
Odour Technical Advice Note

Application Reference: F/23/96253

Site: Unit 1, Strategic Park, Hedge End, Southampton, SO30 4DA

Client: F&C Commercial Property Holdings Limited and F50 League GB Ltd

Date: 20th February 2024

1. Introduction

- I.1 The above planning application seeks a proposed change of use of the commercial premises known as Unit 1 within Strategic Park to a more flexible set of uses which includes B2 General Industrial use class. A similar permission was granted for the commercial premises Unit 2 opposite, under planning reference F/22/93417, in February 2023.
- I.2 The new occupier of the premises F50 League GB Ltd (referred to as 'Sail GP' in this note) are a manufacturer of carbon fibre race yachts and associated components. If the plans are approved, the facility will be used to accelerate its research and development programme and to help maintain the cutting-edge F50 catamarans used in Sail GP's global racing series.
- I.3 The Environmental Health Officer during the course of the current planning process has requested further information in relation to odour and dust in relation to the activities associated with the occupier. This technical note and the attached data sheets / additional information provides an assessment of whether there is likely be a local impact as a result of the change of use.
- I.4 The design of the plant to be used within Sail GP's new premises has been carefully chosen to be in line with the air quality section of the National Planning Practice Guidance and IAQM Guidance on the assessment of odour for planning. One of Sail GP's main pillars is sustainability, so the focus has been on getting this right for both the welfare of its staff employed at the premises and mitigating any potential impacts on its neighbours.

2. Activities within the premises & plant

2.1 Oven

- 2.2 The oven shown in the detailed plans is 100% electric and no emissions or VOCs will be released into the atmosphere. All cure is under vacuum bagging technics therefore only clean air will be extracted, we have no external ducting for the oven and all heat will go directly out the top of the outlet, into the shop floor (plan attached in Appendix I). For further details please see:

- [General Arrangement of Oven Plan - C2986 GA Rev 2 CDS Group 30/11/23](#)

2.3 **Wood Working**

- 2.4 Sail GP do minimal woodworking so all dust extraction will be collected locally using large vacuum units and holding bags. Particulate and dust is captured by the holding bag filter, with air recirculated within the building via the HEPA filter.

2.5 **ARES / CNC Machine**

- 2.6 Extraction (aluminium / carbon fibre) particulate / dust is captured by the bag filter with a horizontal vent to the atmosphere.

2.7 **Grinding Room**

- 2.8 There will be no extracts from the Grinding Room externally to the atmosphere. Sail GP are installing several Environmental Control Booths (ECB) in which to carry out these tasks. They work on the principle of re-circulating all of the air within the defined Booth and by bringing the discharged air from the ECB outlet back to the front of the booth to promote laminar flow and create a “push pull system”. The air from the clean side will then push any dust created in the booth to the front to be captured. To achieve this, we are going to put the HEPA filters in a box and then duct with rectangular ducting under the suspended ceiling to the front of the booth.

- 2.9 For further details, please see:

- [Supplier Details from West Midland Filtration \(WMF\) – Dust Collector Details and Extracts & Environmental Policy](#)
- [Environmental Control Booth Details – Donaldson Torit DCE](#)

2.10 **2D Cutter Room**

- 2.11 The occupier is installing the Pegasus 2060 ATC CNC Router where the extraction is self-contained by means of onboard extraction and housed in an ambient extraction bay to ensure a clean job and to minimise cross contamination in the main warehouse. Dust is bagged and disposed of manually.

2.12 **Glue Room**

- 2.13 There is no extraction to the atmosphere from the Glue Room. Sail GP are using a self-contained workbench with built-in fume extractor system. Users simply work on the downdraught bench surface where fumes are drawn down through the extraction bench’s surface, into the internal

filters. Clean air is returned to the room. The types of glue being used is epoxy which is a two part adhesive and we also use epoxy resin systems prepared in the mixing room before being applied. Approximately 500 Litres is used annually.

2.14 For further details, please see:

- [Durepox High Performance Clear Marine Technical Data Sheet](#)
- [Durepox 2K Primer Technical Sheet](#)
- [AMPREG 36 Low Toxicity Premium Wet Laminating System General Datasheet](#)

2.15 **Spray Booth**

2.16 Durepox is the paint system Sail GP use on the boats (data sheet attached). The frequency of painting is not very often as the wing sails are not painted and the platform of the boat has approximately an 8 month build time. Sail GP would only be painting a maximum of two boats per annum. They approximate that 150 Litres of paint is used each year. In terms of cleaning solvents used for wash down or thinners, approximately 50 Litres of solvents is predicted.

2.17 The performance of the spray booth plant has been provided by Todd Engineering the supplier and manufacturer details included. This confirms that the air handling plant is compact and located on top of the extraction chests down on the side of the spray booth.

2.18 The extraction chests are where the filter media is located to provide emissions to meet with the guarantee certificate attached, these comprise of a 50m thick glass fibre paint-stop filter and synthetic pre-filter to capture over-spray and paint particulates.

2.19 The ducting that exits the façade of the building is 630mm diameter and comprises of X2 Extract stacks and X2 Intake Ducts. Whilst normally this would disperse through the roof to clear the building, however it was not possible due to the solar panels on the roof. It has therefore been located horizontally on the northern façade facing the yard area.

2.20 All external plant and all plant that has intake / extract vents to the outside of the building have been included in the Noise Impact Assessment prepared by 24 Acoustics. The spray booth vents have been included in the Noise Impact Assessment prepared, in their correct location, which is from the northern façade of the building, as shown in the elevation drawings of the development.

2.21 The filter specifications, particulate emissions test data for our Zeus spray booth, fan specification datasheet and photos show the internal cabin with filters and plant on the side. These details are listed on the following page:

- Report for the periodic Monitoring of Emissions to Atmosphere, Todd Engineering Zenu Spray Booth
- Technical Data of the fan: REM 11-0560-4W-19-C (Nicotra Gebhardt)
- General Arrangement Plan Drawing Sail GP PD-4941A Todd Engineering Ltd
- Certificate of Conformity Defra PG6/34(11) for Spray Booth Zenus-Todd/SB0001
- Durepox High Performance Clear Technical Data Sheet
- Filter Specification - Synthetic Media – G3 FL200 White
- Photograph Image 01 and 02 of Spray booth enclosure examples

3. Conclusion

- 3.1 We have considered several factors, including the Frequency, Intensity and Duration of any Odours, its Offensiveness and the sensitivity of any Local receptors that live nearby or in the commercial premises opposite. We conclude that the carefully considered detailed design of associated plant and equipment and the low frequency of paint, glue or cleaning solvents used in activities associated with the use, means that the potential risk of odour is very low. Therefore the change of use is considered acceptable in planning terms.

The logo for Fellows Planning is enclosed in a thin, double-lined rectangular border. It features the word "FELLOWS" in a large, brown, serif font. A horizontal line separates "FELLOWS" from the word "PLANNING", which is written in a smaller, brown, serif font with wide letter spacing.

FELLOWS
P L A N N I N G

Fellows Planning Limited

info@fellowsplanning.co.uk

Prepared by Natalie Fellows BA (Hons) MSc MRTPI

Appendix One

Oven

Appendix Two

Grinding Room

Environmental Control Booth



Environmental Control Booth

Powerful, Self-Contained Dust Collection

When finishing large and irregularly shaped parts pushes the limits of your dust collection technology, turn to Donaldson's Environmental Control Booth (ECB). This powerful, flexible and cost-effective self-contained work station is engineered to remove fine airborne dust without interfering with workers movement or visibility. And with Donaldson's patented Ultra-Web® filter media, no other self-contained work station delivers a more powerful and efficient dust filtration system.

Donaldson's ECB is the cost-effective choice for self-contained workstations. It requires no ductwork, reducing installation costs. ECB offers further savings by recirculating the cleaned air, helping to reduce energy costs. And workers can be more productive operating in a cleaner and safer working environment.

Designed as a stand-alone unit, Donaldson's ECB is also the ideal solution for working conditions that call for maximum flexibility. It can increase capacity to match the demands of almost any job, yet it moves easily to accommodate plant layout changes.

ECB Offers:

- **High filtration efficiency with Ultra-Web filters**
- **Removal of fine airborne dust from multiple sources**
- **Freedom of movement and improved vision**
- **Flexibility to increase capacity**
- **Easy mobility**
- **Requires no ductwork**
- **Safely recirculates cleaned air for reduced energy costs**

*Increase
Flexibility
& Productivity
with ECB*



Environmental Control Booth

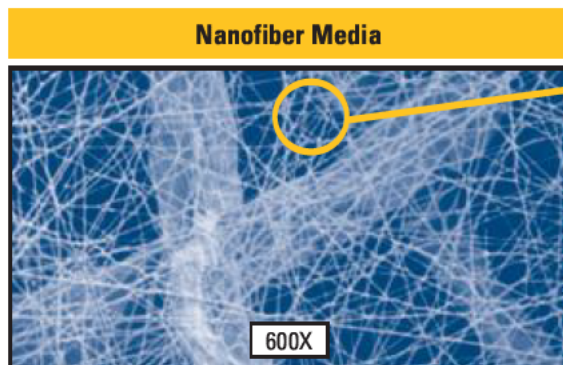
The Ideal Self-Contained Workstation

Donaldson's ECB works by creating a self-contained working environment complete with lighting, sound proofing and built-in dust collection. Workers inside the booth enjoy complete freedom of movement, cleaner air and excellent visibility. Using Ultra-Web filter media with our proprietary nanofiber technology, the powerful filtration capabilities of ECB prevents migration of dust to other parts of the plant, protecting workers outside the booth from the dust and noise generated inside the booth.

