

CHASSIS ENGINEERING GUIDELINES

(ISSUE B, MAY 2019)

DESIGN GUIDELINES FOR:

FUSO SHOGUN 8x4

FUSO HD 8x4

MODELS:

FS72HS, FS74HS

FS52SS, FS54SS

APPLICATIONS - FLAT DECK, CURTAINSIDER, TIPPER, LOGGER

These recommendations have been prepared for design engineers and body builders as a guide to assist when selecting and specifying chassis modification and/or body fitment.

These guidelines should be read in conjunction with the Mitsubishi Fuso Truck & Bus Body Equipment Mounting Directives available on the FUSO Body Builder Portal. Use these guidelines to determine any reinforcement details required for each application.

LOAD CONSIDERATIONS

FLAT DECK

U.D.L.	Consider as a uniformly distributed load over whole or part of deck length.
CURTAINSIDER	Consider as a uniformly distributed load over whole or part of deck length in conjunction with point loads imposed by body and taillifts.
LOAD CENTRE	Determined as water level load 600mm above chassis.

TIPPER

AT LIFT OFF	Point when body raised just clear of the chassis thus imposing two point loads on the chassis rails at hinge and hoist mount.
AT MAX TIP	Point when the body is raised to tip angle of 48°, (tail door closed) so loads act at the hoist mounting and hinge pivot points.
LOAD CENTRE	Determined as water level load 600mm above chassis.
SPREADING	Spreader work imposes higher frame loads and may require chassis reinforcement.

LOGGER

LONGS/SHORTS	Consider as a point load applied through bolster mounting positions. Use Bolster attachment code.
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Frame reinforcements should be balanced in terms of frame strength. Bolster mounts of an appropriate size and shape could contribute to the total frame strength.

CHASSIS FRAME MATERIAL

Hot Rolled Steel, 540 MPa tensile, 380 MPa yield.

MAXIMUM DESIGN STRESS

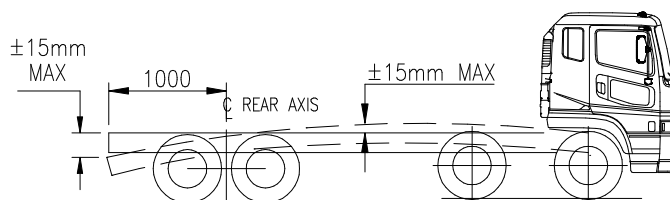
Recommended maximum design stress = 35%* of chassis yield stress (133 MPa) for sections of frame that are unmodified or do not contain stress raisers. Appropriate allowance should be made for details in the frame that have been modified or contain stress raisers. Refer to the body builders manual for stress levels using static load applications.

For heavy duty, more arduous applications, eg., sidelifter, the stress levels should be reduced a further 33% to enhance frame durability.

Recommended heavy duty design stress = 2/3. Recommended max design stress = 90 MPa.

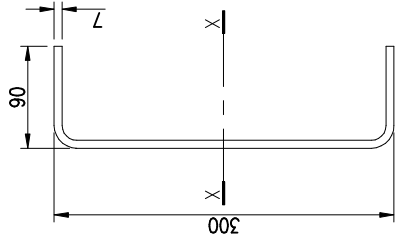
MAXIMUM CHASSIS DEFLECTION

CASE 1	Between front and rear axis. Maximum permissible deflection: $\pm 8\text{mm}$.
CASE 2	Rear overhang. Maximum permissible deflection: 15mm at 1000mm or greater, rear of rear axis.



