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C5 - DIFFERENTIAL:

C5.1 Where any replacement differential is fitted, the original differential's suspension geometry and suspension/locating mounting points must be duplicated on the replacement differential, and at the chassis/subframe attachment points.

COMMENT:

C5.2 Any fabrication work involved in the mounting of the differential to the vehicle, and all radius rods and torsion bars used to locate the diff, must be designed and constructed in such a way that the differential and all of its mounting bracketry, suspension and location attachment points will withstand all forces imposed on them.

COMMENT:

C5.3 All differential mounting and locating welding should be carried out by either an NZHRA-Approved Engineer or a Certified Welder, in either case with paperwork provided. If this can not be complied with particular attention must be paid to the weld quality, and if the quality of the weld is in doubt, then either re-welding by an NZHRA-Approved Engineer or Certified Welder, or N.D.T. Certificates may be required.

Note:- This is deemed a critical area; - welds must be of top quality.

COMMENT:

C5.4 Any bolts used to locate and/or to suspend any differential, replacement, or original, must be of a size, type, and grade no less than originally used in the replacement differential, and that are suitable for the loads that will be imposed on them. All bolts must be secured with Nylocs, spring washers, OEM-type serrated washer-head bolts or nuts in original applications, or other locking devices, which must be in good condition.

COMMENT:

C6 - STEERING:

C6.1 All parts of the steering system, including associated linkages, must be capable of withstanding any additional engine weight or battery weight and increased performance ability as a result of the replacement engine, and all components must be checked to ensure their safe condition.

COMMENT:

C6.2 If interference is encountered during an engine conversion between the replacement engine and the recipient vehicle's steering system, wherever possible the engine should be moved (eg.: mounted, say, an inch left of centre), rather than move the steering system. If moving part of the recipient vehicle's steering system is unavoidable, note the following points:

(a) All universal joint angles must be maintained to within the manufacturers' limits to avoid stress and/or binding on the units;

COMMENT:

(b) Where universal joints are added, only recognised automotive steel universal joints may be used.

COMMENT:

(c) All steel universal joint must be supported outside every pair of universals by a bearing, or a suitable sleeve or bush.

COMMENT:

C6.3 If flexible couplings (otherwise known as fabric or rubber steering dampers) are used within any steering system where an engine conversion has taken place;

(a) The fabric damper may not be used to effect a direction change in the steering system;

COMMENT:



- (b) The fabric damper must be in good order, and its replacement must be ordered if signs of wear are evident;
COMMENT:
- (c) The fabric damper must be well shielded from exhaust heat and any moving parts.
COMMENT:

C6.4 Any modification to any part of the steering system's componentry such as lengthening or shortening of the steering column shaft must be carried out by an NZHRA-Approved Engineer or a Certified Welder, and in either case N.D.T. Certificates and Written Verification must be provided.
COMMENT:

C6.5 No modifications may affect the collapsibility designed into the recipient vehicle's factory-fitted steering column, associated linkages, and mountings.
COMMENT:

C6.6 Split pins and Castle nuts, or Nyloc nuts are to be used in all steering applications. Note that split pins should be replaced everytime they are removed.
COMMENT:

Note - Any additional modifications carried out to the vehicle but not specifically covered in this section should be referred to the NZHRA Code of Construction Manual, Steering Section, Part 1, pages 50-62.

C7 - SUSPENSION:

C7.1 Spring rates of recipient vehicle must be able to cope with any variation in weight as a result of an electric motor conversion. The fitting of proprietary aftermarket suspension equipment from a reputable manufacturer is recommended in these cases. Any modifications to either replacement or original springs may only be carried out by suitably experienced NZHRA-Approved Engineers, or reputable springmakers.

- (a) Front suspension comment:
- (b) Rear suspension comment:

C7.2 Lowered coil springs of unknown origin must be inspected to ensure that lowering has not been the result of heating the coils.
COMMENT:

C7.3 When lowering coil-springs, the correct method is removal and a cut-off wheel. If a gas-axe has been used instead, the spring must be inspected to ensure that the cut has not:

- (a) Been carried out to coils that have reset ends; and,
- (b) Heated the spring any more than necessary for a quick, clean cut

COMMENT:

C7.4 Any vehicle significantly lowered must be checked to ensure against riding on bump stops. All vehicles must retain a minimum of half the suspension travel that the vehicle manufacturer gave it.
COMMENT:

C7.5 Lowered aftermarket or cut factory coil springs must be fitted with a retaining device if in the opinion of the Certifier the spring could become dislodged or lost under full suspension travel.
COMMENT:

C7.6 Any vehicle fitted with significantly lowered rear suspension must be checked to ensure the change has not adversely affected the differential pinion angle.
COMMENT:

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C7.7 All suspension modifications, whether aftermarket or not should be checked to ensure that everything works as it should, and that no binding or other problems result from incorrectly chosen and/or fitted components. All suspension components must be checked to ensure their safe condition.

