



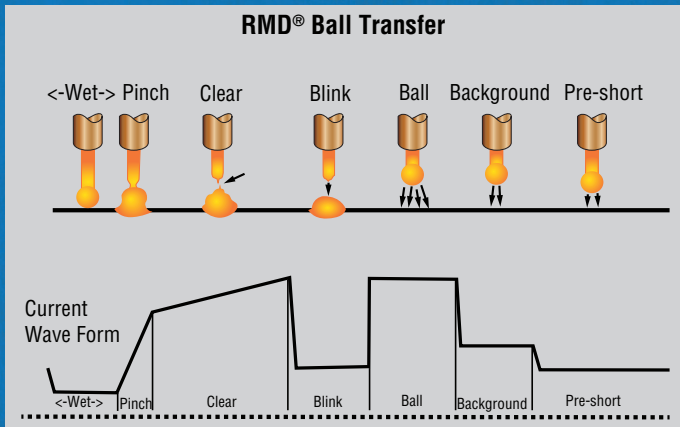
# RMD/ROOT PASS TECHNIQUES

This is a basic set-up and technique guide to welding the root pass on pipe with the Miller® PipeWorx 400 System or the ArcReach® Smart Feeder suitcase wire feeder using RMD® (Regulated Metal Deposition).

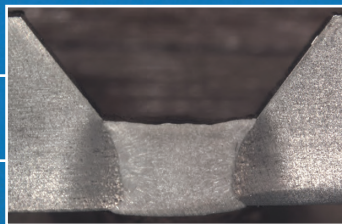
## RMD® Root Pass Welding

A precisely controlled short-circuit metal transfer that provides a calm, stable arc and weld puddle. This provides less chance of cold lap or lack of fusion, less spatter and a higher quality root pass on pipe. The stability of the weld process lessens the weld puddle manipulation required by the welder and is more tolerant to hi-lo conditions, reducing training requirements. Weld bead profiles are thicker than conventional root pass welds which can eliminate the need for a hot pass, improving weld productivity. In some stainless steel application, it may be possible to eliminate the backing (purge) gas to further improve productivity and reduce welding costs.

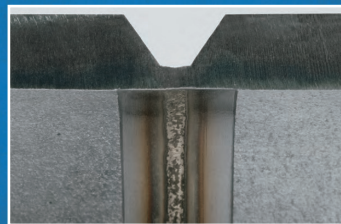
- Ideally suited to root pass welding
- Consistent side wall fusion
- Less weld spatter
- Tolerant to hi-lo fit-up conditions
- More tolerant of tip-to-work distance
- Less welder training time
- Thicker root passes can eliminate hot pass
- Eliminate backing gas on some stainless steel applications



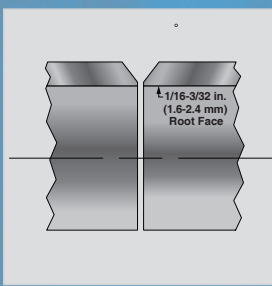
### RMD® Carbon Steel



### RMD® Stainless



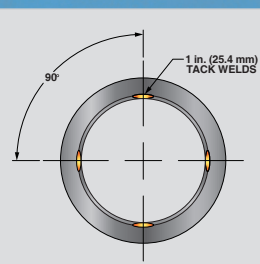
#### Joint Fit-up



Bevel pipe end to 37.5° (standard pipe bevel) leaving a knife edge to 1/16 in. (1.6 mm) root face.

Align pipe ends together leaving a minimum of 1/8 in. (3.2 mm) root opening.

#### Tack Locations



Tack pipe ends together in four locations approximately 90° apart and 1 in. (25.4 mm) long on pipe that is 6 in. (152.4 mm) or larger diameter. Use appropriate sized tack welds on smaller pipe.

#### Feather Tacks



Grind the ends of the tacks with a bevel to insure proper fusion of the sides of the tacks.

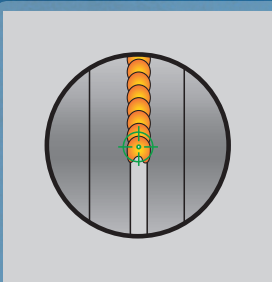
#### Arc Starts/Stops



Start welds on a tack or side wall to help establish the weld puddle.

Stop welding on a tack or side wall to avoid pin hole porosity.

