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**Noise Mitigation & Management Scheme
To Discharge Planning Condition 6
Attached to Planning Permission Ref: P/2021/0725**

Development of a Warehouse Facility

At

**Kronospan Manufacturing Facility
Off Holyhead Road
Chirk
Wrexham**

for

**Axis
Acting on behalf of
Kronospan Ltd**

**Report No.: R22.0104/1/DRK
Date: 21st February 2022
Consultant: D.R. Kettlewell MSc MAE MIOA I.Eng**

Prepared by:

Noise & Vibration Consultants Ltd

**Member of Institute of Acoustics
Member of Association of Noise Consultants
Member of Academy of Experts**

**Report undertaken & checked by:
D R Kettlewell MSc MIOA MAE I.Eng – Principal Consultant:**

A handwritten signature in black ink, appearing to read 'D R Kettlewell', is written over a light blue horizontal line.

Date: 21st February 2022

1.0 INTRODUCTION

- 1.1 At the request of Axis acting on behalf of Kronospan Ltd, Noise & Vibration Consultants Ltd (“NVC”) was originally commissioned to assess the noise impact of the development of the new Warehouse at the Kronospan Works site off Holyhead Road, Chirk, Wrexham. The development has now received planning permission and condition 6 requires a scheme of noise mitigation measures to be submitted for approval to the Local Planning Authority.
- 1.2 This report is therefore being provided to detail the noise mitigation measures required for the proposed development to comply with condition 6.

Sources of Information

- 1.3 Information used in this assessment has been obtained from the following sources:
- Ordnance Survey maps of the local area;
 - Information relating to the site layout was provided by Kronospan (drawing no. 7000/607 Rev D).
 - Planning Permission P/2021/0725 as of 8th February 2022 the planning permission has been provided in draft form and is subject to a section 106 agreement. Providing the noise condition remains as described in the draft decision notice of the planning permission then this report is appropriate;
 - Brigade Back-up and Warning Alarms (BBS-TEK White Sound); and
- 1.4 The areas of the site and plant that are relevant to the site operation include the following:
- Warehouse Building (split into 3 sections)
 - 6 Roller Shutter Doors

2.0 SITE DESCRIPTION

2.1 Location

- 2.1.1 The location for the development is within the existing Kronospan manufacturing site. The Kronospan site is located on land adjacent to Holyhead Road (the B5070), Chirk and covers a total area of approximately 40 hectares.
- 2.1.2 The Kronospan site comprises a number of large industrial process buildings including air emissions stacks, storage areas for raw materials, warehouse buildings for manufactured products, offices and car parking. The development would be located adjacent to the main manufacturing and warehousing buildings.
- 2.1.3 The Proposed Development would be located close to the eastern boundary of the site, adjacent and to the north of the existing warehouse and east of the Kronoplus building.

Site Operation Noise Sources

- 2.1.4 In terms of noise generated by this type of development, the following activities:
- Forklift Truck movements to and from the warehouse.
 - Noise 'break-out' from the use of forklifts within the warehouse.

2.2 Site Operation Hours

- 2.2.1 It is intended that the above facility would operate continuously during day and night-time periods.

2.3 Nearest Sensitive Receptors

- 2.3.1 The nearest sensitive receptors to the development are located east to northeast of the warehouse (i.e. positions 1 to 3 below).

Position 1: Position 1 is located northeast of the development area along Linden Avenue. The receptor position is approximately 410 metres to the nearest building. There is an existing Kronospan building and site boundary earth embankment on intervening land between the receptor and the facility.

Position 2: Position 2 is located northeast of the warehouse at Wern. The closest receptor in this direction is approximately 140 metres from the development.

Position 3: Position 3 is east of the development area at the junction of the Holyhead Road and West View. The approximate distance from the new warehouse to this receptor is approximately 45 metres.

Position 4: Position 4 is southeast of the site entrance at Maes-y-Waun at a distance of approximately 450 metres from the development area. The main Kronospan buildings and site boundary earth mound screen provide some degree of screening from the development in this direction.

Position 5: Position 5 is in a south easterly direction at Shepherds Lane at a distance of approximately 760 metres from the development area.

Position 6: Position 6 is at the front entrance of the Mondelez factory to the south of the Kronospan site. The distance from this location to the nearest building is approximately 820 metres.

Position 7: Position 7 is along the access road to the Canalwood Industrial Estate and approximately 720 metres southwest of the development area.

