 **ROYAL**[®]
Trim & Mouldings

Installation Tips

 **ROYAL**[®] Building Products

Siding • Trim • Accessories • Soffit • Rainware • Mouldings
Deck • Fence • Rail • Window Profiles • Pipe • Fittings

Installation Tips

1. PURPOSE:

This instruction is intended to give a general overview that will assist users in the installation of interior mouldings. Special emphasis is attributed to the various methods for mitering trim and mouldings.

2. SCOPE:

The instruction will cover a variety of tools and techniques, as well as multiple types of trim and mouldings.

3. DEFINITIONS:

- Mitering – miters create clean joints in which there is only one line separating mating pieces. Miter joints offer a way of wrapping mouldings around a corner without interrupting the surface profile.
- Angle Gage – A device used to determine corner angles as well as the angle on the trim.
- Stop Blocks – an auxiliary fence to accompany the saw fence during the cutting process. Saw manufacturers offer these as accessories, but scrap wood clamped to the saw table will work.

4. INSTRUCTIONS:

The instructions will be divided into nine sections.

- Section 1 – Getting Started.
- Section 2 – Preparing to Cut.
- Section 3 – Vertical position miters – Baseboard, chair rail, quarter round.
- Section 4 – Horizontal position miters – Door and window trim.
- Section 5 – Compound position miters – Crown moulding.
- Section 6 – Splice cuts.
- Section 7 – Return cuts.
- Section 8 – Coping joints.
- Section 9 – Additional details.

Section 1 – Getting Started

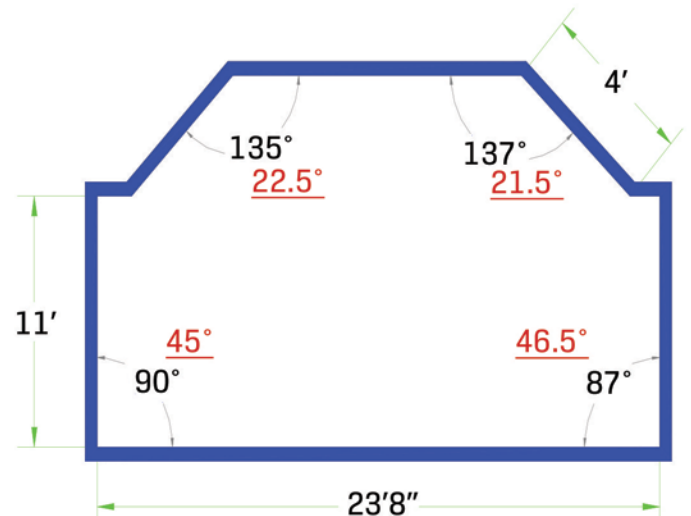
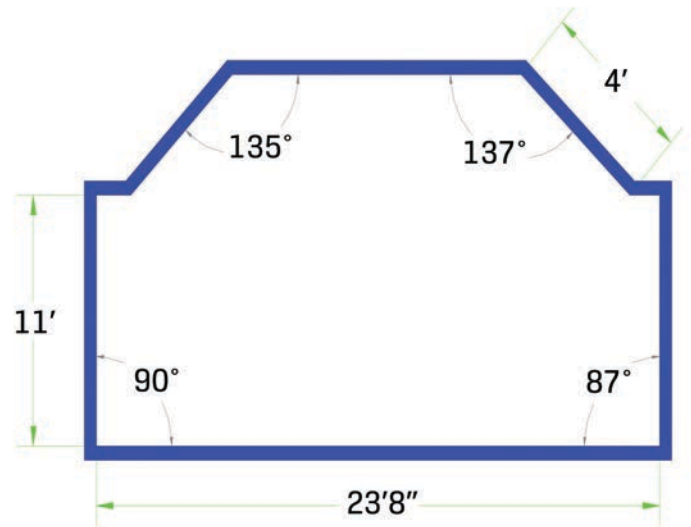
1.1 – Preparing a drawing

One of the most important, and often overlooked, things to do before starting a trim project is to determine the amount of moulding needed and the angles of the walls they will be placed on. To aid in this step of the procedure, make a sketch of the room with the rough measurements of each wall and the angles of each corner, as illustrated in DRAWING 1.