COMMENT:

C7.8 Complete the following table to ensure vehicle will be operating within acceptable load ratings.

	Front Axle	Rear Axle
Laden weight at each axle	kg	kg
Manufacturer's specified maximum laden weight at each axle	kg	kg
Number of tyres on each axle	—	—
Tyre size	—	—
Tyre ply rating	—	—
Tyre load rating (per tyre)	kg	kg
Tyre load rating X number of tyre on each axle	kg	kg
Manufacturer's maximum allowable axle loads	kg	kg

Note - Insert the full tyre size data in the appropriate box, eg: 7.50-16 LT, BR70-H13, etc.

Note - In the event of changed shock absorber mounting points, or any other additional modifications not specifically covered in this section, the NZHRA Code of Construction Manual, Part 2, Suspension Section, pages 63-72 must be referred to.

C8 - BRAKES:

C8.1 When any electric motor conversion results in a significant increase in weight (batteries etc), attention should be paid to the condition and durability of all braking components, including the rotors, callipers, pads, drums and shoes, hubs and bearings.

COMMENT:

C8.2 Where new brake lines have been fitted or where old lines have been re-routed, these must be fixed at either the same intervals as set down by the vehicle manufacturer, or no further than 300mm (12") apart. All brake lines must be free from corrosion.

COMMENT:

C8.3 Any re-routing of brake lines must be done in a tradesman-like manner, and they must:

(a) Not be mounted on the underside of the chassis or subframe rails;

COMMENT:

(b) Be well away (or shielded) from any part within the vehicle.

COMMENT:

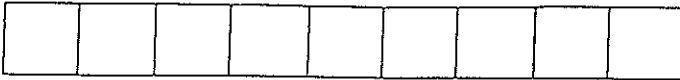
(c) Be double or ball-flared, and not by a single plumber's flare. Certifying Agent should check if there is any reason to suspect that single flares may be used.

COMMENT:

C8.4 Any vehicle that has been modified to an extent where a significant increase in power and/or torque and/or weight has been the result, Chart 4A, Page 80, NZHRA Code of Construction Manual should be referred to as a guide line for brake size suitability. (When chart 4A shows an inconsistency between actual and recommended brake size, extra attention should be given to brake performance testing).

COMMENT:

C8.5 All modifications to hand brake cables may only be carried out by a reputable brake specialist.



COMMENT:

C8.6 Any new vacuum lines fitted must be of an approved automotive type, and be safely and securely routed and fastened.

COMMENT:

C8.7 In all EMV conversions where the original vehicle was only available with vacuum brakes, a vacuum pump and reservoir facility must be incorporated, driven either via main traction motor or 12V stand alone system. To check serviceability of booster, ensure that booster return valve is holding vacuum by pumping brake pedal (engine turned off several minutes prior) and listen for exhausting sound from booster. If there is any doubt, specific testing of repeat braking at idle should be carried out during road-test.

COMMENT:

C8.8 Vacuum source must be fitted with a failure indicator which can be tested to determine whether the vacuum system is operational.

COMMENT:

C8.9 All Category 1 Vehicles must be fitted with a dual-circuit hydraulic braking system.

COMMENT:

Note- Any additional modifications not specifically covered here should be referred to the NZHRA Code of Construction Manual, Part 4, Brake Section, pages 78-80.

C9 - WHEELS:

C9.1 All aftermarket or non-standard wheels must be an appropriate fitment to the recipient vehicle, with particular consideration to width, offset, and load carrying capacity.

COMMENT:

C9.2 When fitting any wheels other than those originally fitted to the vehicle by the manufacturer, there must not be any obstructions impairing a snug fit to the hub flange or drum face, like set screws, balance weights, drum shoulder rib, or disc calliper.

