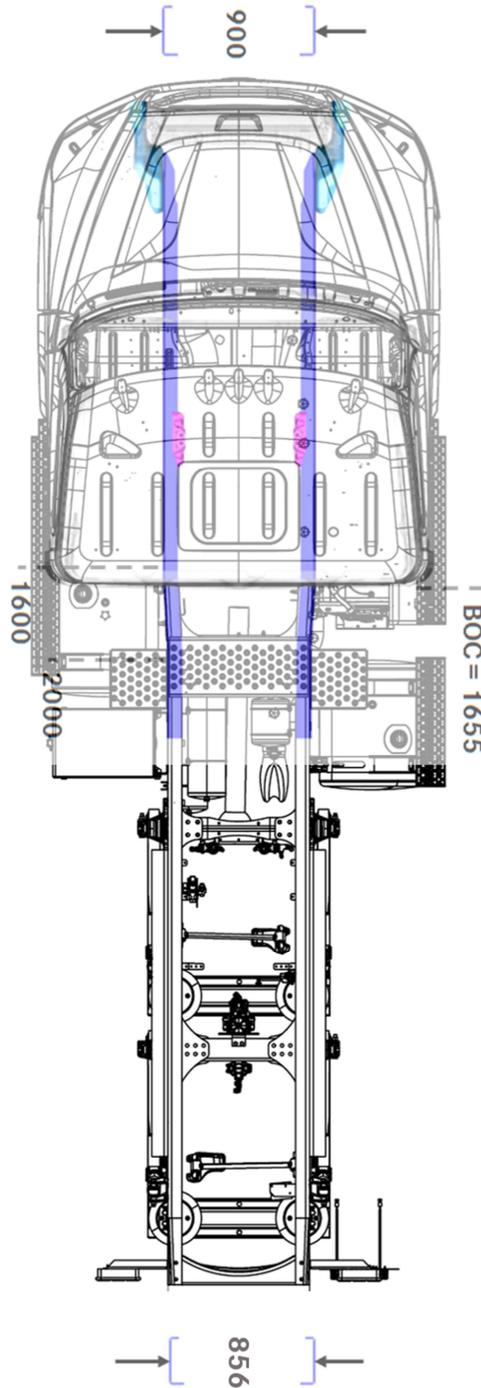
Front Frame Layout

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REAR FRAME LAYOUT

The New Cascadia has a splayed chassis rail (front of chassis is wider than rear). This lets the Engine sit lower down in the chassis therefore the bonnet can be lower and sleeker. This results in less aerodynamic drag and better fuel economy.

The chassis rail splay starts at 1600mm from front axle. 116 Day Cab shown below, 11mm Chassis Rail.



BODY MOUNTING AND TOW COUPLINGS

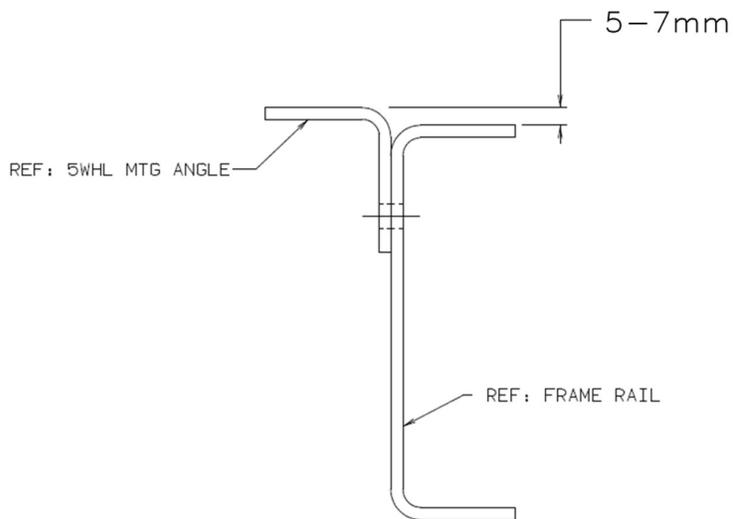
MOUNTING OF BODIES

Refer to VSB6 section J.

MOUNTING OF FIFTH WHEELS

Refer to VSB6 section P.

