



JORDAHL® Elevator Insulation JAI

Reducing sound emissions from the elevator shaft



JORDAHL®
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System Overview

Elevator Insulation JAI is used to acoustically decouple load bearing connections from building structures. The product is designed to be of interest to acoustic engineers and clients who want to reduce structure borne noise transfer from operating machinery.

The bracket used with the JAI system comprises of vibration absorbing material that is housed within a steel frame capable of transferring the applied loads back to the structure. It behaves like a mass spring system.

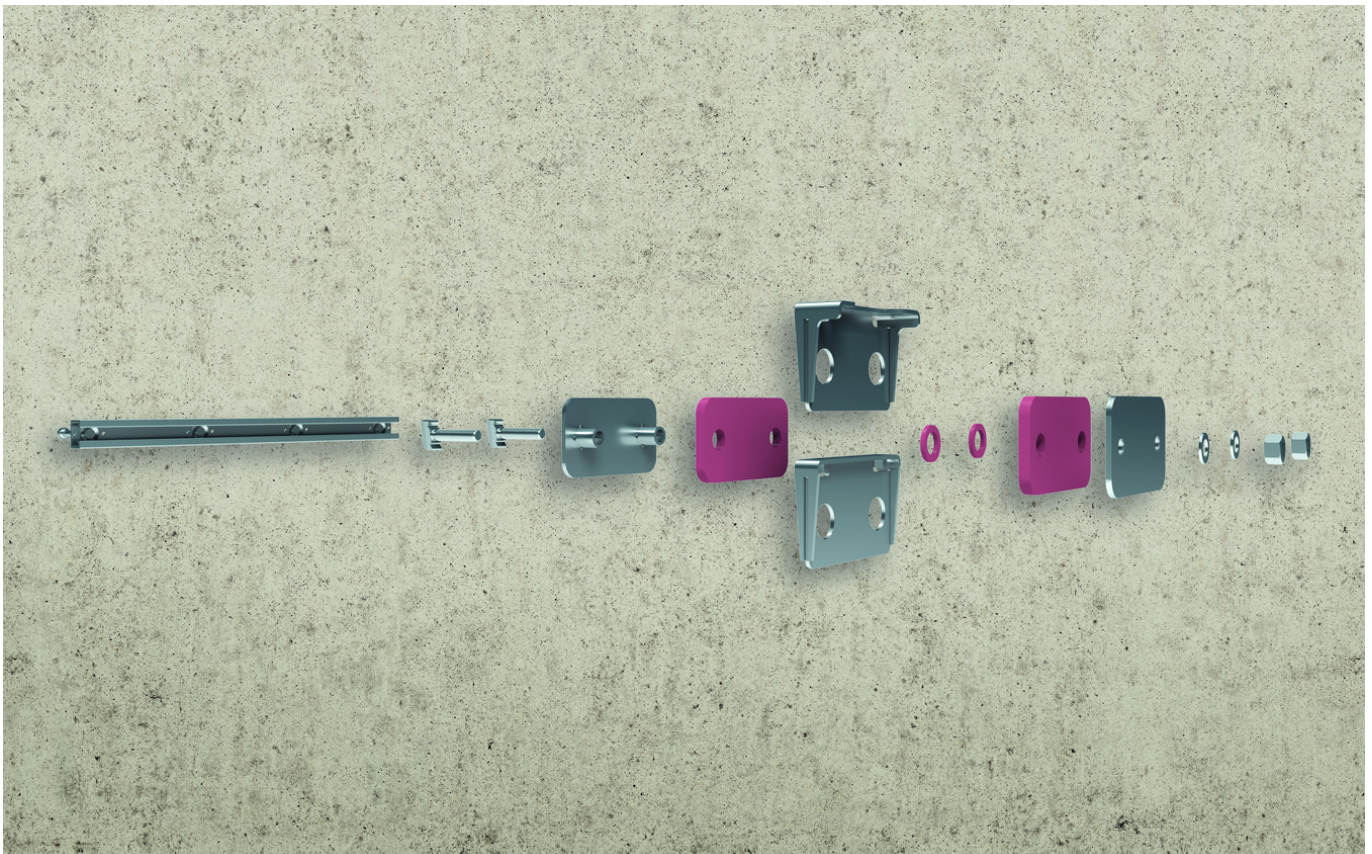
In elevator shafts the system is used for acoustically isolating guide rail and elevator machinery connections by significantly reducing impact sound transmission through elevator shaft walls. This reduces noise levels experienced by occupants of rooms in the vicinity of the elevator shaft when the elevator is operating.