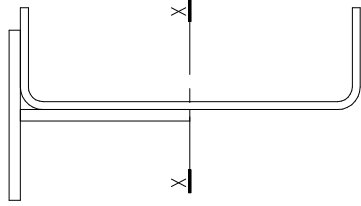
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DESIGN NOT ACCEPTABLE

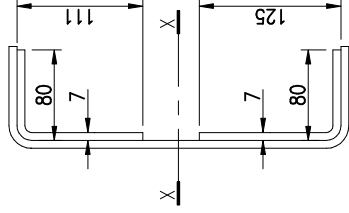


Zxx(TOP) = 273.50 CM3
Zxx(BOTTOM) = 273.50 CM3
Ixx = 3859.02 CM4

STANDARD FACTORY CHASSIS



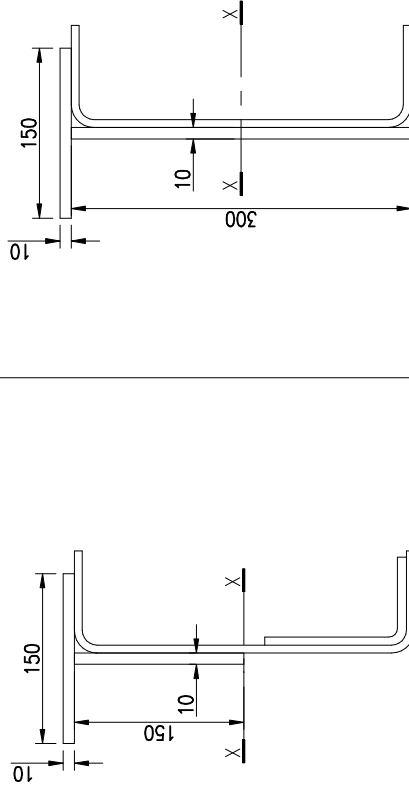
T-RAIL ONLY



Zxx(TOP) = 511.03 CM3
Zxx(BOTTOM) = 478.32 CM3
Ixx = 7412.06 CM4

ADD INNER FLUTCHES

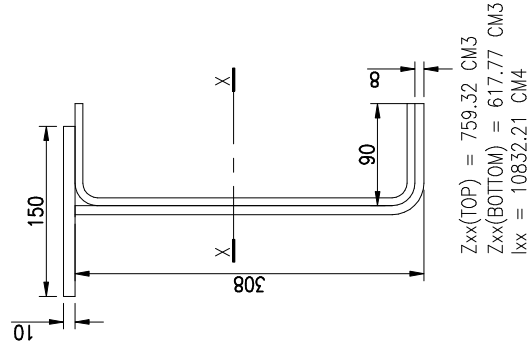
PREFERRED DESIGN



Zxx(TOP) = 694.09 CM3
Zxx(BOTTOM) = 500.33 CM3
Ixx = 9013.17 CM4

ADD FULL DEPTH T-RAIL

PREFERRED DESIGN



Zxx(TOP) = 759.32 CM3
Zxx(BOTTOM) = 617.77 CM3
Ixx = 10832.21 CM4

ADD J-RAIL

NOTE
THESE FRAME REINFORCEMENTS ARE
BASED ON GRADE 350 MATERIAL