Specifications of Freightliner fifth Wheel mounting angle shown below.



OUTBOARD MOUNTED
ANGLE

FUPD AND BULLBARS

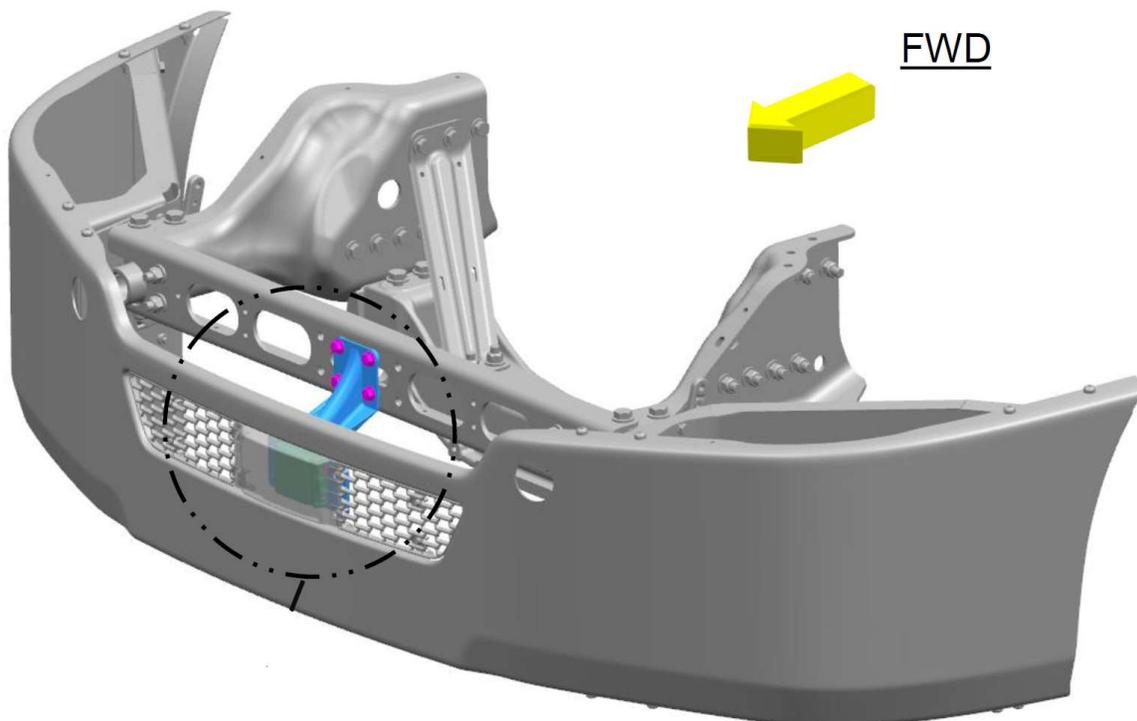
BULLBARS

Refer to VSB 6 section H.

FRONT SENSORS

A radar sensor is installed at the front end of the vehicle for the Detroit Assurance 5.0 safety package.

See highlighted below, radar unit and plastic cover.