COMMENT:

C9.3 When fitting any aftermarket or non-standard wheels, it must be ensured that the disc rotor flange or drum driving face is large enough in diameter to support the wheel.

COMMENT:

C9.4 All aftermarket wheels used in any performance application should have double-sided safety beads.

COMMENT:

C9.5 All wheels must have dustcaps or other suitable seals fitted to protect wheel bearings from dust and other foreign matter.

COMMENT:

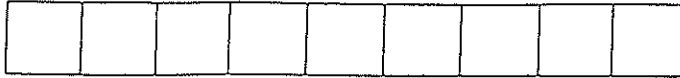
C9.6 All aftermarket or modified wheels must be inspected to ensure that wheel nuts must have sufficient thread engagement and be in good condition, likewise the holes in the wheels and the wheel studs. All studs must have a wheelnut.

COMMENT:

C9.7 Wheel spacer and/or adaptors may only be used when they are of sound design and appropriate material (preferably made by a reputable manufacturer) and suitably longer nuts or studs are employed. Spacers may only be used when their depth is such that the axle bearings' loadings would not be considerably increased.

COMMENT:

C9.8 All widened or modified steel wheels must be visually inspected for weld quality where possible



COMMENT:

In the case of any vehicle fitted with wheels other than proprietary fitment known-manufacture aftermarket wheels, (eg: Cragar etc) or the vehicle's original wheels, the full NZHRA Code of Construction Manual should be referred to, Part 5, Wheel & Tyre Section, pages 81-82.

C10 - MISCELLANEOUS:

C10.1 All flexible hoses, electrical wiring, lines, pipes, etc fitted from a replacement engine to the recipient vehicle's body or chassis must have enough 'slack' to allow for maximum engine movement on its mounts, and should also allow for engine mount failure.

COMMENT:

C10.2 All fans should have some form of protective cover to lessen the likelihood of fan-to-hand contact. *

COMMENT:

C10.3 All cables, hoses, lines etc. that pass through a vehicle's firewall or floor should be sealed with a rubber grommet of the type designed for that purpose, and all holes not serving a purpose should be filled - eg: blank rubber grommet etc.

COMMENT:

C10.4 Electroplating of fasteners with a tensile strength of greater than Grade 5 (Metric 8.8) in high stress or load situations is not permitted.

COMMENT:

C11 - ACCELERATOR SYSTEM:

C11.1 All accelerator systems must incorporate a minimum of two throttle control return springs that will work independently of each other. This may include an accelerator pedal spring.

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C11.2 Linkages must exhibit free movement, without interference from any other part of the vehicle.

COMMENT:

C11.3 All accelerator and butterfly-type carburettor scoop linkages must be designed in such a way that they can not jump over-centre at the full-throttle position.

COMMENT:

C12 - INTERIOR:

C12.1 All aftermarket or non-standard free-standing seats must be attached to the vehicle's floorpan with at least two 5/16" (8mm) bolts on each side near the front and the rear of each seat (all four bolts at the front of rigid forward tilting seats), incorporating adequate load-spreading plates or panel washers as a minimum. Seats may not be attached to a timber or particle-board floor.

COMMENT:

C12.2 All aftermarket or non-standard steering wheels must be checked to ensure the use of a nyloc nut, spring washer, or other approved fastener.

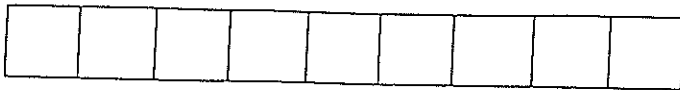
COMMENT:

C12.3 The headlamp switch on all vehicles must incorporate activation of park, tail and registration plate lamps, plus dashlights including a high-beam indicator light.

COMMENT:

C12.4 An effective system of de-misting the vehicle windscreen must be incorporated.

COMMENT:



C13 - TRAFFIC REGULATIONS:

C13.1 HEADLAMPS

All vehicles must be fitted with headlamps that comply with the 1976 Traffic Regulations, as outlined in the condensed 1976 Traffic Regulations section on page 92, NZHRA Code of Construction Manual.

COMMENT:

C13.2 PARK LAMPS

All vehicles must be fitted with two diffused white or amber forward-facing park lamps mounted no higher than 1.5 metres from the ground, and may be incorporated within the headlamps, or as separate units.

