



Special Acoustic Equipment

Tapping Machine for Sound Insulation Measurements

type 3204

FEATURES:

- Fulfils ISO 140 for impact sound transmission measurements
- Interchangeable hammer heads
- Self-starting synchronous motor

USES:

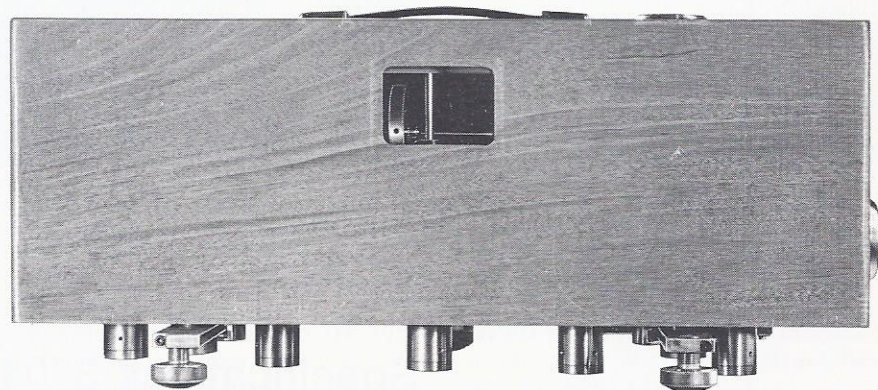
- Impact sound transmission measurements in buildings according to ISO 140 Parts VI and VII
- Determination of the Impact Sound Index, I_i , according to ISOR 717
- Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a standard floor according to ISO 140 Part VIII

The difficulty in assessing the effectiveness of sound insulation in buildings has been to make direct comparison of the results, and, where impact sounds are concerned, to generate consistent impacts of an appropriate nature. ISO 140 defines suitable methods of measurement.

In the case of sounds produced by impacts, it specifies a machine for making standard taps on a floor. Impact sound transmission properties are then simply characterized by the spectrum of the noise produced at another location.

Brüel & Kjær have produced the Tapping Machine Type 3204 to comply with the recommendations of the ISO for such a machine.

The machine is powered by a self-starting synchronous motor which drives a camshaft via suitable gears. A tappet mechanism converts this rotation into the reciprocating motion of five hammers. A single fixed guide rod runs down the centre of each hammer so that it moves with a pure translatory motion in a vertical plane.



Complete sets of both steel and rubber-faced hammer heads are supplied. The external dimensions of the hammers are the same for both types of head and the total weight of each hammer is 500g.

ISO 140 suggests measurement of the average sound pressure levels in third octave bands of the noise produced at another location when the tapping machine is put into operation on a floor. Octave analysis would also be acceptable in certain circumstances. Several instrument combinations can be employed for this. They

can broadly be classified in two groups:

1. Where the complete analysis is to be carried out on the spot using, for example, the Building Acoustics Analyzer Type 4418.
2. Where the received noise is recorded on magnetic tape and subsequently analysed in the laboratory.

The spatial average of the sound pressure levels can be determined either by using a number of microphone positions or by using an Integrating Sound Level Meter Type 2230 or 2231

and a $1/3-1/1$ Octave Filter Set Type 1625 or Octave Filter Set Type 1624 in connection with a Rotating Microphone Boom Type 3923 which sweeps the microphone over a prescribed path.

Figs. 1 and 2 show some other examples of measuring arrangements.

From the results of measurements according to ISO 140, the Impact Sound Index, I_i , can be calculated according to ISO R717. This index is being increasingly used in building regulations to describe acceptable limits of impact sound insulation.

If the Building Acoustics Analyzer Type 4418 is employed for the measurements, it will store the third octave impact sound pressure levels and will, at the push of a button, calculate the Impact Sound Index, I_i , from these results.