The wall measurements will help you estimate the amount of material needed to complete the job. Make sure to allow for the miter cuts when you calculate the amount of trim needed. Measuring the angles of the walls allows you to determine the proper angle of the miters, so you may create a desirable joint. This process may seem trivial and a waste of time, but it must be noted that it is not uncommon for the wall angles of a house to be off as much as 3°. If you were installing a 5" piece of crown moulding, the 3° difference would result in a 3/8" gap in the miter joint.

The angle calculator, on page 4, will help you determine the proper saw settings to create a good miter joint. EXAMPLE: The inside corner of a wall is 135°, using the angle calculator we determine we need a 22.5° setting on the saw. At this point you may want to calculate all the angles on the sketch you made earlier as shown in DRAWING 2. The saw settings are in red.

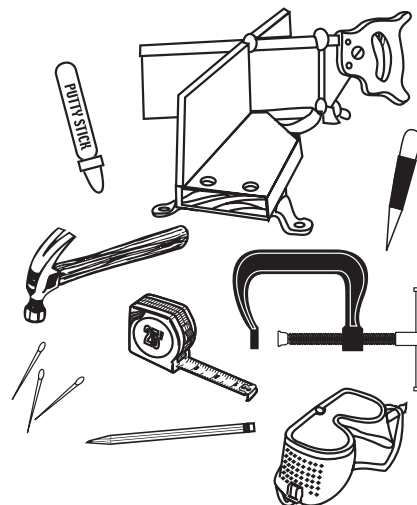
The angle calculator can also be used on window and door casings as well. This is handy in remodels where walls, windows, and doors are often out of square or out of level. The drawings above are only used as an illustration, if this were an actual layout we would have measured and calculated all the angles of the room.



1.2 – Tools

Some of the tools needed are:

- Safety glasses
- Power miter saw – We recommend using carbide saw blade with 80 teeth or more.
- Miter box and hand saw – They have limited angle adjustment (not recommended for crown).
- Coping saw – Only needed if you choose the coping technique to install the moulding.
- Angle gage – To create the correct miter, you must determine the wall corner angle.
- Glue – To adhere the miter joints (we strongly recommend gluing all joints).
- Hammer & nails or a pneumatic nail gun.
- Other tools may include a tape measure, pencil, C-clamp, putty and caulk.