New Structures

For new structures two adjustable JORDAHL® T-bolts are typically used to connect the JAI bracket to dynamically rated hot rolled JORDAHL® Anchor Channels JTA (ETA-09/0338), which are embedded into the concrete elevator walls.

Existing Structures

The acoustic performance of existing structures may also be uprated by retro fitting JAI brackets to JORDAHL® Mounting Channels (ETA-15/0386) that are either welded to structural steel or connected to concrete walls using drilled connections that are suitable for transferring dynamic loads.



Exploded illustration showing the various components of the JORDAHL® JAI bracket and the JTA anchor channel assembly.

Technical Information



Application

If machinery or supporting assemblies for moving components are connected to a building structure, a structure borne sound bridge is formed. In elevator shafts this acoustic coupling occurs where guide rails and machinery structures are directly attached to the shaft walls. Structure-borne sound vibration is introduced into the shaft wall as the elevator operates and is radiated from the structure as airborne sound. This can be perceived by occupants of adjacent rooms as unwanted noise. In the UK the following maximum noise limits in living accommodation are recognised:

Bedroom 25 dB LA_{max,F}
Living room 30 dB LA_{max,F}
Other areas 35 dB LA_{max,F}

These figures relate solely to lift noise levels and do not account for any other noise sources. These values include noise from the lifts irrespective of the transmission mechanism, i.e. they include both airborne and structure-borne noise.

Product Description

To address this problem JORDAHL has developed the JORDAHL® Elevator Insulation JAI system comprised of sound vibration absorption pads housed within a load bearing steel bracket.

The JAI brackets attach to conventional brackets that are supplied by the elevator system manufacturer and are installed between the guide rail and the shaft wall. It's slim design enables the product to be used with most vertical transportation systems.

The system is available in two versions:

- JAI-A1 with round hole connection points
- JAI-A1J with slotted connection points to enable increased positional adjustment

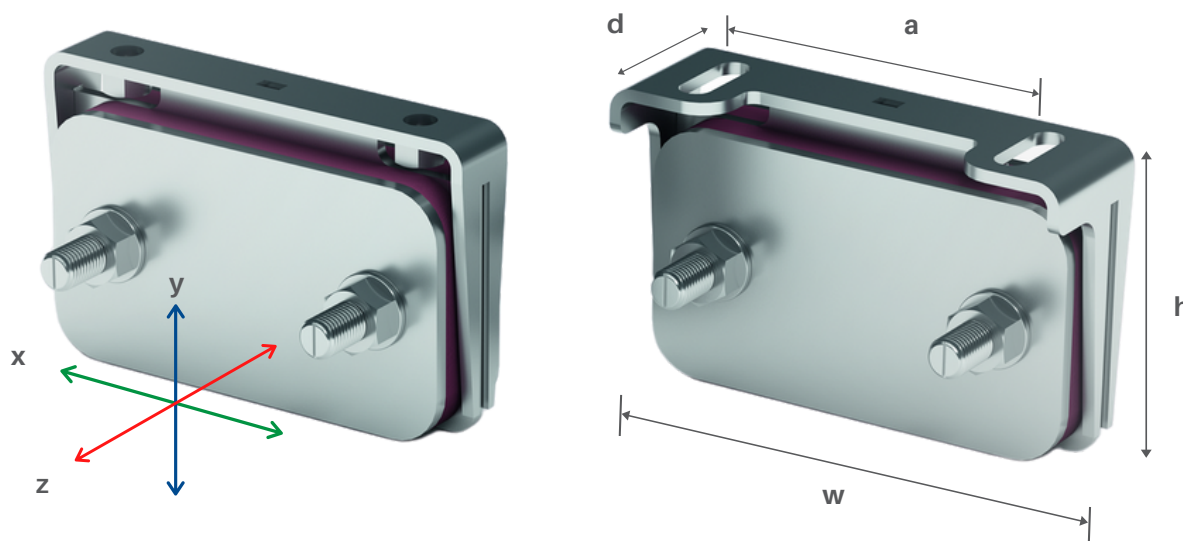
Advantages

- Significant reduction of sound transmission
- Increased predictability of acoustic design

