NOISE SOURCE IDENTIFICATION

Noise Source Identification (NSI) is an important method for optimising the noise emission from mechanical and electro-mechanical products.

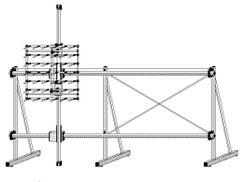
The goal of NSI is to identify the most important sources on an object in terms of position, frequency content, and sound power. In some cases, this is supplemented with additional information that can assist in identifying the root cause and radiation mechanism involved.

Direct measurement methods such as sound pressure mapping and sound intensity mapping are based on mapping the functions actually measured.

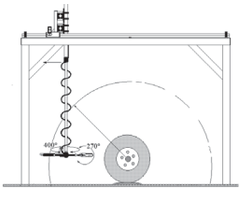
Indirect methods such as STSF and Beamforming rely on sound field propagation models to calculate sound field parameters in positions not directly measured. This not only provides more freedom in choosing where to measure but also provides a more complete understanding of the behaviour of the sound field.

Since most methods involve measuring a large number of points, the measurement is most efficiently performed using an automated transducer positioning (robot) system and/or a microphone array.

Positioning System

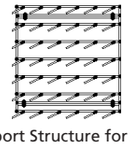


9665 Microphone Array Positioning System

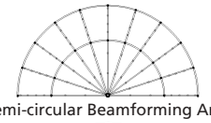


Automated Positioning System

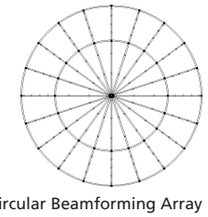
Microphone Arrays



Support Structure for Arrays
Ovid Array for STSF

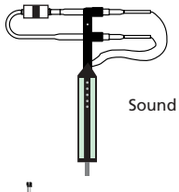


Semi-circular Beamforming Array

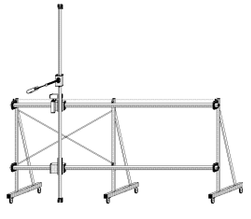


Circular Beamforming Array

Sound Intensity



Sound Intensity Probe



9654 Intensity Probe Positioning System
9665 Array Positioning System

020221

SOUND INTENSITY

3599	Sound Intensity Probe Kit
3541	Sound Intensity Calibrator
4297	Sound Intensity Calibrator
7759	Advanced Intensity Analysis

MICROPHONE ARRAYS

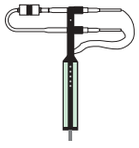
4935	Array Microphone
4944	Prepolarized Pressure-field Microphone
WA 0728	6-channel Pistonphone Adaptor
4228	Pistonphone
WA 0806	Integral Connection Array (ICA)
WA 0807	Flexible Configuration array (FCA)
WA 0808	Vertical In-line Array (VIA)
WA 0890	Circular Beamformer Array
AO 0562	6-channel IDA Array Cable 10 m
WA 0810	Stands for Array

TYPE 3560 C-S18

NSI System – Intensity

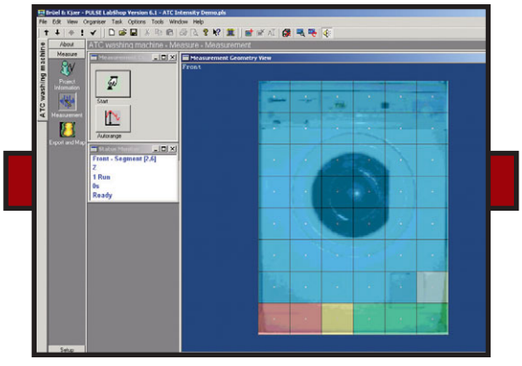
3560 C
7533
3032-A
7700-N2
7752
7761

- Measurement and mapping of sound pressure, sound intensity and other directly measured sound field parameters
- Calculation of partial sound power for ranking of sub-sources
- Easy geometry-guided measuring process
- Intuitive documentation using source image overlay
- Expandable with:
  Selective intensity mapping
  Automated positioning system