WARNINGS

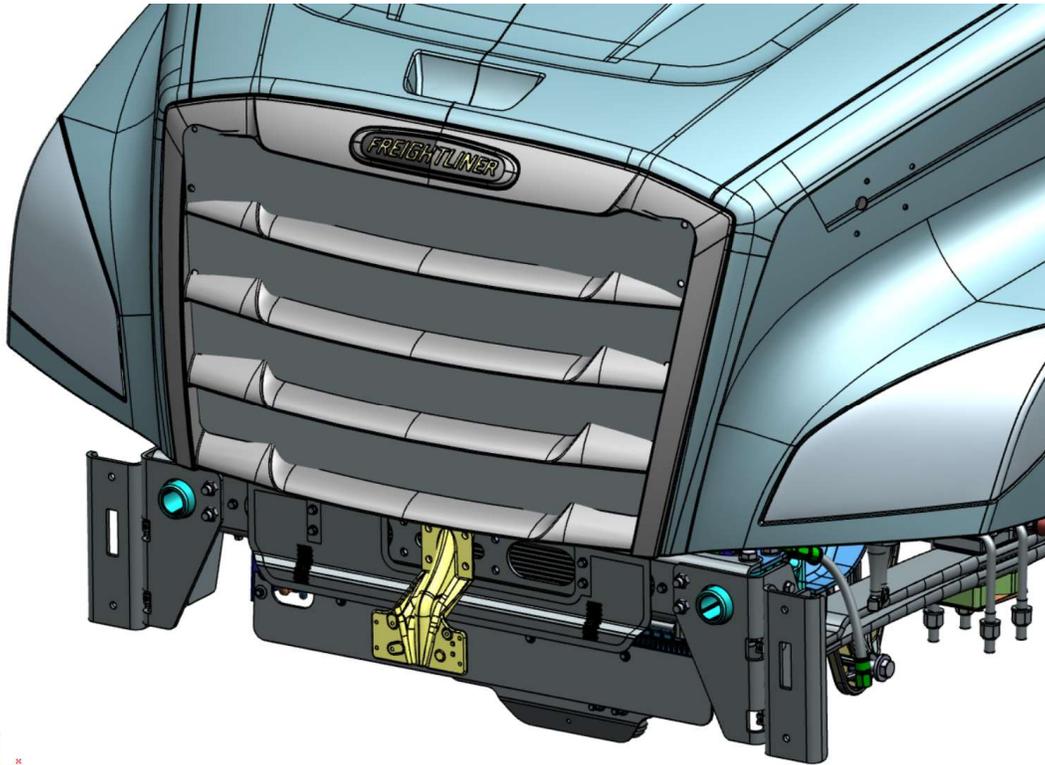
DO NOT:

- Mount Parts in the detection range of the radar sensor.
- Place a cover of any type in front of the radar sensor.
- Paint over the plastic cover of the radar sensor
- Move the position of the radar sensor, it must remain on standard bracket.

Any of the above will impair the function of the system and cause faults.

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Standard Radar Bracket highlighted below, DO NOT move or modify.