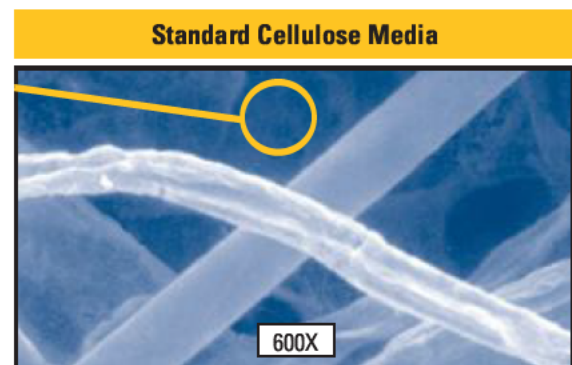


Environmental Control Booth

Nanofiber Filter Media The distinguishing factor in our Ultra-Web and Fibra-Web™ filters is nanofiber filtration technology. It uses a layer of fibers 0.2 to 0.3 microns in diameter to capture contaminants less than one micron in size. With nanofiber filters, dust particles rapidly accumulate on the filter surface to build a thin, permeable dust-stopping cake. As a result, Ultra-Web and Fibra-Web filters offer the highest filtration efficiency by eliminating premature filter plugging and allowing the dust cake's release during the collector's cleaning cycle.



Nanofiber technology is available in all Ultra-Web and Fibra-Web replacement filter cartridges.



Conventional cellulose media has spaces of up to 60 microns between fibers, allowing dust to become deeply imbedded.

Donaldson®

Features And Options

Rely on the world leader in innovative filtration solutions—Donaldson—for dust collectors that meet any air filtration need. With more than 85 years of engineering experience and the most extensive sales and service network throughout Europe, our technical expertise and dedication to our customers is unmatched. Experience the future of dust filtration performance and productivity with Donaldson's ECB.

Standard Features for ECB

- TCB or IPC controller
- Hinged louvered inlet

Equipment Options for ECB

- Booth pack
- Lighting pack
- Magnehelic
- Spark trap inlet
- HEPA afterfilter
- Silencer pack
- Downdraft bench
- Oil/water separator



Donaldson®
FILTRATION SOLUTIONS

Donaldson Europe
Industrial Filtration Solutions
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Tel +32 16 38 38 11
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IAF-europe@donaldson.com
www.donaldson.com

Dust Collector Quotation

SailGP
6th Floor, Kings House
174 Hammersmith Road
London
W6 7JP
UK

FAO – Kevin Bennetts,

In response to this morning's site meeting held between WMF and SailGP representatives, West Midlands Filtration have the pleasure in submitting our revised proposal for the supply and installation of dust extraction equipment as listed below. WMF Ltd have taken steps to reduce our offer by a further 10% as discussed during the meeting to be as competitive as possible. We trust that our offer meets with the approval of the board and look forward working closely to ensure that the supply and installation is a smooth process.

Application Details:

Application	:	ARES CNC Machine Centre Extraction
Air volume/duty	:	8,000 m³/hr
Operating Pressure/Vacuum	:	5,500 Pa (total operating pressure)
Temperature	:	< 30°C
Location	:	Internal.
ATEX Zones:	:	Filter Dirty Chamber : Zone 21.
	:	Filter Clean Chamber : Zone 22.
	:	External : Safe Area.
ATEX Atmosphere	:	Dust – ST3.

Product Details:

Product being handled	:	Aluminium/Carbon Fibre fines.
Particle Size Analysis	:	Not specified.

Collector:

Model	:	WMF- ATEX Titan 18 Horizontal Cartridge Pulse Filter
Filter Media	:	A/S Polyester Media Cartridges
Filter Area	:	180m².
Filtration Velocity	:	0.74 m/min
Filter Cartridge Removal	:	Dirty Side (DSR).
Sections Included	:	Filter Frame, Case Plates, 1 x Hopper, Inlet plenum, fan set & Support Steelwork.
No. of Shipped Parts	:	Filter Main Section, 1 x Hopper, Steelwork,
Filter Mounting Arrangement	:	Free Standing Leg Supports.
Discharge Valve Arrangement	:	1 x rotary valve into bulk bag
Explosion Relief	:	Vertical ER Panel & Switch (see ATEX doc' Note 4).
Differential Pressure Indication	:	Gauge.
Materials of Construction	:	Carbon Steel.

Dust Collector Quotation

Finish	:	Standard outdoor, colour RAL 7000 squirrel grey
Compressed Air Supply	:	6 Bar(g) - Jet Cleaning.
Data Sheet	:	WMF-Titan 18 Horizontal Cartridge Filter

Controls:

Type Included	:	Differential Pressure.
Location	:	Fitted and wired to unit.
Input Voltage	:	240V AC
Output Voltage	:	24V DC

Fan Section:

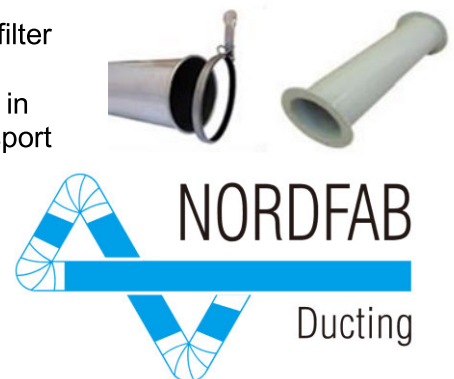
Type	:	Inlet mounted
Model	:	F4
Drive	:	Direct
Duty	:	8,000 ³ /hr.
Pressure	:	5,500 Pa
Fan Motor	:	18.5 kW. IE3.
Fan Silencer	:	Horizontal Discharge.
Noise Level	:	75dB(a) @ 1m from outlet, 1.6m from floor free field. (Note: Site conditions can affect actual noise levels).
Supply Voltage	:	400Volts / 3Phase / 50Hz.
Fan Starter	:	VSD control panel

Special Features:

- Inlet vane separators
- ATEX roof mounted fan set
- ATEX roof mounted explosion relief panel/s
- ATEX ST3 rotary valve.
- ATEX Pulse jet cleaning system

Ducting, Transitions & Supports:

- Nordfab heavy duty fully welded 2mm flanged ducting connecting filter house inlet to NRV outlet
- Nordfab quick clip ducting 0.7mm galvanised steel, correctly sized in accordance with HSG 258 in order to achieve recommended transport velocities from capture points to the inlet side of the NRV, fan exhaust consisting of silencer, includes correctly designed reducing branches within the enclosure connecting manifold in order to maintain correct transport velocities within all sections of the ducting
- Unistrut & threaded rod supports.



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Duct Explosion Protection

To ensure that the flame front does not pass back through the ducting back towards the extraction points WMF Ltd will supply and fit an approved ATEX 355mm diameter NRV damper fitted to heavy duty 2mm flanged ducting prior to the filter house and will be suitably designed for ST3 dusts. Pricing includes a floor mounted support post.



Please note that for any non-serviceable joints (i.e., joints which are not broken after installation), silicon liquid gasket will be provided. Gaskets for connections between the filter unit and any upstream/downstream interfaces are not supplied. Gaskets for serviceable connections (access doors & covers etc.) will be from proprietary rubber seals or closed cell neoprene self-adhesive strip as applicable. We do not supply loose 'cut' gaskets for any joints unless otherwise specified – please advise if you have specific requirements.

Noise levels

Our standard filter package is rated at 75 dB(A) at 1m from the package. This is based on base loading for the fan however this may be louder on start-up. (All measurements will be taken in far field conditions, further reductions are possible at additional cost with higher performance silencer arrangements)

Our standard pulse jet cleaning system will operate at 90 dB(A) for 1 millisecond at an interval of every 2 minutes.

Installation:

Installation on site of dust collector, fan set, enclosure manifold, explosion non-return valve and interconnecting ducting. Installation will be carried out on site by two men for a period of 6 days. Note! Installation excludes:

- Civil/building works. (filter concrete plinth, cutting of holes through building walls)
- Electrical and pneumatic connection works.
- Lifting equipment other than HIAB used for delivery and initial filter placement.

Mechanical & Electrical Commissioning

We include for the services of commissioning engineers to visit site, after the connection of all services have been made, by others. This visit is to ensure the correct operation of the filter unit and to balance the air volumes in the duct system. It is also to ensure the correct operation of the control panel / filter unit interface. All electrical & compressed airline connections must be made by others.