Position 8: Position 8 is adjacent to a small cluster of properties off the Llwyn-y-cil Road, at approximately 1 kilometre southwest to west of the development area.

Position 9: This monitoring position is opposite the Castle back gates on high ground at approximately 1.28 kilometres to the northwest of the development area.

- 2.3.2 Positions 1 to 5 and 8 to 9 are considered to be representative of the nearest sensitive residential properties to the development and are therefore classified as receptors of high sensitivity. Position 6 and 7 are industrial sites and as such are of low sensitivity.
- 2.3.3 Figures 1 and 2 attached shows the layout of the site and building elevations. The topography of the site is relatively flat with existing earth embankment immediately to the east of the warehouse.

3.0 NOISE MITIGATION SCHEME

Noise Mitigation Scheme To Comply with Planning Condition 6

Ref: P/2021/0725

Deemed Planning Permission Ref:

“6. Development shall not commence until a scheme of noise mitigation measures has been submitted to and approved in writing by the Local Planning Authority. The development shall not be brought into use until the measures as approved have been implemented in full. The noise mitigation measures shall thereafter be permanently retained.

Reason: To protect the amenities of the occupiers of nearby properties in accordance with Policy GDP1 of the Wrexham Unitary Development Plan.”

3.1 This section provides mitigation details for the Warehouse facility.

Warehouse Building

Kronospan Drawing No. 7000/607 Rev. D provides detail of the proposed layout and construction of the Warehouse building and is detailed below (also see Figure 1):

- a) Wall Cladding formed by Brucha Paneel panel WP-F80 with 80mm mineral wool core and 0.6mm outer skin and 0.6mm inner skin (core thickness 80mm). Weight 19.8kg/m².
Insulated building cladding having Rw 32dB acoustic performance.
Refer to Appendix 1 for further detail.
- b) Roof Cladding formed by Brucha Paneel panel DP-F122 with 80mm mineral wool core and 0.6mm outer skin and 0.6mm inner skin (core thickness 80mm). Weight 20.9kg/m².
Insulated building cladding having Rw 32dB acoustic performance.
Refer to Appendix 1 for further detail.
- c) Lower sections of the walls 300mm high would be formed by concrete.
- d) Hart Rapid Rise Speedor Storm Roller shutter doors having insulation Rw value of 11dB on all vehicle access doors except the Workshop door. Further detail is provided in Appendix 2.
- e) Personnel doors to be fire doors and no specific acoustic performance required.
- f) All mobile plant to have ‘broadband’ type reverse alarms (i.e. no tonal ‘beeper type’). Refer to Appendix 4.

4.0 NOISE MAPPING RESULTS

- 4.1 The noise model has been updated to ensure it complies with the assumed noise predictions provided within the NVC Noise Impact Assessment (report ref. R21.0502/DRK dated 7th May 2021).

Prediction Methodology

- 4.2 For the operational noise of the Proposed Development we have used ISO 9613-2 for the propagation prediction modelling and CadnaA software for producing noise maps of the highest likely generated noise.
- 4.3 The methodology takes into account source position, distance, duration of activity, and any screening from local buildings and earth mound screens on site. The noise modelling for the fixed plant assumes that they operate continuously. The prediction calculations therefore provide an indication of the highest likely noise level.
- 4.4 Appendix 4 attached provides results of the noise prediction modelling provided by the CadnaA software.

Plant Complement

- 4.5 The plant sound pressure levels from which the noise predictions were made are presented in Appendix 4. The plant noise levels are based on empirical data from site noise survey work recorded of mobile and fixed plant operating within the existing warehouse or main finishing lines.

Results of Noise Predictions

- 4.6 The proposed Warehouse with mobile and fixed plant (from existing finishing lines) operating inside has been considered and calculated using noise prediction modelling software. Noise map 1 in Appendix 4 represents the resultant noise contribution from the proposed development at Kronospan. The results of the modelling are shown in below in Table 4.1 (**including** noise mitigation measures).

