CROWN MOLDING ANGLE FORMULAS

Spring Angle and **Wall Angle** diagrams on following pages.
Spring Angle (SPRING): Measure of the angle between the back face of the crown molding and the wall.
Wall Angle (WALL): Half the total angle in plan between the walls; both spring angles are assumed to be equal.
Bevel Angle (BEVEL): Tilt of the saw blade; at zero degrees the blade is perpendicular to the table.
Miter Angle (MITER): Angle the saw swings left or right from its normal position at 90° to the edge of the work.

tan **MITER** = sin **SPRING** ÷ tan**WALL**
sin **BEVEL** = cos **SPRING** cos**WALL**

Example Calculations:

Spring Angle = 38°, **Angle between walls in plan** = 135°
Wall Angle = 135° ÷ 2 = 67.5°
Miter Angle = arctan(sin 38° ÷ tan 67.5°) = 14.30638°
Bevel Angle = arcsin(cos 38° cos 67.5°) = 17.55124°

Alternate Bevel Formulas:

$$\cos \textbf{BEVEL} = \sqrt{(\sin \textbf{SPRING} \cos \textbf{WALL})^2 + (\sin \textbf{WALL})^2}$$

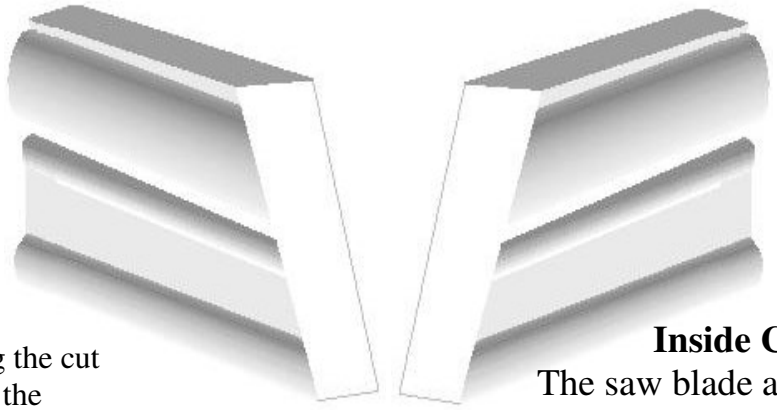
$$\cos \textbf{BEVEL} = \sqrt{(\cos \textbf{SPRING} \sin \textbf{WALL})^2 + (\sin \textbf{SPRING})^2}$$

Calculate the **Miter Angle** first, and:
tan **BEVEL** = sin **MITER** ÷ tan **SPRING**
cos **BEVEL** = sin **WALL** ÷ cos **MITER**
cos **BEVEL** = sin **SPRING** cos **WALL** ÷ sin **MITER**
sin **BEVEL** = tan **MITER** sin **WALL** ÷ tan **SPRING**

Calculate the **Bevel Angle** first, and:
tan **MITER** = sin **BEVEL** tan **SPRING** ÷ sin **WALL**
cos **MITER** = sin **WALL** ÷ cos **BEVEL**
sin **MITER** = tan **BEVEL** tan **SPRING**
sin **MITER** = sin **SPRING** cos **WALL** ÷ cos **BEVEL**

CROWN MOLDING ANGLE DIAGRAMS

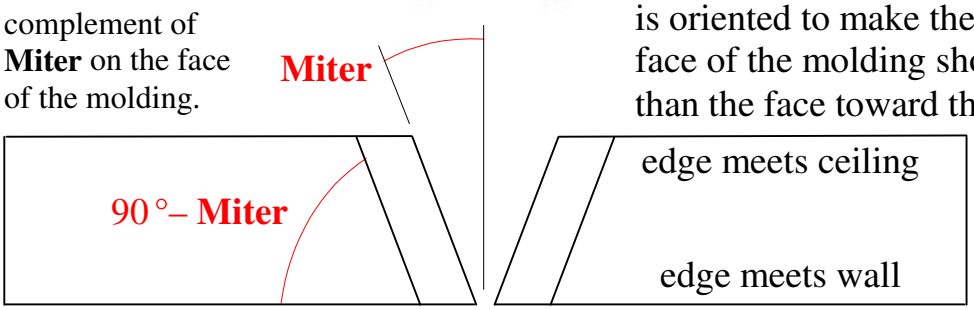
Miter : The angle the saw swings left or right from its normal position at 90° to the work.
Bevel : The angle of tilt of the saw blade, zero bevel means the blade is 90° to the table.