Dust Collector Quotation

Scope of Supply

Description	West Midlands Filtration Ltd	Client
Dust/ Fume extraction Unit	✓	
Hopper & supports	✓	
ATEX Venting	✓	
ATEX Non return valve	✓	
Fan set & Silencer	✓	
Ductwork / Pipework / Hoods	✓	
Ductwork / Pipework Supports	✓	
Control Panel / Inverter / Fan starter	✓	
CAD Drawings	✓	
Site Delivery	✓	
Off-loading of equipment	✓	
HIAB & Driver for off-loading equipment and or positioning and assisting with the installation.	✓	
Lifting equipment and operator	N/A	N/A
Mobile Elevated Work Platform (MEWP)	✓	
Other mobile access equipment (e.g., tower scaffold)	N/A	N/A
Fixed purpose-built scaffold if required	N/A	N/A
Cutting holes in steel clad walls (for ductwork access)		✓
Builders or joiners work such as preparation of foundations, making holes in brick/wood walls and roof penetrations and making good thereafter.		✓
Mechanical Installation	✓	
Compressed air installation		✓
Main electrical supply into the main control panel		✓
All electrical wiring between the main control panel and fan, cleaning controller etc		✓
Commissioning	✓	
Operator & Maintenance Training	✓	
Structural calculations or Building Calculations	N/A	N/A
DSEAR Risk Assessment	N/A	N/A

Dust Collector Quotation

Price Schedule:

1 x ATEX Titan 18 Filter unit, c/w pulse cleaning, extended supports legs, 1 x ST3 rotary valve and 1 x explosion relief panels.

£21,593.68 nett + VAT
(ex-works)

1 x high performance roof mounted ATEX certified centrifugal fan set with a duty of 8,000 m³/hr @ 5,500 Pa.

£4,249.04 nett + VAT
(ex-works)

1 x control panel c/w fan starter (details TBC), RV starter and power supply for pulse cleaning operation, also includes emergency stops for fan and RV's, running lights etc.

£4,448.50 nett + VAT
(ex-works)

1 x inline 355mm diameter ATEX ST3 NRV (non-return valve) explosion damper c/w support post.

£4,118.45 nett + VAT
(ex-works)

1 x set of heavy duty fully welded 2mm flanged ducting for the purpose of connecting the filter inlet to the NRV outlet. 1 x set of Nordfab quick clip ducting for the purpose of connecting the ARES enclosure manifold to the inlet side of the NRV, 1 x inline silencer, includes all necessary supports. Also includes bespoke manifold to connect ARES enclosure outlets to the main ducting.

£9,282.69 nett + VAT
(ex-works)

Installation of Filter, fan, NRV and interconnecting ducting, please refer to scope of supply table for exact details.

£7,793.08 nett + VAT

HIAB delivery (includes shrink wrap and palletising suitable for road transport)

£1,722.00 nett + VAT

Total

£53,207.44 nett + VAT

We make our offer subject to our standard terms and conditions of sale (available on request).

Dust Collector Quotation

Payment Terms:

50% with order (proforma), 25% prior despatch (proforma), 25% within 30 days of ready for despatch.

Supply of Machinery (Safety Regulations 1992):

Equipment supplied will be issued with a declaration of conformity or a declaration of incorporation, as appropriate.

Assuring you of our best attention at all times.

Best Regards,


Paul Barrett
Business Development Manager
Tel: 07511 157370
West Midlands Filtration Ltd

Dust Collector Quotation

Items not explicitly mentioned within the main body of this proposal should be considered as excluded items. Examples of such include but are not limited to items listed below:

Exclusions:

1. Our prices do not include V.A.T.; this will be shown separately on any invoice.
2. All electrical wiring, isolators or provision of power facilities.
3. Electrical wiring or provision of power facilities.
4. Permanent roof access equipment.
5. Ductwork and hoods, unless stated otherwise.
6. Special acoustic treatment: it has been assumed that an industrial noise level will be acceptable, and our tender does not include special treatment.
7. Compressed air services and pipework.
8. Fitting compressed air filter regulator / separator.
9. More than one operating & instruction manual. Manuals are printed in the English language unless otherwise stated. Other languages are available but may be subject to additional cost.
10. Pre-erection storage of our equipment.
11. Off-loading and/or transport from the off-loading point to the place of erection.
12. The dismantling or removal of existing or redundant materials.
13. Builder's work - cutting away, making good, foundations etc.
14. Overtime rates in which we shall be involved, should our staff be requested by you to work out of normal hours.
15. Extra cost which will be incurred if, through no fault of our own, we are unable to complete erection in one unbroken period.
16. Forklift truck and driver.
17. Liability cover above £2,000,000.00 is excluded unless received with quotation request.
18. We exclude liability and indemnity where asbestos has not been advised in writing before commencement of contract.

Dust Collector Quotation

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FAO – Kevin Bennetts,

In response to this morning's site meeting held between WMF and SailGP representatives, West Midlands Filtration have the pleasure in submitting our revised proposal for the supply and installation of dust extraction equipment as listed below. WMF Ltd have taken steps to reduce our offer by a further 10% as discussed during the meeting to be as competitive as possible. We trust that our offer meets with the approval of the board and look forward working closely to ensure that the supply and installation is a smooth process.

Scope of Supply Details:

- 2 x Donaldson – comprising of 1 x ECB-3 and 1 x ECB-2 Filter units, including control panel, ATEX certified, HEPA Filters to exhaust internally.

Application Details

Application: Grinding
Air Volume: 9,900 and 6.600 m³/hour respectively for each booth arrangement
Dust: Various including – carbon fibre, GRP
Media: 378 m² Ultra-Web spun bond anti-static filter cartridges
Dust Explosion Class: KST 199bar/m-1, Pmax 9bar, MIE > 3 mJ
Filtration Velocity: 0.43 m/min
Temperature: < 30° C
Power Requirements: 400 Volts 3 Phase 50 Hertz
Finish: Coated mild steel

Product being handled	:	Various
Particle Size Analysis	:	Not specified.

Filter

To handle this application, we propose 2 x Donaldson ECB power modules comprising of 1 x ECB-3 and 1 x ECB-2 units are manufactured in mild steel with coated finish, complete with Ultra-Web spun bond anti-static filter cartridges, ATEX features including extraction fans complete with CAT 3D 4kW motors, the units will be standalone and be placed within their respective booths, each unit will be supplied as standard with 10 metres fan cable and 10 metres solenoid valve cable our scope includes for joining packs for any site assembly and TCB starter/controller.

Dust Collector Quotation

HEPA Filter

We propose the option for a HEPA Filter outlet in coated mild steel for the recirculation of clean air

Installation:

Installation of the units are to be carried out at site by two men for a period of 4 days, please note! Unless stated otherwise installation will be conducted during normal working weekdays (Monday to Friday). Electrical, pneumatic connections, access and lifting equipment are excluded from our scope of supply.

We assume that a forklift truck and driver will be made available for site positioning of the filter units. Goods will be delivered on a flatbed truck & will require a forklift truck to install. West midlands filtration will provide all applicable Risk Assessments, Method Statements, and any other documentation pertinent to the CDM regulations.

Noise levels

Our standard filter package is rated at 75 dB(A) at 1m from the package. This is based on base loading for the fan however this may be louder on start-up. (all measurements will be taken in far field conditions).

Dust Collector Quotation

Scope of Supply

Description	West Midlands Filtration Ltd	Client
Dust/ Fume extraction Unit	✓	
HEPA secondary filtration	✓	
Fan set & Silencer	✓	
Control Panel / Inverter / Fan starter	✓	
CAD Drawings	✓	
Site Delivery	✓	
Fork lift for off-loading equipment and positioning and assisting with the installation.		✓
Lifting equipment and operator	N/A	N/A
Mobile Elevated Work Platform (MEWP)	N/A	N/A
Other mobile access equipment (e.g., tower scaffold)	N/A	N/A
Fixed purpose-built scaffold if required	N/A	N/A
Cutting holes in steel clad walls (for ductwork access)	N/A	N/A
Builders or joiners work such as preparation of foundations, making holes in brick/wood walls and roof penetrations and making good thereafter.		✓
Mechanical Installation	✓	
Compressed air installation		✓
Main electrical supply into the main control panel		✓
All electrical wiring between the main control panel and fan, cleaning controller etc		✓
Commissioning	✓	
Operator & Maintenance Training	✓	
Structural calculations or Building Calculations	N/A	N/A
DSEAR Risk Assessment	N/A	N/A

Dust Collector Quotation

Price schedule:

2 x Donaldson 1 x ECB-3, 1 x ECB-2 power module
manufactured in mild steel with coated finish, complete with
Ultra-Web spun bond anti-static filter cartridges, ATEX
features including extraction fans complete with CAT 3D 4kW
motors. Scope includes HEPA filtration for safe air return,
joining plates and associated fixings.

£87,299.50 nett + VAT
(ex-works)

Delivery, Installation & Commissioning of 2 x ECB Filter Units,
excludes lifting and access equipment and electrical and
pneumatic works.

£3,283.64 nett + VAT

Total

£90,583.14 nett + VAT

Quoted prices are valid for 30 days from date of quotation.

Delivery: appx' 12 – 14 working weeks from receipt of
purchase order.

We make our offer subject to our standard terms and conditions of sale (available on request).

Payment Terms:

50% with order (proforma), 25% prior despatch (proforma), 25% within 30 days of project completion.