Angle Calculator

Angle of Walls		Miter Angle	Angle of Walls		Miter Angle	Angle of Walls		Miter Angle	Angle of Walls		Miter Angle
Inside Corner	Outside Corner		Inside Corner	Outside Corner		Inside Corner	Outside Corner		Inside Corner	Outside Corner	
0	360	90.0	46	314	67.0	92	268	44.0	138	222	21.0
1	359	89.5	47	313	66.5	93	267	43.5	139	221	20.5
2	358	89.0	48	312	66.0	94	266	43.0	140	220	20.0
3	357	88.5	49	311	65.5	95	265	42.5	141	219	19.5
4	356	88.0	50	310	65.0	96	264	42.0	142	218	19.0
5	355	87.5	51	309	64.5	97	263	41.5	143	217	18.5
6	354	87.0	52	308	64.0	98	262	41.0	144	216	18.0
7	353	86.5	53	307	63.5	99	261	40.5	145	215	17.5
8	352	86.0	54	306	63.0	100	260	40.0	146	214	17.0
9	351	85.5	55	305	62.5	101	259	39.5	147	213	16.5
10	350	85.0	56	304	62.0	102	258	39.0	148	212	16.0
11	349	84.5	57	303	61.5	103	257	38.5	149	211	15.5
12	348	84.0	58	302	61.0	104	256	38.0	150	210	15.0
13	347	83.5	59	301	60.5	105	255	37.5	151	209	14.5
14	346	83.0	60	300	60.0	106	254	37.0	152	208	14.0
15	345	82.5	61	299	59.5	107	253	36.5	153	207	13.5
16	344	82.0	62	298	59.0	108	252	36.0	154	206	13.0
17	343	81.5	63	297	58.5	109	251	35.5	155	205	12.5
18	342	81.0	64	296	58.0	110	250	35.0	156	204	12.0
19	341	80.5	65	295	57.5	111	249	34.5	157	203	11.5
20	340	80.0	66	294	57.0	112	248	34.0	158	202	11.0
21	339	79.5	67	293	56.5	113	247	33.5	159	201	10.5
22	338	79.0	68	292	56.0	114	246	33.0	160	200	10.0
23	337	78.5	69	291	55.5	115	245	32.5	161	199	9.5
24	336	78.0	70	290	55.0	116	244	32.0	162	198	9.0
25	335	77.5	71	289	54.5	117	243	31.5	163	197	8.5
26	334	77.0	72	288	54.0	118	242	31.0	164	196	8.0
27	333	76.5	73	287	53.5	119	241	30.5	165	195	7.5
28	332	76.0	74	286	53.0	120	240	30.0	166	194	7.0
29	331	75.5	75	285	52.5	121	239	29.5	167	193	6.5
30	330	75.0	76	284	52.0	122	238	29.0	168	192	6.0
31	329	74.5	77	283	51.5	123	237	28.5	169	191	5.5
32	328	74.0	78	282	51.0	124	236	28.0	170	190	5.0
33	327	73.5	79	281	50.5	125	235	27.5	171	189	4.5
34	326	73.0	80	280	50.0	126	234	27.0	172	188	4.0
35	325	72.5	81	279	49.5	127	233	26.5	173	187	3.5
36	324	72.0	82	278	49.0	128	232	26.0	174	186	3.0
37	323	71.5	83	277	48.5	129	231	25.5	175	185	2.5
38	322	71.0	84	276	48.0	130	230	25.0	176	184	2.0
39	321	70.5	85	275	47.5	131	229	24.5	177	183	1.5
40	320	70.0	86	274	47.0	132	228	24.0	178	182	1.0
41	319	69.5	87	273	46.5	133	227	23.5	179	181	0.5
42	318	69.0	88	272	46.0	134	226	23.0	180	180	0.0
43	317	68.5	89	271	45.5	135	225	22.5			
44	316	68.0	90	270	45.0	136	224	22.0			
45	315	67.5	91	269	44.5	137	223	21.5			

Section 2 – Preparing to cut

Types of saws are as follows:

- **Miter box and hand saw** – These are the least expensive of the saws, but they also have a lot of limitations. The miter box is basically a three sided template, with slots to guide the hand saw through the trim. Most miter boxes will only allow you to produce a 90° and a right or left 45° angle.
- **Power Miter saw “Chop Saw”**– The most popular of the saws. Most models can be adjusted to cut right and left miters up to 47°, in increments of 1°. The trim is held against the table and the fence, and the cut is made by lowering the motor/blade assembly down toward the table.
- **Power Compound Miter saw** – This saw is basically the same as Chop saw above, except it will allow you to tilt the motor/blade assembly to create a compound angle. This is the type of saw used in the illustrations.

It must be noted that you can not cut trim “free hand” it will require a fixture to hold the saw at correct angle as it passes through the trim.

If you are using a Power Miter Saw it is imperative that the saw is calibrated (checked for accuracy) before you start cutting. Check your saw manual for specific instructions. This is an important step because a 1° difference over a 1” span will result in a 1/32” gap in the finished miter joint. (3° over 5” span and you have a 3/8” gap)

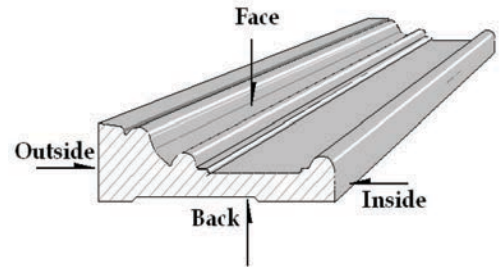
Types of saw blades are as important as the saw itself. For cutting our PVC product we recommend using a carbide toothed blade with 80 teeth or more. See the photos below:



Sec. 2.2 – Anatomy of trim.