COMMENT:

C13.3 TAIL LAMPS

All vehicles must be fitted with two diffused red rear-ward facing stop lamps, mounted no higher than 1.5 metres from the ground.

COMMENT:

C13.4 STOP LAMPS

All vehicles must be fitted with two diffused red rear-ward facing stop lamps, mounted no higher than 1.5 metres from the ground, that are clearly visible from a distance of 100 metres in normal light.

COMMENT:

C13.5 REGISTRATION PLATE LIGHT

All vehicles must be fitted with a white light that effectively illuminates the rear registration plate such that it could be seen from 20 metres at night, but without the light source being visible from behind the vehicle.

COMMENT:

C13.6 REAR REFLECTORS

All vehicles must be fitted with two red rear-ward facing reflectors, mounted no higher than 1.5 metres from the ground.

COMMENT:

C13.7 INDICATORS

All vehicles must be fitted with two forward-facing (amber or white) and two rear-ward facing (amber or red) direction indicators, mounted no higher than 1.5 metres from the ground, visible in normal light from 100 metres.

COMMENT:

C13.8 TYRES

All vehicles must be fitted with tyres in good condition with sufficient tread depth, and of known origin. If the brand name is not recognisable (eg: BF Goodrich, etc) then Standards markings must be identified - refer page 110, Code of Construction Manual.

COMMENT:

C13.9 HORN

All vehicles must be fitted with a working horn that can be heard under normal conditions from a distance of at least 100 metres.

COMMENT:

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C13.10 GLAZING

All vehicles must be fitted with the glazing originally fitted by the vehicle manufacturer (or direct substitute of), without modification, including by way of tinting. Any glazing identified as replacement or modified glazing must be checked for compliance with the Glazing Standard by referring to pages 105-108, NZHRA Code of Construction Manual.

Note - That no adhesive film of any kind may be fitted to any glazing.

COMMENT:

C13.11 SEATBELTS

All vehicles must comply with the Seatbelt Standard applicable for the vehicle in question, which is determined by the year and class of vehicle. If any vehicle is found to:

- (a) Not have seatbelts;
- (b) Not have seatbelts fitted to some seating positions;
- (c) Have seatbelts fitted that are not original equipment for that vehicle; or
- (d) Raise any doubt or question as to the suitability or legality of its seatbelt equipment, then pages 96-99, and 108-109 of the NZHRA Code of Construction Manual must be referred to.

COMMENT:

C13.12 SPEEDOMETERS

All vehicles first registered after 1st December 1951 must be equipped with an accurate speedometer.

COMMENT:

C13.13 REAR-VISION MIRRORS

All vehicles must have an effective rear-view mirror. Any vehicle so designed that the internal rear view is ineffective, must be fitted with an exterior rear-view mirror.

COMMENT:

C15.14 WINDSCREEN WIPERS

All vehicles must be fitted with an efficient mechanically operated windscreen wiping system in good working condition.

COMMENT:

C13.15 SUN VISORS

All closed vehicles, unless the vehicle is so constructed that it is impracticable to do so, must be fitted with an efficient sun visor for the use of the driver.

COMMENT:

C13.16 DANGEROUS FITTINGS

No vehicle may be fitted with ornaments, decorations or fittings of such a nature and in such a position that they may be likely to cause injury to pedestrians.

COMMENT:

C13.17 CORROSION

No vehicle may have its body or chassis structure weakened by rust, corrosion, cracks or other damage to the point where the vehicle may be unsafe to operate.

COMMENT:

C13.18 MEANS OF ENTRANCE AND EXIT

All vehicles must allow all passengers and driver a ready means of entrance and exit to and from the vehicle from both inside and outside the vehicle.

COMMENT:

For any additional information required for Traffic Regulations, or information on Traffic Regulations on any vehicles that have been modified in any areas than may directly or indirectly affect any of the regulations, pages 91-100 of NZHRA Code of Construction Manual

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C15 - ROAD-TEST PROCEDURES

C15.1 The depth of the road-test is dependant on the level of modification, and the Certifying Agent's feel for the way in which the vehicle responds. Assuming the modifications are minor, and there is no reason why the modifications performed should have any adverse affect on the vehicle's driving characteristics, the road-test may be carried out by observing the following points:

- (a) .. All pedals, steering wheel and hand controls display a smooth and satisfactory operating action.
COMMENT:
- (b) Steering is light enough to allow both easy parking manoeuvring, and road-feel at highway speed.
COMMENT:
- (c) Steering doesn't exhibit any tendencies to "bump-steer", pulling to left or right, and shows adequate or normal "self-centring" after exiting turns for vehicle type being tested.
COMMENT:
- (d) Stability or "body-roll" is acceptable during braking, cornering, slalom-type steering, combination of cornering and braking, and over uneven surface.
COMMENT:

C16 - BRAKE-TEST PROCEDURE:

C16.1 All vehicles must be tested to one of the following procedures appropriate for the level of modification to the vehicle in question.