Dust Collector Quotation

Exclusions:

1. Our prices do not include V.A.T.; this will be shown separately on any invoice.
2. All electrical wiring, isolators or provision of power facilities.
3. Electrical wiring or provision of power facilities.
4. Permanent roof access equipment.
5. Craneage/Scaffolding/Access/Lifting equipment.
6. Special acoustic treatment: it has been assumed that an industrial noise level will be acceptable, and our tender does not include special treatment.
7. Compressed air services and pipework.
8. Fitting compressed air filter regulator / separator.
9. More than one operating & instruction manual. Manuals are printed in the English language unless otherwise stated. Other languages are available but may be subject to additional cost.
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11. Off-loading and/or transport from the off-loading point to the place of erection.
12. The dismantling or removal of existing or redundant materials.
13. Builder's work - cutting away, making good, foundations etc.
14. Overtime rates in which we shall be involved, should our staff be requested by you to work out of normal hours.
15. Extra cost which will be incurred if, through no fault of our own, we are unable to complete erection in one unbroken period.
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Supply of Machinery (Safety Regulations 1992):

Equipment supplied will be issued with a declaration of conformity or a declaration of incorporation, as appropriate.

Assuring you of our best attention at all times.

Best Regards,


Paul Barrett
Business Development Manager
Tel: 07511 157370
West Midlands Filtration Ltd

West Midlands Filtration LTD **Environmental Policy Statement**

Introduction and aim

West Midlands Filtration Ltd is a Dust & Fume Extraction business, operating from a site in Tamworth Staffordshire. Our main services are LEV, Ducting Installations, Fabrication & Dust collector manufacturer. We recognise that our operations result in emissions to air and water, and the generation of waste. It is our aim to comply with legislation and other requirements, continue to reduce the environmental impacts of our business and operate in an environmentally responsible manner. This policy describes how we will achieve our aim.

Responsibility

This environmental policy applies to all of our operations including management, office services, site operations, and procurement. Liam Eyre, Managing Director has overall responsibility for ensuring that sufficient resources are made available to enable the business to achieve our environmental objectives and targets and that the policy is implemented.

Liam Eyre, Managing Director has the day-to-day responsibility for ensuring that the requirements of this policy are being followed and for monitoring the effectiveness of the objectives. However, all employees have a responsibility in their area to ensure that the aims and objectives of the policy are met.

Objectives

During 2023 and 2024, we aim to:

- make efficient use of natural resources by conserving energy and water, minimising waste and recycling where possible.
- meet our duty of care requirements in relation to waste by ensuring the safe keeping, transportation and subsequent recovery or disposal of waste
- use recycled construction materials whenever these can be commercially justified
- keep transport use to a minimum and regularly service vehicles to maintain their efficiency
- work with suppliers to ensure they recognise and reduce the environmental impact of their products and transportation
- include environmental considerations in investment decisions for new plant, equipment or working practices
- inform and train all employees of the companies' environmental objectives and how they can assist in meeting targets
- use the most environmentally friendly cleaning products whenever possible

Targets

To achieve our aims, we have set ourselves the following targets:

- reduce vehicle emissions to air by the scheduling of work to reduce mileage and servicing all vehicles
- reduce the generation of general and hazardous wastes by reducing the amount of stock held in stores and ensuring all jobs are accurately scoped and priced to ensure material usage is minimised
- recycle as much paper, cardboard, plastic and metal waste generated in the office as possible
- reduce paper usage by increasing the use of e-mail and electronic documentation
- reduce energy consumption by monitoring energy usage and training staff on basic housekeeping

Monitoring and auditing

Progress against these objectives will be monitored through a number of mediums including:

- Annual management review of this environmental policy and any associated environmental procedures
- Regular internal audits of environmental procedures
- The monitoring of environmental objectives and associated KPI's / targets
- Monthly management meetings.

Communication

This environmental policy is available at Tamworth office Health & Safety Board All members of staff will receive training on the environmental responsibilities of their role and will be informed of any updates or revisions via e-mail or team meetings.

Liam Eyre

Position: Managing Director

Date: 25-10-23

Date of next review 25-10-24

Appendix Three

Glue Room

AMPREG™ 36

LOW TOXICITY PREMIUM WET LAMINATING SYSTEM

- ▣ Uniform 100:29 resin to hardener mix ratio by weight across range of hardener speeds
- ▣ Premium laminating resin offering:
 - Improved fabric impregnation with lower initial mixed viscosity
 - Faster mechanical property generation at ambient cure
 - High flexural properties without compromising tensile performance
- ▣ Low Toxicity Ampreg™ 3X Hardener Formulations
 - Improved Hazard Labelling and Environmentally Non-hazardous
 - Non-CMR and SVHC Free**
- ▣ Formulated with Gurit LRT (Light Reflective Technology) as standard

INTRODUCTION

Ampreg™ 36 is Gurit's premium epoxy laminating system and is particularly suitable for the manufacture of large, high-performance composite structures, whilst offering improved health and safety through the careful selection of low toxicity raw materials. The product's superior laminate mechanical properties and high Tg's achievable from modest post-cures, make it well suited for heavily loaded applications, particularly those where a little extra thermal performance is required.

Ampreg™ 36 is optimised for use in hand-lay up and vacuum bagging processes, but can also be used in other processes such as RTM, vacuum infusion, pultrusion and filament winding. Ampreg™ 36 is recognised worldwide as the premium laminating system for the manufacture of racing sailboats, and high performance, one-off cruising boats. This system is available with a range of hardener speeds, from Fast to Extra Slow and in a wide range of formats from small pack sizes to drums and IBCs. The unique formulation offers improved health & safety through the careful selection of low toxicity raw materials as well as Light Reflective Technology which in conjunction with a UV light-source can detect droplets as small as 1mm for easy identification of contamination to improve industrial hygiene.

SYSTEM PROPERTIES AT 25°C		MIXED VISCOSITY*	150g POT-LIFE*	EARLIEST TIME TO APPLY VACUUM*	LATEST TIME TO APPLY VACUUM*	EARLIEST DEMOULD TIME*	PAGE
Ampreg™ 36 Resin	Product Information, Instructions for Use and Health & Safety						2
	Ampreg™ 3X Fast Hardener	700 cP	½ hour	1 ½ hours	2 hours	2 ¾ hours	4
	Ampreg™ 3X Standard Hardener	450 cP	1 hour	2 ¼ hours	3 hours	5 ¾ hours	5
	Ampreg™ 3X Slow Hardener	275 cP	3 ½ hours	3 ½ hours	4 ½ hours	13 hours	6
	Ampreg™ 3X Extra-slow Hardener	200 cP	6 hours	4 ¾ hours	5 ¾ hours	21 hours	7

**working time properties are highly subjective to ambient conditions and should be used as an approximate guideline for all Ampreg 36 systems at 25°C. Please refer to the corresponding page of this document for specific testing methods used.*

****CMR = Substances classified as Carcinogenic, Mutagenic or toxic for Reproduction**
SVHC = Substances of Very High Concern

PRODUCT INFORMATION

AVAILABILITY

The product is available in a number of formats please contact your local customer support representative for more information.

TRANSPORT & STORAGE

The resin and hardeners should be kept in securely closed containers during transport and storage. Any accidental spillage should be soaked up with sand, sawdust, cotton waste or any other absorbent material. The area should then be washed clean (see appropriate Safety Data Sheet).

COMPONENT	UNITS	10 – 25°C
Ampreg™ 36 Resin	months	24
Ampreg™ 3X Hardeners	months	24

Adequate long term storage conditions will result in a shelf life of 2 years for both the resin and hardeners. Storage should be in a warm dry place out of direct sunlight and protected from frost. The storage temperature should be kept constant between 10°C and 25°C, cyclic fluctuations in temperature can cause crystallization. Containers should be firmly closed. Hardeners, in particular, will suffer serious degradation if left exposed to air.

INSTRUCTIONS FOR USE

The product is optimised for use at temperatures between 18 and 25°C. At lower temperatures the product thickens and may become unworkable. At higher temperatures working times will be significantly reduced. Maximum relative humidity for use is 70%.

MOULD RELEASE

Smooth metal and GFRP mould tests have shown that suitable release can be obtained by use of 5-6 waxings of a carnauba based wax e.g. Polywax. Use PVA for less well prepared or more complex surfaces. The highest quality surface can normally be generated by using semi-permanent release systems like TR 920 (TR Industries) or PMR EZ (Chemlease).

Before the application of the release agent onto a new mould it should be sealed and primed, this is also true if an old mould have had its released agents stripped and a new system applied. It is suggested that a complete system is purchased from a single manufacture to ensure there are no compatibility issues. A low VOC (Volatile Organic Chemical) option is water based systems like chemlease 5051W or 5016W which will not generate class A surface finish but will help to reduce VOC release in moulding areas. Whichever mould release is proposed it is recommended that a test laminate is laid up under production conditions and time scales, in order to ensure an adequate and effective part release.

MIXING AND HANDLING

Accurate measurement and thorough mixing are essential when using this system, and any deviation from the prescribed mix ratios will seriously degrade the physical properties of the cured system. Ampreg™ 3X Fast and Extra-slow hardeners can be blended in order to achieve intermediate speeds as indicated in the table (right). When blending hardeners, it is recommended that the hardener components are dispensed and mixed together for approximately 2 minutes before the addition to the resin.

Hardener	Fast	Standard	Slow	Extra-slow
Ampreg 3X Fast	100%	67%	25%	0%
Ampreg 3X Extra-slow	0%	33%	75%	100%

The resin and hardener must be stirred well for two minutes or more, with particular attention being paid to the sides and bottom of the container. As soon as the material is mixed the reaction begins. This reaction produces heat (exothermic), which will in turn accelerate the reaction. If this mixed material is left in a confined mixing vessel the heat cannot disperse and the reaction will become uncontrollable.