ISSUE DATE	REISSUE WITH EURO 6 MODEL CODES	K.H.	BY
20/8/2018	CHANGES MADE		



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REINFORCEMENT EXAMPLES FOR FRAME REINFORCEMENT TYPES

FS52SS/FS54SS/FS72HS/FS74HS

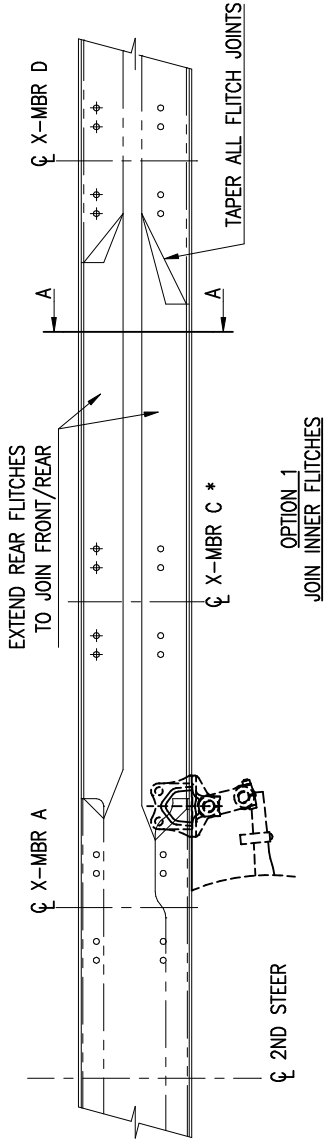


3 - 500215

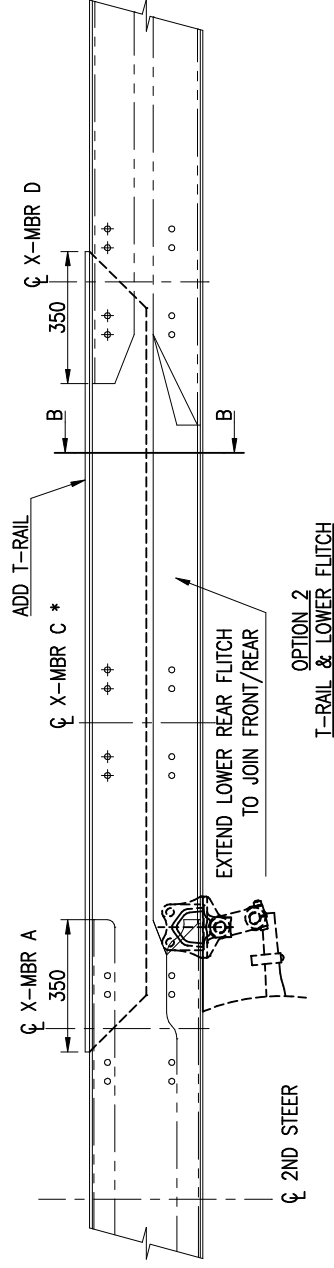
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Date: 20/8/19	Scale: N.T.S.	Date:

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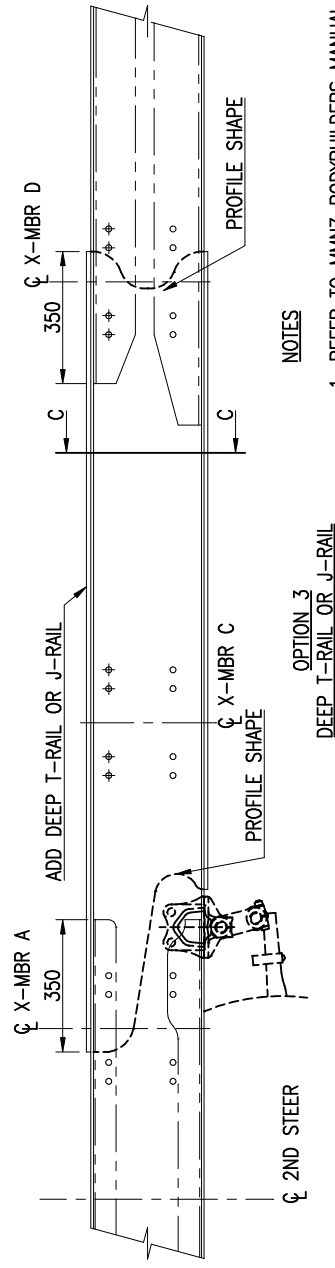
500215B1



SECTION 'A-A'



SECTION 'B-B'



SECTION 'C-C'

NOTES

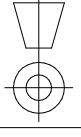
1. REFER TO MMNZ BODYBUILDERS MANUAL FOR CROSSMEMBER SPECIFICATION/DETAILS.
2. * MODS MAY BE REQUIRED TO CROSSMEMBER.

