

## Automotive industry.

### Car exhaust control.



#### Car exhaust control

Car exhaust and smog is a problem for human beings and our nature in most parts of the world. Nevertheless, we continue driving around in our cars. The question is then how can we develop vehicles and regulations to reduce the health risks and environmental damages? How can we limit the level of exhaust? These are topics that governments, international organizations and the industry in the whole world are continuously working with, and for the last 30 years the governments around the world have been progressively decreasing vehicle emission limits.

#### Annual testing of car emission

All car engines are tested at many stages in their lifecycles. In the development phase, they are tested to minimize emissions and achieve maximum energy conversion. The next step is specific type approval, which involves rigorous testing against international laws. The third time is during series production to see whether each unit complies with its design specifications. And finally, and normally the most familiar test, is the car's annual checkup at the garage where among others the exhaust is controlled.

#### Correct calibration

Several of these engine and vehicle tests are carried through with different analytical instruments. The performance and correctness of the instruments are dependent on correct calibration, normally performed with a gas mixture. A wide range of gas mixtures has been developed for this industry, both for the development of cars and gas mixtures that are used during compliance testing and for the annual testing. Calibration mixtures for annual car exhaust control contain typically propane, carbon monoxide and carbon dioxide. In addition, the level of oxygen ( $O_2$ ) is controlled to calculate the Lambda value, calibrated with a gas mixture of  $O_2$  in nitrogen. The Lambda value represents the burning efficiency of the engine.

#### Accreditation

The result of the periodic car exhaust test is greatly dependent on the garage performing the measurements. The measurement must be done correctly under reliable conditions and the instruments must be calibrated in a trustworthy way. An important facet here, beside the measuring procedure itself, is the calibration gas mixture.

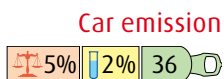
The garage performing the measurements normally needs an official approval. One way of assuring the measurements is through accreditation. Several countries have chosen this way. In many countries there is a demand that the calibration gas mixtures must be made by a supplier who has an accreditation for analyzing them. Accredited facilities are obliged to keep track records as base for all legal aspects. To offer a flexible service, AGA holds several accreditations according to ISO17025 for analyzing such calibration mixtures. Please contact your local organization for details.

#### HiQ® product program

The HiQ® product program serves a wide range of calibration mixtures that fulfill the demands concerning car exhaust control.

## Calibration mixtures

The range of standard calibration mixtures for car emission control is wide and covers most of the different calibration needs from the lower to the higher concentration area. Typical examples of calibration mixtures for the European market covering both the high and the low concentration level:



### Car emission

	CO/CO <sub>2</sub> /propane carem 3.5/14/0.2%	CO/CO <sub>2</sub> /propane carem 0.5/6/0.02%
Component concentration	3.5% CO 14% CO <sub>2</sub> 2000 ppm C <sub>3</sub> H <sub>8</sub>	0.5% CO 6% CO <sub>2</sub> 200 ppm C <sub>3</sub> H <sub>8</sub>
Balance gas	Nitrogen	Nitrogen
Product code	2272	2263

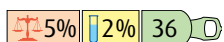
### Automotive

The corresponding mixtures with 1% analytical uncertainty when special high accuracy is needed and for pattern approval of instruments are:

CO/CO <sub>2</sub> /propane auto 3.5/14/0.2%	product code 2248
CO/CO <sub>2</sub> /propane auto 0.5/6/0.02%	product code 2256

For other calibration mixtures please look into the HiQ® product catalog 'Automotive' or ask your local AGA sales representative. If you do not find your mixture among the pre-defined mixtures, we can of course produce the mixture that fulfills your demands.

## O<sub>2</sub> for Lambda measurement



	Oxygen carem high
Component concentration	1-30%
Balance gas	Nitrogen
Product code	2785

Also for O<sub>2</sub> mixtures there is a range of different products in the HiQ® product program.

### Cylinder size

Calibration mixtures are normally delivered in cylinders of volume 5, 10 and 20 liters, well suited for mobile calibration services. Other sizes can be obtained upon request.

### Recommended cylinder regulators

HiQ® REDLINE two stage regulator, C200/2, provides a stable secondary outlet pressure. C200/2 can be plain or equipped with a shut-off valve (type A), a needle valve (type B) or equipped for purging of the high-pressure side (type P). For calibration of car emission measurements we recommend C200/P in brass. The regulator can be delivered with the following working range of outlet pressure:

HiQ® REDLINE		Outlet pressure		Product code
		bar	psi	
Two stage	C200/2 A, brass	0.2-3	3-45	5484
Two stage	C200/2 A, brass	0.5-6	8-85	3131
Two stage	C200/2 A, brass	1-10.5	15-150	3132

### More information

Please look into our HiQ® catalog 'Automotive', consult your local AGA sales representative or look into our web site, <http://hiq.aga.com> to get more information about gases for automotive industry.



Blending tolerance



Analysis uncertainty



Shelf life

Sweden, AGA Gas AB, Phone +46 (0)8 706 95 00, Fax +46 (0)8 628 23 15, [www.aga.se](http://www.aga.se)  
 Finland, Oy AGA Ab, Phone +358 (0) 10 2421, Fax +358 (0) 10 242 0311, [www.aga.fi](http://www.aga.fi)  
 Norway, AGA AS, Phone +47 23 17 72 00, Fax +47 22 02 78 04, [www.aga.no](http://www.aga.no)  
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