APPLICATION

The mixed system is usually applied by foam roller from a roller tray. Accurate fibre volume fractions can be obtained by applying a known weight of mixed resin / hardener to each fabric / fibre layer. As a general rule of thumb, resin weight per square metre must be no more than, and preferably less than, the area weight of the fabric being wet out. If the laminate is particularly thick, it is recommended that slower hardeners are used for laminating the first layers and faster hardeners in the later layers. In this way the whole thickness laid down remains workable for approximately the same time. For further advice, please contact Gurit Technical Support.

BONDING TECHNIQUES & PEEL PLY

It is recommended to use nylon peel ply for any secondary bonding applications. Peel Ply is typically used on laminate surfaces which need to be left to cure or partially cure before further laminating or bonding operations. The peel ply serves two functions - preventing the surface from becoming contaminated and / or damaged, and providing a 'textured' surface that can reduce the level of preparation required for the secondary laminating or bonding operations. After curing and just prior to bonding, the Peel Ply is stripped off leaving a clean, dust and grease free surface, with an already 'textured' surface which makes the 'keying' process less time consuming. Gurit recommends the use of a 80 -100g/m.sq scoured and heat set Nylon peel ply. Any proposed peel ply should be tested prior to use to ensure that it not only releases adequately from the laminated surface but also does not leave any residues behind which may impair adhesion. If in doubt please contact Gurit Technical Support.

VACUUM BAG TECHNIQUES

Consolidation of the laminate can be obtained either by hand using paddle rollers or by vacuum or pressure bags. A typical vacuum bag arrangement is shown in figure 1. It is important when using high vacuums and using the slower hardeners that vacuum is not applied until at least 50% into the mixed system working time, as applying the vacuum earlier may result in excessive resin flow and resin starved laminates. For advice on effective vacuum bag consolidation, please contact Gurit Technical Support.

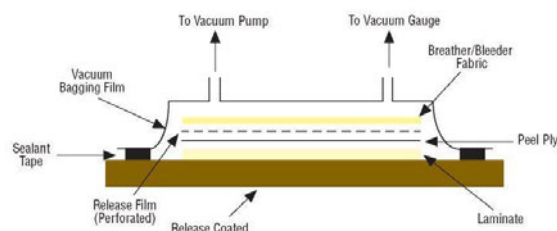


Figure 1

CURING SCHEDULE

AMBIENT TEMPERATURE CURE

The system has been developed to provide good mechanical properties after an ambient only cure. The minimum recommended cure temperature is 18°C. Excellent mechanical/thermal properties can be achieved after a slightly elevated temperature post-cure. An initial cure of at least 48 hours (with slow hardener) or 16 hours (with fast hardener) at 18°C is recommended before demoulding.

When using the Slow, Extra Slow or High Tg Hardeners exclusively, an elevated temperature postcure is strongly recommended.

ELEVATED TEMPERATURE CURE

Post curing the laminate will greatly increase mechanical/thermal properties. The system will achieve similar properties with a cure of 5 hours at 70 - 80°C or 16 hours at 50°C. The latter temperature is easily achievable with low cost heating and insulation techniques.

The post cure need not be carried out immediately after laminating. It is possible to assemble several composite components and post-cure the entire assembly together. It is recommended, however, that elevated temperature curing should be completed before any further painting / finishing operations. Furthermore, care should be taken to adequately support the laminate if it is to be post cured after demoulding, and the laminate must be allowed to cool before the support is removed.

When postcuring it is recommended to use a ramp rate of 10°C/hour when heating from ambient to the postcure temperature, to ensure that the thermal performance of the laminate stays ahead of the oven temperature. Higher ramp rates may result in the resin softening and distortion of the part.

HEALTH AND SAFETY

The following points must be considered:

1. Skin contact must be avoided by wearing protective gloves. Gurit recommends the use of disposable nitrile gloves for most applications. The use of barrier creams is not recommended, but to preserve skin condition a moisturising cream should be used after washing.
2. Overalls or other protective clothing should be worn when mixing, laminating or sanding. Contaminated work clothes should be thoroughly cleaned before re-use.
3. Eye protection should be worn if there is a risk of resin, hardener, solvent or dust entering the eyes. If this occurs flush the eye with water for 15 minutes, holding the eyelid open, and seek medical attention.
4. Ensure adequate ventilation in work areas. Respiratory protection should be worn if there is insufficient ventilation. Solvent vapours should not be inhaled as they can cause dizziness, headaches, loss of consciousness and can have long term health effects.
5. If the skin becomes contaminated, then the area must be immediately cleansed. The use of resin-removing cleansers is recommended. To finish, wash with soap and warm water. The use of solvents on the skin to remove resins etc must be avoided.
Washing should be part of routine practice:
 - ▢ before eating or drinking
 - ▢ before smoking
 - ▢ before using the lavatory
 - ▢ after finishing work
6. The inhalation of sanding dust should be avoided and if it settles on the skin then it should be washed off. After more extensive sanding operations a shower/bath and hair wash is advised.

APPLICABLE RISK & SAFETY PHRASES

Gurit produces a separate full Safety Data Sheet for all hazardous products. Please ensure that you have the correct SDS to hand for the materials you are using before commencing work.

LIGHT REFLECTIVE TECHNOLOGY

Gurit Light Reflective Technology (LRT) is formulated into the resin, and has been introduced to minimise workers' exposure to hazardous chemicals. This unique formulation:

- ▢ Causes the resin and mixed system to fluoresce under UV light
- ▢ Enables droplets of resin <1mm to be detected
- ▢ Allows contamination outside the workshop to be traced
- ▢ Facilitates users to put safer working practices in place
- ▢ Reduces the risk and occurrence of workplace skin sensitisation
- ▢ Does not change mixing, handling or cured properties

Low power UV lamp technology with a suitable power rating intended for routine exposure to human skin and eyes is low-cost and widely available. H&S procedures can be further developed in conjunction with "vision" systems in order to automatically detect potential contamination.

AMPREG™ 36 RESIN & AMPREG™ 3X FAST HARDENER

This 1 page product summary is intended for use in conjunction with further advice provided under the Instructions for Use section. All data has been generated from typical production material and does not constitute a product specification.

MIXING AND HANDLING

PROPERTY	UNITS	AMPREG™ 36 RESIN	FAST HARDENER	MIXED SYSTEM	TEST METHOD
Colour	-	Colourless	Dark Orange	Orange	-
Mix ratio by weight	Parts by weight	100	29	-	-
Mix ratio by volume	Parts by volume	100	34	-	-
Density at 21 °C	g/cm ³	1.15	1.00	1.13	ISO 1183-1B

COMPONENT & MIXED SYSTEM PROPERTIES*

PROPERTY	UNITS	15°C	20°C	25°C	30°C	TEST METHOD
Ampreg™ 36 Resin Viscosity	cP	3220	1840	1050	585	-
Ampreg™ 3X Fast Hardener Viscosity	cP	900 - 1000	500 - 600	300 - 500	150 - 250	-
Initial Mixed System Viscosity	cP	-	-	696	-	-
Pot-life (150 g, mixed in water)	hrs:min	-	-	25	-	Tecam Gel Time
Earliest Time To Apply Vacuum	hrs:min	-	-	01:26	-	Internal Gurit Method
Latest Time To Apply Vacuum	hrs:min	-	-	01:54	-	Internal Gurit Method
Earliest Demould Time	hrs:min	-	-	02:46	-	Internal Gurit Method

CURED RESIN MECHANICAL AND THERMAL PROPERTIES

PROPERTIES	SYMBOL	UNITS	28 DAYS AT 21°C	16 HOURS AT 50°C**	TEST STANDARD
Glass Transition Temperature	T _{g2}	°C	57	79	ISO 11357 (DSC)
Ultimate Glass Transition Temp.	UT _{g2}	°C	-	98	ISO 11357 (DSC)
Cured Density	ρ _{CURED}	g/cm ³	-	1.18	ISO 1183-1A
Linear Shrinkage	-	%	-	1.37	ISO 1183-1A
28 Day Water Uptake	-	%	0.9	TBC	In accordance with ISO 62
Tensile Strength	σ _T	MPa	64	85	ISO 527-2
Tensile Modulus	E _T	GPa	3.82	3.51	ISO 527-2
Tensile Strain	ε _T	%	2.29	5.72	ISO 527-2
3-point flexural strength	σ _F	N/mm ²	89	135	ISO 178
3-point flexural modulus	E _F	GPa	2.96	3.61	ISO 178
3-point flexural Strain	ε _F	%	3.27	8.33	ISO 178

CURED LAMINATE MECHANICAL PROPERTIES

PROPERTIES	SYMBOL	UNITS	28 DAYS AT 21°C	16 HOURS AT 50°C**	TEST STANDARD
Fibre Volume Fraction	V _{FVF}	%	34.5	35.3	ASTM D 3171 Method II
ILSS***	X _{ILSS}	MPa	46.7	47.8	ISO 14130
ILSS (after 7 days in water)***	X _{ILSS}	MPa	-	45.6	ISO 14130

*working time properties are highly subjective to ambient conditions and should be used as an approximate guideline for all Ampreg™ 36 systems

**initial cure of 24 hours at 21°C

***laminate construction: 8 plies of RE301H8, 50% resin content by weight

AMPREG™ 36 RESIN & AMPREG™ 3X STANDARD HARDENER

This 1 page product summary is intended for use in conjunction with further advice provided under the Instructions for Use section. All data has been generated from typical production material and does not constitute a product specification.