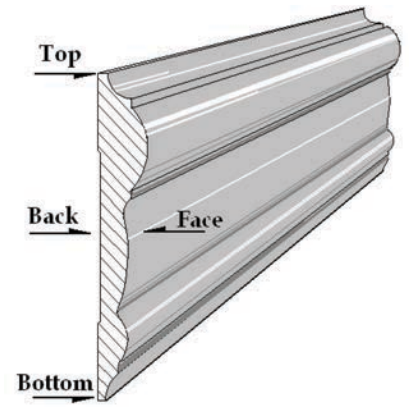
Casing – is used for windows and doors.

- Face – The largest part of the moulding you see after installation. The face should always be “facing” you when you are cutting it.
- Back – The part of the trim placed against the wall after installation. Most of the time this part of the trim will be resting on the saw table during the cutting process “Horizontal Position”.
- Outside – The majority of the time this is the “thickest” side of the profile and it will be held against the fence when cutting.
- Inside – Most often the “thinnest” part of the profile. This part of the profile is always placed toward the window or door “or the short side of the miter”.



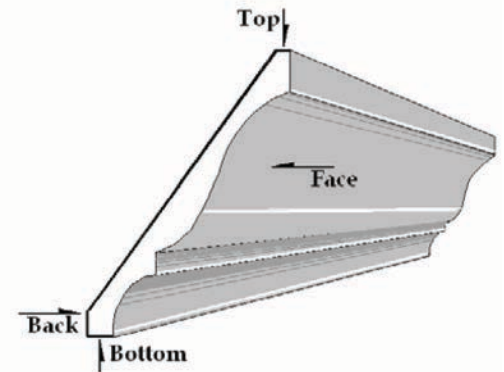
Trim – The chair rail is shown in the drawing, but the same principles apply to baseboard and other vertically positioned trim.

- Face – The largest part of the moulding you see after installation. The face should always be “facing” you when you are cutting it.
- Back – The part of the trim placed against the wall after installation. Most of the time this part of the trim will be resting on the saw fence during the cutting process “Vertical Position”.
- Top – The part of the trim seen after installation. In chair rail this is usually the “thickest” and on base it is the most Ornate.
- Bottom – This part will ride on the saw table during the cut.



Crown moulding – This is the most complex and difficult moulding to miter. You can miter crown in the horizontal, but it requires a compound miter saw. The most common way to miter crown is by placing it on the saw in the compound position “next page”.

- Face – The largest part of the moulding you see after installation. The face should always be “facing” you when you are cutting it.
- Back – The part of the trim that rests against the wall after installation. This part of the trim will be resting on the saw fence during the cutting process “Compound Position”.
- Top – The part of the trim will be placed against the ceiling. (On compound miters the top will rest on saw table).
- Bottom – This area is visible after installation

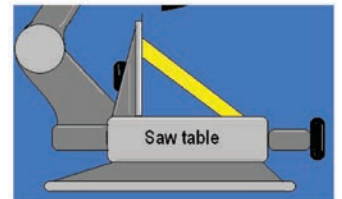
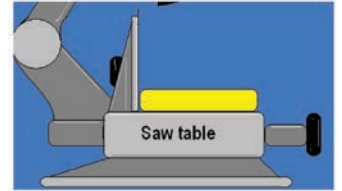
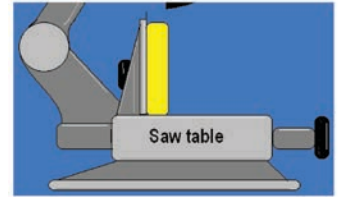


Sec. 2.2 – Positioning of the trim.

