INSTRUCTIONS

PATENT PENDING
916-3289 - WheelWise™ Tire Fitment Attachment
916-23280 - WheelWise™ Tire Fitment Tool Kit - 5-Lug Standard Bolt Pattern
916-23284 - WheelWise™ Tire Fitment Tool Kit - 4-Lug Bolt Pattern
916-23285 - WheelWise™ Tire Fitment Tool Kit - 5-Lug Metric Bolt Pattern
916-23286 - WheelWise™ Tire Fitment Tool Kit - 6-Lug Bolt Pattern
916-23288 - WheelWise™ Tire Fitment Tool Kit - 8-Lug Bolt Pattern

POSSIBLE KIT CONTENTS BASED ON PART NUMBER			
Qty	Hub Plate P/N	Description	Kit P/N
1	916-32850	Hub Mount Plate for 5-Lug Standard Bolt Pattern	916-23280
1	916-3284	Hub Mount Plate for 4-Lug Bolt Pattern	916-23284
1	916-3285	Hub Mount Plate for 5-Lug Metric Bolt Pattern	916-23285
1	916-3286	Hub Mount Plate for 6-Lug Bolt Pattern	916-23286
1	916-3288	Hub Mount Plate for 8-Lug Bolt Pattern	916-23288
STANDARD ATTACHMENT COMPONENTS			
Qty	Description		Item P/N
1	Tire Spacing Marker		916-3289.1
1	Tire Height Slider		916-3289.2
1	Tire Width Slider		916-3289.3
1	Tire Spacing Slider, Long		916-3289.4
1	Tire Spacing Slider, Short		916-3289.5
1	Angle, Tire Tool		916-03280.5
Qty	HARDWARE		Thread Lock
7	Wing nut, 1/4-20		No
7	Carriage Bolt, 1/4-20 x 3/4		No

INSTRUCTIONS

Tire Fitment Calculations
Below are the most used calculations to help determine your optimal tire size.

1. **Tire Aspect Ratio:**
   Sidewall Height(mm) divided by Tire Width(mm), multiplied by 100 = Tire Aspect Ratio

2. **Tire Diameter:**
   Sidewall Height(in) multiplied by 2, plus Wheel Diameter(in) = Tire Diameter in inches (in)

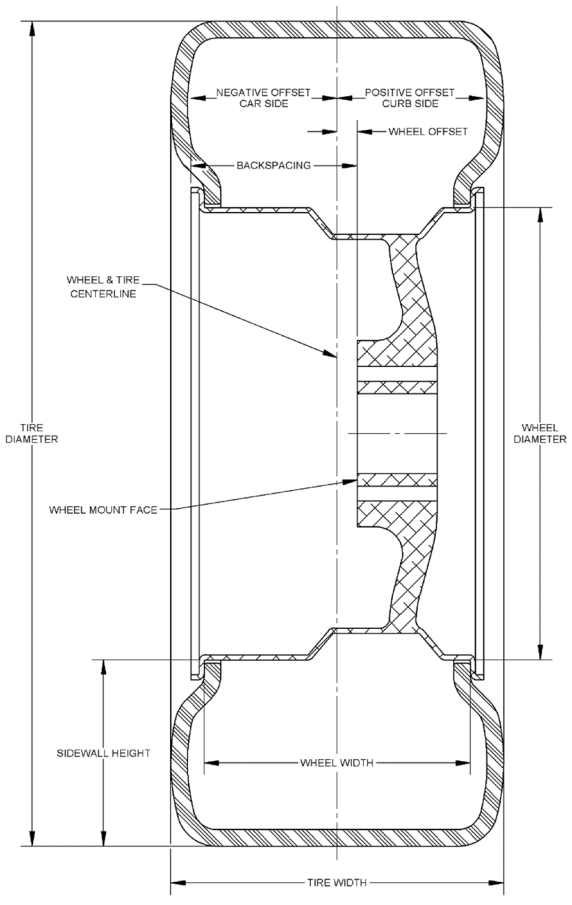
3. **Sidewall Height:**
   Metric (mm):
   Tire Aspect Ratio divided by 100, multiplied by Tire Width(mm) = Sidewall Height in millimeters (mm)

   SAE (in):
   Tire Diameter(in) subtract Wheel Diameter(in), divided by 2 = Sidewall Height in inches (in)