IMPORTANT INFORMATION FOR BULLBARS

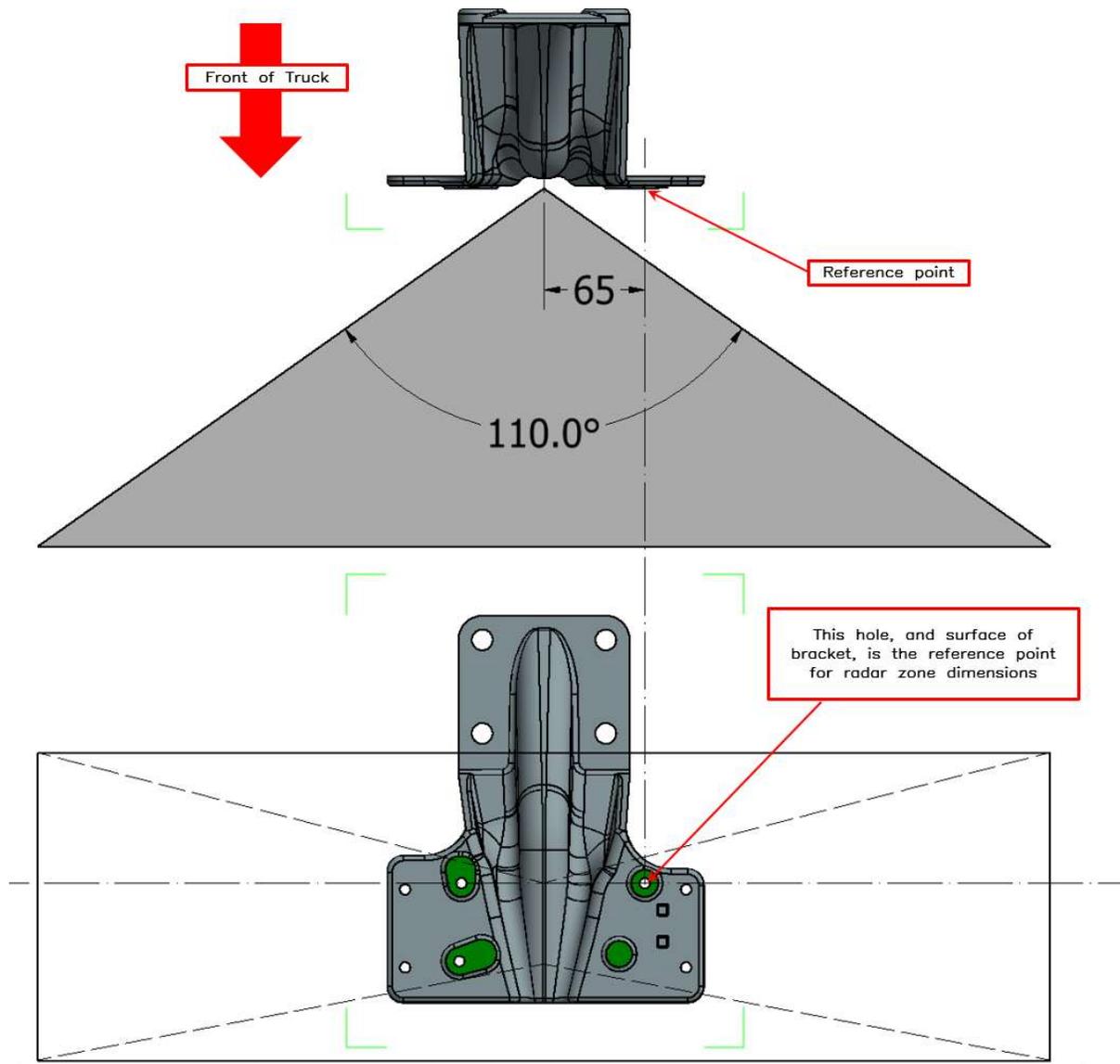
DETAILS OF RADAR SENSOR BEAM

Design bulbar, FUPD or device so that it does not encroach on the radar beam detailed on next three pages.

Keep factory plastic radar cover and mount in same position relative to radar bracket.

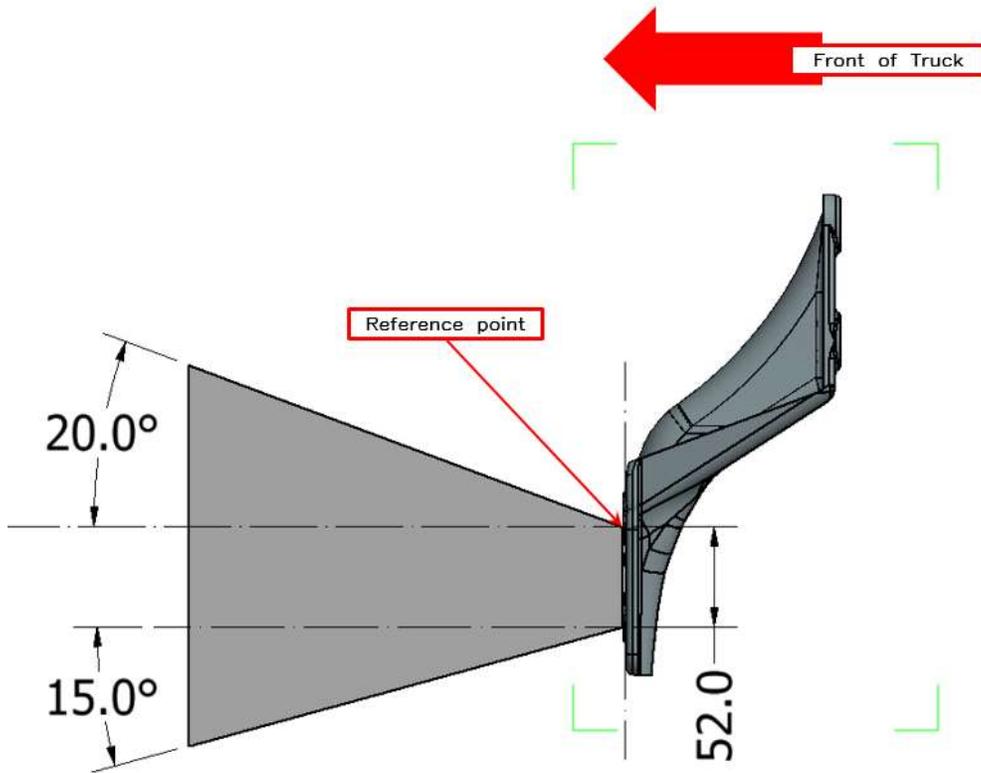
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RADAR SENSOR BEAM, top and front views