The position of the trim is the way the trim sets on the saw bed and fence. The end of the trim that you are cutting is also relevant “Right or Left”.

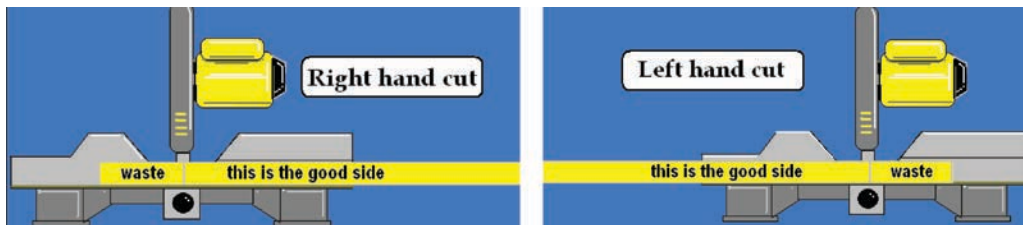
The positions are as follows:

- Vertical position – as illustrated in the drawing the back of the trim will rest against the fence of the saw. Base board, chair rail, quarter round, and splice cuts are made in this position.
- Horizontal position – as illustrated in the drawing the back of the trim will rest on the bed of the saw. Door and window trim are cut in this position.
- Compound position – as illustrated in the drawing the trim will rest on the fence and bed. This is the position used to cut Crown Mould.



The side of the trim you are cutting is as important as its position on the saw table. We refer to these as “right and left handed cuts”. Throughout these instructions we will shorten this to “RH cut – for a right hand cut and LH cut for a left hand cut.” This is important because changing the trim from right to left position can be the difference between a inside corner miter joint and a outside corner miter joint.

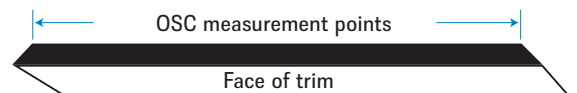
The drawings below will illustrate the “RH & LH cut” with the trim being highlighted in yellow.



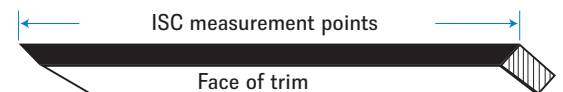
Sec. 2.3 – Measuring and marking the trim.

When measuring and marking trim for miters you will need to start your measurement at a miter, the type of miter is the dictating factor in finding the reference point. Below we have tried to illustrate the scenarios you may encounter.

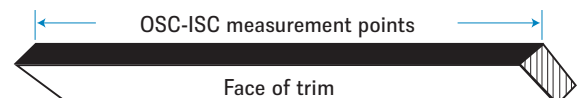
Outside Corner miters – Should be measured from the points marked on the drawing to the right.



Inside Corner miters – Should be measured from the points marked on the drawing to the right.

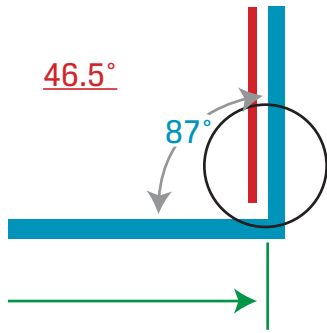


Outside and Inside corner miters on the same piece of trim – Should be measured from the points marked on the drawing to the right.



Section 3 – Vertical Position Mitters

Vertical position miters. This technique is used to miter base board, chair rail, quarter round, and splice cuts.



Inside corner miters. We are going to cut baseboard trim for the inside corner highlighted in the illustration. We have established the miter angle, 46.5° , on the sketch we made earlier.

STEP 1 - The first cut will be a vertical LH Inside corner. Start by adjusting the angle gage on the saw "clock wise" or to the left to the 46.5° setting. Then place the trim on the saw table as shown in the "Left Hand Cut" illustration on the previous page.

The Setup should look like this photo.

STEP 2 - After cut is made, you are ready to cut the trim to length. Measure the wall highlighted red, in the illustration. When

measurement is established, mark the trim using the technique in sec 2.3.

