



Ultra Low Emission Engines

- Available now.
- Dramatic emission reductions.
- Natural Gas or Propane.
- 50 hp through 500 hp.
- Cost competitive with Tier 3 engines.

NOx	.02 g/bhp-hr
CO	.13 g/bhp-hr
VOC	.08 g/bhp-hr



Emission Reduction

Emission Reduction from the Replacement of Ag IC Pump Engines

Current		Q5.9	Q5.9.02	Q12	
Step 1. Emission Factors for Existing Engines (g/bhp-hr)					
NOx (ppb)		0.27	18.86	17.56	Lowest emission factor is used to determine actual emissions.
NOx (4702 for Ag Engines)		1.0750	1.0750	1.0750	
SOx (pp-42)		0.93	0.93	0.93	
PM10 (pp-42)		1.0000	1.0000	1.0000	
CO (wt)		30.72	0.8	4.82	
CO (4702 for Ag Engines)		14.555	14.555	14.555	
VOC (ppb)		0.06	0.56	0.59	
VOC (4702 for Ag Engines)		1.04	1.04	1.04	
Step 3. Selected Emission Factors (g/bhp-hr)					
NOx		1.0750	1.0750	1.0750	If existing engine
SOx		0.9300	0.9300	0.9300	
PM10		1.0000	1.0000	1.0000	
CO		14.5550	0.8000	4.8200	
VOC		0.0800	0.0800	0.0800	
Step 4. Emission Factors from Replacement (g/bhp-hr)					
NOx		0.02	0.02	0.02	For engine manufacturer specification
SOx		0.009	0.009	0.009	
PM10		0.003	0.003	0.003	
CO		0.13	0.13	0.13	
VOC		0.08	0.08	0.08	
Step 5. Applicable District Rules					
Addressed above by selecting lowest emission factor	n/a	n/a	n/a		
Step 6. Proposed Changes to Rules					
No new rules reducing emissions from spark-ignited IC engines are being proposed at this time	n/a	n/a	n/a		
Step 7. Hourly Emission Reduction Factor (g/bhp-hr)					
NOx		1.056	1.056	1.056	Actual replacement
SOx		0.921	0.921	0.921	
PM10		0.997	0.997	0.997	
CO		14.425	0.870	4.690	
VOC		0.000	0.480	0.180	
Step 8. Actual Hours of Operation (hr/yr)					
		3000	3000	3000	Estimate
Step 9. Total Horsepower (BHP)					
		1000	1000	1000	
Step 10. Annual Emission Reduction (tons/yr)					
NOx		3.5	3.5	3.5	Hourly emission factors * (annual hours) * horsepower <i>(pp. 20, 18, current) (p. 20, 18, new)</i>
SOx		3.0	3.0	3.2	
PM10		3.3	3.3	3.3	
CO		47.7	2.2	15.5	
VOC		0.0	1.6	0.8	



Implementation Strategies

Strategy

Benefit

Field verify emissions.	More solutions, The faster the
Incentives tied to emission reductions.	reduction, the greater the
Allow ERCs.	incentive Private funding of emission reduction.
Third party own/operate.	No risk BHP contracts.
Pilot program.	Verify reduction opportunity.
Create regulatory path to follow.	Make emission reduction about the bottom line.