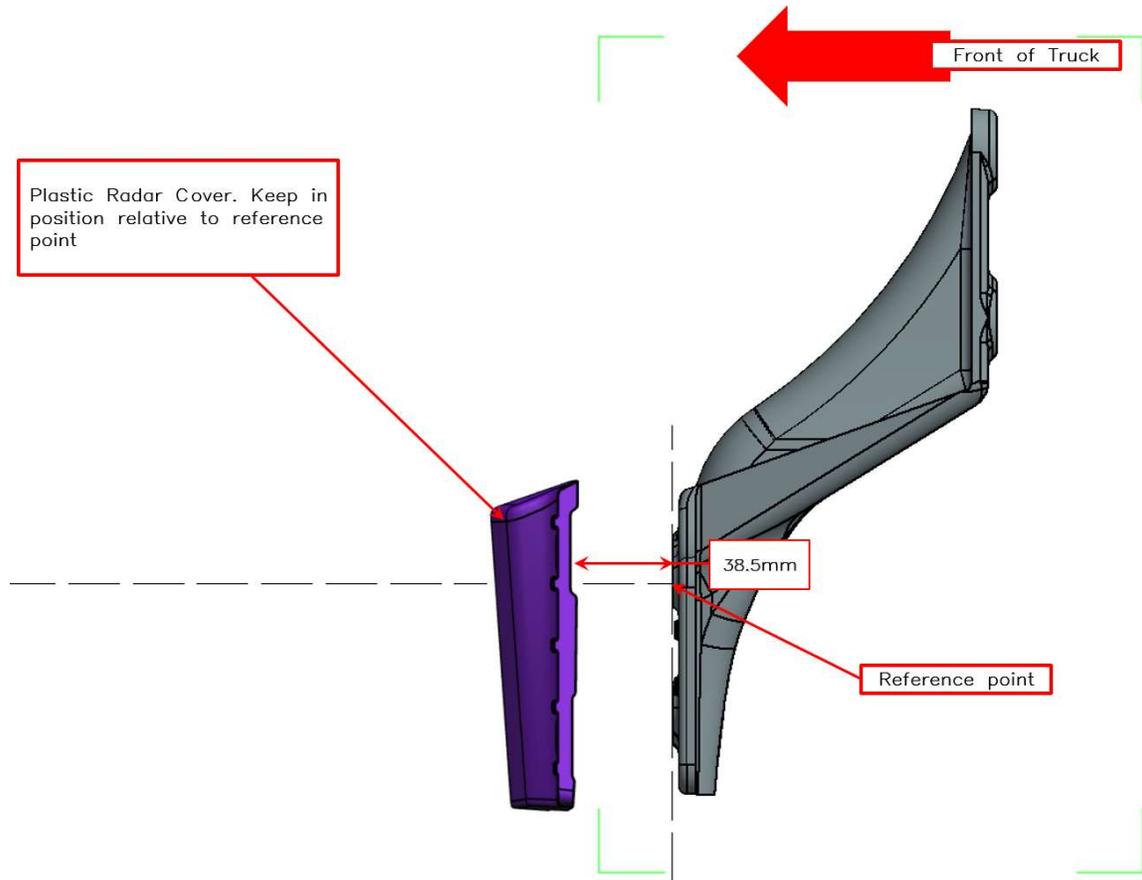
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RADAR SENSOR BEAM, side view



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PLASTIC RADAR COVER POSITION