Table 4.1: Predicted Noise Contribution from the Proposed Development

Receptor Position	Time Period	Predicted Noise Contribution from Proposed Development L _{Aeq1hr} dB	Typical Residual & Background Noise level L _{Aeq} & [L _{A90}] dB	Rating compared to background noise L _{Aeq1hr} dB	Resultant Increase in residual noise levels due to Warehouse Facility L _{Aeq} dB
1. Linden Avenue	Daytime	14	51 [47]	-37 [-33]	0 [0]
	Night-time	14	43 [40]	-29 [-26]	0 [0]
2. Wern	Daytime	20	58 [48]	-38 [-28]	0 [0]
	Night-time	20	53 [46]	-33 [-26]	0 [0]
3. Holyhead Rd/ West View	Daytime	26	60 [50]	-34 [-34]	0 [0]
	Night-time	26	48 [44]	-22 [-18]	0 [0]
4. Maes-y-Waun	Daytime	12	56 [52]	-44 [-40]	0 [0]
	Night-time	12	52 [51]	-40 [-39]	0 [0]
5. Shepherds Lane	Daytime	8	53 [48]	-45 [-40]	0 [0]
	Night-time	8	46 [45]	-38 [-37]	0 [0]
6. Cadbury's Entrance	Daytime	9	57 [52]	-48 [-43]	0 [0]
	Night-time	9	52 [50]	-43 [-41]	0 [0]
7. Canalwood Industrial Estate	Daytime	7	62 [60]	-55 [-53]	0 [0]
	Night-time	7	60 [60]	-53 [-53]	0 [0]

Receptor Position	Time Period	Predicted Noise Contribution from Proposed Development L _{Aeq1hr} dB	Typical Residual & Background Noise level L _{Aeq} & [L _{A90}] dB	Rating compared to background noise L _{Aeq1hr} dB	Resultant Increase in residual noise levels due to Warehouse Facility L _{Aeq} dB
8. Llwyn-y-cil Road	Daytime	5	57 [49]	-52 [-44]	0 [0]
	Night-time	5	53 [49]	-48 [-44]	0 [0]
9. Opposite Chirk Castle back gates	Daytime	5	54 [48]	-49 [-43]	0 [0]
	Night-time	5	49 [48]	-44 [-43]	0 [0]

Note: Frequency spectral data on site indicates no tonal character and observations indicate no other noise character that is perceptible at receptors at night-time. Column 5 is calculated by subtracting column 3 from 4. Column 6 is calculated by logarithmically adding column 3 and column 4 and subtracting column 4 from the answer.

- 4.7 The predicted noise levels are for the Proposed Development attributable noise (with mitigation) range between 5dB and 26dB LAeq. The fifth column in Table 4.1 shows the difference between the predicted Proposed Development plant noise and typical background noise at the receptor positions. The Proposed Development is not expected to contain any unusual noise characteristics. The rating level in column 5 is therefore in accordance with the methodology found within BS 4142: 2014+A1:2019, which is the most relevant noise criterion. Column 6 in Table 5.1 shows the level difference between the baseline residual noise at the receptors and the predicted noise contribution from the Proposed Development.
- 4.8 The results shown in Table 4.1 above indicate that the Proposed Development are between 18dB and 53dB below the baseline background noise and 22dB and 55dB below residual noise levels. This is a clear indication that the development is acceptable when considered in isolation.
- 4.9 In consideration of the comparison of the Proposed Development noise contributory levels and background and residual sound levels, we conclude that the new plant would not cause any background noise 'creep' in accordance with H3 Horizontal Guidance Note for Noise Part 2: Noise Assessment and Control and BAT.
- 4.10 The magnitude of the impact during daytime or night-time is shown to be a **low impact** (i.e. according to BS 4142: 2014+A1:2019).
- 4.11 The results show that the cumulative effect of all plant consented since 2011 compared with the baseline background and residual noise. The level difference is at least 10dB below the existing residual noise and therefore it would not cause any increase. The cumulative noise level is also at least 7dB below baseline background sound levels.
- 4.12 The magnitude of the impact during daytime or night-time is shown to be a **low impact** (i.e. according to BS 4142: 2014+A1:2019).
- 4.13 As the Proposed Development is not predicted to create any increase in residual sound levels due to the fact that the Proposed Development noise contribution is insignificant.
- 4.14 It is important to note that the introduction of the new warehouse along the north-eastern site boundary will provide some acoustic screening benefit in terms of noise reduction from the overall Kronospan site (i.e. activities from the central to northern site areas) to those residential receptors to the northeast and east of the Site (i.e. Lindern Avenue, Wern, George Street, West View and other properties in this direction).