MIXING AND HANDLING

PROPERTY	UNITS	AMPREG™ 36 RESIN	STANDARD HARDENER	MIXED SYSTEM	TEST METHOD
Colour	-	Colourless	Very Dark Orange	Orange	-
Mix ratio by weight	Parts by weight	100	29	-	-
Mix ratio by volume	Parts by volume	100	35	-	-
Density at 21 °C	g/cm ³	1.15	1.00	1.13	ISO 1183-1B

COMPONENT & MIXED SYSTEM PROPERTIES*

PROPERTY	UNITS	15 °C	20 °C	25 °C	30 °C	TEST METHOD
Ampreg™ 36 Resin Viscosity	cP	3220	1840	1050	585	-
Ampreg™ 3X Standard Hardener Viscosity	cP	200 - 300	150 - 200	100 - 150	50 -100	-
Initial Mixed System Viscosity	cP	-	-	446	-	-
Pot-life (150 g, mixed in water)	hrs:min	-	-	60	-	Tecam Gel Time
Earliest Time To Apply Vacuum	hrs:min	-	-	02:19	-	Internal Gurit Method
Latest Time To Apply Vacuum	hrs:min	-	-	02:59	-	Internal Gurit Method
Earliest Demould Time	hrs:min	-	-	05:49	-	Internal Gurit Method

CURED RESIN MECHANICAL AND THERMAL PROPERTIES

PROPERTIES	SYMBOL	UNITS	28 DAYS AT 21 °C	16 HOURS AT 50 °C**	TEST STANDARD
Glass Transition Temperature	T _{g2}	°C	58	77	ISO 11357 (DSC)
Ultimate Glass Transition Temp.	UT _{g2}	°C	-	95	ISO 11357 (DSC)
Cured Density	ρ _{CURED}	g/cm ³	-	1.18	ISO 1183-1A
Linear Shrinkage	-	%	-	1.40	ISO 1183-1A
28 Day Water Uptake	-	%	0.8	TBC	In accordance with ISO 62
Tensile Strength	σ _T	MPa	53	81	ISO 527-2
Tensile Modulus	E _T	GPa	3.90	3.48	ISO 527-2
Tensile Strain	ε _T	%	1.64	5.97	ISO 527-2
3-point flexural strength	σ _F	N/mm ²	80	130	ISO 178
3-point flexural modulus	E _F	GPa	3.46	3.54	ISO 178
3-point flexural Strain	ε _F	%	2.40	9.30	ISO 178

CURED LAMINATE MECHANICAL PROPERTIES

PROPERTIES	SYMBOL	UNITS	28 DAYS AT 21 °C	16 HOURS AT 50 °C**	TEST STANDARD
Fibre Volume Fraction	V _{FVF}	%	36.8	36.5	ASTM D 3171 Method II
ILSS***	X _{ILSS}	MPa	48.5	50.3	ISO 14130
ILSS (after 7 days in water)***	X _{ILSS}	MPa	-	49.2	ISO 14130

*working time properties are highly subjective to ambient conditions and should be used as an approximate guideline for all Ampreg™ 36 systems

**initial cure of 24 hours at 21 °C

***laminate construction: 8 plies of RE301H8, 50% resin content by weight

AMPREG™ 36 RESIN & AMPREG™ 3X SLOW HARDENER

This 1 page product summary is intended for use in conjunction with further advice provided under the Instructions for Use section. All data has been generated from typical production material and does not constitute a product specification.

MIXING AND HANDLING

PROPERTY	UNITS	AMPREG™ 36 RESIN	SLOW HARDENER	MIXED SYSTEM	TEST METHOD
Colour	-	Colourless	Burnt Orange	Yellow	-
Mix ratio by weight	Parts by weight	100	29	-	-
Mix ratio by volume	Parts by volume	100	36	-	-
Density at 21 °C	g/cm ³	1.15	1.00	1.11	ISO 1183-1B

COMPONENT & MIXED SYSTEM PROPERTIES*

PROPERTY	UNITS	15 °C	20 °C	25 °C	30 °C	TEST METHOD
Ampreg™ 36 Resin Viscosity	cP	3220	1840	1050	585	-
Ampreg™ 3X Slow Hardener Viscosity	cP	34 - 42	24 - 34	20 - 30	14 - 20	-
Initial Mixed System Viscosity	cP	-	-	276	-	-
Pot-life (150 g, mixed in water)	hrs:min	-	-	03:35	-	Tecam Gel Time
Earliest Time To Apply Vacuum	hrs:min	-	-	03:32	-	Internal Gurit Method
Latest Time To Apply Vacuum	hrs:min	-	-	04:26	-	Internal Gurit Method
Earliest Demould Time	hrs:min	-	-	13:04	-	Internal Gurit Method

CURED RESIN MECHANICAL AND THERMAL PROPERTIES

PROPERTIES	SYMBOL	UNITS	28 DAYS AT 21 °C	16 HOURS AT 50 °C**	TEST STANDARD
Glass Transition Temperature	T _{g2}	°C	57	70	ISO 11357 (DSC)
Ultimate Glass Transition Temp.	UT _{g2}	°C	-	94	ISO 11357 (DSC)
Cured Density	ρ _{CURED}	g/cm ³	-	1.17	ISO 1183-1A
Linear Shrinkage	-	%	-	1.63	ISO 1183-1A
28 Day Water Uptake	-	%	0.8	TBC	In accordance with ISO 62
Tensile Strength	σ _T	MPa	52	78	ISO 527-2
Tensile Modulus	E _T	GPa	3.69	3.37	ISO 527-2
Tensile Strain	ε _T	%	1.69	5.58	ISO 527-2
3-point flexural strength	σ _F	N/mm ²	83	126	ISO 178
3-point flexural modulus	E _F	GPa	3.60	3.46	ISO 178
3-point flexural Strain	ε _F	%	2.43	10.2	ISO 178

CURED LAMINATE MECHANICAL PROPERTIES

PROPERTIES	SYMBOL	UNITS	28 DAYS AT 21 °C	16 HOURS AT 50 °C**	TEST STANDARD
Fibre Volume Fraction	V _{FVF}	%	37.3	35.9	ASTM D 3171 Method II
ILSS***	X _{ILSS}	MPa	45.3	51.1	ISO 14130
ILSS (after 7 days in water)***	X _{ILSS}	MPa	-	50.5	ISO 14130

*working time properties are highly subjective to ambient conditions and should be used as an approximate guideline for all Ampreg™ 36 systems

**initial cure of 24 hours at 21 °C

***laminate construction: 8 plies of RE301H8, 50% resin content by weight

AMPREG™ 36 RESIN & AMPREG™ 3X EXTRA-SLOW HARDENER

This 1 page product summary is intended for use in conjunction with further advice provided under the Instructions for Use section. All data has been generated from typical production material and does not constitute a product specification.

MIXING AND HANDLING

PROPERTY	UNITS	AMPREG™ 36 RESIN	EXTRA-SLOW HARDENER	MIXED SYSTEM	TEST METHOD
Colour	-	Colourless	Colourless / Pale Yellow	Colourless / Pale Yellow	-
Mix ratio by weight	Parts by weight	100	29	-	-
Mix ratio by volume	Parts by volume	100	36	-	-
Density at 21 °C	g/cm ³	1.15	0.95	1.10	ISO 1183-1B

COMPONENT & MIXED SYSTEM PROPERTIES*

PROPERTY	UNITS	15 °C	20 °C	25 °C	30 °C	TEST METHOD
Ampreg™ 36 Resin Viscosity	cP	3220	1840	1050	585	-
Ampreg™ 3X Extra-Slow Hardener Viscosity	cP	18 - 28	15 - 20	5 - 15	5 - 10	-
Initial Mixed System Viscosity	cP	-	-	209	-	-
Pot-life (150 g, mixed in water)	hrs:min	-	-	06:06	-	Tecam Gel Time
Earliest Time To Apply Vacuum	hrs:min	-	-	04:40	-	Internal Gurit Method
Latest Time To Apply Vacuum	hrs:min	-	-	05:43	-	Internal Gurit Method
Earliest Demould Time	hrs:min	-	-	21:18	-	Internal Gurit Method

CURED RESIN MECHANICAL AND THERMAL PROPERTIES

PROPERTIES	SYMBOL	UNITS	28 DAYS AT 21 °C	16 HOURS AT 50 °C**	TEST STANDARD
Glass Transition Temperature	T _{g2}	°C	56	69	ISO 11357 (DSC)
Ultimate Glass Transition Temp.	UT _{g2}	°C	-	93	ISO 11357 (DSC)
Cured Density	ρ _{CURED}	g/cm ³	-	1.16	ISO 1183-1A
Linear Shrinkage	-	%	-	1.65	ISO 1183-1A
28 Day Water Uptake	-	%	0.8	-	In accordance with ISO 62
Tensile Strength	σ _T	MPa	51	78	ISO 527-2
Tensile Modulus	E _T	GPa	3.86	3.45	ISO 527-2
Tensile Strain	ε _T	%	1.62	5.05	ISO 527-2
3-point flexural strength	σ _F	N/mm ²	94	126	ISO 178
3-point flexural modulus	E _F	GPa	3.51	3.53	ISO 178
3-point flexural Strain	ε _F	%	3.32	9.84	ISO 178

