FAQ on Rim and Tyre Resizing for FB and EK Holden's.

In my search for information on tyre and rim changes for the FB / EK Holden series I discovered that the relevant information was quite fragmented and difficult to consolidate without some considerable time and work.

The following is what is hoped to be a concise guide for those looking for information on this topic.

1.0 Reading tyres Specs 101:

Example: 215/60/R15

215= width (mm), 60= Aspect ratio (as a %), R= Radial Ply, 15= Dia. of Rim (in inches)

Aspect ratio = Height of tyres sidewall over Tyre Width => Height / Width

2.0 Original Vehicle Tyre and Rim Specs:

Rims: Steel 13"x 4.5"

Tyres: Rolling Diameter (Height): 622mm (24.5")

Sidewall Height: 145.9mm (5.75")

Tyre Width: 162mm (6.4")

Aspect ratio: = 145.9/162 = 90%

Calculated Tyre size: **162/90/R13**

2.1 Equivalent Modern Tyre:

Nearest tyre size: **165/90/R13**

Rolling Diameter (Height): 627mm (24.68")

Sidewall Height: 149mm (5.86")

Tyre Width, 165mm (6.5")

Error ratio = 0.8%

3.0 New Rim and Tyre Sizing

Modern Rims, even at the standard 13" size are typically wider than the Factory original rims. Below is a table for recommended tyre widths based on wider Rim widths. Remember that wider Rims and Tyres will impact handling and may cause scrubbing issues on panels. This sizing is independent of the Aspect ratio.

Rim Width (inches)	Min Tyre Width (mm)	Recommended Tyre Width	Max Tyre Width
5	155	165-175	185
5.5	165	175-185	195
6	175	185 -195	205
6.5	185	195-205	215
7	195	205-215	225
7.5	205	215-225	235
8	215	225-235	255

It is also important to ensure that the Rolling Diameter of the new Rim/ tyre Combination is as close to the original as possible (622mm) this ensures that the Speedometer readings remain accurate. See Tables Below.

3.1 Wider Rims and tyres at the Standard (13") Rim Size.

Using the table above a 6" Rim would typically use a 185mm width tyre. To comply with the Rolling Diameter of 622mm of the original tyre, the sidewall of the new tyre would need to remain constant. i.e 145.9mm as there is no change in Rim size. The Aspect ratio is calculated as H/W => 145.9/185 = 79.

In this instance the new technical tyre spec required would be ***185/80/R13***.

Using this spec would increase the sidewall height from 145.9mm to 148mm with a rolling diameter of 626mm. The % difference here is +1.44%.

3.2 Wider Rims and Tyres at 14" Rim Size Using Speedometer Error Table*.

Tyres Sizes	Sidewall (mm)	Diameter (mm)	Diff (%)
165/80/R14	132	620	-2.56
175/80/R14	140	636	2.83
185/75/R14	139	633	1.99
195/70/R14	137	629	0.47
205/65/R14	133	622	-1.72
215/65/R14	140	635	2.66
225/60/R14	135	626	-0.54
235/60/R14	141	638	3.50

* Based on 165/90/R13

3.3 Wider Rims and Tyres at 15" Rim Size Using Speedometer Error Table*.

Tyres Sizes	Sidewall (mm)	Diameter (mm)	Diff (%)
155/80/R15	124	629	0.61
175/70/R15	123	626	-0.40
185/65/R15	120	622	-1.92
195/65/R15	127	635	2.46
205/60/R15	123	627	-0.07
215/60/R15	129	639	3.97
225/55/R15	124	629	0.44
245/50/R15	123	626	-0.40

* Based on 165/90/R13

4.0 Back Spacing's and Offsets

These are important specs to understand when selecting a rim that will fit appropriately on the vehicle. It is possible to have a two rims the same size and width but one not fit due to the different backspacings/offsets used.

The Back spacing of a rim is the distance from the interface with the hub, back to the rim edge on the inside of the rim. These vary based on the design /form of the rim itself.

The offset is where the middle of the Rim is located compared to the Rim/Hub interface. The offset can be +ve or -ve or zero.

Google these terms and you will get good diagrams showing both Backspacing and offsets and how they are measured.

5.0 Diff ratios

If you change the effective Rolling Diameter size with a new Rim/Tyre Combination *substantially* this will also affect the vehicles drive train performance.

For Rolling Diameters smaller than the original specification this would manifest itself in higher revs for a similar speed (or lower speed at same revs). This may increase performance at take-off but cause Whining or high reving at cruise speeds.

For Rolling Diameters larger than the original specification this would result in lower revs for a similar speed (or higher speed at same revs). This would show as a degraded performance at take-off but more comfortable cruising speeds and with a higher top end speed. This change may also require dropping down a gear earlier when travelling up hills.

These issues can be counter balanced by considering a change in the Diff sizing to compensate.

As Rim/Wheel sizing and Diff sizing are linked if you are contemplating changing the original Diff to a different ratio the Rim/Wheel sizing should also be considered.

6.0 Front and Back Wheel Sizing

For Roadworthy Compliance, rim sizes should be the same back and front. The Rolling Dia. of each Wheel on an individual axle also needs to be the same. From this it is clear that both Rims and Tyres must match for each individual axle.

The width of tyre may be different on back and front provided the Rims are the same and the rolling Diam is the same (or within 1%)

7.0 PCD or Pitch Circle Diameter

When selecting new rims for a FB/EK series, it is also important to understand and match the original axle stud pattern to the new Rims. The Factory Spec for this model is 7/16" Stud on a 4 ¼"PCD.

The pattern is also called a 5/108 PCD.

8.0 Will they fit?

There are many factors that determine if a new Rim/Tyre combination will be suitable for any individual vehicle. Aside from the obvious factors of rim size and tyres selection, the offset and backspacing of the rims, the front steering and suspension design (original or modified), and whether the vehicle has been raised or lowered all come into consideration.

So unfortunately there is not a generic answer to this question.

There is also the question of whether the panel wheel arches have been rolled or belled out as these give an increased area for the wheel dimensions

Go too big however and the tyres may foul against fenders or steering/suspension during travel.

Selecting appropriate Backspacing and offsets for Custom Rims will greatly assist in proper fitment/performance.

If the vehicle is roadworthy you should also be able to take it to a local Tyre centre who can test various combinations via a wheel jig. This would take out much of the guess work.

9.0 Useful Website Tools

There are many tyre/rim calculators available on the internet.

Google "tyre size calculator" or "tyre and rim calculator" and select your preference. The site tyresizecalculator.com was used in putting the charts in this paper together.

If you wish to look at how different tyre/Rim combinations and Diff sizes interact then kabamus.com/garage/gear and tiresize.com are worth a look.

10.0 A Resizing Example

The owner of a Standard EK wishes to replace the original 13” Rims with 15” Rims. The front Rims are to be 6” wide. The back Rims 7” wide.

From the Rim/Tyre width Chart in 3.0. The front tyres are selected to be 185mm wide and the back tyres 205mm wide.

Selecting from the 15” chart in 3.3 The tyre Spec for the front tyres is *185/65/15R*. The back tyre spec is *205/60/15R*

Due to the different rolling Diameters between front and back (622mm – 627mm) a variation check needs to occur. There is a 0.8% variation between front and back so that is within tolerance.

The owner then selects Rims with an appropriate offset and backspace to ensure best fitment.

In this case a 3.5” backspace with zero offset is selected for the front rims and a 4” backspace with zero offset is selected for the back rims. As the Vehicle is standard, the rims are matched for 7/16 studs on a 5/108 PCD.

Payne62