

Custom Independent Front and Rear Suspension (IFS/IRS) Approval Application Guide

Background:

The NZ Hobby Car Technical Manual (HCTM) requires that any custom independent front or rear suspension (IFS/IRS) assembly obtains approval from the LVVTA's Technical Advisory Committee. This includes any situation where an original equipment (OE) IFS has been transplanted into a different vehicle and where its OE suspension arm pivot-point locations have changed to non-OE locations, or where the relocation of any geometry-critical pivot points has taken place, thereby altering the suspension systems pre-set geometry.

Purpose of this Information Sheet:

This Information Sheet has been developed to assist applicants who require individual IFS/IRS approval, by providing an explanation of the process, a check-list of the required information, and samples of suspension drawings. Providing the right information to the TAC enables them to more easily assess applications, and to approve them more quickly. Therefore, it is necessary for all relevant information to be presented to the TAC in a clear and logical format, and to include a set of drawings, prepared to scale, and showing all details clearly. It may not be necessary to provide all of the drawings or details shown in this information sheet in all cases – for example, where OE suspension arms are being used, drawings of the suspension arms are not required and clear photographs will suffice, however all pivot-point measurements are still required.

Getting Started:

The application form required for an IFS/IRS approval can be downloaded free from the 'Approvals' > 'Design Approval' section on the LVVTA website – lvvta.org.nz/approvals.html. Form 4B is also available in the HCTM, however downloading the document ensures that you're using the most recent version. Form 4B is an interim document, to be used until such time as the Form 4C, IFS & IRS application form is released.

Detail Requirements check-list:

There is a significant quantity of information required by the TAC to enable them to accurately assess a custom IFS or IRS assembly. It is important therefore, that all of the required details are provided within the IFS or IRS Approval Application. The following checklist should be used to ensure that all of the required information has been provided.

✓ *Tick box once completed*

- Completed Design Approval Application Form 4B sections as follows;
 - *General* *pages 4-10 & 4-31 to 4-33*
 - *Suspension* *IFS – pages 4-13 to 4-15, IRS – pages 4-16 to 4-18*
 - *Steering* *pages 4-18 to 4-21*
 - *Brakes* *pages 4-21 to 4-23*
 - *Wheels & Tyres* *pages 4-24 & 4-25*
- All pages provided as supporting information to Form 4B (including photographs and drawings), must be added as an appendix at the end of the application form, and must be clearly numbered.
- Dimensions between all pivot point centres on the complete suspension setup, measured at normal ride height.
 - *For an example, see sample drawing 'Front Elevation view' and 'plan view' below*
- Upper and lower a-arm shapes and dimensions. Actual arm shapes must be exactly duplicated.
 - *For an example, see 'Upper and lower a-arm shapes and dimensions' below.*
- Construction and type of pivot joints/bushes.

- Spindle/stub axle details, include type, diameters, and notice of any modifications or machining to be carried out.
- Brakes – Callipers and disc set up, and brake hose attachments and routes.
- Steering setup including rack or steering box details and mounting details, with any box or rack modifications noted.
- Dimensions of main supporting sub-frame and details of attachment to the chassis.
 - For an example, see sample drawing 'Front Elevation view', 'plan view', and 'a-arm attachment details' below.
- Details of coil/shocks and method of mounting.
- Types of welding proposed, and the person who is to carry out welding.
- Full material specifications for each component within the suspension assembly. This includes tube diameters and thicknesses, steel plate, sub-frame, crossmember and gusset thickness, steel grades, fastener details, and bushing materials. These details should be provided directly on the working drawings, and also within the appropriate section of the Form 4B application form.
 - For examples, see sample drawings 'Upper a-arm rod-end sleeve detail' and 'Upper and lower a-arm inner bush details' below.
- A number of clear, high resolution, colour photographs of the actual vehicle and its modifications, to enable TAC members to gain a clear understanding of all aspects of the IFS or IRS.

