

# ZÖLLNER

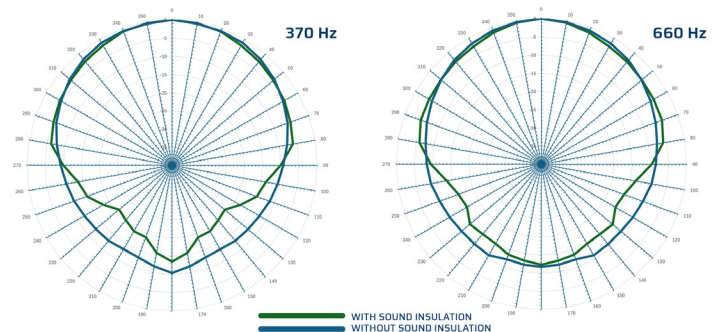
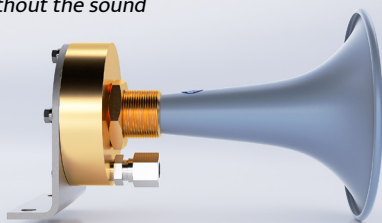
## Designing Safety Solutions

At ZÖLLNER, our focus is on developing safety solutions! Divided into three different segments, our experts develop and build products for both the ship and railway sectors! Keeping people safe is what drives and motivates us!

### Safety Solutions for Rail Vehicles

Our rolling stock segment is dedicated to developing and supplying signal horns for rail vehicles. With more than 75 years of experience, ZÖLLNER has accumulated vast knowledge and expertise making compressed-air operated Makrofons and electrically operated Makrofons. Our innovations adhere to the necessary standards required by different norms and guidelines and our facilities include state-of-the-art production and testing areas.

The Makrofon ZM75 can be used with and without the sound insulation



The sound pressure level decreases towards the rear/towards the driver's cab when the sound insulation is installed

### The Unmistakable Signal

When every second counts, the warning signal emitted by a Makrofon must be clear and unmistakable. Our Makrofons must therefore comply with TSI (Technical Specifications for Interoperability) requirements in terms of volume, frequency and duration of the signal to ensure that it functions effectively as a warning signal and can be recognised by all as coming from a train. These specifications were adopted by the European Union to ensure compatibility and safety in all European rail transport.

### More Safety through Innovative Sound Insulation

Another part of the TSI norm for noise is protection of people in the driver's cab of the rail vehicle. The ZÖLLNER sound insulation allows for a targeted sound propagation meaning that the sound signal is emitted not equally loud in all directions. Optimal installation minimises both structure-borne and airborne noise inside the vehicle, reducing the sound level by 5–11dB(C) to the rear (the direction of the personnel in the driver's cab). This allows for a safer working environment with a drastically reduced noise level while ensuring that the signal outside of the rail vehicle is as loud as need be.