Figure 1: Location of Proposed Development



Plan
Scale = 1/8" = 1'-0"

Section A-A
Scale = 1/8" = 1'-0"

Section B-B
Scale = 1/8" = 1'-0"

Section C-C
Scale = 1/8" = 1'-0"

Section D-D
Scale = 1/8" = 1'-0"

Typical portal section
Scale = 1/8" = 1'-0"

East Warehouse Proposal
Planning General Arrangement
7000/607
Preliminary: 12.02.2021

Figure 3: Nearest Sensitive Receptor Location Relative to the Site



APPENDIX 1

WALL CLADDING DETAIL

BRUCHAPanel®

Fire protection wall – WP-F

Visible mounting

Standard DESIGN AND SURFACES

Coil-coated, hot-dip galvanised steel sheet

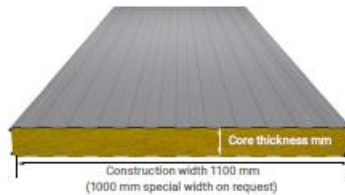
EXTERIOR:	- Exposed side 25 µm polyester coating with a PVC protective film (protects against solar radiation). The film must be removed no later than 10 weeks after the production date (visible on the longitudinal joint of the panel). - Profile 1 = Standard, for other profiles see WP-F profiles - Metal gauge: 0.6 mm (smaller metal gauge on request)
INTERIOR:	- Exposed side 25 µm polyester coating with a PVC protective film (protects against solar radiation). The film must be removed no later than 10 weeks after the production date (visible on the longitudinal joint of the panel). - Profile 1 = standard (profile 2 and 3 on request) - Metal gauge: 0.6 mm (smaller metal gauge on request)
INSULATION CORE:	- Structural, web-oriented mineral fibre wool - Securely attached to the sheet steel shell - Density approx. 120 kg/m³, 140 kg/m³ available on request
FIRE BEHAVIOUR:	In accordance with EN 13501-1, Euroclass A2s1d0, non-combustible
STANDARDFARBEN:	In accordance with BASIC colour range
PANEL CONNECTION:	Tongue and groove system in which the panels interlink precisely with no thermal bridge.
SPECIFICATIONS:	Download from www.brucha.com
EXTERNAL MONITORING:	National and international tests, quality standards
VAPOUR DIFFUSION:	Determined by climatic conditions inside building. Panels must be installed vapour tight.
PANEL INSTALLATION:	When working with our products, please follow our installation guidelines at www.brucha.com/downloads.

BRUCHAPaneel®

Fire protection wall – WP-F

Visible mounting

BRUCHAPaneel®



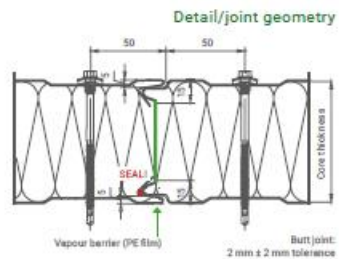
BRUCHAPaneel panel WP-F with mineral wool core can be combined with BRUCHAPaneel WP with polyurethane core using an adaptor panel.



Panel type:	WP-F60	WP-F80	WP-F100	WP-F120	WP-F140	WP-F150	WP-F160	WP-F180	WP-F200	WP-F240
Core thickness mm	60	80	100	120	140	150	160	180	200	240
U value W/m²K - EN 14509 including joint section	0.70	0.52	0.41	0.35	0.30	0.29	0.27	0.24	0.22	0.18
Weight kg/m²	17.4	19.8	22.2	24.6	27.0	28.2	29.4	31.7	34.2	39.0
Fire resistance*	EI 30	EI 60	EI 90	EI 120	EI 120	EI 180	EI 180	EI 180	EI 240	EI 240

*Certificates must be checked for the usage case in question (horizontal/vertical/span width etc.).

Manufacturing tolerances:	In line with EN 14509
Manufacturing lengths:	Max. 15.6 m (extra-long transport from 13.6 m) ATTENTION! Danger of kinking due to heavy weight in the case of long panels!
Span width tables:	From Dr Wilhelm Pilgram – Vienna
Sound insulation:	32 dB (frequency dependent)
Fire behaviour:	In accordance with EN 13501-1, Euroclass A2s1d0, non-combustible