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REINFORCEMENT EXAMPLES FOR FRAME REINFORCEMENT TYPES
FS52SS/FS54SS/FS72HS/FS74HS



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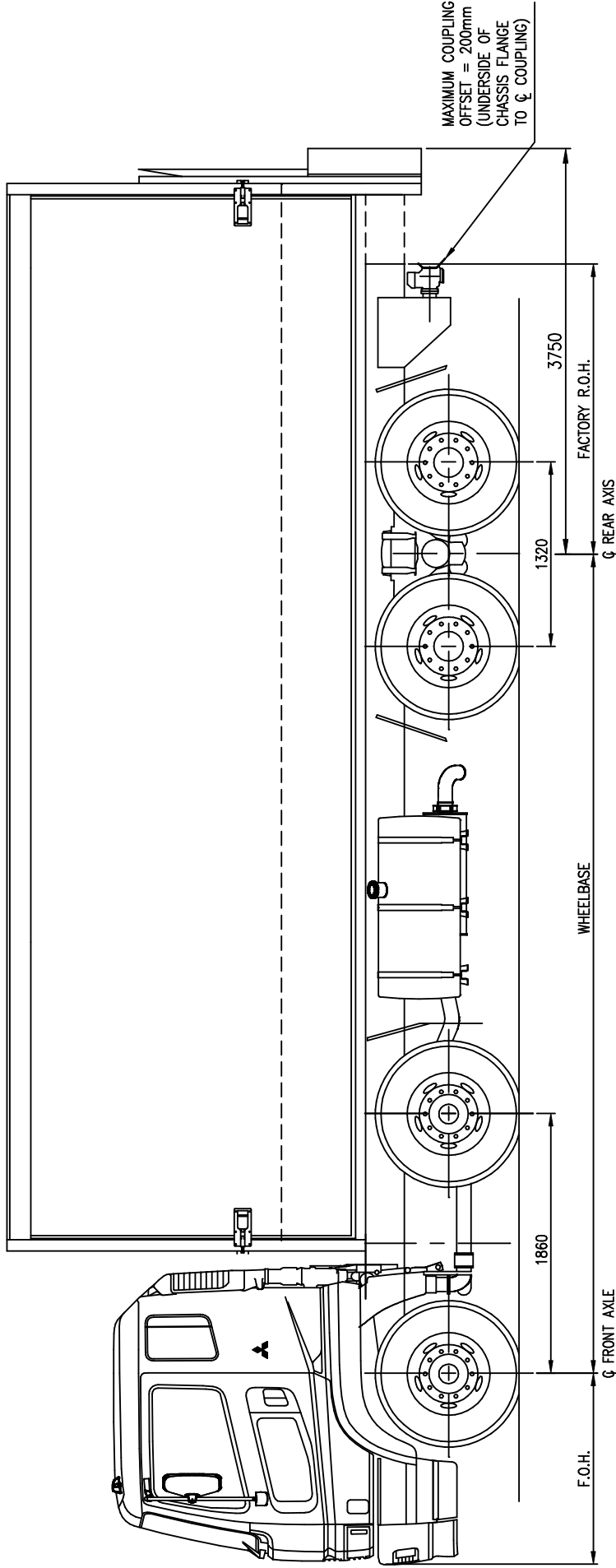
3 - 500215

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500215B2

NOTES:

- 01) THIS CHASSIS (WITHOUT A SUBFRAME) IS SUITABLE FOR FITTING A CURTAINSIDER BODY AND LOADS UP TO THE MANUFACTURERS GVM PROVIDING THE BODY/CHASSIS R.O.H. DOES NOT EXCEED THE RELEVANT BODY R.O.H. FIGURE STATED.
- 02) THE FITTING OF A BODY AND ANY WORK ON THE CHASSIS FRAME MUST BE CARRIED OUT IN ACCORDANCE WITH THE FUSO GUIDELINES FOR THIS MODEL AND GOOD INDUSTRY PRACTICE.
- 03) IF THE BODY/CHASSIS REAR OVERHANG EXCEEDS 3750mm, A SUBFRAME OR CHASSIS REINFORCEMENT IS RECOMMENDED, AND THIS REQUIREMENT SHOULD BE DETERMINED BY ENGINEERING CALCULATION AND ASSESSMENT USING THE FUSO GUIDELINES.
- 04) THIS DRAWING IS FOR USE AS A GUIDE ONLY, TO ASSIST WHEN SELECTING AND SPECIFYING CHASSIS MODIFICATION AND/OR BODY FITMENT.
- 05) REGARDLESS OF THE BODY/CHASSIS REAR OVER HANG, FITMENT OF A TAILLIFT MAY REQUIRE A SUBFRAME OR ADDITIONAL CHASSIS REINFORCEMENT, AND THIS REQUIREMENT SHOULD BE DETERMINED BY ENGINEERING CALCULATION AND ASSESSMENT USING THE FUSO GUIDELINES.



