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- REPORT -

**XMile Europe B.V.
Results of the emission
measurements
at the MS Catharina
January 16th 2013, baseline
August 27th 2014, with XMile additive**

SGS registration	
Our reference	EZMO/11/0027-2_rap
Version no.	1
Report date	17 October 2016
Author	John van Middelkoop

Version history		
Version	Date	Changes
0	01-12-2014	
1	17-10-2016	Fuel consumption based on calculation
2		
3		

Whenever a new version is made, the prior version is cancelled.

Project details

General information

Company name	XMILE Europe B.V.
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Contact	Mr. M. Overbeeke
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Client reference number	MS Catharina
SGS reference number	EZMO/11/0027-2



Plant details

Location	MS Catharina
Plant	MAK 6Mu451 AK located Tolkamer, the Netherlands
Production details	E3 Test Cycle

Measurement details

Kind of measurement	Emission measurements, O ₂ , CO ₂ , CO, NO _x , PM
Measurement period	January 16, 2013 and August 27, 2014
Measuring staff	John van Middelkoop and Joop Kleverwal

Signatures

Project Manager	Technical Manager
 John van Middelkoop	 Charlotte Wösten

Quality

For a list of the accredited activities (RvA L092) of the SGS Nederland BV Environmental Services Department in Arnhem, The Netherlands, we refer to the last three pages of the Dutch Accreditation Council RvA website (<http://www.rva.nl/?p=cins0200>).

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Terminology

°C	degrees Celsius
% by weight	percentage by weight
h	hours
ind	in normal condition dry (101.3 kPa, 273 K)
inm	in normal condition moist (101.3 kPa, 273 K)
K	Kelvin
kg	kilogrammes
kPa	kilo Pascal
m	metres
vppm	volume parts per million
mg/m ₀ ³	milligrammes per normal cubic metre
m ³	cubic metres
mg	milligrammes
vol%	volume percentage
g	grammes
GJ	gigajoules
m ³ /h	flow under normal operating conditions
m ₀ ³ /h	normalized flow (273 K, 1013 hPa, current % O ₂ and dry flue gas)
m ₀ ³ /h @ x vol% O ₂	normalized flow (273 K, 1013 hPa at X vol% O ₂ and dry flue gas)
s _D	standard deviation of the differences D _i between the measurements being compared
D _i	difference between the i th measured value of the SRM and the corresponding calibrated (corrected) value of the AMS
σ _o	uncertainty derived from the requirements of the law
AMS	Automatic Measuring System
JC / AST	Annual Check / Annual Surveillance Test
ELV	Emission Limit Value
QAL1	First Quality Assurance Level
QAL2	Second Quality Assurance Level
QAL3	Third Quality Assurance Level
SRM	Standard Reference Method
K _v	These are the measurement values from an x ² test with a β value of 50%, a factor of 0.9161-0.9521 (depending on the number of measurements). Is a value from a table and depends on the number of measurements. Varies between 0.91 and 0.98.
t _{0.95}	Confidence interval of 95%
t _{0.95} (N-1)	Is a value from a table and depends on the number of measurements. Generally varies between 2.1 and 1.8.

Summary

Commissioned by XMile Europe B.V., SGS Nederland BV, Environmental Services, executed emission measurements on the propulsion engine of the MS Catharina.

XMile Europe B.V. wants to reduce the emission of engines. The product of XMile is an additive in the fuel. The Ms Catharina is using the product of XMile Europe BV since January 2013 after the base line measurements were performed.

Purpose of the measurements

The purpose of the measurements is to get information about the emissions of the engine during the use of the XMile product in the fuel. Therefore a base line measurement is executed 16 January 2013. On August 27th 2014 the measurements are repeated with the additive of XMile in the fuel.

A summary of the results of the emission measurements is given in the table below. The measurements are performed with the cycle E3 at different loads.

Table 0.1 Summary results

Engine			
Manufacturer		MAK	
Type		6Mu451 AK	
Number		24652	
Location		MS Catharina	
Cycle		E3: 882 kW @ 375 rpm	
Emissions		Without fuel treatment	With XMILE additive
NOx relative emission	(g/kWh)	17.7	16.7
CO ₂ relative emission	(g/kWh)	641	599