CURED LAMINATE MECHANICAL PROPERTIES

PROPERTIES	SYMBOL	UNITS	28 DAYS AT 21 °C	16 HOURS AT 50 °C**	TEST STANDARD
Fibre Volume Fraction	V _{FVF}	%	40.1	39.7	ASTM D 3171 Method II
ILSS***	X _{ILSS}	MPa	41.5	46.3	ISO 14130
ILSS (after 7 days in water)***	X _{ILSS}	MPa	-	44.4	ISO 14130

*working time properties are highly subjective to ambient conditions and should be used as an approximate guideline for all Ampreg™ 36 systems

**initial cure of 24 hours at 21 °C

***laminate construction: 8 plies of RE301H8, 50% resin content by weight

NOTICE

All advice, instruction or recommendation is given in good faith but the selling Gurit entity (the Company) only warrants that advice in writing is given with reasonable skill and care. No further duty or responsibility is accepted by the Company. All advice is given subject to the terms and conditions of sale (the Conditions) which are available on request from the Company or may be viewed at Gurit's Website: www.gurit.com/terms-and-conditions.aspx

The Company strongly recommends that Customers make test panels in the final process conditions and conduct appropriate testing of any goods or materials supplied by the Company prior to final use to ensure that they are suitable for the Customer's planned application. Such testing should include testing under conditions as close as possible to those to which the final component may be subjected. The Company specifically excludes any warranty of fitness for purpose of the goods other than as set out in writing by the Company. Due to the varied nature of end-use applications, the Company does, in particular, not warrant that the test panels in the final process conditions and/or the final component pass any fire standards.

The Company reserves the right to change specifications and prices without notice and Customers should satisfy themselves that information relied on by the Customer is that which is currently published by the Company on its website. Any queries may be addressed to the Technical Services Department.

Gurit is continuously reviewing and updating literature. Please ensure that you have the current version by contacting your sales contact and quoting the revision number in the bottom left-hand corner of this page.

TECHNICAL CONTACT INFORMATION

For all other enquiries such as technical queries:

Telephone	+ 44 1983 828000 (08:30 – 17:00 GMT)
Email	technical.support@gurit.com

24-HOUR CHEMICAL EMERGENCY NUMBER

For advice on chemical emergencies, spillages, fires or exposures:

Europe	+44 1273 289451
Americas	+1 646 844 7309
APAC	+65 3158 1412

E customer.support@gurit.com

W www.gurit.com

Always use correct Personal Protective Equipment

DUREPOX HIGH PERFORMANCE CLEAR

Marine TDS

Description

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Durepox High Performance Clear is a unique 2-pack epoxy urethane clear formulated for the Marine market as a direct to substrate clear or in conjunction with Durepox 2K Primer.

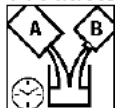
Durepox High Performance Clear is extensively used in the general marine and racing yacht market in particular. Also the product of choice for the competition marine market such as America's Cup racing and many other domestic and international regattas.

Durepox High Performance Clear Features:

- Used with Durepox 2K primer as a topcoat or mixed in during the last coat application.
- Excellent adhesion to a variety of substrates.
- UV Stable.
- Excellent Filling properties & gloss level.
- Long term hold out.

Limitations: Durepox High Performance Clear is **not** recommended for the domestic pleasure craft market above or below the water line for permanently moored or exposed to the weather.

Best practice is to always test a small area to confirm substrate compatibility and desired finish.

Products


Product Type:	Epoxy Urethane Clear
Colour:	Slightly Yellow Tone with a full 4L can.
Pot Life:	45 min with Durepox Hardener & reducer at 20°C
Induction Time:	5-10 Minutes
Density:	0.95-1.00 kg/L.
Recommended DFT:	25-35 microns DFT PER COAT
Theoretical Coverage:	10m ² /L @ 40 Microns DFT

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Always use correct Personal Protective Equipment

Properties

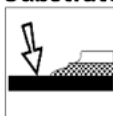


VOC: 515 g/L
Volume Solids: 41% (non catalysed)
Dry Time @ 20°C: 2hr detail sand and recoat.
 Touch Dry: 1 Hour
 Handle: 12 Hours

Recoat-ability

Self recoat @ 20°C: between 0 and 2 hours. After 2 hours must be detail sanded to ensure intercoat adhesion. Like most 2 pack products the higher the temperature the shorter the pot life.

Substrates



Durepox High Performance Clear can be applied over pigmented Durepox Primer or directly over correctly prepared:

- G.R.P. (Fibreglass)
- Carbon Fibre.
- Pigmented Durepox.
- Veneer coated ply wood & most wood finishes.

Note:

Satin Finishes:

It is possible to reduce the gloss of Durepox High Performance Clear to a satin finish of 35% gloss with the addition of 2% by weight of AF41 matting powder (Available to be shaken in from RALI Auckland, Christchurch and Wellington sites). Highly recommend a test sample to be done first, judge gloss level after 48 hr for an accurate indication of gloss level.

Surface

Preparation



Carbon Fibre:

Wash with warm detergent solution e.g. C-Power solution. Degrease with Wax & Grease Remover. Abrade with 120-180 grit dry sandpaper, finish with P400. Remove dust and wipe clean with Wax & Grease Remover and or IPA spirit wipe. Apply Durepox High Performance Clear.

After full cure sand and recoat if necessary for desired finish.

Wood and MDF Board Composites:

Clean all timber surfaces to be coated after final sanding. Strongly advise testing a small area for coating success due to the amount of variables in veneers & timbers.

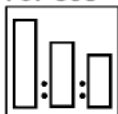
Ensure substrates are dirt, dust & grease free. Depending on the particular wood substrate most can be coated on day one, left for overnight drying in warm temperatures (at least 20°C) followed by final sanding of P400 grit detail dry sand and recoated the following day.

After full cure sand and recoat if necessary for desired finish.

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Always use correct Personal Protective Equipment

Directions For Use



Mixing Ratio:

4 parts Durepox HP Clear
(Volume) to 1 part Durepox Hardener

Thinning:

Up to 20 – 40% 400, 909 Fast or 400 Slow Reducer

Note

Lower temperatures will slow drying; adding of up to 5% by volume of RALI 62C Accelerator will approximately halve curing and pot life times. Reduce addition to 1-2% RALI 62C Accelerator when drying with IR lamps. Misuse of 62C Accelerator can cause loss of adhesion and poor flow-out.

High temperatures can accelerate drying time and reduce pot life, the use of 400 slow reducer can help in these circumstances. Always be mindful of recoat times in warm conditions as in over 25 deg C.

Spray Equipment:



Compliant / Conventional suction and gravity feed guns.

Tip Size: 1.5 - 2 mm

Spray pressure: 275-380KPA (40-55 PSI)

Number of coats: 2 coats (5-10 minutes flash between coats)

Air less / Air assisted airless & electrostatic follow equipment manufacturer's recommendations.

Although Durepox High Performance Clear can be applied without thinning, best results are obtained by thinning up to 20% by volume with 400, 909 Fast or 400 Slow Reducer. This allows for different gun set-ups and techniques, and assists flow and levelling.

Remarks: Do not use activated material beyond pot life time or by reducing it further to get the viscosity down again. This procedure results in poor flow and adhesion failures.

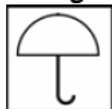
Large surface areas in conjunction with temperatures +20°C it is highly recommended to use 400 Slow Reducer. Plan the job required and seek advice if unsure.

Health & Safety



For detailed information refer to Safety Data Sheet (SDS). Mixed product contains isocyanates. Inhalation of vapours or dust from sanding may cause respiratory sensitisation. Splashes to eyes will cause irritation. Contact with skin may cause irritation. Applicators should use protective clothing and respiratory equipment. Product is flammable, use and store away from heat and ignition sources.