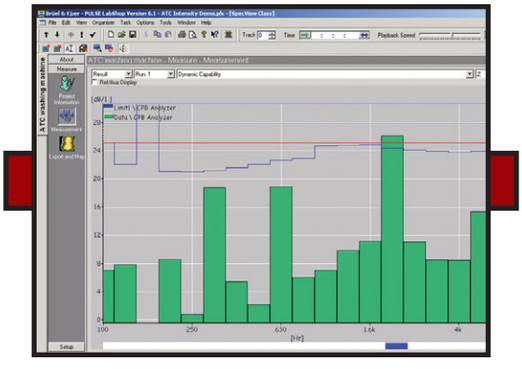


* *One year SW maintenance*

The geometry-guided measurement process gives direct feedback on where to measure next and the quality of the measurements already performed



Data validation functions in ATC can be used to check measurements against limits, e.g., Dynamic Capability check of intensity measurements



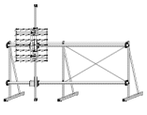
TYPE 3560 D-S19 TYPE 3560 D-S11

NSI STSF (12 In)
NSI STSF (30 In)

3560 D
7536
2 × 3032-B
7770-N12
7752
7761
7780

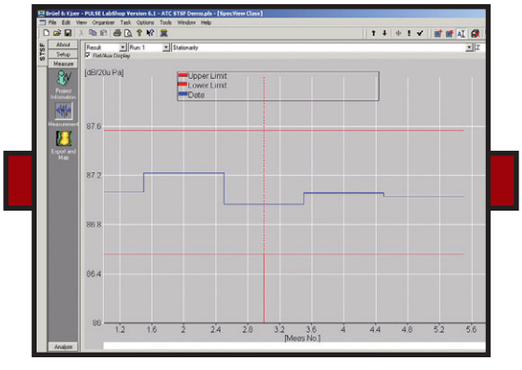
- Mapping of sound pressure and sound intensity and other sound field parameters
- Transformation to parallel planes using acoustical holography
- Low to medium frequencies (0.1 to 5 kHz)
- Analysis of the full sound field or the part coherent to specific reference signals
- Calculation of partial sound power for ranking of sub-sources
- Easy geometry guided measuring process
- Intuitive documentation using source image overlay
- Expandable with:
  Automated positioning system
  Non-stationary STSF
  Beamforming

3560 D
7536
4 × 3032-B
3232-A
7770-N16
7752
7761
7780

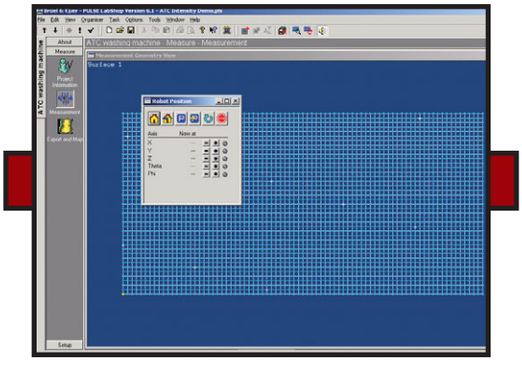


* *One year SW maintenance*

In STSF, data validation functions can be used to check the stationarity of the object measured by controlling the overall level of the reference signals



A robot may be used to automate scanned measurements. This not only saves time but also improves the positional accuracy and repeatability of the measurement points



POSITIONING SYSTEM

BZ 5370 Robot Option for Acoustic Test Consultant
9665 Array Positioning System
9654 Intensity Probe Positioning System
WB 1477-002 STSF Motor Controller, 2 Axis
WB 1477-004 STSF Motor Controller, 4 Axis
WB 1477-006 STSF Motor Controller, 6 Axis
WL 1090 STSF Motor Connection Cable

FRONT-END EXPANSION

UH 1031 Fan Unit
KQ 0155 Rack Cabinet
UA 1365 Blank Module
3032 6-channel General I/O Module
7536 10/100 BaseTx LAN Controller Module
2826 Power Supply Module