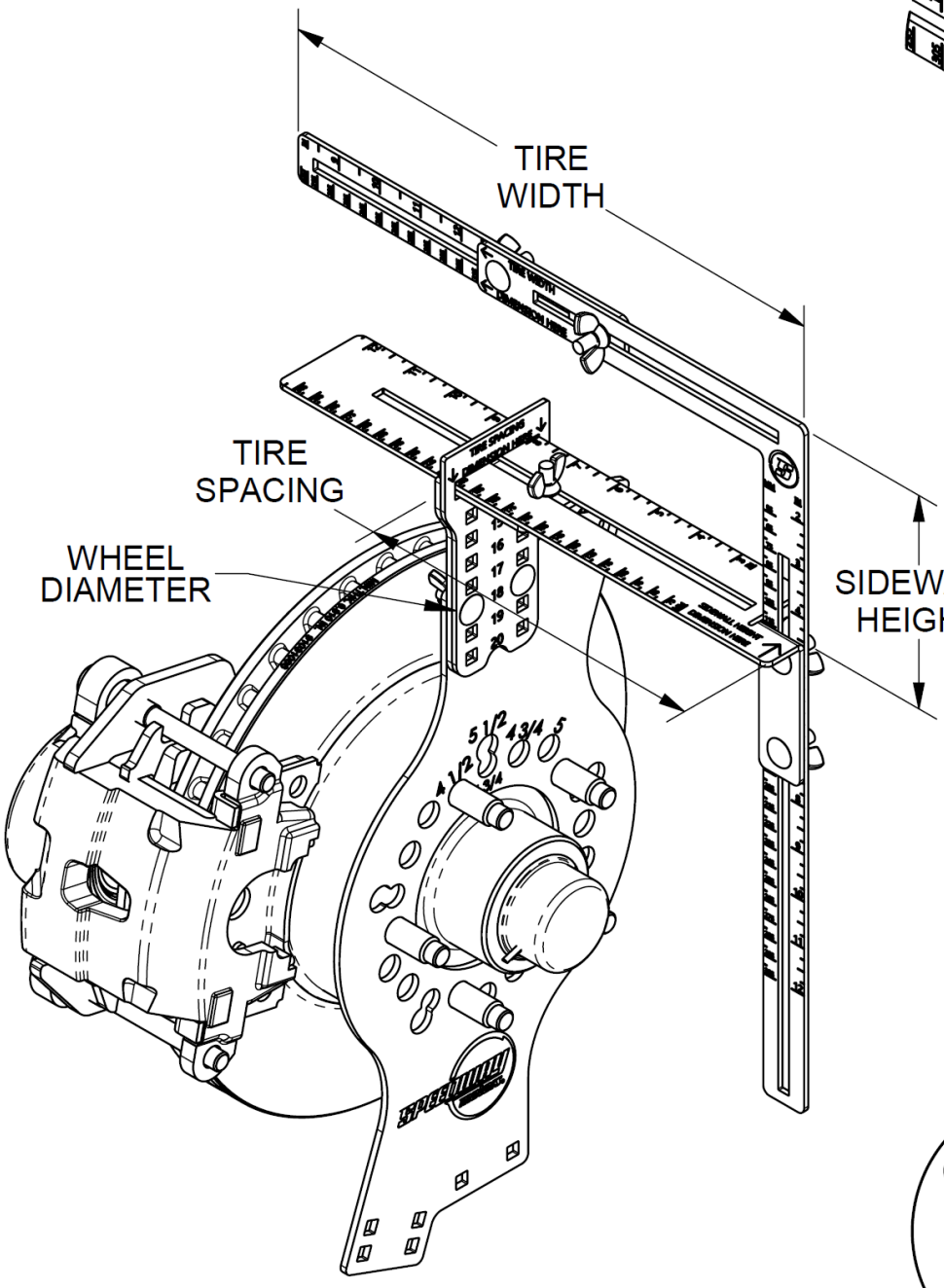
4. **Wheel Offset:**
   Tire Width(mm) divided by 2, subtract Tire Spacing(mm) = Wheel Offset in millimeters (mm)

5. **Backspacing:**
   Tire Width(in) plus Wheel Width(in), divided by 2, subtract Tire Spacing(in), plus .5(in) = Backspacing in inches

