

Les laboratoires



**Xbee, a solution against pollution.**

**Ascal** laboratories, branch of **Air Liquide** ([www.airliquide.com](http://www.airliquide.com)), are accredited by the **Cofrac** for "measuring and analyzing the atmosphere pollutants in emissions" under the number 1-1594 (97 program) and agreed by the French Ministry of Ecology and Sustainable Development for "measuring and analyzing particles" (E1).

Measures have been operated on a sample of buses managed by **Veolia Transport Saumur** ([www.veolia-transport.fr](http://www.veolia-transport.fr)) of **Veolia Environnement** ([www.veoliaenvironnement.com](http://www.veoliaenvironnement.com) and [www.durable.veoliaenvironnement.com](http://www.durable.veoliaenvironnement.com)). Said measures show a dramatic reduction of the greenhouse gases emissions by -12.27% in average: CO<sub>2</sub>, CO, NO, NO<sub>x</sub> and VOC in a cubic-meter exhausted. Yet, the average flow drops by -30.67%, so the gases emissions reduction is actually at -39.35!

**Cofrac** signed a multilateral recognition agreement to the **EA** (European Co-operation for Accreditation – [www.european-accreditation.org](http://www.european-accreditation.org)) :

sont accrédités par le



Et agréés par le



Ministère de l'Ecologie, du Développement et de l'Aménagement Durables  
[www.environnement.gouv.fr](http://www.environnement.gouv.fr)

- Austria -- BMWFJ ([www.bmwfj.gv.at](http://www.bmwfj.gv.at))
- Belgium -- BELAC ([www.belac.fgov.be](http://www.belac.fgov.be))
- Bulgaria -- BAS ([www.nab-bas.bg](http://www.nab-bas.bg))
- Croatia -- HAA ([www.akreditacija.hr](http://www.akreditacija.hr))
- Cyprus -- CYS-CYSAB ([www.cys.mcit.gov.cy](http://www.cys.mcit.gov.cy))
- Czech Republic -- CAI ([www.cai.cz](http://www.cai.cz))
- Denmark -- DANAK ([www.danak.org](http://www.danak.org))
- Estonia -- EAK ([www.eak.ee](http://www.eak.ee))
- Finland -- FINAS ([www.finas.fi](http://www.finas.fi))
- France -- COFRAC ([www.cofrac.fr](http://www.cofrac.fr))
- Germany -- DGACH ([www.dga-mbh.de](http://www.dga-mbh.de)); DKD ([www.dar.bam.de/ast](http://www.dar.bam.de/ast))
- Greece -- ESYD ([www.esyd.gr](http://www.esyd.gr))
- Hungary -- NAT ([www.nat.hu](http://www.nat.hu))
- Iceland -- ISAC ([www.faggilding.is](http://www.faggilding.is))
- Ireland -- INAB ([www.inab.ie](http://www.inab.ie))
- Italy -- ACCREDIA ([www.sinal.it](http://www.sinal.it) / [www.sincert.it](http://www.sincert.it)) ; COPA ([www.sit-italia.it](http://www.sit-italia.it))
- Latvia -- LATAK ([www.latak.gov.lv](http://www.latak.gov.lv))
- Lithuania -- LA ([www.nab.lt](http://www.nab.lt))
- Luxemburg -- OLAS ([www.ilnas.public.lu](http://www.ilnas.public.lu))
- Macedonia -- IARM ([www.iarm.gov.mk](http://www.iarm.gov.mk))
- Malta -- NAB-Malta ([www.nabmalta.org.mt](http://www.nabmalta.org.mt))
- Netherlands (the) -- RVA ([www.rva.nl](http://www.rva.nl))
- Norway -- NA ([www.akkreditert.no](http://www.akkreditert.no))
- Poland -- PCA ([www.pca.gov.pl](http://www.pca.gov.pl))
- Portugal -- IPAC ([www.ipac.pt](http://www.ipac.pt))
- Romania -- RENAR ([www.renar.ro](http://www.renar.ro))
- Slovakia -- SNAS ([www.snas.sk](http://www.snas.sk))
- Slovenia -- SA ([www.sa.gov.si](http://www.sa.gov.si))
- Spain -- ENAC ([www.enac.es](http://www.enac.es))
- Sweden -- SWEDAC ([www.swedac.se](http://www.swedac.se))
- Switzerland -- SAS ([www.sas.ch](http://www.sas.ch))
- United Kingdom -- UKAS ([www.ukas.com](http://www.ukas.com))
- Turkey -- TURKAK ([www.turkak.org.tr](http://www.turkak.org.tr))



**Ascal (Unité d'Exploitation Nord)**

Emmanuel Moulin  
Z.A. du Pommier  
557. route de Noyelles  
F-62110 Hénin-Beaumont

- +33 (0)3 21 08 80 00
- [emmanuel.moulin@ascal.fr](mailto:emmanuel.moulin@ascal.fr)
- <http://www.ascal.fr>



*Ascal laboratory*  
*Emissions measures*



**Emissions averages**

For 1 m<sup>3</sup> of produced gas

For **1500** working hours  
and for a fleet of **100** vehicles.

