

## Boom stability testing with active height control

### HARDI Commander 5500 – 36 m DELTA FORCE

The purpose of this activity is to investigate the stability of the spray boom and the importance of the stability to the precision of plant protection products, with a view to elucidating possible under- / overdose during treatment.

All sprayers with 36 m boom  
Speed 8 km/h; boom height: 70 cm; Boom control active

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#### Test method

The test is carried out in accordance with ISO 14131: 2007 section 5.3 'Tests on tracks' which specifies ISO 5008 'Smoother Track' as a suitable track. ISO 5008 'Smoother Track' is laid on an asphalt area at Test Center Bygholm, Horsens, DK, and the areas around the track have been rejected immediately before the test to ensure uniform conditions for the boom height sensors.



As the test track is higher than the surrounding, a 70 cm working height is chosen for the test.

	Horsch 6 LT	Amazone UX6201	Dammann 10000 Tandem DAS	HARDI COMMANDER 5500 DDZ
Boom Center min. height	67 cm	64 (65) cm	70 cm	72 cm
Boom center maximum height	81 cm	82 (87) cm	87 cm	90 cm
Difference min / max	15 cm	17 (22) cm	17 cm	18 cm
Boom tip maximum height	85 cm	84 (98) cm	99 cm	92 cm
Higher than center	4 cm	2 (11) cm	12 cm	2 cm
Tilt fluctuation SD	7 cm	11 (13) cm	11 cm	16 cm
Peak to peak (max 3 sec)	26 cm	40 (71) cm	38 cm	74 cm
Yaw fluctuated SD	25 cm	13 (17) cm	10 cm	13 cm
Peak to peak (max 3 sec)	110 cm	59 (81) cm	48 cm	78 cm
Distance between boom center and measuring point	15,98 m	10,44 (17,2) m	14,8 m	14,91 m

SD is the standard deviation out of 12 measurements calculated to 18 m distance from the boom center. The sensors had been in different position on the boom wing. The difference between the Amazone data is due to this sensor position.

## Classification

The data has a variation due to different tractor and sprayer specification. The wheels, the length of the sprayer and the position of the sensors on the boom require a classification in a range; otherwise, the measuring failure is not covered. We in HARDI use a classification scheme for some years, when we verify new boom management software on our different booms.

	Horsch	Amazone	Dammann	HARDI		XXXX	XXX	XX	X
Difference min / max	XXXX	XXXX	XXXX	XXXX		< 20 cm	20 - 25 cm	25 - 50 cm	> 50 cm
Boom tip higher than center	XXX	XXXX	X	XXXX		< 3 cm	3 - 6 cm	6 - 9 cm	> 9 cm
Tilt fluctuation SD	XXXX	XXX	XXX	XXX		< 10 cm	10 - 20 cm	20 - 30 cm	> 30 cm
Peak to peak (max 3 sec)	XXXX	XXX	XXXX	XXX		< 40 cm	40 - 80 cm	80 - 120 cm	> 120 cm
Yaw fluctuated SD	XX	XXX	XXX	XXX		< 10 cm	10 - 20 cm	20 - 30 cm	> 30 cm
Peak to peak (max 3 sec)	XX	XXX	XXX	XXX		< 40 cm	40 - 80 cm	80 - 120 cm	> 120 cm

## Conclusion

All sprayers show a good performance under these test conditions.

The height movement is not from major importance, as nozzles have a proven cross distribution by working heights from 30 – 70 cm. The risk of higher drift is given, when the nozzles are too high. For that it is interesting to look on the maximum boom tip value compared to center.

The yaw movement is influencing the length distribution here a big movement can have a large impact. In this test, the sprayers are not turning, so this negative result gets far higher when working in curves, or after turning. But already here are differences visible between different boom designs.