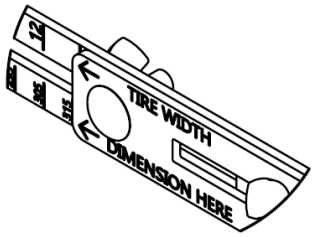
Wheel & Tire Dimensions



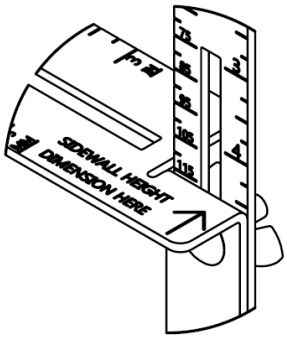
WheelWise™ Tire Fitment Tool Dimensions



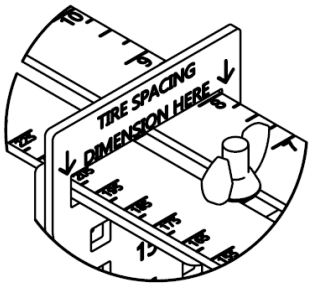
AS INSTALLED



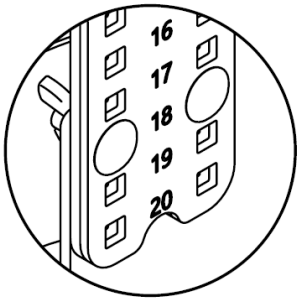
TIRE WIDTH



SIDEWALL HEIGHT



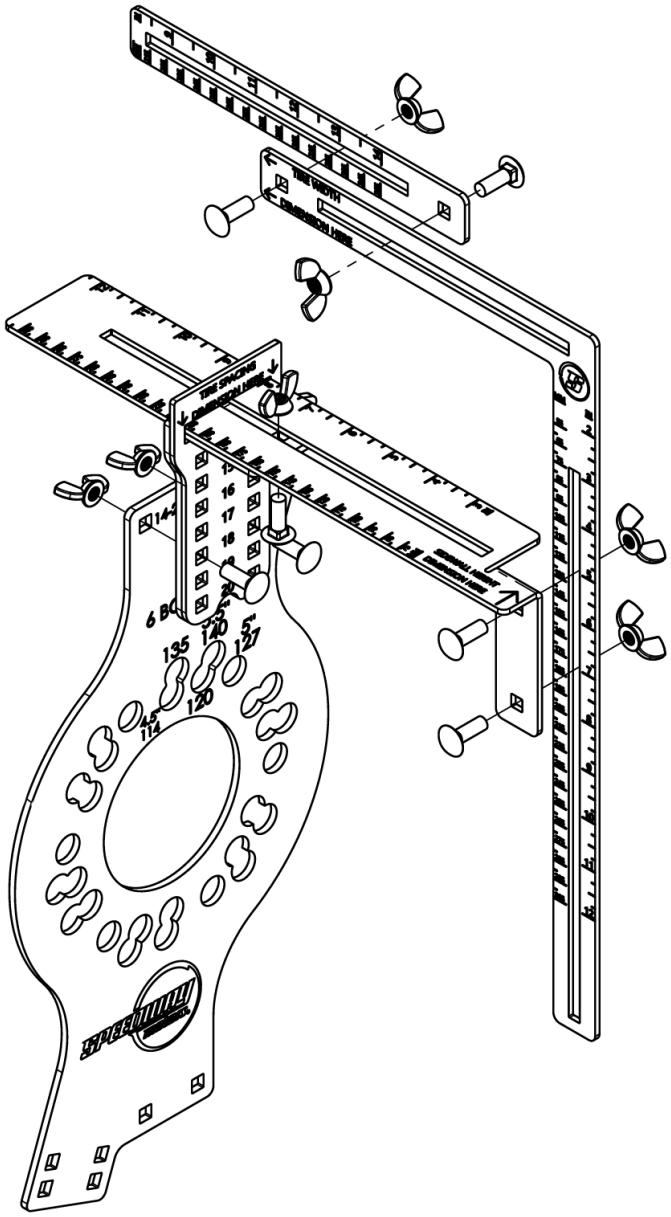
TIRE SPACING



WHEEL DIAMETER

INSTRUCTIONS

1. Assemble the tire tool as shown below. The tire spacing sliders can be used interchangeably depending on control arm clearance at large positive wheel offsets. Set the wheel diameter to the wheel diameter you would like to simulate.



2. For best results, it is recommended that you either compress or remove your suspension spring to allow the hub assembly to travel upward into bump and simulate ride height tire clearance.

3. Mount the hub plate to the hub mounting surface.

   NOTE: In some instances, removal of the brake caliper may be necessary to clearance the hub plate. The tool is not intended to simulate wheel clearance (only tire clearance) so it is recommended that you consult your brake manufacture for compatible wheel sizes with adequate clearance.