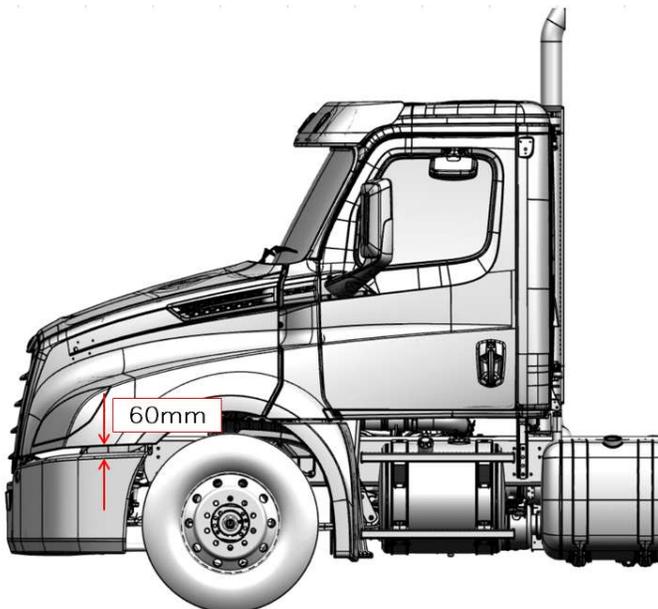
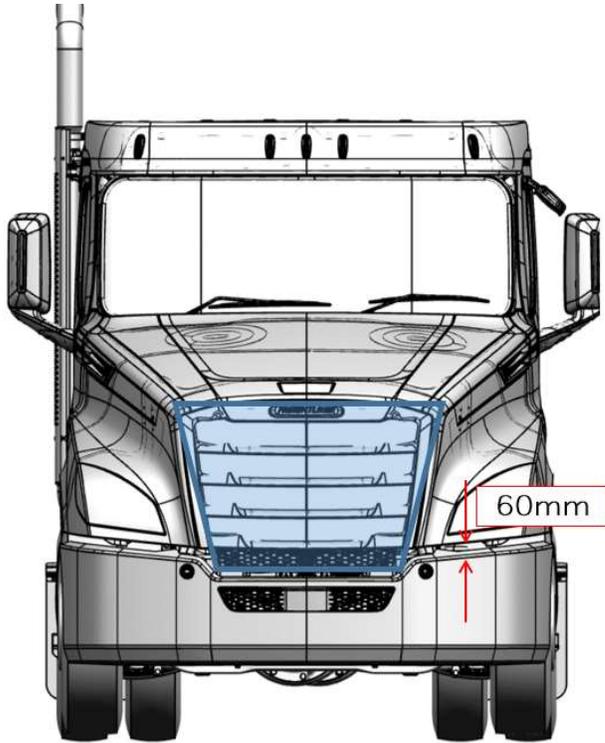


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COOLING SYSTEM

Main area of cooling system shown below in blue, keep area free of obstructions as best possible.

Maintain bumper/bullbar to body Gap of 60mm, shown below.



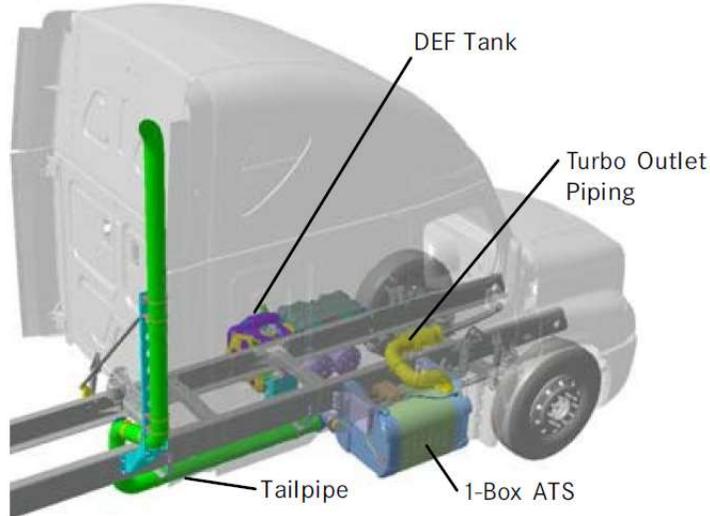
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EXHAUST SYSTEM

EMISSIONS

Freightliner trucks have an exhaust after treatment system (ATS) as illustrated below.

The after treatment system contains the Diesel Particulate Filter (DPF) and a Selective Catalyst Reduction (SCR).