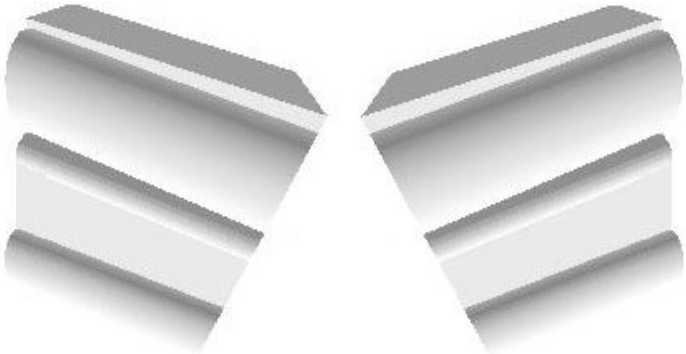


Making the cut creates the complement of **Miter** on the face of the molding.

Inside Corner

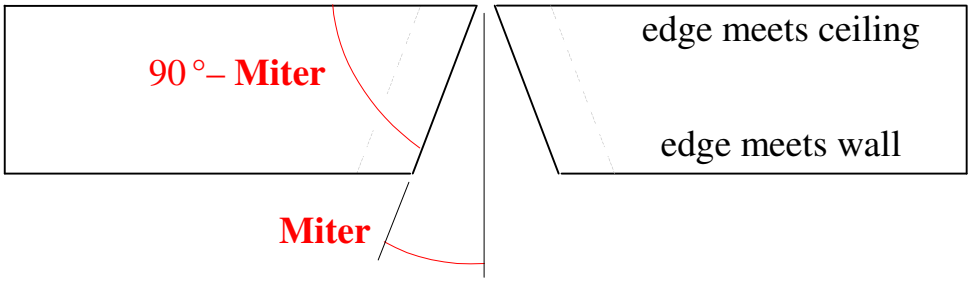
The saw blade angle or **Bevel** is oriented to make the visible face of the molding shorter than the face toward the wall.