Related UK and European Standards

- BS 8233:2014: Guidance on sound insulation and noise reduction for buildings
- GVB4/16 CIBSE B4: Noise and Vibration Control for Building Services Systems
- CIBSE Guide A Environmental Design
- EN 81-20
- EN 81-50
- Machinery Directive 2006/42/EC
- European Directive 2014/33/EU
- ISO 12354-1:2017 Building acoustics
- ISO 10140-1:2016 Acoustics
- ISO 16283-1:2014 Acoustics

Technical Information



Product Dimensions

Bracket Type	JAI-A1	JAI-A1J
Height (h)	120mm	120mm
Width (w)	192mm	192mm
Depth (d)	42mm	63mm
Top Hole/Slot Spacing (a)	135mm	135mm
Top Hole/Slot Dimensions	Threaded M12	13 x 40 mm

Standardised Sound Transmission Loss - Frequency Averaged in x, y, x Directions

Frequency	63Hz	125Hz	250Hz	500Hz	Average
x-axis	26 dB	24 dB	23 dB	22 dB	22 dB
y-axis	20 dB	21 dB	20 dB	18 dB	19 dB
z-axis	14 dB	13 dB	12 dB	11 dB	12 dB
Average	20 dB	19 dB	18 dB	17 dB	18 dB

Introducing JAI insulation into connection assemblies produces a sound transmission loss over the range shown in the table above. The data is based on independent laboratory and comparison tests run on existing on-site installations.

Product Materials

Bracket Body: Electroplated steel (stainless steel available on request).

Recommended Bolts for Top Connection: M12 (8.8) – Torque 70 Nm

Sound Insulating Material: Mixed cell polyurethane.

The frequency range from approx. 100 Hz to 200 Hz is particularly critical in the period during the acceleration of the elevator car and counterweight. Preliminary studies have shown that a frequency of 125 Hz has the highest interference potential for residents and often perceived as unwanted noise.