- (a) Vehicles with a performance increase (via engine swaps or modifications to the original engine) of 20% or less must achieve:
Two successive 100-0kph stops at .6G (within 4.8 seconds or less) within a total time limit of 1 minute 20 seconds.
Times recorded: Test 1) Test 2)
Total time for two stops
COMMENT:
- (b) Vehicles with a 20% or greater increase in performance, and/or mass, and/or any brake system modifications must achieve:
Three successive 100-0kph stops at .65G (within 4.4 seconds or less), within a total time limit of 2 minutes.
Times recorded: Test 1) Test 2) Test 3)
Total time for 3 stops:
COMMENT:
The vehicle must be subjected to the following Scratch-built (Category One) vehicle brake test, if:
 - (i) The vehicle exhibits any significant fade during the Brake Test;
 - (ii) The vehicle exhibits any significant pedal pressure increase during the Brake Test;
 - (iii) The vehicle in the opinion of the Certifying Agent may have marginal braking componentry relative to its performance ability or weight;
 - (iv) The vehicle has undergone a dramatic increase in performance ability or weight, (eg: V8 into 4 or 6-cylinder Torana, etc).
- (c) Scratch-built (Category One) Vehicles must achieve:
Five successive 100-0kph stops at .65G (within 4.4 seconds or less), within a total time limit of 3 minutes

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Times recorded: Test 1) Test 2) Test 3) Test 4) Test 5)

Total time for 5 stops:

COMMENT:

(d) Any vehicle not capable of achieving 100 kph must have successive Brake-Tests conducted from either:

(i) 90 kph at .65G (within 3.9 seconds or less)

(ii) 80 kph at .65G (within 3.5 seconds or less)

Speed tested from:

Times recorded: Test 1) Test 2) Test 3)

COMMENT:

C16.2 Throughout the Brake-Test procedure, all vehicles must exhibit satisfactory handling characteristics, including even progressive braking, no vibrations, no premature lock-up of either axle or individual wheel, and no instability or deviating from the chosen line.

COMMENT:

C16.3 An acceptable amount of pedal effort is required throughout all Brake-Testing. The minimum allowable brake pressure is 6.6 kilograms and the maximum is 68 kilograms.

COMMENT:

C16.4 All vehicles must be fitted with a Parking Brake that will achieve a 30-0kph stop within a distance of 18 metres. (In the case of Carden Shaft Parkbrakes, the test is to hold the vehicle at rest on a gradient of 1 in 5).

COMMENT:

Note - In the event of any vehicle tested under C18.1b, c or d, being unable to achieve the required .65G, .6G may be accepted at the discretion of the Certifying Agent if in his opinion there is sufficient justification such as special or unusual weather conditions, road surfaces, suspected instrument inaccuracy or is of the opinion that the vehicle's braking performance is as good as could reasonably be expected.

COMMENT:

GENERAL NOTES:

Note 1: If the vehicle exhibits driving/handling characteristics that differ significantly to that which would be expected of the vehicle in standard form, or if there is the slightest doubt as to the vehicle's roadworthiness or braking ability either before or during the inspection, or during the road-test, the Certifying Agent is to refer to the NZHRA Code of Construction Manual, Part 9, and complete the full Road-Test Procedure, as set out on pages 141-145 inclusive.

Note 2: If there is any doubt or uncertainty in regard to any component, part of a vehicle, or engineering practice, the Certifying Agent may order its removal, replacement, or N.D.T. Certification. The Certifying Agent has legal and moral obligations to the New Zealand Hot Rod Association and the Land Transport Safety Authority, and may refuse Certification of any vehicle, for any reason he sees fit.

Note 3: If any area of vehicle being inspected under this Certification where there is a modification, or it has a level of modification not covered specifically within this paperwork, then the full NZHRA Code of Construction Manual should be referred to.