Sample Drawing Requirements:

All IFS/IRS applications must include an accurate set of drawings. Not all applicants will be skilled in technical drawing, however these drawings are a vital piece of information to provide, and without them, the TAC can't fully assess the IFS/IRS. This can result in the TAC being unable to complete an application in a timely manner, due to a lack of information, and as meetings are held on a monthly basis, any additional information required by TAC can't be assessed until the following meeting. In an effort to assist applicants, a set of sample drawings is provided, to provide a clear indication of what the TAC requires in order to undertake a meaningful assessment of the application. An applicant can also choose to engage a professional to assist in providing the required information – in this case the applicant should contact the LVVTA office, and an attempt will be made to locate a suitably skilled person.

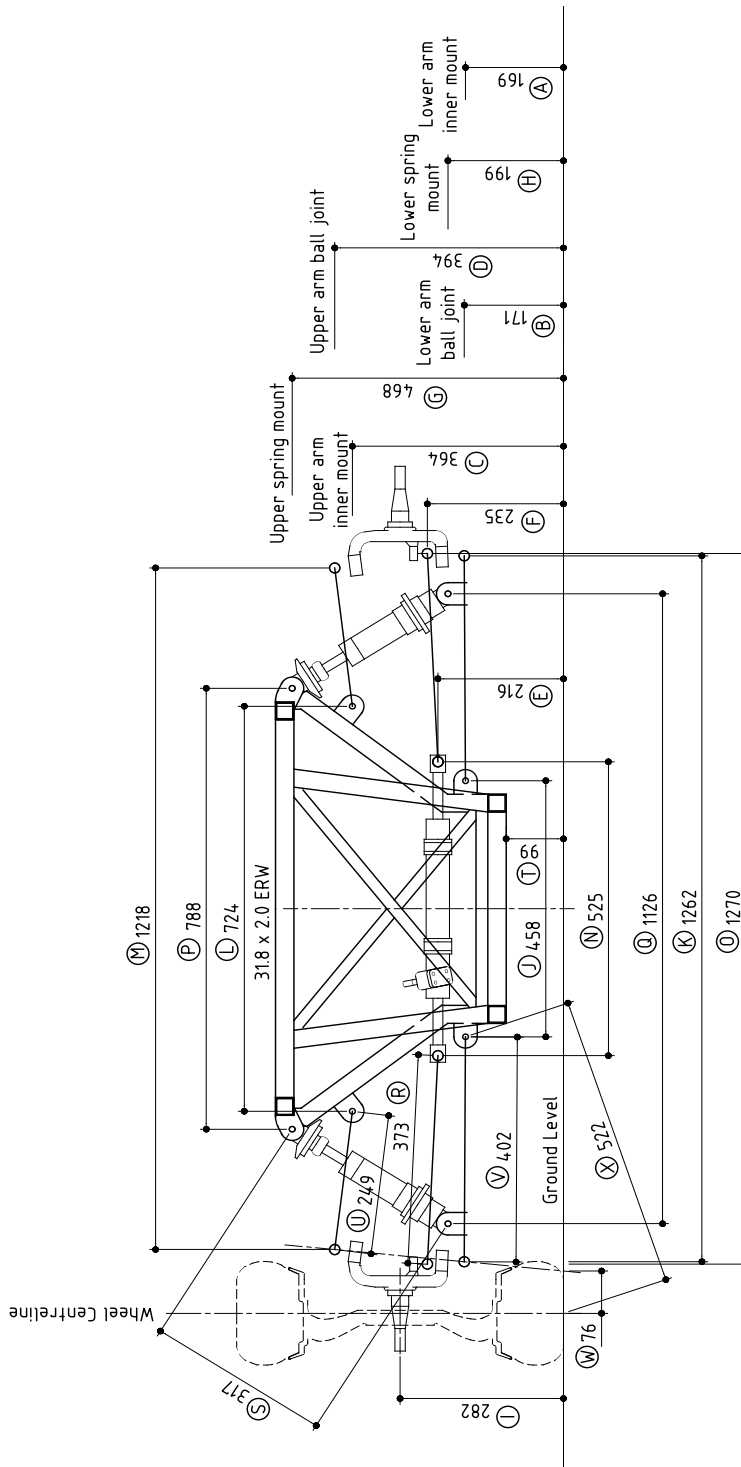
It should be made clear that 'computer aided design' (C.A.D.) drawings *are not* mandatory in this approval process. While CAD has advantages, it is perfectly acceptable for hand drawings to be submitted, or as a last resort, for photographs to be 'dimensioned' just as a drawing would be. These options are all acceptable, provided they are to scale, clear, accurate, and contain all of the required specifications seen in the examples below.

