The Classing System
For NSW Production Touring Category

Author: Technical Committee

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Executive Summary

In recent years the NSW Production Touring Category has grown from the old Street Sedan category and has been hugely successful. During this time the club has seen growing grids and lots of new competitors many with the latest types of vehicles. This has put the current non-published classing system under strain to correctly classify these vehicles, with their current technology and development, within the existing criteria. The dynamics of some of these vehicles does not fit well with handling prowess, as opposed to straight-line performance through large capacity engines. This has highlighted the need for a robust published classing system that can be used by competitors to determine their class.

The purpose of this document is to detail a formula-based system based on readily available data for some key performance based aspects of the vehicles, namely: power, weight, torque, drivetrain and factory performance vehicles.

These factors are applied to give a class factor. This is then used to place the vehicles in classes with cars of similar performance.

This system for classing has be used from 2015 onwards.

Determining the Factors

There are many factors that determine the performance of a vehicle on a race track. The following are some of the key factors that are used or not used, and the logic behind their choice.

Power

The power of a vehicle is the most common determinate to performance in that acceleration is directly attributed to power and acceleration is highly important in the speed achieved down a straight. Therefore, Power MUST be used in any calculation. With production car categories such as Production Touring, the power cannot be varied significantly so therefore the published power figures in Kilowatts available on the RVD documents can be used for this value.

Torque

The variety of engines used in the category from four to eight cylinders, some with forced induction creates great variation in Torque. Torque is also a major determinate in how a vehicle accelerates particularly coming out of corners. As with power, the torque for production cars should not vary greatly for production cars, therefore the published torque values can be used. Torque also caters for engine types such as V8 which generally have high power and high

torque, diesels which have relatively low power with high torque, and cars such as rotaries which have relative high power but low torque.

Unfortunately, the Torque values are not recorded on the RVD so an alternate source was needed. Redbook is a trusted industry source that uses manufacture's published data and is readily available online at redbook.com.au. The Redbook value of Torque in NM is used.

Weight

The enemy of power and torque is weight, as the power needs to overcome the weight to achieve the acceleration. Therefore, the weight of the vehicles must be considered. To determine the race weight of the vehicle in Kilograms, the published values on the vehicles RVD can be used once the Motorsport Australia 3E weight calculation (where applicable) has been applied.

Drivetrain

There are three general types of drivetrain used, rear wheel drive, front wheel drive, and four or all-wheel drive. The two-wheel drive vehicles are at a significant disadvantage to the all-wheel drive vehicles so a factor to compensate is used to offset this advantage in the calculation. The AWD factor has been set as 1.5.

Factory Performance Vehicles

Some vehicles from particular manufacturers (such BMW Motorsport, Renault, AMG and HSV) are significantly upgraded and have advantages in handling and braking which gives those vehicles an advantage in balance and cornering ability. Therefore, a factor to compensate is used to offset this advantage in the calculation. The Factory Performance Vehicles factor has been set as 1.15.

Other Factors

Some other factors were considered but rejected. Brakes were one of these factors however as the 3E rules allows for limited upgrades of Brakes, eg from sliding calipers to 4 spot calipers and thicker discs and therefore the standard brakes cannot be used to gauge performance. Suspension setup and tuning also has a significant impact on performance but as these are relatively free under the 3E rules these factors cannot be used.

The Biggest Single factor

The one factor that really impacts the performance of similar vehicles is the experience and capability of the driver. This can be measured by lap time differences between the same vehicles. However, drivers should not be

disadvantage by being placed in a higher class due the experience or ability. So, driver ability is not factored into allocating cars to classes.

The Formula

The formula to calculate the Class Factor is as follows:

$$Class\ Factor\ = \frac{Race\ Weight\ KG}{Power\ KW} \times \frac{Race\ Weight\ KG}{Torque\ NM}\ /AWD\ Factor\ (1.5)/Factory\ Perfromance(1.15)$$

How to calculate your Class Factor:

Gather the data required

1. Locate the RVD for your vehicle - http://myrta.com/rvd/searchRVD.do
   - Record the Tare Mass (Kg)
   - Record the NEP (kW)