WARNINGS

Relocation of the ATS (aftertreatment system) or modification of the turbo outlet piping is **NOT** permitted.

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TAILPIPE MODIFICATIONS

These guidelines apply only to the piping that is downstream of the ATS outlet.

Caution: Use the same pipe size and material as the original tailpipe. Any additional extensions and bends will change the exhaust gas pressure, which could result in damage to the ATS or other engine components as well as reduction in fuel economy.

Engine	DD13/DD16	
Tailpipe Material	Aluminised 409 Stainless Steel	
Tailpipe Diameter	5" minimum	
Wall thickness	.065"	

EXHAUST BACKPRESSURE LIMITS

Backpressure is the static pressure measured at the turbo outlet. Backpressure reflects the total pressure imposed on the turbo by the exhaust and after treatment system.

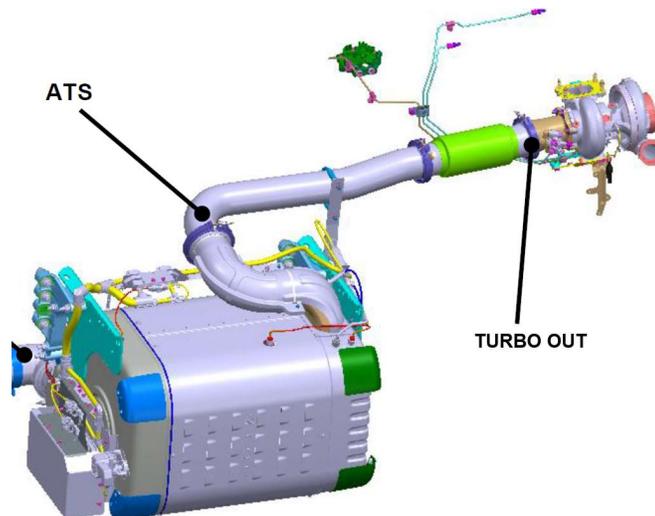
Excessive backpressure reduces fuel economy and can potentially damage the turbocharger. In order to protect the turbocharger from damage, the engine manufacturers have determined a maximum backpressure for each engine and engine rating. The maximum backpressure values are listed on the next page.

Check exhaust back pressure does not exceed limits below.

The measurement should be conducted after a parked regeneration with a low mileage (<5000 mi.) ATD (Aftertreatment device).

Pressure should be recorded at full load, rated engine speed, to validate exhaust backpressure specification conformance. Measurement taken at Turbo Outlet.

Turbo Out measurement location below. Take reading within 1x pipe diameter from turbo outlet below.



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BACKPRESSURE LIMITS

DD 13 GHG17	
Rating	Max Back Pressure
450hp	16.8 kPa
470hp	17.5 kPa
505hp	18.7 kPa

DD 16 GHG17	
Rating	Max Back Pressure
500hp	19.3 kPa
530hp	19.9 kPa
560hp	20.4 kPa
600hp	22.2 kPa

EXHAUST TAILPIPE MODIFICATION GUIDELINES

Exhaust Tailpipe Modification	Effect of Backpressure	Guidelines & Recommendations
Addition of Straight Pipe	Backpressure increase is dependent upon the length of straight pipe added and the roughness of the inside pipe surface.	Avoid pipes with rough inside surfaces.
Addition of Bends	Backpressure for each added bend is dependent upon the bend angle, bend radius, and the roughness of the inside pipe surface. Bends impose significantly more backpressure than straight pipe.	Keep number of bends to a minimum. Use large bend radii where possible. Avoid pipes with rough inside surfaces.
Addition of Flex Hose	Backpressure increase is dependent upon the length of flex hose added and the straightness of the flex hose. Flex hose imposes significantly more backpressure than straight pipe.	Keep flex hose length to a minimum. Avoid using flex hose for bends. Install flex hose as straight as possible.
Addition of Weld Seams	Backpressure increase is dependent upon how much weld slag bleeds through the weld seam to the inside surface of the pipe.	Avoid excessive bleed through on weld seams.

If you have any questions, please contact freightliner_technical@daimler.com.

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