

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 L/min	BAR	Sprayer Speed Range - km/h (Rounded)					VMD (Droplet Size in µ); %<141µ (Drift %); %<200µ (Drift %); %<600µ (Small Droplets)												Tip-Cap & Part No.					
			@ Application Rate (Litres/Hectare) @ 50cm					110° ER Series			110° SR Series			110° MR Series			110° DR Series			Tip-Cap	Part #				
			50	75	100	125	150	VMD	<141	<200	<600	VMD	<141	<200	<600	VMD	<141	<200	<600			VMD	<141	<200	<600
08	2.29	2.0	11-55	7-37	6-28	4-22	4-18	315	15%	28%	92%	494	4%	10%	58%	576	3%	7%	43%	657	2%	4%	34%	ER110-08	40281-08
	2.81	3.0	13-67	9-45	7-34	5-27	4-22	278	19%	34%	94%	432	7%	14%	70%	509	5%	9%	57%	593	3%	6%	44%	SR110-08	40287-08
	3.24	4.0	16-78	10-52	8-39	6-31	5-26	252	21%	38%	95%	388	8%	16%	77%	461	6%	11%	65%	548	4%	7%	50%	MR110-08	40291-08
	3.62	5.0	17-87	12-58	9-43	7-35	6-29	232	23%	41%	96%	353	9%	18%	81%	424	6%	12%	69%	513	4%	8%	54%	DR110-08	40286-08
	3.97	6.0	19-95	13-64	10-48	8-38	6-32	215	25%	44%	96%	325	11%	19%	84%	394	7%	14%	73%	485	5%	9%	57%		
10	2.71	2.0	13-65	9-43	7-33	5-26	4-22	360	10%	24%	88%	532	4%	8%	48%	584	3%	5%	42%	721	2%	3%	26%	ER110-10	40281-10
	3.32	3.0	16-80	11-53	8-40	6-32	5-27	322	14%	29%	91%	467	6%	12%	63%	520	4%	8%	53%	669	3%	4%	33%	SR110-10	40287-10
	3.83	4.0	18-92	12-61	9-46	7-37	6-31	296	17%	33%	92%	420	8%	14%	71%	474	5%	9%	60%	632	3%	5%	37%	MR110-10	40291-10
	4.28	5.0	21-103	14-69	10-51	8-41	7-34	275	19%	36%	93%	384	9%	16%	76%	438	6%	11%	65%	603	4%	6%	40%	DR110-10	40286-10
	4.69	6.0	23-113	15-75	11-56	9-45	8-38	258	21%	38%	94%	354	9%	17%	79%	409	6%	12%	68%	580	4%	7%	43%		
125	3.14	2.0	15-75	10-50	8-38	6-30	5-25	433	8%	16%	67%	560	3%	5%	43%	704	3%	3%	23%	706	2%	4%	26%	ER110-125	40281-125
	3.84	3.0	18-92	12-61	9-46	7-37	6-31	395	10%	18%	74%	492	4%	9%	58%	638	4%	5%	36%	661	3%	5%	33%	SR110-125	40287-125
	4.44	4.0	21-106	14-71	11-53	9-43	7-35	369	11%	19%	79%	444	5%	11%	66%	592	4%	6%	44%	630	4%	6%	37%	MR110-125	40291-128
	4.96	5.0	24-119	16-79	12-60	10-48	8-40	348	12%	20%	81%	407	6%	13%	72%	556	5%	8%	49%	606	4%	7%	40%	DR110-125	40286-125
	5.43	6.0	26-130	17-87	13-65	10-52	9-43	331	12%	21%	83%	377	7%	15%	75%	527	5%	9%	53%	586	5%	8%	43%		
15	3.47	2.0	17-83	11-56	8-42	7-33	6-28	466	7%	14%	58%	641	3%	4%	25%	689	4%	5%	26%	744	3%	2%	22%	ER110-15	40281-15
	4.26	3.0	20-102	14-68	10-51	8-41	7-34	426	9%	16%	66%	581	4%	6%	41%	642	4%	6%	35%	695	3%	3%	33%	SR110-15	40287-15
	4.91	4.0	24-118	16-79	12-59	9-47	8-39	398	10%	18%	71%	539	5%	8%	51%	608	4%	7%	40%	660	3%	5%	40%	MR110-15	40291-15
	5.49	5.0	26-132	18-88	13-66	11-53	9-44	376	12%	19%	75%	505	5%	9%	57%	582	4%	8%	44%	632	4%	6%	44%	DR110-15	40286-15
	6.02	6.0	29-144	19-96	14-72	12-58	10-48	358	12%	20%	77%	478	6%	10%	61%	560	5%	8%	47%	610	4%	6%	48%		

*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: 100 Litres/Hectare; **Speed:** 24 KPH; **Nozzle Spacing:** 50cm; **Target Droplet Size:** 400 microns (Systemic Herbicide)

If the total application is 100L/Ha, the effective rates per tip must add up to 100L/Ha. For simplicity, split the flow in equal parts; for example, two tips applying 50L/Ha. Consult the tip charts. A suitable choice might be the MR110-04 at ~2.8BAR with an effective volume of 50L/Ha per tip. The droplet size is right around 400µ, and travel speed at max speed (24MPH) is roughly at a 70% duty cycle.