













European Garage Equipment Association (EGEA)

The European Garage Equipment Association was founded in 1980 and regroups 11 national professional organisations representing the interests of both manufacturers and importers of garage and test equipment. EGEA's role is to provide increased influence, better information, stronger support and a healthier working environment for the garage and test equipment industry throughout Europe!

EGEA

EUROPEAN GARAGE EQUIPMENT ASSOCIATION

The following organisations are represented within EGEA:

	Austria	AVL DiTest (Member Company)
	Belgium	FMA - Fédération du Matériel pour l'Automobile
	France	GIEG - Groupe des Industries d'Equipements de Garage
	Germany	ASA - Bundesverband der Hersteller und Importeure von Automobil Service Ausrüstungen
	Italy	AICA - Associazione Italiana Costruttori Autoattrezzature
	Netherlands	RAI - AUTOVAK Rijnwiel- en Automobiël-Industrie
	Norway	ABL - Autobransjens Leverandørforening
	Poland	STM - Stowarzyszenie Techniki Motoryzacyjnej
	Spain	AFIBA - Asociación de Fabricantes e importadores de Bienes de Equipo Para La Automoción
	Sweden	FVU - Fordons Verkstads Utrustarna
	Switzerland	SAA - Swiss Automotive Aftermarket
	UK	GEA - The Garage Equipment Association

These guidelines are an initiative from EGEA

WG8
"Extraction and Filter systems"

GUIDELINES
for the reduction of exposure to hazardous vehicle exhaust emissions

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EGEA Exhaust Extraction Guidelines

The hazards of combustion engine exhaust emissions

Exposure to hazardous vehicle exhaust emissions in the workplaces is a serious health risk. Exhaust from combustion engines is a complex mixture of many hazardous substances.

Examples of the most hazardous substances in exhaust emissions:

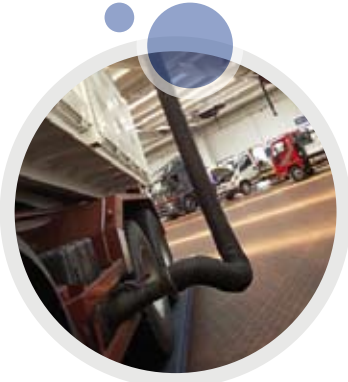
Benzene	Carcinogen to humans (Group 1A)
Diesel engine emissions	Suspected human carcinogenic
Polycyclic aromatic hydrocarbon (PAH)	Suspected human carcinogenic
Hydrocarbons	Suspected human carcinogenic (Group 2A)
Benzene "alpha" pyrene Group 2A	Suspected human carcinogenic
Formaldehyde	Suspected human carcinogenic (Group 2A)
Benz furan Group 2B	Suspected human carcinogenic
Carbon monoxide	Acute toxic (Cat. 3)
Carbon dioxide	Danger of suffocation at high concentrations
Nitric oxide / nitrogen dioxide	Acute toxic (Cat. 1)

The individual substances may lead to permanent health complications, especially diesel engine emissions (particles) can cause cancer.

Even modern combustion engines produce harmful exhaust emissions which are not visible to the human eye.

General recommendations

- Exposure to vehicle exhaust emissions indoors should be avoided whenever possible
- If this can not be guaranteed, the workplace should be equipped with an exhaust extraction system to protect workshop technicians and other workers against hazardous substances
- The exhaust emissions should be captured at source which means directly at the exhaust tailpipe. The exhaust nozzle or funnel should be designed so that 100% of the exhaust emissions can be captured
- Exhaust extraction systems should work with negative pressure
- The extraction volume should be at least 25% above the maximum emitted exhaust volume
- The extraction system specification should accommodate the largest engine in use at the workplace (see extraction volume)



FORMULA
to calculate the extraction volume needed:

$$V = V_h \times n \times (0,0363) \times 1,25$$

- V = Volumetric extraction airflow required (m³/h)
- V_h = Cubic capacity of the vehicle to be tested (litre)
- n = Test speed of vehicle (rpm)
- 0,0363 = Physical conversion factor
- 1,25 = 25% proportion of fresh air/ambient air

Approximate values of recommended extraction volumes

Cars up to 4 litres engines with max. 2500 rpm
= 450m³/h (normal service)

Cars up to 4 litres engines with max. 5000 rpm
= 900m³/h (exhaust tests)

Trucks up to 16 litres engines with max. 1300 rpm
= 1000m³/h (normal service)

Trucks up to 16 litres engines with max. 2500 rpm
= 1800m³/h (exhaust tests)



For other applications like performance tests or tests on special vehicles, individual verification needs to be carried out.

EGEA recommends using a professional for the planning, installation and on-going maintenance support of your exhaust extraction or filtration system.

For further information, please contact the EGEA member in your country or the EGEA Secretariat.