STEP 3 - When the trim is marked and ready for cutting, reverse the saw setting by rotating the table angle adjustment "counter clock wise" or to the right to the 46.5° setting. Place the trim on the saw in the vertical Right Hand cut position and proceed with the cut.

STEP 4 - To produce the mate to this miter, simply rotate the saw table angle adjustment in the opposite direction to the "other" 46.5° setting. Place trim on the saw in the vertical Left Hand cut position and proceed with the cut.

STEP 4 - After completing step 3 you should be able to install the baseboard. At this point, fasten the trim in a couple of studs leaving the end loose to aid in the "fitting of the Miter Joints"

STEP 5 - Using the techniques above complete all the Inside corner miters, but be certain of the angles because they could change with each corner.

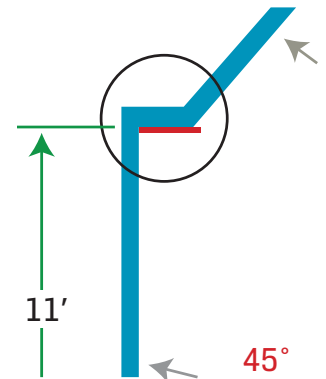
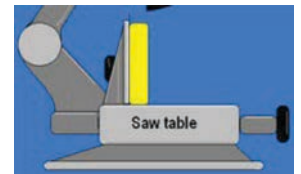
Outside corner miters.

We are going to cut baseboard trim for the outside corner highlighted in the illustration. The outside angle is 225° , using the angle calculator; we have determined the miter angle will be 22.5° .

STEP 1 - The first cut will be a RH Inside corner as shown in the inside corner instructions. Once you have cut the ISC angle on the trim and established the measurement needed, mark the trim starting from the RH Inside corner miter.

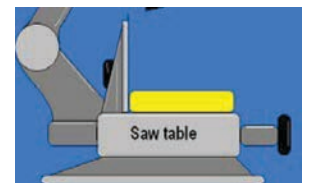
STEP 2 - With the saw table angle adjuster set at 0° rotate to the right or "counter clock wise" to the 22.5° setting. Place trim on the saw in the vertical LH cut position, after visually aligning the blade with the measurement mark, proceed with the cut.

STEP 3 - To produce the mate to this miter, simply rotate the saw table angle adjustment in the opposite direction to the "other" 22.5° setting. Place trim on the saw in the vertical RH cut position and make the cut.



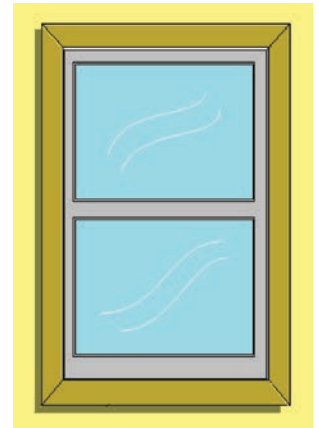
Section 4 – Horizontal Position Mitters

Horizontal position miters. This technique is used to miter window and door trim. In an instance when vertical position miters can not be made because of saw limitations, this technique will work if you are using a Compound Miter Saw.



Mitering window & door trim

We are going to miter trim for the window in the illustration to the right. Start by measuring the opening, and make a quick sketch. In a perfect world the miter angles should be 45°, but it may benefit you to check the angles with an angle gage. Once the angles needed to produce the proper miter are determined we can move to the saw. For our illustration we will say the angles are 90°. Using the angle calculator we verify the miter angle will be 45°.



STEP 1 – Place the casing on the saw in the LH horizontal position with the “outside of the trim” against the fence. Rotate the table angle adjustment to the “left” 45° setting and make the initial cut. See photo to the right.

STEP 2 – Using your measurements, mark the trim as illustrated in the OSC measurement in sec.2.3.

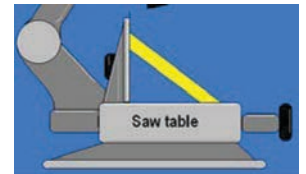
STEP 3 – Rotate the table angle to the opposite 45° angle, visually align the blade with your measurement mark and cut.