Fleet number	68	66	60	71	70
Mark	RENAULT	RENAULT	RENAULT	HEULIEZ	HEULIEZ
Type	PR 100-2	S 53 RX	PR 100-2	GX 317 euro 2	GX 317 euro 2
Euro Norm				2	2
Plate number	3126 WT 49	7688 WJ 49	325 VD 49	9051 XT 49	9050 XT 49
Serial number	VF6PS08A1PX100165	NF6S53R000005076	VF6PS05A1PX102062	VJ1PS09B400013074	VJ1PS09B400013076
First drive	13-Feb-85	25-May-88	21-Dec-90	3-Jan-01	3-Jan-01
Meter kilometrage on April 27, 2005	709645	540468	629550	242517	251570
Sheet kilometrage on July 1 <sup>st</sup> 2005	713528	542787	633552	250680	261932
Driven Kms from July 1st, 2005 to February 21, 2006	7251	4425	15004	25441	34931

	w/o Xbee			with Xbee			diff. %			w/o Xbee			with Xbee			diff. %			w/o Xbee			with Xbee			diff. %			w/o Xbee			with Xbee			diff. %			w/o Xbee			with Xbee			diff. %			w/o Xbee			with Xbee			diff. %		
Temperature - °C	78.0	80.5	3.21%	50.4	50.6	0.40%	85.7	76.1	-11.20%	66.0	68.7	4.09%	70.2	65.0	-7.41%	70.1	68.2	-2.68%	0.0015	0.0011	-30.67%	-0.0005	-0.05																															
Moisture- %	1.6	2.2	37.50%	3.2	2.0	-37.50%	1.4	2.8	100.00%	2.6	1.8	-30.77%	2.4	2.6	8.33%	2.24	2.28	1.79%	0.0015	0.0011	-30.67%	-0.0005	-0.05																															
Flow- Nm <sup>3</sup> /h	129	91	-29.61%	94	59	-37.23%	170	98	-42.29%	148	133	-10.20%	217	143	-34.01%	151.60	104.80	-30.87%	0.0015	0.0011	-30.67%	-0.0005	-0.05																															
Dusts- mg/Nm <sup>3</sup> - average	3.40	5.00	47.06%	15.10	16.90	11.92%	5.10	5.40	5.88%	5.80	4.20	-27.59%	4.60	2.60	-43.48%	6.80	6.82	0.29%	0.0015	0.0011	-30.67%	-0.0005	-0.05																															
Stream - Kg/h	0.00044	0.00045	3.51%	0.00142	0.00100	-29.75%	0.00087	0.00053	-38.90%	0.00086	0.00056	-34.97%	0.00100	0.00037	-62.70%	0.00103	0.00071	-30.67%	0.0015	0.0011	-30.67%	-0.0005	-0.05																															
CO <sub>2</sub> - Carbon Dioxide - %	1.4	1.4	0.00%	1.3	1.0	-23.08%	1.5	1.4	-6.67%	1.8	1.6	-11.11%	1.6	1.4	-12.50%	1.52	1.36	-10.53%	6789.5	4199.5	-38.15%	-2.590	-259.00																															
CO - Carbon Monoxide - mg/Nm <sup>3</sup>	256	193	-24.61%	575	503	-12.52%	364	321	-11.81%	245	192	-21.63%	271	104	-61.62%	342.20	262.60	-23.26%	77.8	41.3	-46.95%	-0.037	-3.65																															
NO - Nitrogen Oxide - mg/Nm <sup>3</sup>	477	482	1.05%	152	111	-26.97%	378	330	-12.70%	586	554	-5.46%	485	426	-12.16%	415.60	380.60	-8.42%	94.5	59.8	-36.69%	-0.035	-3.47																															
NOx - Nitrogen Dioxide - mg/Nm <sup>3</sup>	912	874	-4.17%	389	294	-24.42%	743	645	-13.19%	1115	1046	-6.19%	947	738	-22.07%	821.20	719.40	-12.40%	186.7	113.1	-39.44%	-0.074	-7.37																															
VOC - Volatile Organic Compounds - mg/Nm <sup>3</sup>	105.7	93.0	-12.02%	189.0	203.0	7.41%	134.9	130.0	-3.63%	72.9	64.0	-12.21%	62.5	37.0	-40.80%	113.00	105.40	-6.73%	25.7	16.6	-35.52%	-0.009	-0.91																															
Average			-7.95%			-15.92%			-9.60%			-11.32%			-29.83%			-12.27%			-39.35%																																	

Measured in dry gases