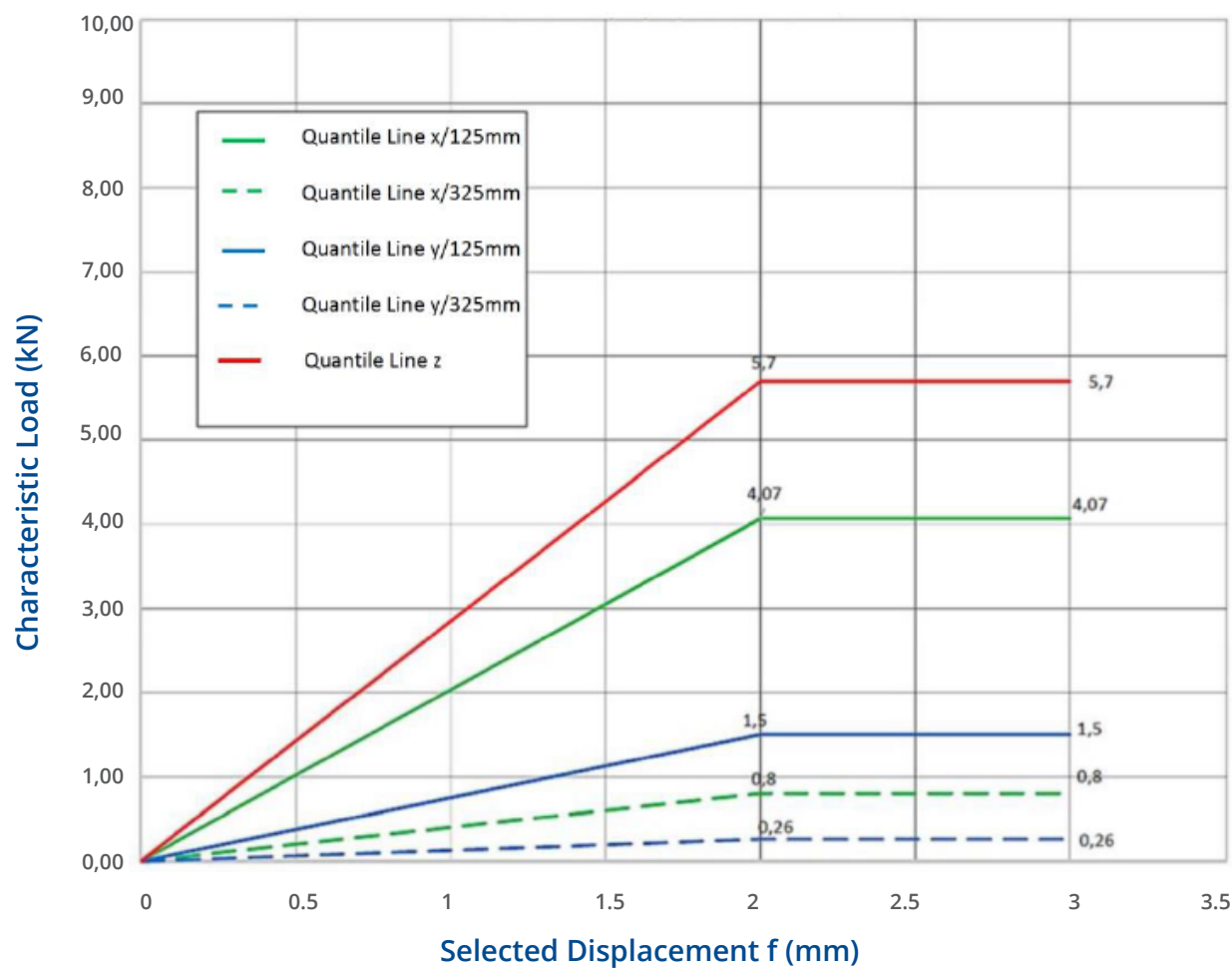
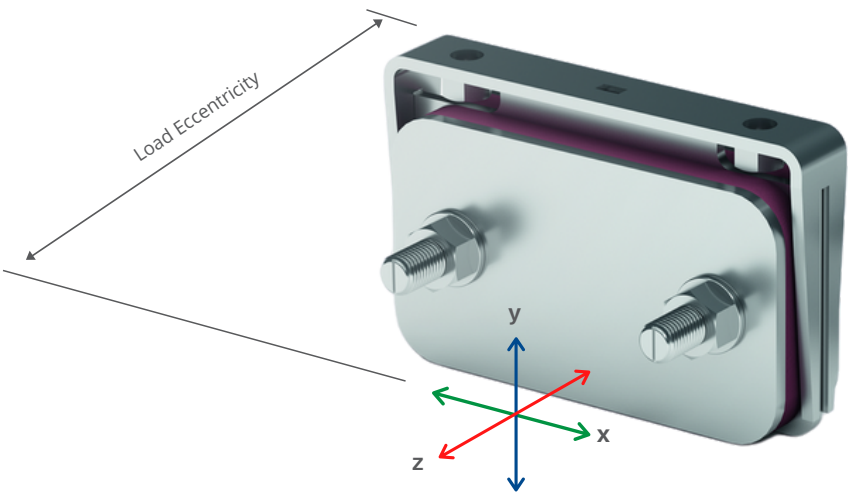
Bracket T-Bolts: Choice according to type of JORDAHL® Anchor Channels JTA or JM required -

JB M16 (8.8) – for JORDAHL® Anchor Channels JTA or JM Type 50/30 – Torque 180 Nm

JC M16 (8.8) – for JORDAHL® Anchor Channels JTA or JM Type 40/22 – Torque 180 Nm

Technical Information

Load data



The graph above shows deflections when loads are applied in the x, y, z directions at eccentricities of 125mm and 325mm.

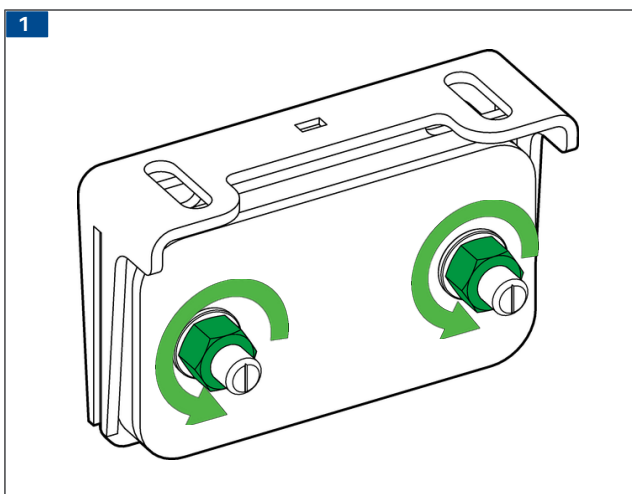
Maximum allowable deflection is set at 2mm for all directions in accordance with EN81-20. The above testing criteria were supervised by TUV.