Dimension and measurement check-list:

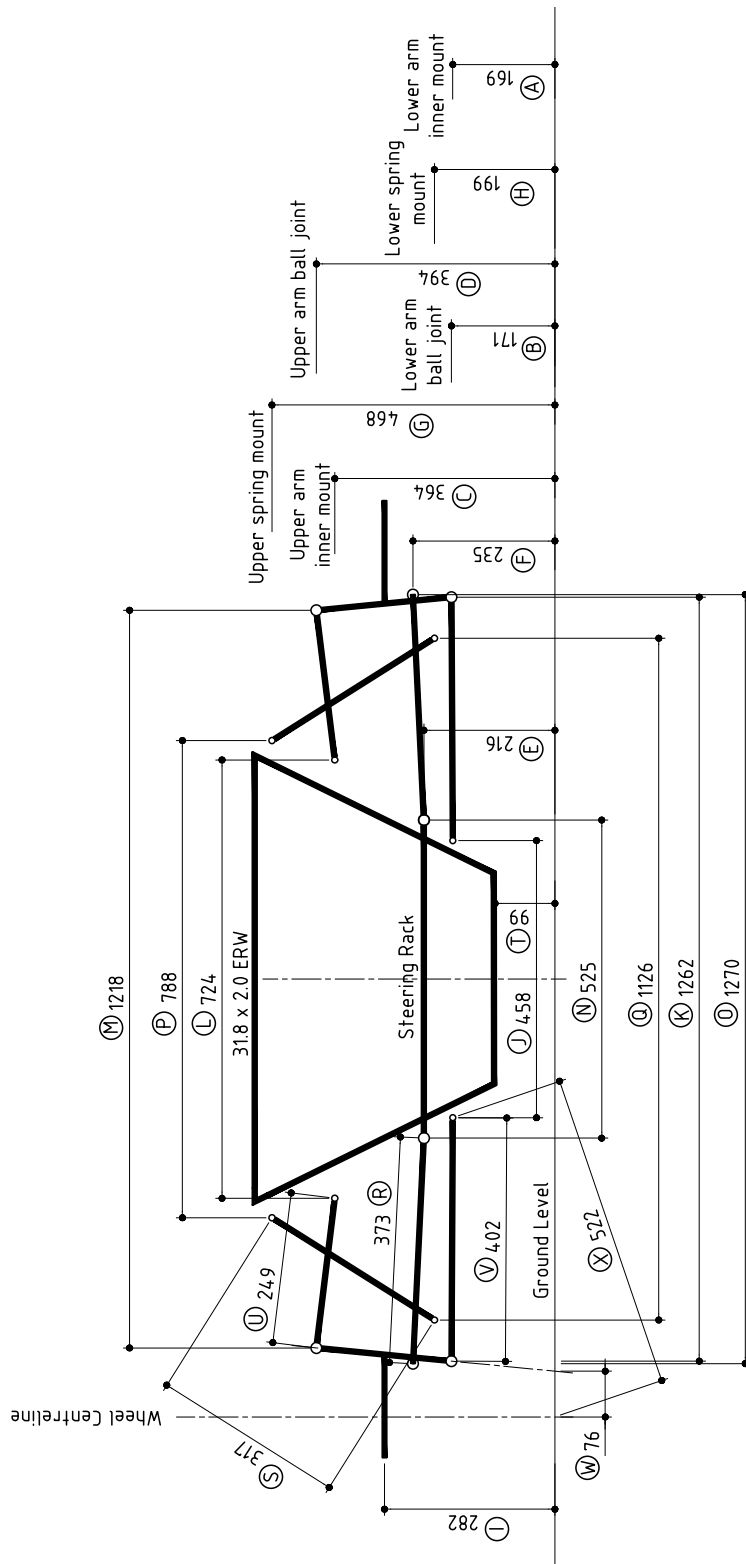
Vertical (centre to ground):		(mm)	Horizontal (centre-to-centre):		(mm)
A.	Lower arm inner mount height.....	.....	J.	Lower a-arm inner pivot centres.....	.....
B.	Lower arm ball joint height.....	.....	K.	Lower a-arm ball joint centres.....	.....
C.	Upper arm inner mount height.....	.....	L.	Upper a-arm inner pivot centres.....	.....
D.	Upper arm ball joint height.....	.....	M.	Upper a-arm ball joint centres.....	.....
E.	Steering rack-end height.....	.....	N.	Steering rack-end centres.....	.....
F.	Steering outer tie rod-end height.....	.....	O.	Steering tie-rod centres.....	.....
G.	Upper spring mount height.....	.....	P.	Upper spring mount centres.....	.....
H.	Lower spring mount height.....	.....	Q.	Lower spring mount centres.....	.....
I.	Spindle height (centreline to ground).....	.....	R.	Tie-rod overall length.....	.....
Other dimensions:		(mm)			(mm)
S.	Coil-over length (centre-to-centre).....	.....	V.	Lower a-arm length.....	.....
T.	Chassis or suspension beam height.....	.....	W.	Scrub radius.....	.....
U.	Upper a-arm length.....	.....	X.	Lower a-arm inner to tyre centreline	.....