Brucha - 51 - 2018/1

ROOF CLADDING DETAIL

BRUCHAPaneel®

Fire protection roof – DP-F

Standard DESIGN AND SURFACES

Coil-coated, hot-dip galvanised steel sheet

EXTERIOR:	- Exposed side 25 µm polyester coating with a PVC protective film (protects against solar radiation). The film must be removed no later than 10 weeks after the production date (visible on the longitudinal joint of the panel). - Profile: Trapezoidal profile, 42 mm (according to diagram) - Crown distance: 333.3 mm - Metal gauge: 0.6 mm (smaller metal gauge on request)
INTERIOR:	- Exposed side has 25 µm polyester coating without protective PVC film (if required, please specify with order). - Profile 1 = standard (profile 2 and 3 on request) - Metal gauge: 0.6 mm (smaller metal gauge on request)
INSULATION CORE:	- Structural, web-oriented mineral fibre wool - Securely attached to the sheet steel shell - Density approx. 120 kg/m³, 140 kg/m³ available on request
FIRE BEHAVIOUR:	In accordance with EN 13501-1, Euroclass A2s1d0, non-combustible
STANDARD COLOURS:	In accordance with BASIC colour range
PANEL CONNECTION:	- External, by overlapping of the profiles, whereby the non-foamed sheet of a panel is placed over the corresponding section of the next panel. - On the underside, by special shaping, whereby the complementary profile to the profile of one roof panel overlaps the profile of the second panel. The included seals offer additional reliability, achieving a reliably tight connection. - Capillary break (acc. drawing).
SPECIFICATIONS:	Download from www.brucha.com
EXTERNAL MONITORING:	National and international tests, quality standards
VAPOUR DIFFUSION:	Determined by climatic conditions inside building. Panels must be installed vapour tight.
PANEL INSTALLATION:	When working with our products, please follow our installation guidelines at www.brucha.com/downloads.



We will be happy to send certificates on request!

BRUCHA

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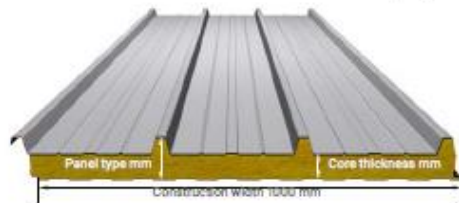
BRUCHAPaneel®

Fire protection roof – DP-F

Minimum roof pitch 3° (5.2%) without transverse joint and penetration.

BRUCHAPaneel panel DP-F with mineral wool core
can be combined with BRUCHAPaneel DP with polyurethane core.

BRUCHAPaneel®



TRAPEZOID PROFILE exterior

Cut-out

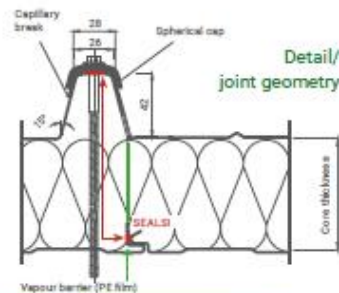


Panel type	DP-F102	DP-F122	DP-F142	DP-F162	DP-F182	DP-F192	DP-F202	DP-F222	DP-F242
Core thickness mm	60	80	100	120	140	150	160	180	200
U-value W/m²K in line with EN 14509 including joint section	0.65	0.50	0.41	0.35	0.30	0.28	0.26	0.24	0.21
Weight kg/m²	18.7	20.9	24.4	26.9	29.5	30.8	31.9	33.6	36.3
Fire resistance*	REI 30	REI 90	REI 90	REI 90	REI 90	REI 90	REI 90	REI 90	REI 90

*Certificates must be checked for the usage case in question (horizontal/vertical/span width etc.).

Manufacturing tolerances:	In line with EN 14509
Manufacturing lengths:	Max. 15.6 m (extra-long transport from 13.6 m) ATTENTION! Danger of kinking due to heavy weight in the case of long panels!
Span width tables:	From Dr Wilhelm Pilgram – Vienna
Sound insulation:	32 dB (frequency dependent)
Fire behaviour:	In accordance with EN 13501-1, Euroclass A2s1 d0, non-combustible

A notch in the eave area is required in order to rule out any possibility of the sheet metal shell lifting up from the insulation body (available at a surcharge).
Similarly, a drip cap should be fitted in the eave area so as to prevent a capillary effect (only possible on the construction site). These measures prevent the formation of corrosion between the sheet metal shell and the insulation. We recommend to cover the core in the end with (part No. Z 13b) cog sheet.



Detail/
joint geometry



Brucha - 98 - 2018

APPENDIX 2

ROLLER SHUTTER DOOR ACOUSTIC PERFORMANCE

DATA SHEET 109





Speedor Storm is a new model from the family of Speedor high speed energy saving industrial doors, designed for frequent use on exposed external openings:

- Warehouses
- Refuse / Waste Plants, ERW, Grain tipping bays
- AD Facilities
- Factories
- Distribution stores
- Ports
- Large wind exposed areas

Main features include unique guide system offering exceptional wind resistance, reliable and clean inline drive system complete with integral safety brake and variable speed operation. Benefits include reduced heat loss, odour control, vermin control, refuse containment and safety control.