STEP 4 – Repeat steps 1-3 to cut the four pieces needed to trim the window.

Hint: When using PVC or Styrene trim try gluing the miters before you attach it to the wall. This will allow you to fit the joints uninhibited, and then you can hang the trim as one unit.

Section 5 – Compound Position Miters

Compound Mitering - This is the most common way to miter crown mould. This is also the most confusing of the mitering positions. The most important thing to remember is the crown is cut “Upside down and backward”. In other words the saw table represents the ceiling and the fence represents the wall. The moulding is upside down during the cutting process and the angle points in the opposite direction, hence the term “Upside down and backward”. Because the moulding is expensive, and the mitering process is confusing, we recommend cutting a pair of pattern blocks – one for the inside corners and one for the outside corners – to make sure the moulding is always in the right position before the cut. Although Crown moulding can be hand-held while it’s being cut, a stop blocks on the table keeps the crown at the correct angle to ensure consistent miters. See photo to the right.



Inside corner miters - Crown mould

The Right hand & left hand positions play an important part in mitering crown. The photo to the right shows a left hand inside corner miter.

STEP 1 – The cut in the photo was achieved by placing the crown “upside down” or the top of profile on the saw table and the back of the profile resting on the fence, then rotating the table angle gage to the left at a 45° angle. . Then we proceeded with the cut. NOTE: if we change the position of the trim from right hand to left hand the same setting would produce a right hand outside corner.

STEP 2 – To complete the miter rotate the table angle gage to the opposite 45° angle. And insert the mating piece of trim in the right hand position. Make sure the top of profile is on the saw table and the back of the profile is resting on the fence. Then proceed with the cut. See photo to the right.

This will complete the miters needed to produce an inside corner. They are ready for installation.



Outside corner miters - Crown mould

This cut is achieved using the same technique as an inside miter. The determining factor, with this miter, being the RH or LH positioning. The photo to the right shows a right hand outside corner miter.

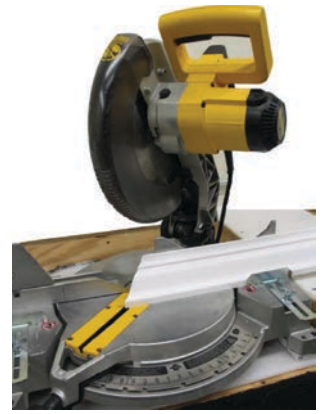
STEP 1 – To produce the miter in photo #1 place the crown on the saw, top of the profile on the saw table and the bottom of the profile against the fence, in the RH position illustrated on page 6. Rotate the table angle gage to the appropriate angle; in the photo we used a 45°. With this arrangement, you are ready to make the initial cut.



STEP 2 – To complete the miter, rotate the table angle gage to the opposite 45° angle. And insert the mating piece of trim in the left hand position. Then proceed with the cut. See photo #2 to the right.

This will complete the miters needed to produce an outside corner. They are ready for installation.

Note: In the photos you can see we are using the stop blocks to hold the crown in position during the cutting process. It is important that the compound angle be correct, remember an angle deference of 3° over a 5" span will create a 3/8" gap in the finished miter.



Section 6 – Splice Miters

Splicing miters – You will need to use this technique when a wall is longer than the trim that you are installing. Example; the trim you have is in 16' lengths and a wall in the room is 20'. Then you will need to splice a 16' and a 4' piece to obtain the appropriate length. There are two reasons for mitering these joints as opposed to a butt joint (two 90° angles).

1. The miter joint is more visually appealing
2. The miter joint creates more surface area for the glue or adhesive to be applied thus makes the joint stronger.