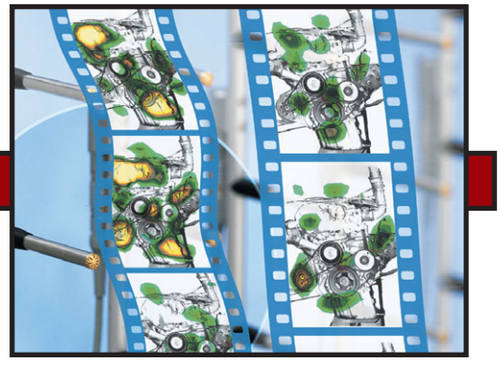
TYPE 3560 E-S2

NSI Non-stat STSF (36 In 3.2 kHz)
NSI Non-stat STSF (96 In 6.4 kHz)

3560 E
7536
6 × 3032-B
7701
7712-D
7761
7770-N16

- Mapping of sound pressure and sound intensity and other sound field parameters – also as a function of time
- Averaging in Time, RPM, Angular or Cycle domain
- Order filtering
- Transformation to parallel planes using acoustical holography
- Low to medium frequencies (0.1 to 3 kHz)
- Calculation of partial sound power for ranking of sub-sources
- Easy one-shot measuring process
- Intuitive documentation including animation using source image overlay
- Expandable with:
  STSF
  Beamforming

Based on time domain acoustical holography, Non-stationary STSF supports noise mapping as a function of time, RPM or Shaft Angle. This provides new insight into the detailed behaviour of many products

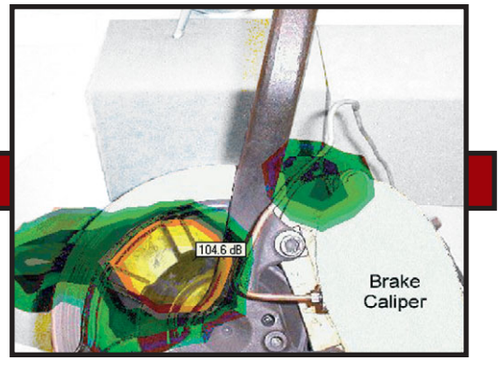


TYPE 3560 E-S3

2 × 3560-E
2 × 7536
15 × 3032-B
3032-A
7701
7707
7712-D
7761
7770-N16

** One year SW maintenance*

Because of its high time resolution, Non-stationary STSF can also map transient and hard to reproduce events like brake squeals

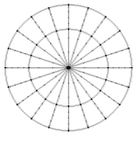


TYPE 3560 E-S4

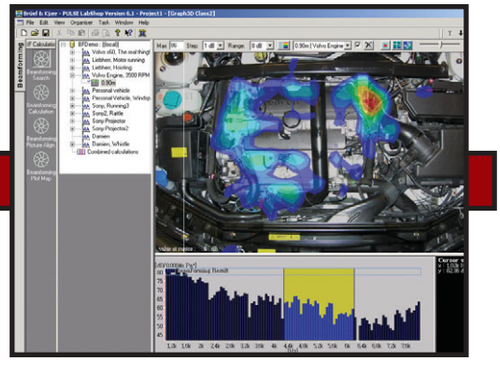
NSI System Beamforming (42 In)
NSI System Beamforming (66 In)

3560-E
7536
7 × 3032-B
7701
7752
7761
7768
7770-N16

- Mapping of relative sound pressure contribution
- Easy geometry-guided measuring process
- Intuitive documentation using source image overlay
- Well-suited for large objects
- Medium to high frequencies (0.5 to 20 kHz)
- Easy one-shot measuring process
- Intuitive documentation using source image overlay
- Expandable with:
  STSF
  Non-stationary STSF



Beamforming can quickly map objects also at high frequencies



TYPE 3560 E-S5

2 × 3560-E
2 × 7536
11 × 3032-B
7701
7707
7752
7761
7768
7770-N16

** One year SW maintenance*

With synchronised map and spectral views, Noise Source Identification Type 7752 makes it easy to explore the source behaviour in terms of frequency and position