Permissible applied loads at max. 2mm deflection:

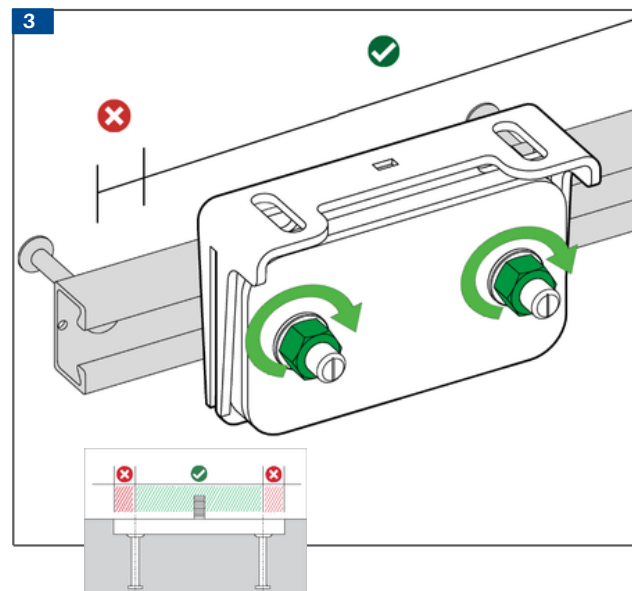
125mm eccentricity
x direction - 4.07 kN
y direction - 1.5 kN
z direction - 5.7 kN

325mm eccentricity
x direction - 0.8 kN
y direction - 0.26 kN
z direction - 5.7 kN

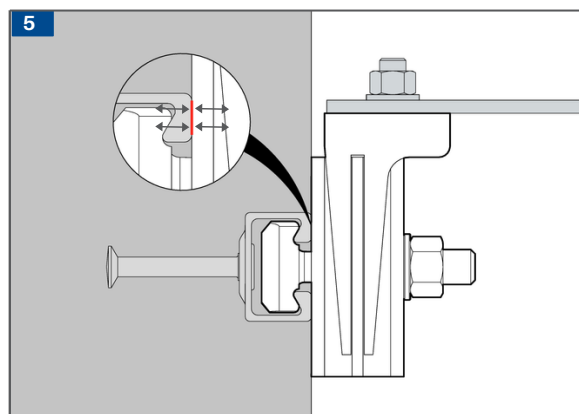
Installation - New Construction



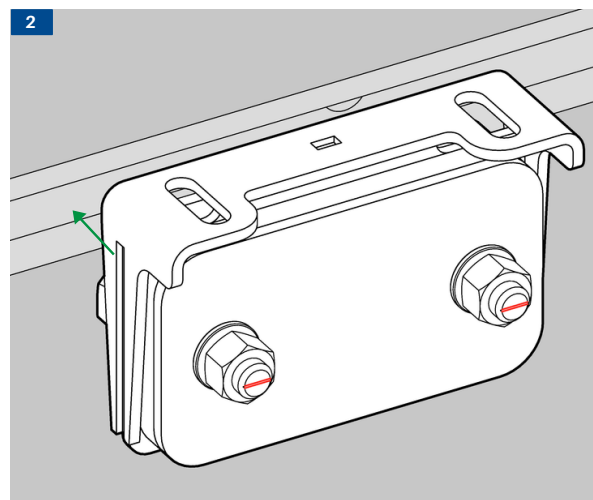
Loosen the nuts on the supplied Jordahl® T-bolts by approximately 10mm on the threads.