#### Arc Position



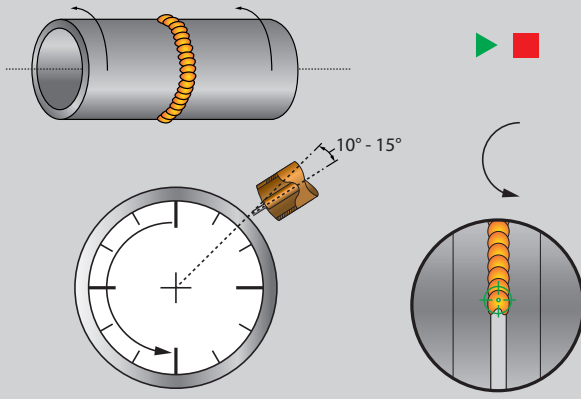
Hold the arc in the center of the weld pool. If too far back in the weld pool, the arc will become unstable. If too far forward, the wire will push through and leave wire on the back of the joint.

#### Gas Nozzle



Use a tapered nozzle and a tapered contact tip for proper gas coverage and better visibility of the weld pool.

1G

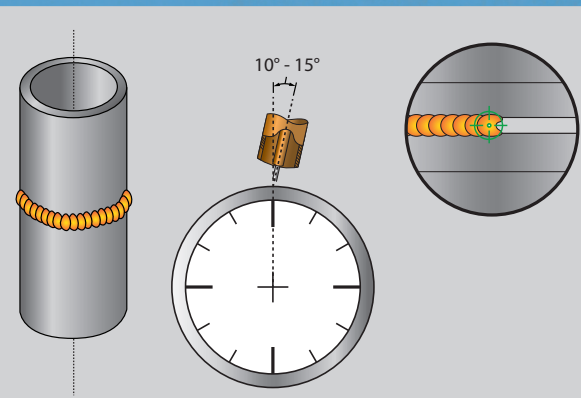


Start and Stop the arc on a tack at the 1:30 position.

Rotate pipe away while maintaining the arc at the 1:30 to 2:00 position.

Hold the arc in the center of the weld pool.

2G

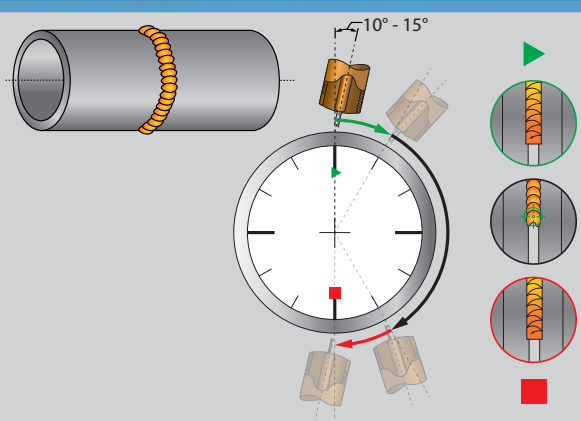


Start the weld on a tack or side wall

Hold the arc in the center of the weld puddle (A slight weave can be used to achieve a flatter bead)

Maintain a 10 to 15° drag angle

5G



Start on the tack at 12:00 position.

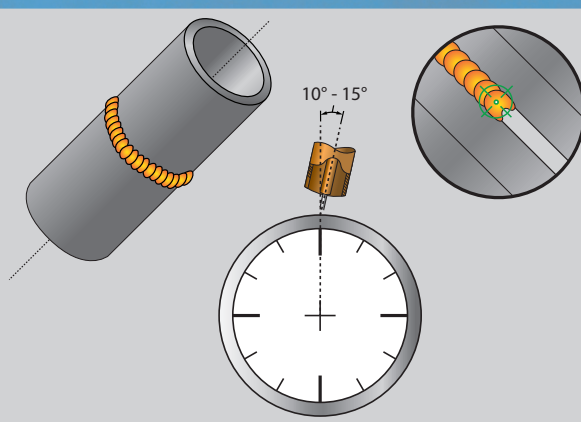
12:00 to 1:00 - Weave quickly side to side.

1:00 to 5:00 - Hold arc in center of joint.

5:00 to 6:00 - Weave quickly side to side.

Stop on a tack at 6:00.

6G



Start the weld on a tack or side wall

Hold the arc in the center of the weld puddle (A slight weave can be used to achieve a flatter bead)

Maintain a 10 to 15° drag angle