4. Use any of the following three simulation procedures depending on if you have only wheel specifications, tire specs, or neither.

Tire & Wheel Sizing Styles
Tire and wheel sizes come in a couple different styles and often mix and match units. Tire sizes come in the two basic styles given below.

Metric
Tire Width(mm) / **Tire Aspect Ratio** R **Wheel Diameter**(in) Ex: 305/55R20

SAE
Tire Diameter(in) X **Tire Width**(in) R **Wheel Diameter**(in) Ex: 33x12.5-20

Unit Conversions
Wheels are generally dimensioned with the backspacing given in inches and the offset given in millimeters. Because both units are often used, the following two equations can be used to convert inches to millimeters and vice versa.

(a.) millimeter to inch $Y(in) = \frac{X(mm)}{25.4\left(\frac{mm}{in}\right)}$

(b.) inch to millimeter $Y(mm) = X(in) \times 25.4\left(\frac{mm}{in}\right)$

To convert between SAE and metric tire sizes, the following four equations can be used.

Metric to SAE Conversion:

(c.) $\text{Tire Width(in)} = \frac{\text{Tire Width(mm)}}{25.4\left(\frac{mm}{in}\right)}$

(d.) $\text{Tire Diameter(in)} = 2 \times \frac{\text{Tire Width(mm)} \times \text{Tire Aspect Ratio}}{\left[25.4\left(\frac{mm}{in}\right) \times 100\right]} + \text{Wheel Diameter (in)}$

SAE to Metric Conversion:

(e.) $\text{Tire Width(mm)} = \text{Tire Width(in)} \times 25.4\left(\frac{mm}{in}\right)$

(f.) $\text{Tire Aspect Ratio} = \frac{\text{Tire Diameter(in) - Wheel Diameter(in)}}{[2 \times \text{Tire Width(in)}]} \times 100$

Have a Tire Size in Mind?
Have a specific tire size in mind? Use that tire's dimensions to calculate your ideal wheel specs.

1. Calculate your tire's sidewall height using either SAE or metric sizing.

   (g.) $\text{Sidewall Height(mm)} = \frac{\text{Tire Aspect Ratio}}{100} \times \text{Tire Width(mm)}$

OR

   (h.) $\text{Sidewall Height(in)} = \frac{\text{Tire Diameter(in)} - \text{Wheel Diameter(in)}}{2}$

2. Set your tool's sidewall height and tire width to the tire's specs and move the tool in and out of the wheel well until you achieve a configuration you like with adequate clearance. Read and record your tire spacing dimension off the tool. Use your tire spacing and tire width values to calculate your simulated wheel offset.

   (i.) $\text{Wheel Offset(mm)} = \frac{\text{Tire Width(mm)}}{2} - \text{Tire Spacing(mm)}$

   *Wheel offset is traditionally only given in millimeters.

3. Choose a recommended wheel width compatible with your tire size to calculate your needed wheel backspacing.

   (j.) $\text{Backspacing(in)} = \frac{\text{Tire Width(in)} + \text{Wheel Width(in)}}{2} - \text{Tire Spacing(in)} + .5\text{(in)}$

   *If backspacing is desired in millimeters, you can use the unit conversion equations.

You now have your wheel width, backspace, diameter, and offset to search for wheels that will fit your application. Most wheels are only sold in specific incremental sizes, so it is recommended that you choose a wheel close to your calculated specifications and then recheck clearance with those parameters before purchasing.

Have a Wheel in Mind?
Have a specific wheel size in mind? Use that wheel's dimensions to calculate your ideal tire size.

1. If your wheel offset is not known, use the wheel width and backspacing to calculate your offset. If the offset is known, skip to step 2.

   (k.) $\text{Wheel Offset(mm)} = 25.4\left(\frac{\text{mm}}{\text{in}}\right) \times \left\{\left(\text{Back Spacing(in)} - \frac{\text{Wheel Width(in)}}{2}\right) - .5\text{(in)}\right\}$

   *Wheel offset is traditionally only given in millimeters.

2. Knowing your wheel width, choose a compatible tire width and calculate your tire spacing dimension needed to simulate that tire. Note, to hold your wheel offset constant your tire spacing measurement will change for every subsequent tire width you would like to analyze.

   (l.) $\text{Tire Spacing(mm)} = \frac{\text{Tire Width(mm)}}{2} - \text{Wheel Offset(mm)}$

3. With your tool set to your determined tire spacing dimension, adjust the tire sidewall slider to a size you like that has adequate wheel well clearance. Read and record the sidewall height dimension and calculate your final tire size.