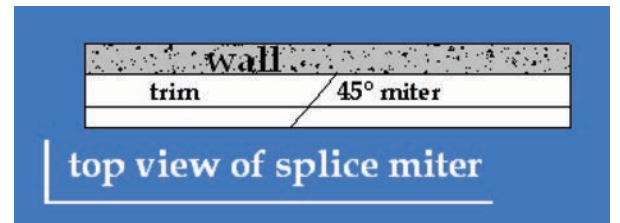
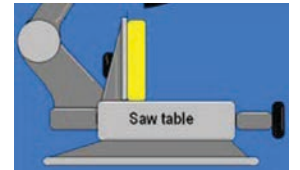
Most of the time a splicing miter is cut in the vertical position illustrated on page 6. The angle used to produce this cut will be a 45°.

STEP 1 – Place the trim on the saw table in the vertical left hand position, with the table angle gage adjusted to 45°, and proceed to cut.

STEP 2 – Place the mating trim on the saw in the vertical right hand position and, without changing the angle settings, make the cut.

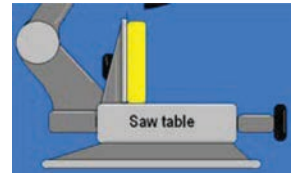
STEP 3 – It is recommended that you assemble these splice joints before you install the trim. When using PVC trim, glue the miters before you attach it to the wall. This will allow you to fit the joints uninhibited, and then you can fasten the trim to the wall as one piece. Fitting the joint on the wall is difficult, and can jeopardize the integrity of the miter joint.

This will complete the miters needed to generate a splicing miter.



Section 7 – Return Miters

Return miters – You will need to use this technique when trim ends with an exposed end. If you are installing chair rail and needed to end midway on the wall it would reveal the unfinished end of the trim. A mitered return will remedy this problem. See photos.



STEP 1 – To produce this miter, cut the trim as though you are turning an outside corner.

STEP 2 – Then cut a short piece to mate to the end of the first piece cut. Glue the short piece to the long piece and you are ready for installation.
NOTE: the thickness of the trim will dictate the length of the short piece cut for the return.

This will complete the miters needed to generate a Return miter joint.



Section 8 – Coping Joints

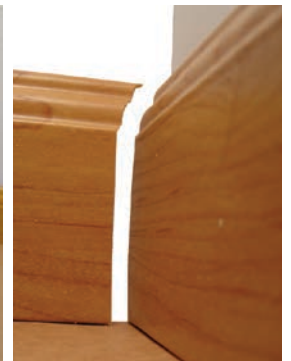
Coping is simply transferring the contour “profile” of one piece of trim to the end of another piece of trim, then cutting the profile line so that, when finished, the second piece of trim will mate with the first with a nice joint.

Step 1 – Cut the first piece of trim to length and position it on the wall. Use straight cuts, no angles.

Step 2 – To create the profile line, cut the second piece of moulding at a 45° as though you were cutting an inside corner.

Step 3 – Following the profile line as a guide cut the trim with a coping saw.

Step 4 – The moulding should be ready for installation. See photos.



Section 9 – Additional Details

Gluing Miter Joints

We strongly recommend gluing all miter joints on PVC or styrene mouldings using a quality instant glue and/or PVC cement. It may seem unconventional, but the benefits outweigh the inconvenience. When assembling splice and return miters try gluing the mouldings together before installation. This will allow you to fit the joints uninhibited, and fasten the trim to the wall as one unit. Fitting these joints on the wall can be difficult and possibly jeopardize the integrity of the miter joint.

Fastening Moulding to the Wall

PVC trim can be nailed with finishing nails and/or glued. Our recommendations for the nails are paneling, finishing, or pneumatic finish nails. For the glue we recommend PL Glues/PC – 200, 300, 400/LIQUID NAILS applied according to manufacturer's directions. Glue alone is not advised for crown mouldings.

Maintenance and Repainting

To clean Clearwood® PS, gently wipe with a damp cloth. To clean other finished mouldings, use a mild detergent soap.

To re-paint white finished mouldings, lightly scuff, sand with 220 grit sandpaper and apply latex or oil based paint as directed by paint manufacturer.

Installation Tips

Document no. LVL 3-RD-004 | Date Revised: June 3, 2005