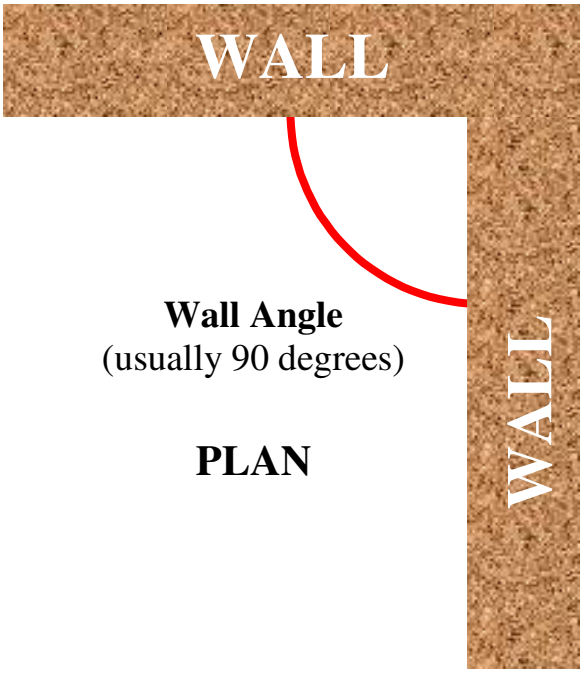


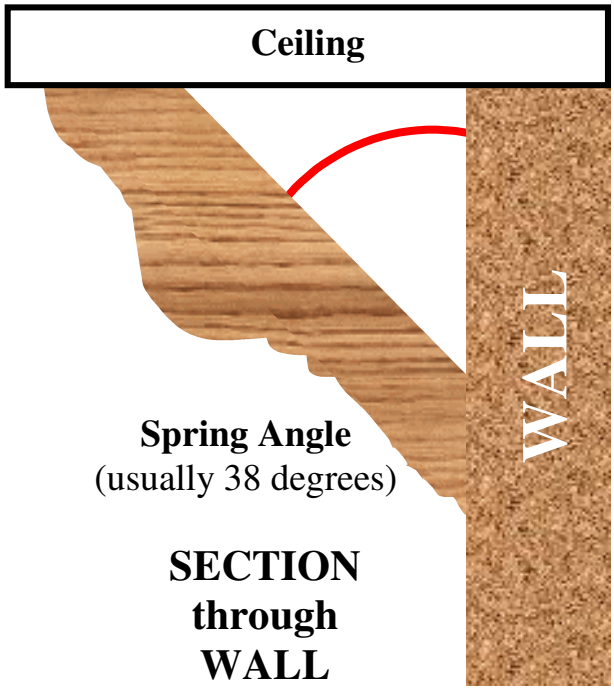
Outside Corner

The saw blade angle or **Bevel** is oriented to make the visible face of the molding longer than the face toward the wall.



Using the LAG Program
to cut CROWN MOLDING





Sample Crown Molding Calculation

Set the **LAG** calculator to **Angle Mode**

LAG Entries: Main Pitch Rise = Adjacent Pitch Rise
= 90 – **Spring Angle** = 52 degrees
Run values are not required in Angle Mode.
Total Deck Angle = **Wall Angle** = 90 degrees *

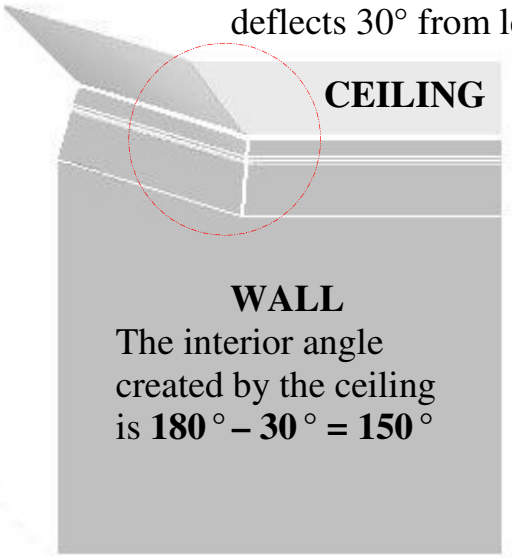
LAG Returns: **Miter angle** = **P2** (31.61901 degrees)
Bevel angle = **C5** (33.86291 degrees); revolve the blade or turn the work to make the finished face shorter than the back face.

The spring angle and wall angle may assume values other than those given in the example.

* For an outside corner, this value is 270 degrees. The same miter and bevel angles will be returned, but the blade angle or the work must be oriented so that the finished face is the long side.

CROWN MOLDING meets VAULTED CEILING

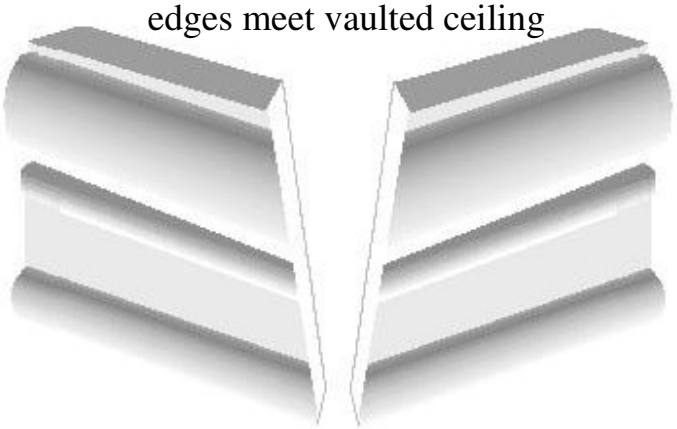
The plane of the ceiling deflects 30° from level