Redburn Road, Westerhope Industrial Estate, Newcastle upon Tyne, NE5 1PJ, UK.

T: +44 (0) 191 214 0404 F: +44 (0) 191 271 1611

E: info@hartsdoors.com www.hartsdoors.com



VB

NVC On Site Test Results (Northampton WTS) WTS Rapid Rise Roller Shutter Door									
Position					LAeq dB				
Inside WTS Inside (1m) from Rapid Rise Door					79.8				
Outside WTS Rapid Door (1m)					69.3				
Reduction					10.5				
Acoustic Performance (frequency spectrum)									
Hz	31.5	63	125	250	500	1k	2k	4k	8k
Leq dB	5.1	1.7	4.2	7.3	9.6	10.2	11.4	15.6	17.4

APPENDIX 3

REVERSING ALARMS

Back-up & Warning Alarms



Vital safety devices needed to warn workers and pedestrians that a vehicle is maneuvering. Our range includes bbs-tek® white sound® alarms; smart alarms which adjust to the ambient noise level; and speaking alarms, which provide a real speech warning of imminent danger.

Which alarm is for you?

Heavy duty
For plant, quarry and construction machines or environments with high ambient noise.



Medium duty
Ideal for commercial road going vehicles and environments with mid-level ambient noise.



bbs-tek® white sound®
The safest alarms in the world due to their instant locatability and directional sound. The multi-frequency alarms are only heard in the danger zone, thus eliminating noise nuisance for local residents.



41

bbs-tek® back-up alarms

Model

Part No:

WHITE SOUND® SMART BACK-UP ALARM



SA-BBS-107 - Self-adjusting heavy-duty - 87-107 Decibels

1400

- 12-24Vdc
- IP68
- Size (WxHxD)
172 x 79 x 95mm
6.7 x 3.1 x 3.7 inches
- Lifetime warranty

Features

- Alarm continually adjusts to 5-10dB above ambient
- Multi-frequency broadband sound
- Instantly locatable
- Sound confined to danger area
- Eliminates noise nuisance
- Sounder unit: Driver
- Hole centres: 153mm / 6"

Power

- Current: Max 1 Amp

Durability & standards

- Mechanical vibration: 10G
- Operating temperature: -40 to +85°C / -40 to +185°F
- CE marked
- EMC approved: E
- SAE J994

WHITE SOUND® SMART BACK-UP ALARM



SA-BBS-97 - Self adjusting - medium duty - 77-97 Decibels

1399

SA-BBS-97HV - Self adjusting - electric forklift - 77-97 Decibels

1398

- 12-24Vdc
- 36-80Vdc (HV)
- IP68
- Size (WxHxD)
127 x 76 x 65mm
5 x 3 x 2.5 inches
- Lifetime warranty

Features

- Alarm continually adjusts to 5-10dB above ambient
- Multi-frequency white sound alarm
- Instantly locatable
- Sound confined to danger area
- Eliminates noise nuisance
- Sounder unit: Driver
- Hole centres: 98-108mm / 3.9-4.2"

Power

- Current: Max 1 Amp

Durability & standards

- Mechanical vibration: 10G
- Operating temperature: -40 to +85°C / -40 to +185°F
- CE marked
- EMC approved: E
- SAE J994
- NAS/PIEK approved for night-time delivery

WHITE SOUND® BACK-UP ALARM



BBS-107 - Heavy duty - 107 Decibels

0899

BBS-102 - Heavy duty - 102 Decibels

0898

- 12-24Vdc
- IP68
- Size (WxHxD)
172 x 79 x 95mm
6.8 x 3.1 x 3.7"
- Lifetime warranty

Features

- Multi-frequency broadband sound
- Instantly locatable
- Sound confined to danger area
- Eliminates noise nuisance
- Sounder unit: Driver
- Hole centres: 153mm / 6"

Power

- Current: Max 1 Amps

Durability & standards

- Mechanical vibration: 10G
- Operating temperature: -40 to +85°C / -40 to +185°F
- CE marked
- EMC approved: E
- SAE J994

APPENDIX 4

NOISE MAPPING RESULTS

Noise Map: New Warehouse Noise Prediction