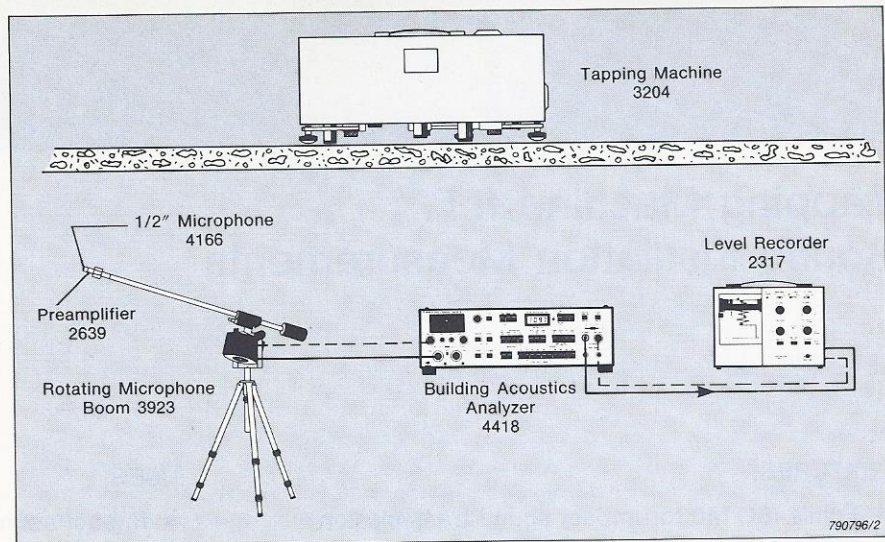


Fig. 1. Typical arrangement for automatic analysis in third octave bands using the Building Acoustics Analyzer Type 4418

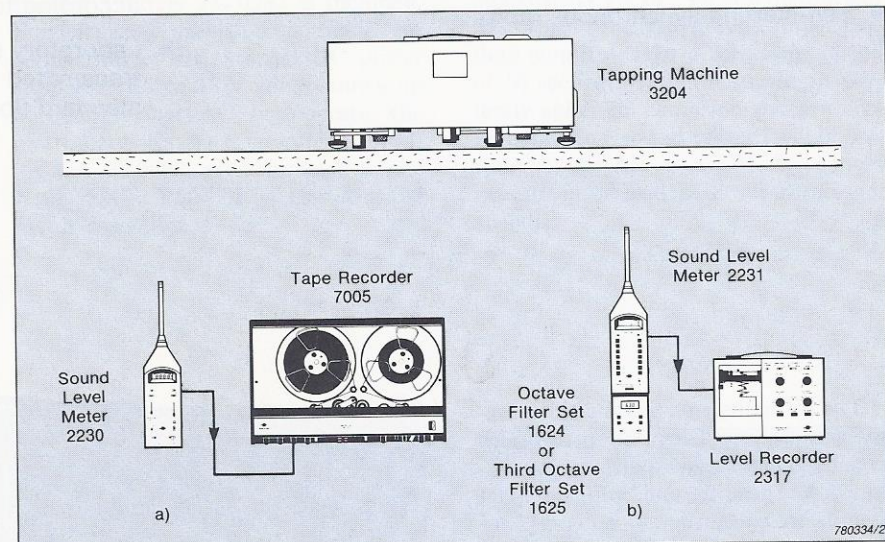


Fig. 2. Examples of battery operated arrangements
(a) Sound level meter in conjunction with a tape recorder
(b) Sound level meter with filter set in conjunction with a level recorder

Specifications 3204

FREQUENCY:

10 impacts/s. Deviation governed only by mains frequency

HAMMERS:

Cylindrical. Five in line, 100 mm between axis of each. Nickel plated brass bodies

HAMMER HEADS:

Stainless steel or ISO specified rubber. Weight and external dimensions identical

IMPACT DYNAMICS:

Total weight of each hammer: 500 g \pm 5 g

Free fall equal to: 40 mm
Speed at impact: 885 mm/s

POWER LINE FREQUENCY:

Phase splitting networks for motor providing for 50 and 60 Hz operation. Two alternative gear ratios to give correct camshaft speed

POWER LINE VOLTAGE:

100, 115, 127, 150, 220 or 240 V. Complies with Safety Class I of IEC 348

POWER CONSUMPTION:

60 VA approximately

DIMENSIONS:

Height: 200 mm (8") cabinet only; 240 mm (9.5") overall
Length: 550 mm (22")
Width: 200 mm (8")

WEIGHT:

16 kg (35 lb)

ACCESSORIES INCLUDED:

Key and gauge necessary for adjustment