MODEL	WHEELBASE	F.O.H.	FACTORY R.O.H.
FS52SS/FS72HS	5870mm	1370mm	2900mm
FS54SS/FS74HS	5900mm	1370mm	2870mm/2900mm

C	13/2/2020	REISSUED WITH R.O.H. AMENDMENTS	K.H.
B	20/8/2019	REISSUE WITH EURO 6 MODEL CODES	K.H.
A	1/8/2018	FIRST ISSUE	K.H.
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FS52SS/FS54SS/FS72HS/FS74HS RIGID 8 x 4

SAMPLE CURTAINSIDER LAYOUT



3 - 560822

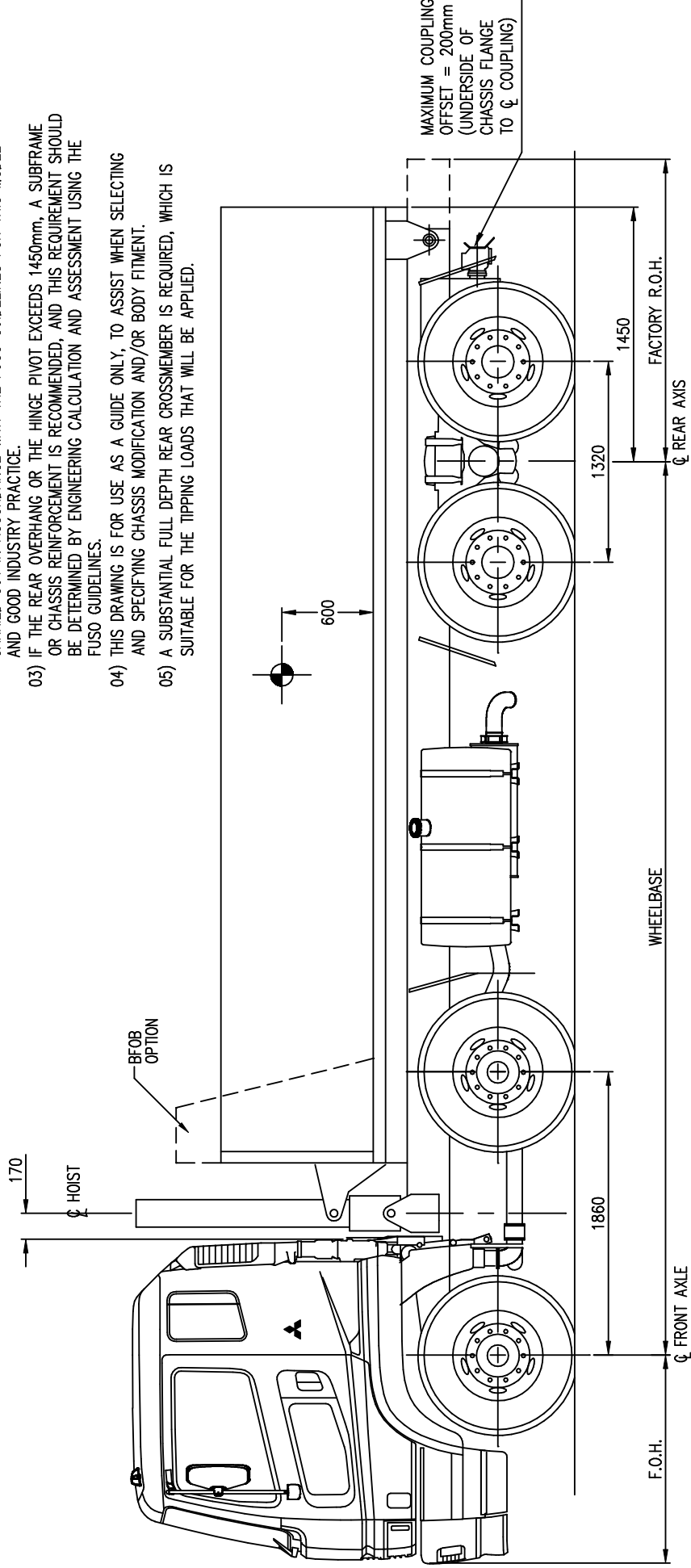
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Date: 13/2/20 Scale: 1:30 Date:

