

FOR PWM SPRAYERS

COMBO-JET® 110° Tip-Cap Performance Specifications for PWM Systems

Please Note: 1. Flow and application rates shown are for water only, applied on 20" spacing. 2. For applications where a uniform pattern is required, recommended pressures are higher than in standard spray systems. 3. Cap color determined by flow rate, as per ISO standard. 4. In order to make this chart easier to use, not all available tip-cap sizes are shown. For specifications for 005, 0067, 20, 25, 30, 40, 50 & 60 size Tip-Caps, visit our website. 5. Standard PWM systems have inherent flow capacity up to 1.5 USG/Min		ER110-XX TIP SERIES <small>Recommended pressure varies with each size of tip</small>					SR110-XX TIP SERIES <small>Recommended pressure varies with each size of tip</small>					MR110-XX TIP SERIES <small>Recommended pressure varies with each size of tip</small>					DR110-XX TIP SERIES <small>Recommended pressure varies with each size of tip</small>					SPRAY TIP PART #s							
Tip Cap No.	Flow Rate USGPM	PSI	Sprayer Speed Range (Rounded) @ Application Rate (US Gallons/Acre) @ 20"					VMD (Droplet Size in µ); %<141µ (Drift %); %<200µ (Drift %); %<600µ (Small Droplets)															Tip-Cap & Part No.						
								110° ER Series					110° SR Series					110° MR Series					110° DR Series					Tip-Cap	Part #
			5.0	7.5	10.0	12.5	15.0	VMD	<141	<200	<600	VMD	<141	<200	<600	VMD	<141	<200	<600	VMD	<141	<200	<600	VMD	<141	<200	<600	Strainer not req'd	
08	0.62	30	9.1-37	6.1-24	4.6-18	3.7-15	3.0-12	312	15%	28%	92%	489	4%	11%	59%	570	3%	7%	45%	651	3%	4%	35%	ER110-08	40281-08				
	0.71	40	11-42	7-28	5.3-21	4.2-17	3.5-14	286	18%	32%	93%	445	6%	13%	68%	522	4%	9%	54%	606	3%	5%	42%	SR110-08	40287-08				
	0.79	50	12-47	7.9-31	5.9-24	4.7-19	3.9-16	266	20%	36%	95%	410	7%	15%	74%	486	5%	10%	61%	571	4%	6%	47%	MR110-08	40291-08				
	0.87	60	13-52	8.6-34	6.5-26	5.2-21	4.3-17	249	21%	38%	95%	382	8%	16%	78%	455	6%	11%	65%	543	4%	7%	50%	DR110-08	40286-08				
10	0.94	70	14-56	9.3-37	7.0-28	5.6-22	4.7-19	235	23%	41%	96%	359	9%	17%	80%	430	6%	12%	69%	519	4%	8%	53%						
	0.73	30	11-43	7.2-29	5.4-22	4.3-17	3.6-14	357	11%	25%	88%	527	4%	9%	50%	579	3%	6%	43%	716	2%	3%	26%	ER110-10	40281-10				
	0.84	40	13-50	8.3-33	6.2-25	5.0-20	4.2-17	330	13%	28%	90%	480	6%	11%	60%	533	4%	7%	51%	679	2%	4%	31%	SR110-10	40287-10				
	0.94	50	14-56	9.3-37	7.0-28	5.6-22	4.7-19	310	16%	31%	91%	444	7%	13%	67%	497	5%	8%	57%	651	3%	5%	35%	MR110-10	40291-10				
125	1.03	60	15-61	10-41	7.6-31	6.1-24	5.1-20	293	17%	33%	92%	414	8%	14%	72%	468	5%	10%	61%	628	3%	5%	38%	DR110-10	40286-10				
	1.11	70	17-66	11-44	8.3-33	6.6-26	5.5-22	278	19%	35%	93%	389	8%	15%	75%	444	6%	10%	64%	608	4%	6%	40%						
	0.84	30	13-50	8.3-33	6.3-25	5.0-20	4.2-17	430	8%	16%	68%	554	3%	5%	44%	699	3%	3%	24%	670	2%	5%	31%	ER110-125	40281-125				
	0.97	40	14-58	9.6-39	7.2-29	5.8-23	4.8-19	403	9%	17%	73%	506	4%	8%	55%	652	3%	4%	33%	635	3%	6%	36%	SR110-125	40287-125				
15	1.09	50	16-65	11-43	8.1-32	6.5-26	5.4-22	383	10%	18%	77%	469	5%	10%	62%	616	4%	6%	40%	617	3%	7%	39%	MR110-125	40291-128				
	1.19	60	18-71	12-47	8.8-35	7.1-28	5.9-24	366	11%	19%	79%	439	6%	12%	67%	587	4%	7%	44%	605	4%	7%	40%	DR110-125	40286-125				
	1.29	70	19-76	13-51	9.6-38	7.6-31	6.4-25	351	12%	20%	81%	413	6%	13%	71%	562	5%	7%	48%	596	4%	7%	41%						
15	0.93	30	14-55	9.2-37	6.9-28	5.5-22	4.6-18	463	7%	14%	58%	636	3%	4%	27%	686	4%	5%	27%	740	3%	2%	23%	ER110-15	40281-15				
	1.08	40	16-64	11-43	8.0-32	6.4-26	5.3-21	434	9%	16%	65%	594	4%	6%	38%	652	4%	6%	33%	705	3%	3%	31%	SR110-15	40287-15				
	1.20	50	18-72	12-48	8.9-36	7.2-29	6.0-24	413	10%	17%	69%	561	4%	7%	46%	626	4%	6%	38%	678	3%	4%	36%	MR110-15	40291-15				
	1.32	60	20-78	13-52	9.8-39	7.8-31	6.5-26	395	11%	18%	72%	534	5%	8%	52%	604	4%	7%	41%	655	3%	5%	40%	DR110-15	40286-15				
1.43	70	21-85	14-56	11-42	8.5-34	7.1-28	380	11%	19%	74%	511	5%	9%	56%	586	4%	7%	44%	637	4%	5%	43%							