   (m.) $\text{Tire Aspect Ratio} = \frac{\text{Sidewall Height(mm)}}{\text{Tire Width(mm)}} \times 100$

OR

   (n.) $\text{Tire Diameter(in)} = 2 \times \text{Sidewall Height(in)} + \text{Wheel Diameter(in)}$

With your final tire size calculated, search for tires that will work for your application that are comparable to your calculated specifications. Tires come in standardized sizes so some compromise may be necessary. Once finding the tire you want it is recommended that you recheck that tire's exact specs for clearance before purchasing.

Sizing from Scratch:
No specific wheel or tire size in mind? No problem.

1. Choose a wheel diameter and set the tool so that your tire size is calculated correctly.
2. Adjust the tool's sliders for sidewall height, tire width, and tire spacing until you get a configuration you are happy with. Read and record the sidewall height and tire width dimensions to calculate your final tire size.

(o.) $$\text{Tire Aspect Ratio} = \frac{\text{Sidewall Height(mm)}}{\text{Tire Width(mm)}} \times 100$$

OR

(p.) $$\text{Tire Diameter(in)} = 2 \times \text{Sidewall Height(in)} + \text{Wheel Diameter(in)}$$

3. Using your tire spacing dimension read off your tire fit tool, calculate your wheel offset.

(q.) $$\text{Wheel Offset(mm)} = \frac{\text{Tire Width(mm)}}{2} - \text{Tire Spacing(mm)}$$

*Wheel offset is traditionally only given in millimeters.

4. Choose a recommended wheel width compatible with your tire size to calculate your needed wheel backspacing.

(r.) $$\text{Backspacing(in)} = \left(\frac{\text{Tire Width(in)} + \text{Wheel Width(in)}}{2} - \text{Tire Spacing(in)}\right) + .5\text{(in)}$$

*If backspacing is desired in millimeters, you can use the unit conversion equations.

You now have your wheel and tire specifications to search for a combination you enjoy. Wheel and tire offerings will vary by manufacturer, so it is recommended you choose a combination close to your chosen and calculated specs and then recheck the specifications for the final combination with the tire fit tool.

Tire Size in Mind, Example:

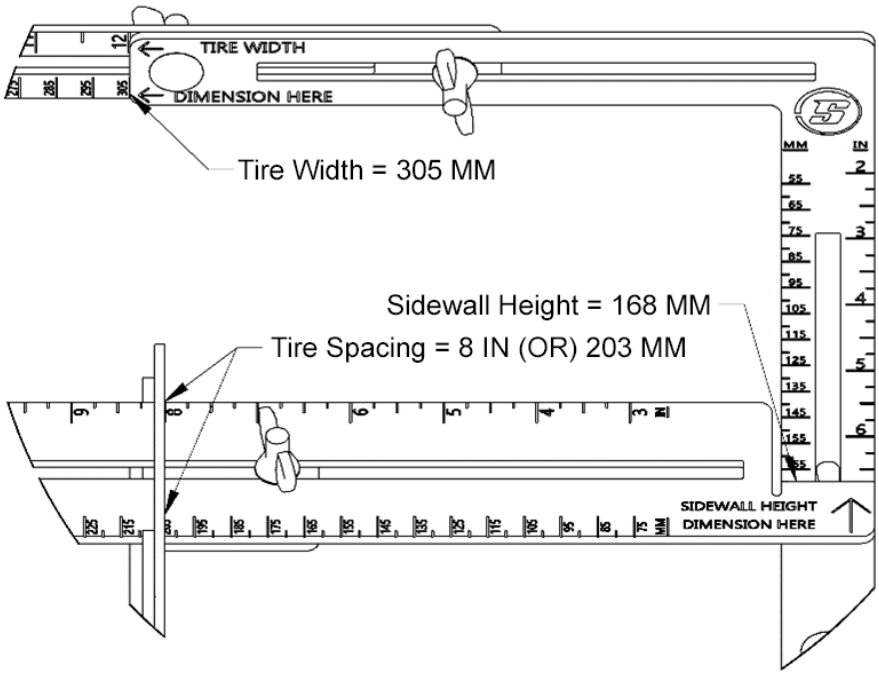
Metric Example:

Chosen Tire: 305 / 55 R 20

1. Calculate sidewall height.

   (g.) Sidewall Height(mm) = $\frac{55}{100} \times 305(mm) = 168(mm)$

2. Calculate wheel offset based on tire spacing and tire width.



   (b.) Tire Spacing(mm)= $8(in) \times 25.4\left(\frac{mm}{in}\right) = 203(mm)$

   (i.) Wheel Offset(mm)= $\frac{305(mm)}{2}$ - 203(mm) = -51(mm)

3. Calculate backspacing based on tire spacing, tire width, and a chosen wheel width.

   Chosen Wheel Width: 9 in

   (a.) Tire Width(in) = $\frac{305(mm)}{25.4\left(\frac{mm}{in}\right)} = 12(in)$

   (j.) Backspacing(in) = $\frac{12(in) + 9(in)}{2}$ -8(in)+.5(in)=3(in)

Final Wheel Size:
20 X 9, 3.00 in backspace, -51 offset

Tire Size in Mind, Example:

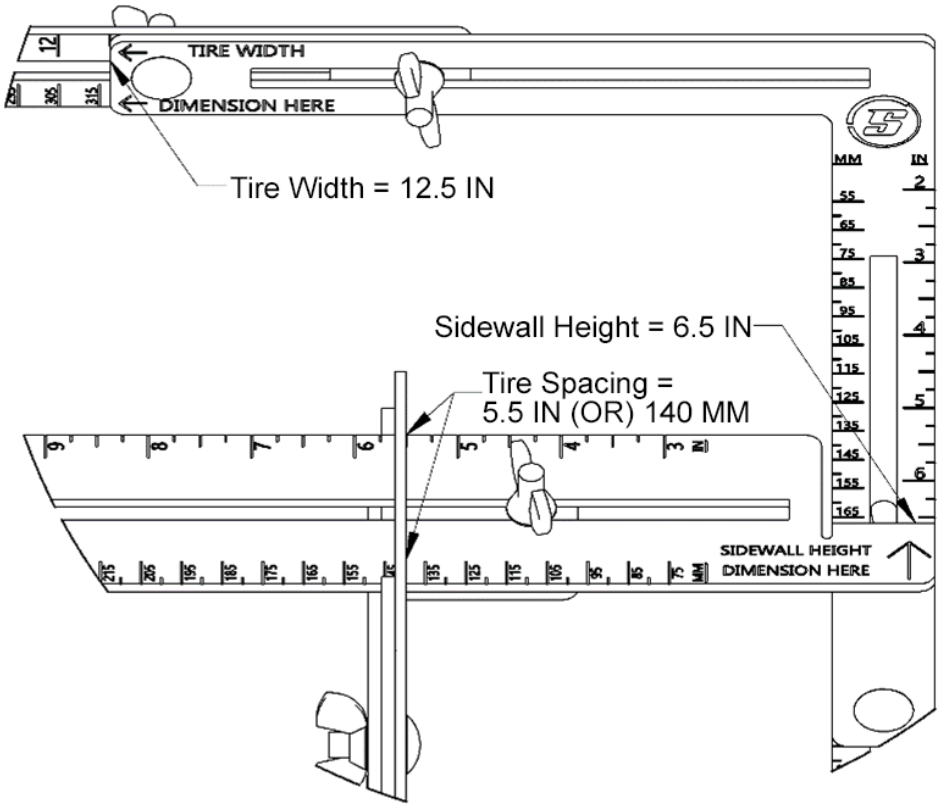
SAE Example:

Chosen Tire: 33 X 12.5 R 20

1. Calculate sidewall height.

   (h.) Sidewall Height(in)= $\frac{33(in) - 20(in)}{2}$ =6.5(in)

2. Calculate wheel offset based on tire spacing and tire width.



(b.) Tire Width(mm)= 12.5(in) × 25.4$\left(\frac{mm}{in}\right)$ = 318(mm)

(i.) Wheel Offset(mm)= $\frac{318(mm)}{2}$ - 140(mm) = + 19(mm)

3. Calculate backspacing based on tire spacing, tire width, and a chosen wheel width.

   Chosen Wheel Width: 10 in

   (j.) Backspacing(in) = $\frac{12.5(in) + 10(in)}{2}$ -5.5(in)+.5(in) = 6.25(in)

Final Wheel Size:
20 X 10, 6.25 in backspace, +19 offset

Wheel Specs in Mind, Example:

Wheel Specs:

Chosen Wheel: 20 X 10, 4.5 in backspace

1. Calculate wheel offset.

(k.) Wheel Offset(mm) = $25.4 \left(\frac{mm}{in}\right) \times \left\{\left(4.5(in) - \frac{10(in)}{2}\right) - .5(in)\right\} = -25(mm)$