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560822C1

NOTES:

- 01) THIS CHASSIS FRAME IS SUITABLE FOR FITTING AN F.O.B. (OR B.F.O.B.) HOIST AND BODY WITHOUT A SUBFRAME, PROVIDING THE BODY OR HINGE PIVOT DO NOT EXCEED A R.O.H. OF 1450mm.
- 02) THE FITTING OF A BODY AND ANY WORK ON THE CHASSIS FRAME MUST BE CARRIED OUT IN ACCORDANCE WITH THE FUSO GUIDELINES FOR THIS MODEL AND GOOD INDUSTRY PRACTICE.
- 03) IF THE REAR OVERHANG OR THE HINGE PIVOT EXCEEDS 1450mm, A SUBFRAME OR CHASSIS REINFORCEMENT IS RECOMMENDED, AND THIS REQUIREMENT SHOULD BE DETERMINED BY ENGINEERING CALCULATION AND ASSESSMENT USING THE FUSO GUIDELINES.
- 04) THIS DRAWING IS FOR USE AS A GUIDE ONLY, TO ASSIST WHEN SELECTING AND SPECIFYING CHASSIS MODIFICATION AND/OR BODY FITMENT.
- 05) A SUBSTANTIAL FULL DEPTH REAR CROSSMEMBER IS REQUIRED, WHICH IS SUITABLE FOR THE TIPPING LOADS THAT WILL BE APPLIED.



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FS52SS/FS72HS	5870mm	1370mm	2900mm
FS54SS/FS74HS	5900mm	1370mm	2870mm/2900mm

GVM=30800 Kg
GCM=53000 Kg

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FS52SS/FS54SS/FS72HS/FS74HS RIGID 8 x 4