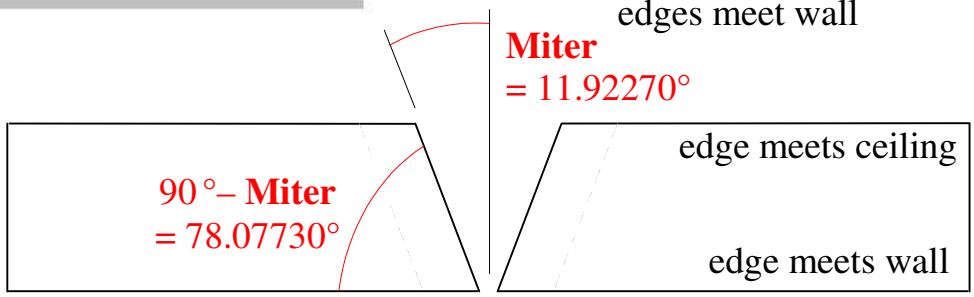
The interior angle created by the ceiling is **180 ° – 30 ° = 150 °**

Compare the orientations of **Miter** and **Bevel** in the diagrams below with the previous examples.

edges meet vaulted ceiling



edges meet wall



Crown Molding meets Vaulted Ceiling: Outside Corner

The saw blade angle or **Bevel** is oriented to make the visible face of the molding longer than the face toward the wall.

Sample Calculation

Total Deck angle = Interior angle **on the Wall** = 150°

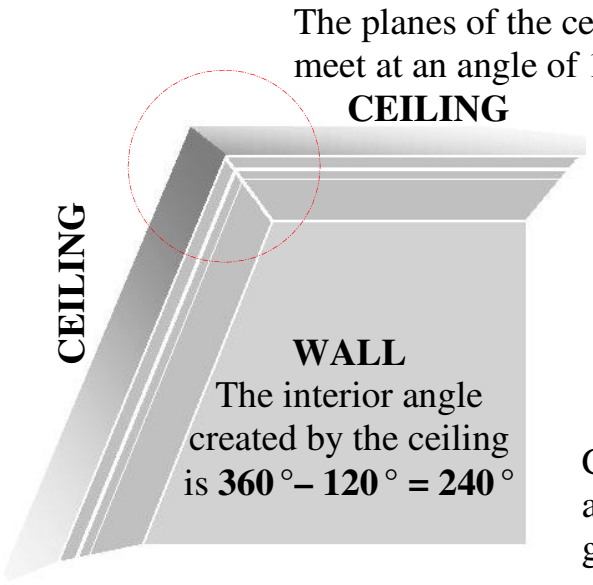
Pitch angle of molding with **respect to the Wall** * = Spring Angle = 38°

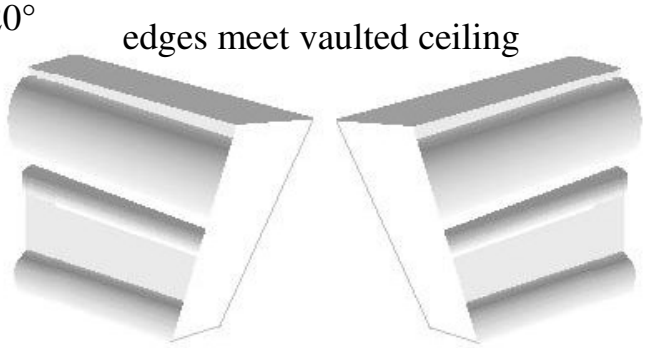
LAG Entries: Main Pitch Rise = Adjacent Pitch Rise
= **Spring Angle** = 38 degrees
Run values are not required in Angle Mode.
Total Deck Angle = Interior Angle **on the Wall**
= 150 degrees *

LAG Returns: **Miter angle** = **P2** (11.92270 degrees)
Blade angle = **C5** (9.16887 degrees)