2. Look up your vehicle on Redbook - http://www.redbook.com.au/
   - Record the Torque (Nm)

3. Calculate the race weight.
   - Take the minimum of the RVD Tare Mass from step 1. If the RVD Tare Mass is 1450 or less then the RVD Tare Mass is the race weight. If over 1451 KG, then calculate the race weight by taking Tare Mass from step 1 multiply by the percentage reduction as per the CAMS 3E rules (see table below) and add 85 Kg to give you the race weight

Tare Mass	Percentage reduction
1450 or less	0
1451 – 1499	6
1500 – 1549	7
1550 – 1599	8
1600 – 1649	9
1650 – 1699	10
1700 or greater	11

Perform the Calculation

1. Calculate the Power to weight (PWR) value

   Divide the Race Weight in Kilograms by the RVD Power in Kilowatts

2. Calculate the Torque to weight (TWR) value

Divide the Race Weight in Kilograms by the Redbook Torque in Newton Metres

3. Multiply the Power to Weight by the Torque to Weight values

4. Apply the AWD Factor if appropriate. Take value from step 3 and divide by AWD Factor. The AWD Factor is 1.5.

5. Apply the Factory Performance Vehicle Factor if appropriate. Take value from step 4 and divide by Factory Performance Vehicle Factor. The Factory Performance Vehicle Factor is 1.15.

6. Take the resultant number (class factor) and determine where it fits within the class brackets.

Class Brackets

The following are the suggested class brackets:

Class	Maximum Class Factor
X	10 See note below
A1	17
A2	17
B1	23
B2	24
C	41
D	58
E	>58 See note below

- Class X also has to have forced induction and have 5 or more cylinders
- Class E vehicles cannot have forced induction

Exceptions

There will always be exceptions to the formula, particularly if vehicles do not have the required RVD or Redbook entries. These vehicles will have to use information form alternate sources to try and class these vehicles. The Production Touring committee will allocate the vehicle to a class. Examples are Mitsubishi Evolution vehicles and Nissan GTiR.

This system should be suitable for the majority of the vehicles that race with the Production Touring category.

The NSW Production Touring Technical Committee reserves the right to reclassify the class of vehicles, in exceptional circumstances. The Technical committee needs to be unanimous in this decision.

Examples

The following are examples:

A. Holden Commodore VE SS

>Race weight = RVD Weight 1684 Kg less 10% plus 85KG = 1600Kg
>RVD Power = 270KW
>Redbook Torque = 530Nm
>
>1. Power to weight = 1600KG/270Kw = 5.93
>2. Torque to Weight = 1600KG/530Nm = 3.02
>3. Multiply together = 5.93 x 3.02 = 17.90
>4. Apply AWD factor = Not applicable
>5. Apply Factory Performance Vehicle factor = Not applicable
>6. Compare Class Factor to class brackets = 17.90 = class B2

B. BMW E46 M3

>Race weight = RVD Weight 1455 Kg less 6% plus 85KG = 1452Kg
>RVD Power = 252KW
>Redbook Torque = 365Nm
>
>1. Power to weight = 1452KG/252Kw = 5.76
>2. Torque to Weight = 1563KG/530Nm = 3.98
>3. Multiply together = 5.76 x 3.98 = 22.94
>4. Apply AWD factor = Not applicable
>5. Apply Factory Performance Vehicle factor = 22.94/1.15 = 19.95
>6. Compare Class Factor to class brackets = 19.95 = class B2

C. Subaru WRX Sti MY10

>Race weight = RVD Weight 1465 Kg less 5% plus 85KG = 1462Kg
>RVD Power = 221KW
>Redbook Torque = 407Nm
>
>1. Power to weight = 1462KG/221Kw = 6.62
>2. Torque to Weight = 1462KG/407Nm = 3.59
>3. Multiply together = 6.62 x 3.59 = 23.77
>4. Apply AWD factor = 23.77/1.5 = 15.84
>5. Apply Factory Performance Vehicle factor = Not applicable
>6. Compare Class Factor to class brackets = 15.84 = class A1

D. Mitsubishi Evolution IX RS

> Race weight = No RVD data
> RVD Power = No RVD data
> Redbook Torque = No Redbook data
> Therefore, class assigned by Production Touring Committee

Appendix A – Class Table

The list of Eligible Vehicles and their assigned class has been moved to a separate document:

2021 LIST OF ELIGIBLE AUTOMOBILES
CLASS STRUCTURE & AUTOMOBILE ELIGIBILITY LIST

This will be available on the Production touring website and is the official list of vehicles and classes.