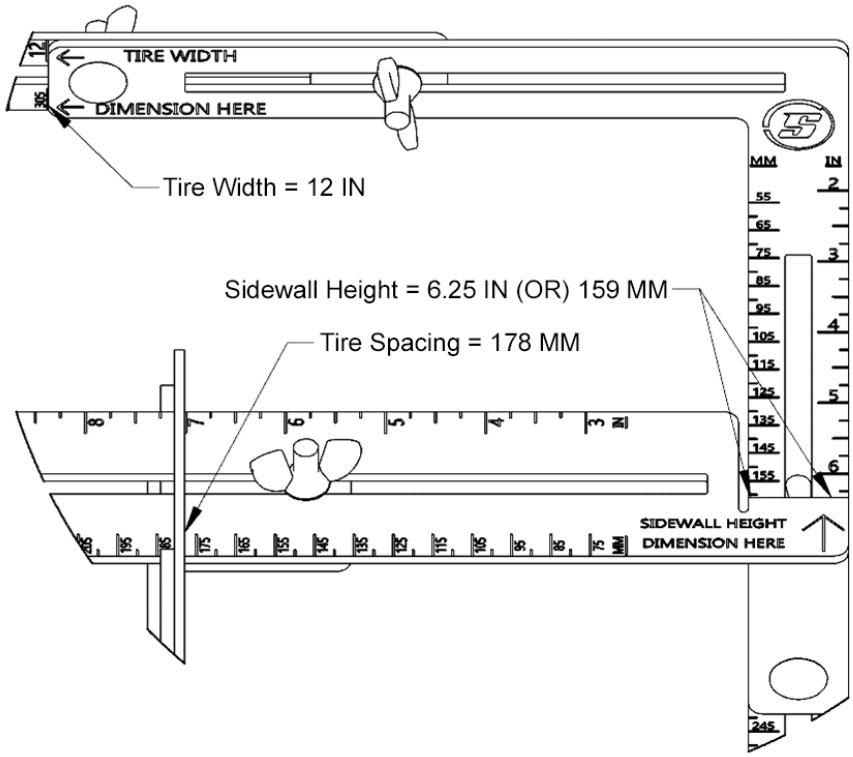
Equation process:
Step 1: 10" divided by 2 equals 5"
Step 2: 4.5" subtract 5" equals -.5"
Step 3: -.5" subtract .5" equals -1"
Step 4: -1" multiplied by 25.4 equals -25mm

2. Calculate the tire spacing dimension based on wheel offset and a chosen tire width.

Chosen Tire Width: 12 in

(b.) Tire Width(mm)= $12(in) \times 25.4 \left(\frac{mm}{in}\right) = 305(mm)$

(l.) Tire Spacing(mm) = $\frac{305(mm)}{2} - (-25(mm)) = 178(mm)$



3. Calculate the final tire size using the sidewall height dimension.

(m.) Tire Aspect Ratio = $\frac{159(mm)}{305(mm)} \times 100 = 52$

Final Metric Tire Size: 305 / 52 R 20

OR

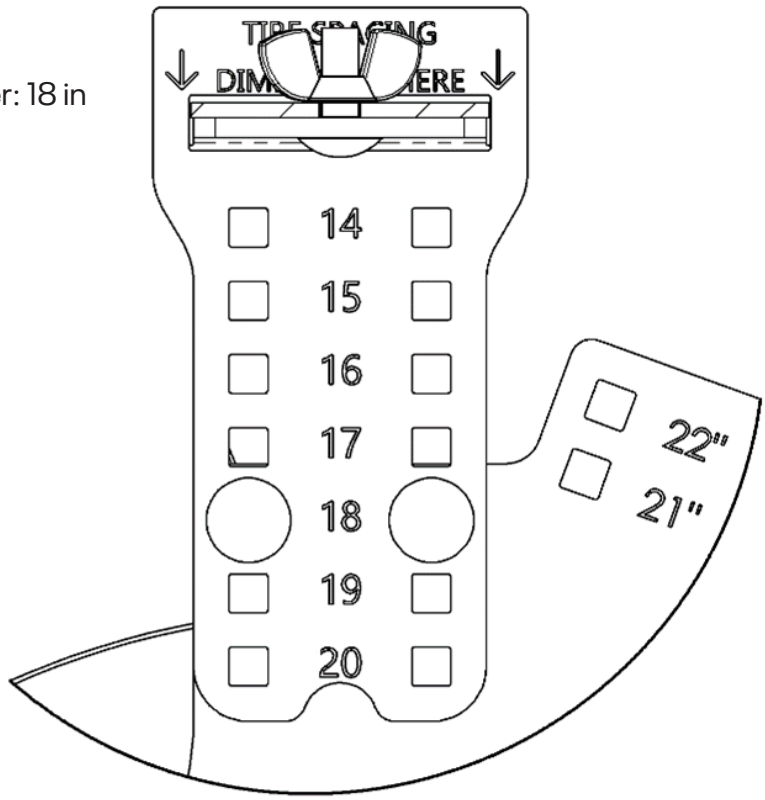
(n.) Tire Diameter(in)=2×6.25(in)+20(in) = 32.5(in)