- Record your measurements directly onto the table above, and then transfer them onto your drawing. Include this table in your application.
- All measurements must be recorded with the vehicle at its normal ride-height.
- Horizontal heights can be measured to the vehicle centre if needed.

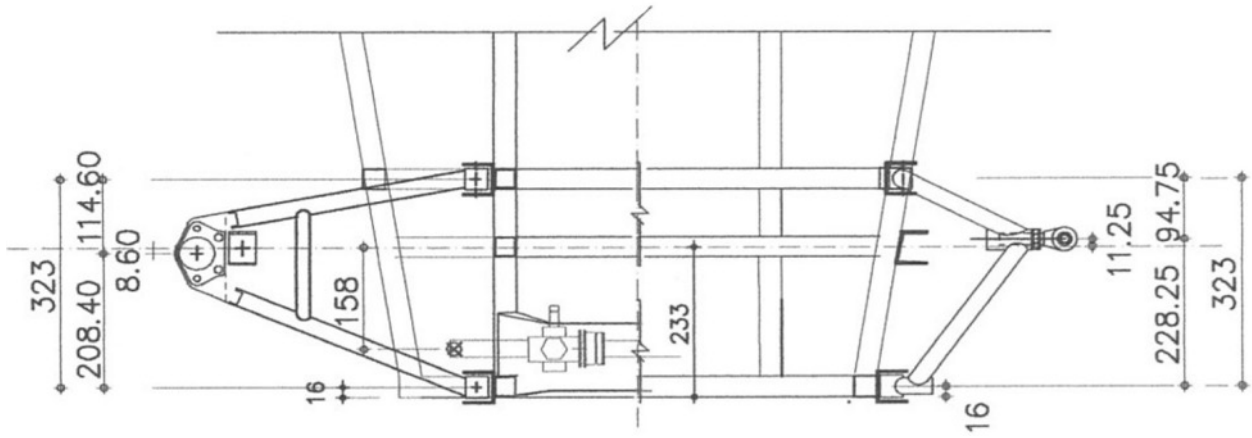
Sample Drawings:



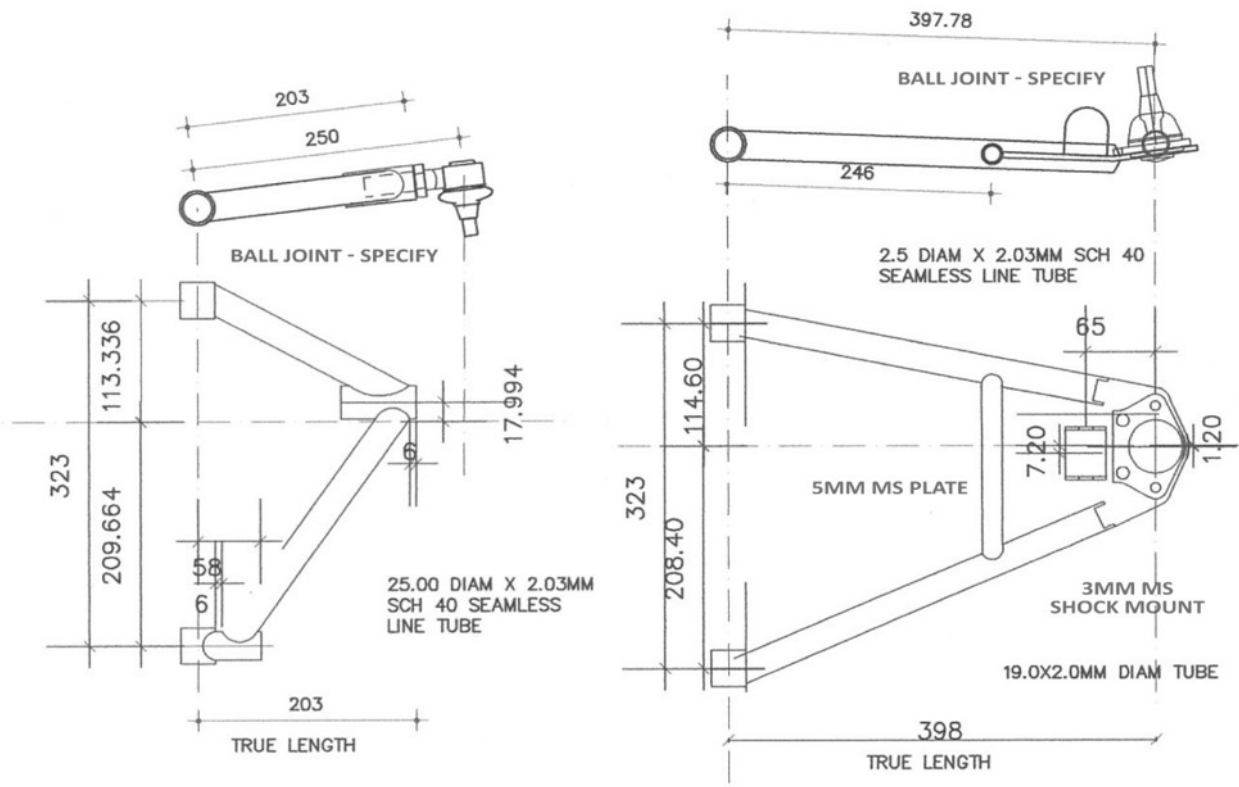
Above: Example of a drawing showing the preferred level of detail for an IFS or IRS application. Where possible, all vertical heights must be measured from ground level, with the vehicle at its correct ride height. If the ground level can't be used (i.e. if the chassis is on a jig or table) then the reference should be made from a permanent part of the structure and clearly marked as such – for example the bottom of the front chassis crossmember or suspension beam.