*Droplet categories: The above chart is based on the ASABE Standard 572.1. Refer to chemical label to verify which ASABE S572.1 categories should be followed.

Droplet Categories as per ASABE S572.1 Classification (2009-current)

Extremely Fine
<60

Very Fine
60-105µ

Fine
106-235µ

Medium
236-340µ

Coarse
341-403µ

Very Coarse
404-502µ

Extremely Coarse
503-665µ

Ultra Coarse
>665µ

Recommended Pressure

Pressure Range for Tips
For PWM systems, the pressure loss through system components is accounted for in these charts. Specified pressure in chart is boom pressure. Additional solenoid wear may occur for pressures above 60PSI.

ASABE Droplet Categories

Color Classifications
The colors associated with the VMD is based on an ASABE standard for droplet size categorization. See categories and colors above. Refer to wilger.net for older ASABE standard S572.

Duty Cycles

Effective run time of PWM
Since PWM systems hold pressure constant, they adjust rates by the length of time the solenoids stay open (the duty cycle). Duty cycle is calculated by dividing your current speed into the max speed for that tip. Ideal operating duty cycles are 40-100%.

Pre-orifice Length & Color

Differences in tip pre-orifices
Pre-orifice color and length vary for some tips. SR-series pre-orifices will vary in color from the color of the cap. MR & DR pre-orifices will be the same color as the cap. Pre-orifices for high volume tips use a longer pre-orifice.

Using Tip Wizard

Same search, different results
PWM systems use plumbing components that cause more in pressure loss when compared to standard spray systems. Tip Wizard accounts for those pressure drops, and also provides crucial duty cycle information as well.

Multi-tip spraying with Pulse Width Modulation Technology

Pulse Width Modulation (PWM) provides the ability to hold tip pressure constant; therefore, holding the droplet size constant as well.

This holds true with multi-tip spraying as well.

As a standard, PWM systems use one solenoid per nozzle body. For best utilization of PWM technology, a dual tip adapter [left] is used.

Spraying with two separate outlets [right] is possible, but the outlet not controlled by a solenoid will be controlled by the auto-rate controller.

To use Tip Wizard to help select a multi-tip setup, simply split the total flow rate into two (or more) parts and ensure the tips selected can operate within the same duty cycle range and pressures.



Example Rate: 10 US Gallons/Acre; **Speed:** 15 MPH; **Nozzle Spacing:** 20"; **Target Droplet Size:** 400 microns (Systemic Herbicide)

If the total application is 10GPA, the effective rates per tip must add up to 10GPA. For simplicity, split the flow in equal parts; for example, two tips applying 5GPA. While consulting the tip charts, a suitable choice might be the MR110-04 at ~35PSI, with effective volume of 5GPA per tip. The droplet size is right around 400microns, and max travel speed (15MPH) is at a ~70% duty cycle.