Final SAE Tire Size: 32.5 X 12 R 20

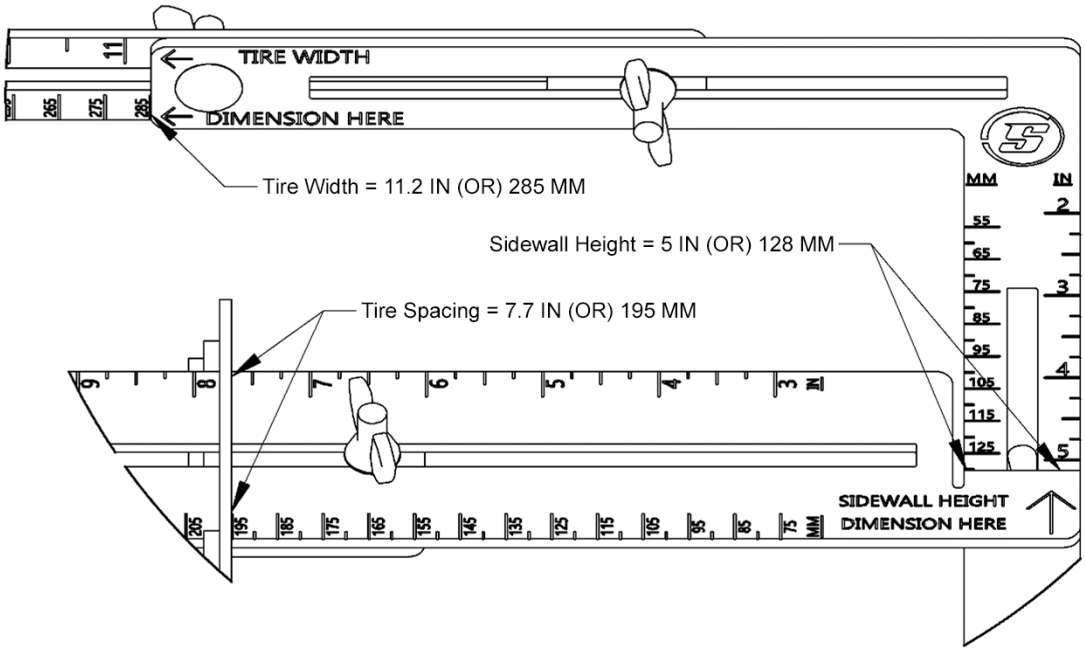
Sizing from Scratch:

1. Choose wheel diameter.

Chosen Wheel Diameter: 18 in



2. Calculate the tire size based on tool dimensions.



(o.) Tire Aspect Ratio = $\frac{128(mm)}{285(mm)} \times 100 = 45$

Final Metric Tire Size: 285 / 45 R 18

OR

(p.) Tire Diameter(in) = 2×5(in) + 18(in) = 28(in)

Final SAE Tire Size: 28 X 11.2 R 18

3. Calculate wheel offset using the tool tire spacing dimension and tire width.

(q.) Wheel Offset(mm) = $\frac{285(mm)}{2}$ - 195(mm) = - 53(mm)

4. Calculate wheel backspacing with the tire width, tire spacing, and chosen wheel width.

Chosen Wheel Width: 8.5 in

(r.) Backspacing(in) = $\left(\frac{11.2(in)+8.5(in)}{2} - 7.7(in)\right) + .5(in) = 2.65(in)$

Equation written out: 11.2" plus 8.5", divided by 2, subtract 7.7", plus .5", equals 2.65"

Final Wheel Size:
18 X 8.5, 2.65 in backspace, -53 offset

IMPORTANT

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