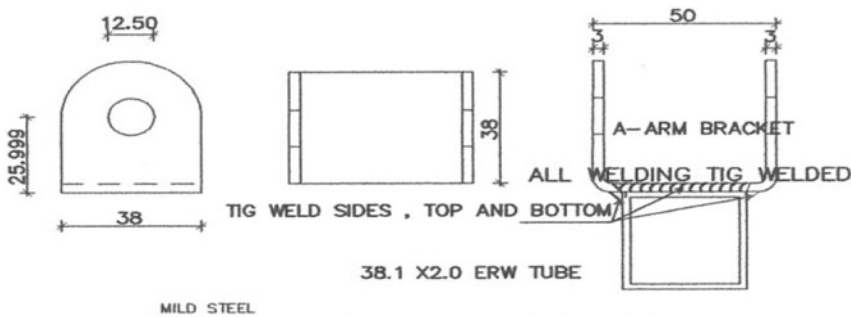
Above: An example of an alternative option for front elevation view. TAC consider this type of drawing to be the 'bare minimum', and must be well supported by clear photographs, and other supporting information.



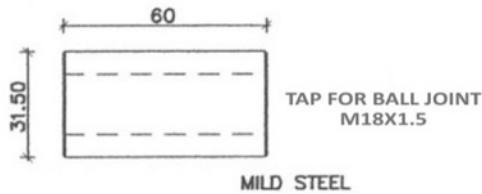
Above: An example of a good plan view drawing, showing one upper and one lower a-arm.



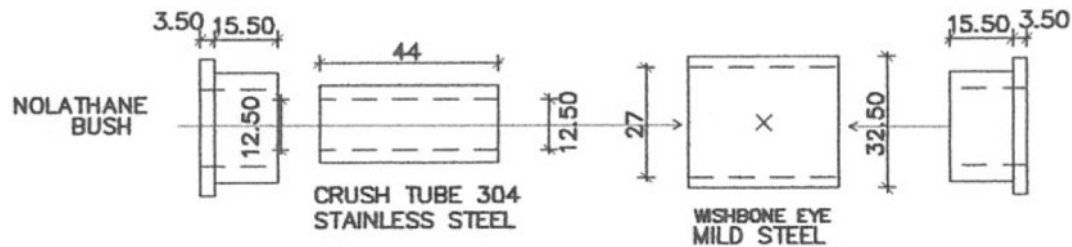
Above: Examples of good upper and lower a-arm drawing, showing shapes and dimensions



Above: Examples of good A-arm attachment bracket drawing



Above: Example of upper a-arm rod-end sleeve drawing



Above: Example of good upper and Lower a-arm inner bush drawing

Helpful information regarding the submission of applications:

- TAC applications should be sent by post to the address listed, and following the directions provided within the introduction pages of the Form 4B application form.
- Always remember to take a copy of the application before sending.
- Applications can be accepted electronically, provided the application is sent in a clear and logical format that allows LVVTA staff to easily identify and print the files for distribution to committee members.
- Don't just add your measurements to the sample drawings - these drawings are provided as examples only, to show the required level of detail required. The drawings you provide to the TAC must represent the actual IFS or IRS that you are seeking approval for.
- All IFS & IRS are required to meet HCTM requirements. If any aspect of the IFS or IRS does not meet HCTM requirements and where there is sound justification that should be taken into consideration by the TAC, a variation from a technical requirement can be applied for in conjunction with the IFS application. Contact the LVVTA office for further details.

Helpful information regarding the timing of TAC Meetings:

- TAC meeting take usually place on the evening of the first Tuesday of each month, and additional meetings may be scheduled if there is sufficient demand and necessity.
- Applications and additional supporting information must be received by the LVVTA office no later than 5 working days prior to the meeting date, except for commercial applications and approvals which have different requirements.
- For application details for a Component Type Approval (an approval process for multiple identical units), or for details of other commercial applications, please read this information sheet in conjunction with the LVVTA Approval Application Guide Information Sheet (Info 11-2012), which is available from Documents > Infosheets, from lvvta.org.nz.
- TAC meeting applications are prepared for the meeting using a 'first-in-first-served' basis, meaning an application that is processed on or near the cut-off date will be the most likely to be held over if there are a lot of applications received for that meeting, or where a meeting runs over-time.

For more details of the approval process, or for any clarification on this, or any part of the approval process, please contact the Technical Team at the LVVTA office on (04) 238-4343.