

GUIDELINES FOR RANKING TEST RESULTS



TECH MEMO 0317-3

SOLVITA CO₂-BURST : AND SOLVITA SLAN

Solvita CO₂ and SLAN are soil tests designed to indicate biological factors generally associated with changes in soil quality and soil health. An appreciable research effort went into selecting the practical measurement ranges for Solvita. Additionally, a fairly large body of work on soil respiration already exists from European studies tracking biological farming effects dating to the 70's and continuing into the present along with several long-term plot studies¹. This dataset was also accessed to aid selecting meaningful ranges to interpret CO₂ rates.

To further improve interpretive criteria for a range of soils and farm conditions, Woods End Laboratories has launched a proficiency-reference program for commercial labs with Solvita soil tests. This will serve to improve understanding of CO₂ rates in relation to known farm-soil conditions, and to monitor capabilities of labs in distinguishing differently managed soils.

Table 1 indicates suggested interpretation of Solvita by the type of test grouped into "low", "med" and "high" categories all for 20-24°C tests. These ranges may change over time. Data for the Low and High are consistent with proficiency results for 28 commercial soil labs for a poor and enriched soil.

	Solvita Test	Method	Suggested Interpretation		
			LOW	MEDIUM	HIGH
			<i>results as ppm (mg/kg)</i>		
LAB	CO₂-Burst (dry soil)	50% WFPS	0 - 40	40 - 140	*140 - 300
		Capillary Wetting	0 - 20	20 - 60	60 - 120
			<i>mg /kg (kg /ha)</i>		
FIELD	BASAL	Field Moist	0 - 5	5 - 45	*45 - 125
			<i>results as ppm (mg/kg)</i>		
LAB	SLAN	4g/10cc2N NaOH	0 - 40	40- 150	150 -350

* NOTE: consider using less soil or larger jars

Basal respiration is a field test with minimally disturbed soil. To obtain similar ranges the mean difference between CO₂-burst and field rates was determined. Additionally, the ranges and median values for basal CO₂ reported for 9 published field respiration studies was tabulated and yielded 25.5 ± 15 kg ha⁻¹ day⁻¹ as CO₂-C. This value is consistent with the MED rank category shown for Basal in Table. 1.

From all these data, it can also be appreciated that the CO₂-Burst with 50% WFPS shows maximum potential respiratory activity and is often 2-4x higher than basal rates. These numbers express differently the same fundamental biological activity of a soil under differing states. CO₂-Burst is a good test for any lab while basal represents background respiration in a less disturbed status. A future memo will discuss stoichiometric conversion of these respiration units into probable mineralization units of N.

It is recommended that soils which test consistently over a Solvita Color of 4.8 (see * in Table 1) are candidates for dilution, to improve readability. A previous Technical Memo² described how to do this.

¹ Leigh & Johnston Eds. (1993) Long Term Experiments in Agricultural and Ecological Studies. CAB Press

² Guidelines for Soil Dilution. 2017. Technical Memo 0317-2. Woods End Laboratories