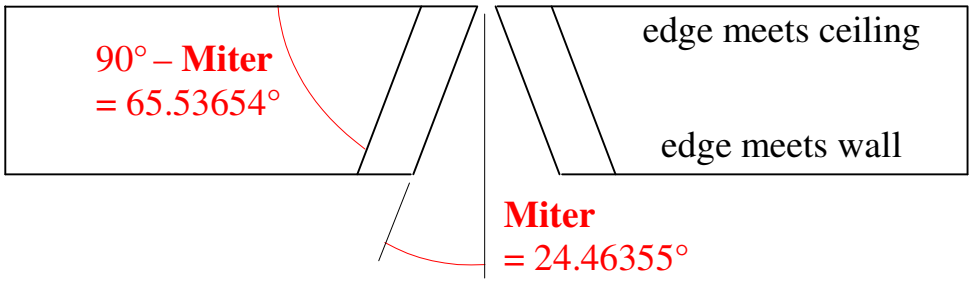
* Note that the angle **on the Wall** is entered, contrary to the usual definition of **Wall Angle**. An entry of 180 ° + 30 ° = 210 ° for the Total Deck Angle will also return correct results.

CROWN MOLDING meets VAULTED CEILING





Compare the relative orientations of **Miter** and **Bevel** in these diagrams with the examples given elsewhere.



Crown Molding meets Vaulted Ceiling: Inside Corner

The saw blade angle or **Bevel** is oriented to make the visible face of the molding shorter than the face toward the wall.

Sample Calculation

Total Deck angle = Interior angle **on the Wall** = 240°
Pitch angle of molding with **respect to the Wall** * = Spring Angle = 38°

LAG Entries: Main Pitch Rise = Adjacent Pitch Rise
= **Spring Angle** = 38 degrees
Run values are not required in Angle Mode.
Total Deck Angle = Interior Angle **on the Wall**
= 240 degrees *

LAG Returns: **Miter angle** = **P2** (24.46355 degrees)
Blade angle = **C5** (17.72855 degrees)

* Note that the angle **on the Wall** is entered, contrary to the usual definition of **Wall Angle**. An entry of 120 ° for the Total Deck Angle will also return correct results.

CROWN MOLDING follows VAULTED CEILING MODIFIED ANGLE FORMULAS

The definitions of **Spring Angle (SPRING), Bevel Angle (BEVEL)** and **Miter Angle (MITER)** in the following formulas remain the same. The meaning of **Wall Angle** is modified as follows:

Wall Angle (WALL): Half the smallest total angle measured **on the wall**; both spring angles are assumed to be equal. The trig functions in the equations have been adjusted to reflect the definition of wall angle under these cicumstances.

tan **MITER** = cos **SPRING** ÷ tan**WALL**

sin **BEVEL** = sin **SPRING** cos**WALL**

Example Calculations:

Spring Angle = 38°, **Angle measured on Wall** = 135°

Wall Angle = 135° ÷ 2 = 67.5°

Miter Angle = arctan(cos 38° ÷ tan 67.5°) = 18.07693°

Bevel Angle = arcsin(sin 38° cos 67.5°) = 13.62720°

Alternate Bevel Formulas:

$$\cos \textbf{BEVEL} = \sqrt{(\cos \textbf{SPRING} \cos \textbf{WALL})^2 + (\sin \textbf{WALL})^2}$$

$$\cos \textbf{BEVEL} = \sqrt{(\sin \textbf{SPRING} \sin \textbf{WALL})^2 + (\cos \textbf{SPRING})^2}$$

Calculate the **Miter Angle** first, and:

tan **BEVEL** = sin **MITER** tan **SPRING**

cos **BEVEL** = sin **WALL** ÷ cos **MITER**

cos **BEVEL** = cos **SPRING** cos **WALL** ÷ sin **MITER**

sin **BEVEL** = tan **MITER** sin **WALL** tan **SPRING**

Calculate the **Bevel Angle** first, and:

tan **MITER** = sin **BEVEL** ÷ (tan **SPRING** sin **WALL**)

cos **MITER** = sin **WALL** ÷ cos **BEVEL**

sin **MITER** = tan **BEVEL** ÷ tan **SPRING**

sin **MITER** = cos **SPRING** cos **WALL** ÷ cos **BEVEL**