SAMPLE FOB TIPPER LAYOUT



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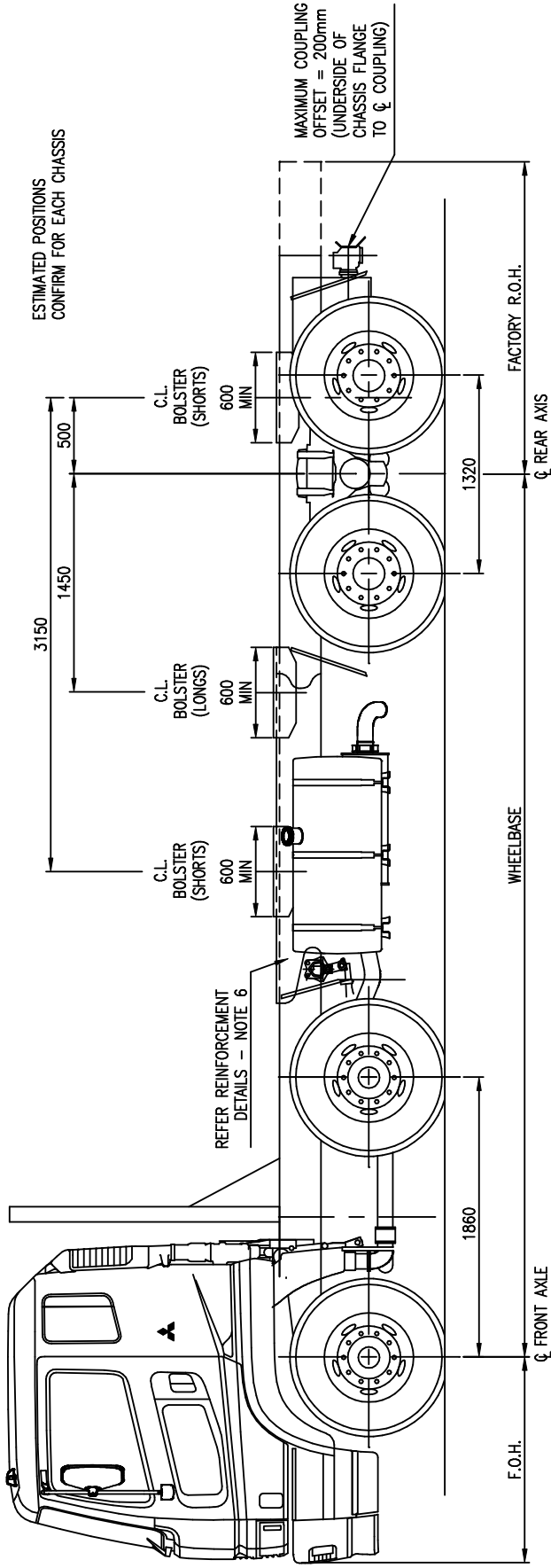
560822C2

NOTES:

- 01) THE FITTING OF A BODY AND ANY WORK ON THE CHASSIS FRAME MUST BE CARRIED OUT IN ACCORDANCE WITH THE FUSO GUIDELINES FOR THIS MODEL AND GOOD INDUSTRY PRACTICE.
- 02) FOR BOLSTERS/LOGGING APPLICATIONS, A SUBFRAME OR CHASSIS REINFORCEMENT IS REQUIRED, AND THIS REQUIREMENT SHOULD BE DETERMINED BY ENGINEERING CALCULATION AND ASSESSMENT USING THE FUSO GUIDELINES.
- 03) THIS DRAWING IS FOR USE AS A GUIDE ONLY, TO ASSIST WHEN SELECTING AND SPECIFYING CHASSIS MODIFICATION AND/OR BODY FITMENT.

BOLSTER MOUNTING DETAILS:

- 01) RECOMMENDED POSITIONS FOR LOGGING BOLSTERS ARE SHOWN
- 02) BOLSTER MOUNTINGS AND ATTACHMENTS TO BE SPREAD OVER DISTANCES INDICATED. MIN. BOLSTER LENGTH = 600mm
- 03) MOUNTING ANGLE/SUBFRAMES TO BE FABRICATED FROM STEEL WITH A MINIMUM YIELD STRESS OF 350 MPa. ENSURE PROGRESSIVE(OR MINIMAL) CHANGE OF SECTION AT TERMINATION(S)ENDS). ALL BOLSTERS.
- 04) DO NOT BOLT TO TOP FLANGE, OR WELD TO CHASSIS.
- 05) ENSURE BOLSTER ATTACHMENT METHOD MEETS THE REQUIREMENTS OF NZS 5444, AND BOLSTER ATTACHMENT CODE - (ISSUE 2 NOVEMBER 2010)
- 06) REINFORCEMENT IS REQUIRED FOR THE CHASSIS; REFER TO REINFORCEMENTS EXAMPLES AS DETAILED IN DRAWINGS 3-500215/01/02 TO ENSURE THAT MAX DESIGN STRESS LEVELS ARE NOT EXCEEDED.



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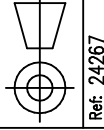
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SAMPLE LOGGING LAYOUT



3 - 560822

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Date: