

# EXHAUST SILENCERS

## Introduction

Naval vessels and power generators are amongst the users of high capacity diesel and gas engines. The unsilenced noise levels produced by these machines are markedly greater than the permissible levels under existing regulations. In addition to the low frequencies middle and high frequency noise is present in the exhaust and it is this that requires especial treatment. An ideal silencer will combine compact proportions with optimum attenuation over the widest possible frequency spectrum with the lowest possible pressure drop. Gas velocities within the silencer should be limited.

## Q.E. exhaust silencer

Q.E. has built a high reputation for exhaust silencers. The silencers have been installed throughout the world for leading motor suppliers.

Q.E. has a range of standard silencers and a design team specialising in producing custom-built units for those applications requiring non-standard solutions. For example: cases with space limitations or very demanding attenuation requirements.

Q.E. is unique in combining expertise with innovative solutions for difficult and complex problems.

Q.E. silencers are quality products that we guarantee will meet the specified noise levels. The silencers are fabricated in the most economical locations – and are supplied at the keenest prices.



*Wärtsilä engine*

## Principle of operation

Dependent upon the client's specifications each silencer design may be based on noise absorption or upon combined resonance/absorption. In either case a spark-arresting version is available.

### Absorption silencer:

In this design the gas/vapour flows through a conduit formed from perforated material. The conduit is surrounded by sound absorbent – usually in the form of a blanket of fine threads of an inert mineral. Noise energy entering the blanket is converted to heat energy by continuous friction over the threads.

### Combination Resonance and Absorption Silencers:

In those applications having more stringent specifications, especially in the lower frequencies, an alternative design embodies low frequency resonance dampening together with medium and high frequency absorption. The resonance section unites two separate volumetric chambers by one or more throttling tubes so that the gas / vapour expands into the leading volume chamber and is then throttled before expanding into the second of the volume chambers. The proportions of chambers and tubes are selected to impress the maximum effect upon the low frequency pulses from the motor exhaust connection.

## Spark-arrestor

There are a number of situations in which a spark-arrestor is required or specified. All Q.E. silencers can be fitted with a spark-arrestor that operates upon the centrifugal principle in which the particles, whether incandescent or not, are separated from the gas-stream by a series

of shaped blades and are captured in a particle collector. The collector is designed and located to be easily cleaned. The inclusion of a spark-arrestor ensures a particle-free exhausting gas.

#### **Placement of the silencers**

In the ideal situation the silencers should be located as close to the motor exhaust port as is practicable. Should this be impossible additional acoustic/ heat insulating application to the exterior of the connection may become necessary.



*Maritime application*

#### **Construction**

In the standard designs the silencers are constructed in carbon steel. The exterior surfaces are blast cleaned and coated with a 40-micron dry film thickness (DFT) of zinc-rich primer. Alternative materials of construction may, always, be specified.

#### **Required Data**

Our design team requires the following data in order to be able to complete a suitable unit:

- Type of diesel or gas motor (in-line, V)
- Two stroke or four stroke
- Number of cylinders
- Rotary speed of the motor
- Dimensions of gas exhaust port
- Temperature of exhausting gas
- Unsilenced noise levels
- Required dampening
- Maximum permissible pressure loss
- Connection sizes



*Fulda Power Plant*

#### **Q.E. International B.V., your partner in Industrial noise abatement**

In short, with more than 40 years experience Q.E. International has demonstrated to its loyal and satisfied clients that it is the partner in solving industrial noise problems and we can perform the same services for your organisation. Our advisors will be pleased to confer with you in order to find the most effective and economical approach to your problem.

#### **Contact**

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