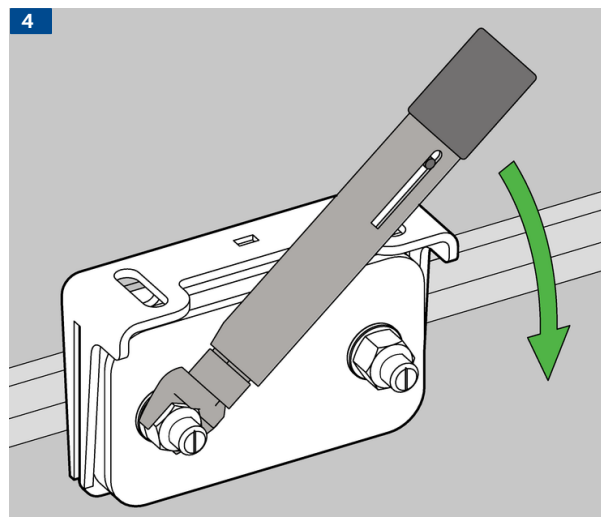
Rotate the JORDAHL® T-bolts 90° so the heads lock behind the lips of the channel, and loosely tighten them by hand. Check the lines on the ends of the bolts are aligned at 90° to the channel opening. Position the JORDAHL® JAI bracket checking that neither T-bolt is closer than 35mm to end of channel.



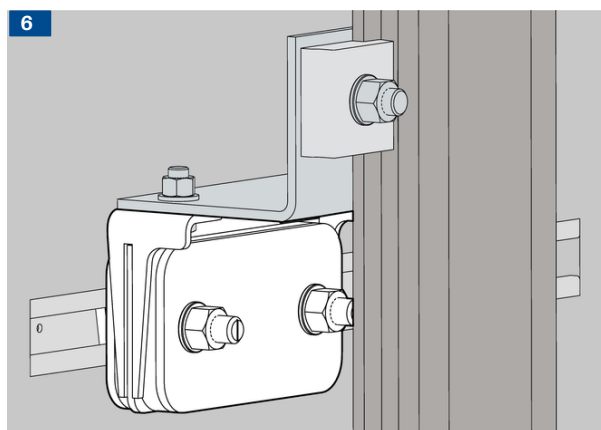
During final tightening it is important to check that the JORDAHL® JAI bracket has contact with the lips of the JORDAHL® Anchor Channel. If the channel is not flush with the surface, use steel shims to fill the voids so that the back of the bracket has full bearing both on the concrete surface, and the face of the channel.



Place the JORDAHL® JAI bracket over the cast in JORDAHL® Anchor Channel. Align the heads of the JORDAHL® T-bolts and engaging them with the channel opening.



Check the concrete surface behind the JORDAHL® JAI bracket is flat and that the JORDAHL® Anchor Channel is flush with the surface. When the bracket is exactly positioned tighten the M16 T-bolts to 180 Nm using a calibrated torque wrench, while also checking point 5 below.



Attach the guide rail brackets to the top of the JORDAHL® JAI brackets using suitable bolts. Adjust for position and tighten connections to the guide rail in accordance with the manufacturer's instructions.

Service

You can rely on our comprehensive service: we aim to assist you at every stage of your project - whether this is by telephone, email or personal meetings at your office. As your partner, we attach great importance to sharing your challenges and working with you to find the best solutions.



Technical Advice

In addition to the technical information in our brochures and on our website, our engineers will make static calculations and provide technical advice on request at: contact@jordahl.de



Tender texts

For all JORDAHL® product ranges complete tender texts are available. These contain all of the relevant technical information with regard to material, bearing capacity and sizes together with notes on installation. The data can be exported, e. g. in GAEB-format, and sent as an e-mail attachment or stored as a data file.



Software

Easy-to-use design software is available to help identify the best products for individual installation situations. This software is available free-of-charge at: www.jordahl.de → Download.



BIM Objects

The BIM (Building Information Modelling) method allows all parties involved in a design to work on the same 3D model. Making project management simpler, more economical and more reliable. Products must first be available as smart BIM Objects, containing product information and relations. The first JORDAHL products are now available as BIM Objects and can be downloaded for free at: www.jordahl.de → Download → CAD & BIM Library.



Installation Instructions/Videos

In order to achieve optimum results from the use of JORDAHL® products, various installation instructions and videos are available at: www.jordahl.de → Download.



General Terms & Conditions

Our general terms and conditions are available on our website at: gtc.jordahl.de

The digital Price List as well as the current valid surcharges are available on our website at: www.jordahl.de → Downloads → Price List.

JORDAHL GmbH

Nobelstr. 51

12057 Berlin

Tel +49 30 68283-02

Fax +49 30 68283-497

www.jordahl.de

info@jordahl.de