Transport & Storage



Sizes:

4L

Dangerous Goods:

3A

UN:

1263

Hazchem:

3[Y]

Packing Group:

III

Shipment name:

PAINT Flammable Liquid Low Flash Point

Flash point:

27°C

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Technical Data Sheet

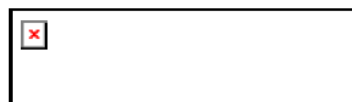
DUREPOX 2K PRIMER

DESCRIPTION	SUITABLE SUBSTRATES
A unique highly pigmented free sanding 2-pack epoxy urethane primer formulated for the Automotive Refinish, Marine, Industrial and Aircraft industries. One of the great features of this two-pack product is its remarkable flexibility and adhesion to bare metal. As a 'top of the range primer', Durepox not only provides a workable stable base onto which two-pack systems may be confidently applied but is also excellent for preparing a solid foundation for top quality Alkyd, Nitro-cellulose and Acrylic Lacquer finishes. MAF Approved - Refer MQ1, Dairy approval. Regulatory Authority manual 15 for meat, fish, game and poultry, all areas.	Durepox can be applied over correctly prepared: • Aged and fully cured Automotive finishes including Acrylic Lacquers and clear over base systems • Steel • Galvanised steel (after 81A 2-Pack Etch Primer) • Wood and MDF Board Composites • Aluminium after 81A 2-Pack Etch Primer • G.R.P. (Fibreglass) • Concrete • Polyester body fillers • Ideal isolator and sealer over aged enamels and difficult substrates. • Carbon Fibre. • Plastic bumpers

SPECIFICATION DATA	
Product Type: Epoxy Urethane Colour: White, Black, Grey, Light Grey, Pot Life: Bright Red, Deep Red, Blue 4 hours with Durepox Hardener Induction Time: at 20°C 5 Minutes Density: 1.331kg/L Recommended D.F.T: 50 Microns Theoretical Coverage: 9m²/L @ 50 Microns D.F.T. V.O.C: 523 g/L Volume Solids: 37.82% (White)	Dry Time @ 20°C: • Touch Dry: 1 Hour • Handle: 12 Hours • Sandable: 12 Hours • Self recoat @ 20°C: between 1 and 48 hours. (After 48 hours must be sanded to ensure intercoat adhesion) • Topcoat: between 2 hours and 36 hours, then any time after sanding, except lacquers which should be applied after Durepox has dried for at least 36 hours and dry sanded as application of many coats of products containing high proportions of solvents can cause uncured 2K products to react.

Lower temperatures will slow drying; adding of up to 5% by volume of **RAPC 62C Accelerator** to mixed primer and hardener will approximately halve curing and pot life times. Reduce addition to 1-2% when drying with IR lamps. Misuse of **62C Accelerator** can cause loss of adhesion and poor flow-out.

SURFACE PREPARATION
Old Finishes: Wash with C-Power diluted 20 parts clean water to 1 part C-Power. Degrease with Wax & Grease Remover. Abrade with suitable grit abrasive paper and ensure surface is completely dry and dust free. Steel: Degrease thoroughly with Wax & Grease Remover, sand to eliminate all rust or corrosion and treat with Rustkill (refer data sheet). Wipe surface clean with Wax and Grease Remover. Allow drying. Apply first 81-Two Pack Etch Primer for optimum adhesion on large areas (refer data sheet). Allow a minimum 3 hours flash time before applying Durepox Primer



Technical Data Sheet

SURFACE PREPARATION cont.

Aluminium:

Degrease with Wax & Grease Remover. Mechanically abrade with P280 or P320 disc. Treat with Hydracos - acid wash (refer data sheet). Rinse with clean water, ensuring that all metal swarf and acid is removed and allow drying. Immediately after wipe surface clean with G.P Thinners. Apply first 81-Two Pack Etch Primer within 20 minutes of surface preparation. Allow a minimum of 3 hours flash time (24 hour maximum) before applying Durepox.

Galvanised Steel:

Degrease with Wax & Grease Remover. Mechanically abrade to remove rust and corrosion. Treat with Hydracos acid wash. Rinse with clean water. Immediately wipe surface clean with GP Thinners. Apply 81A 2-Pack Etch Primer within 20 minutes of surface preparation. Allow a minimum of a 3 hours flash time (24 hour maximum) before applying Durepox.

G.R.P (Fibreglass):

Wash with warm detergent solution e.g. C-Power solution. Degrease with Wax & Grease Remover. Abrade with 120-180 grit dry paper. Remove dust and wipe clean with Wax & Grease Remover.

Plastic Bumpers & Carbon Fibre:

Clean thoroughly with Wax & Grease Remover. Sand with 320 grit abrasive paper. Remove dust and wipe clean with Wax & Grease Remover. Apply one full coat of Durepox. Types of plastic vary, so adhesion should be tested prior to top coating.

Concrete:

Treat with Hydracos-acid wash (refer Data Sheet) or abrasive blast new concrete. Ensure surface is dry and free from dirt, grease and oil deposits. When Durepox is to be used as a single coat finish on interior floors in workshops, garages etc, consult **Resene Automotive and Performance Coatings** Technical Staff.

DIRECTIONS FOR USE

Strain mixed product prior to application.

Mixing Ratio: 4 parts Durepox Primer
(Volume) 1 part Durepox Hardener

Thinning: Up to 20% 400 Reducer

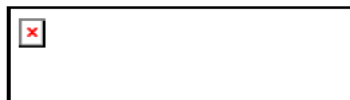
Spray Equipment:

- Conventional suction and gravity feed guns.
- Tip Size: 1.5 - 2 mm
- Spray pressure: 275-380KPA (40-55 p.s.i.)
- Number of coats: 2 coats (5-10 minutes flash between coats)

Although Durepox can be applied without thinning, best results are obtained by thinning up to 20% by volume with 400 Reducer. This allows for different gun set-ups and techniques, and assists flow and levelling.

Brush and Roller: 4:1 Durepox Hardener and 0 – 5% 400 Reducer.

Remarks: Do not use activated material beyond pot life time or by reducing it further to get the viscosity down again. This procedure results in poor flow and adhesion failures.



Technical Data Sheet

HEALTH & SAFETY

For detailed information refer to Material Safety Data Sheet. Mixed product contains isocyanates. Inhalation of vapours or dust from sanding may cause respiratory sensitisation. Splashes to eyes will cause irritation. Contact with skin may cause irritation. Applicators should use protective clothing and respiratory equipment. Product is flammable, use and store away from heat and ignition sources

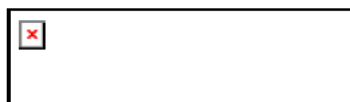
TRANSPORT & STORAGE

Sizes:	1L, 4L, 20L
Dangerous Goods:	3A
UN:	No 1263
Hazchem:	3(Y)E
Packing Group:	II
Shipment name:	PAINT Flammable
Flash point:	Below 23°C

DISCLAIMER

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23/03/06



Appendix Four

Spray Booth

Report for the Periodic Monitoring of Emissions to Atmosphere

Todd Engineering

Zeus Spray Booth

Permit No: N/A
Installation: Todd Engineering
Monitoring Dates: 28th April 2023
Site Address: MG Accident Repair Centre, Enterprise Drive, Cannock, WV10 7DF

Report Number:	ES-1290	Version:	1	Visit:	1 in 2023
Date of Report:	11th July 2023				
Report Author:	Zak Hedges				
MCERTS No:	MM 21 1622	MCERTS Level:	2 (TE1, TE2, TE3, TE4)		
Approved By:	Andy Dykes	Function:	Operations Manager		
MCERTS No:	MM 04 500	MCERTS Level:	2 (TE1, TE2, TE3, TE4)		

T: 07774 068 027

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YOUR INDUSTRY EXPERTS



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Executive Summary

Monitoring Objectives

Envirocare Technical Consultancy were contracted by Todd Engineering to carry out emissions monitoring to determine the emissions to atmosphere of the Zeus Spray Booth. The methodologies utilised and the results obtained form the basis of this report.

The substances requested for monitoring are listed below.

Emission Point Identification

Substances to be Monitored	Zeus Spray Booth
Total Particulate Matter	✓
Water Vapour	✓
Volumetric Flow	✓

Special requirements: none

Opinions and interpretations expressed within this report are outside the scope of Envirocare Technical Consultancy's MCERTS and UKAS accreditation. Envirocare accepts no responsibility for information in this report that was provided by the client, the client's representative or employees of the client. Where such information has been provided by external sources this is identified in footnotes of the respective tables.

Executive Summary

Monitoring Results

where MU = Measurement Uncertainty associated with the result (95% Confidence)

		Concentration				Mass Emission				
Substance		Limit (mg/m³)	Result (mg/m³)	Measurement Uncertainty (MU) +/-	Reference Conditions	Limit (g/hr)	Result (g/hr)	Measurement Uncertainty (MU) +/-	Sampling Date	Sampling Times
Total Particulate Matter	R1	-	3.6	0.56	273k, 101.3kPa, Wet Gas	-	146	24.2	28/04/2023	10:57-11:27
	R2		1.8	0.55			73.7	22.6	28/04/2023	11:36-12:06
	R3		0.94	0.55			37.7	22.1	28/04/2023	12:12-12:42
	Ave		2.1	0.56			85.8	23.0	28/04/2023	-
Volumetric Flow Actual	R1	-	42,164 m³/h	2464	As Measured	-	-	-	28/04/2023	10:45-10:50
Volumetric Flow @ REF	R1	-	40,068 m³/h	2342	273k, 101.3kPa, Wet Gas	-	-	-	28/04/2023	10:45-10:50

Reference conditions (REF) are: 273k, 101.3kPa, Wet Gas

Supporting Information

Appendix 1: General Information

Operating Information

Parameter	Process Details
Process Type	Spray Booth
Continuous or Batch Process	Batch
Operating Status	Normal Operation
Feedstock	Auto paints / lacquers
Normal Load, Throughput or Continuous Rating	N/A
Abatement System	Cartridge Filters
Abatement System Status	Normal Operation
Process Fuel	N/A
Plume Appearance	None visible

Monitoring Deviations

Parameter	Run	Deviation
Total Particulate Matter	Run 1	Due to the restricted access, it was not possible to sample at all of the sample points on the available sampling lines.

Monitoring Organisation Staff Details

Personnel	Position	MCERTS Level	MCERTS Number
Mr Z Hedges	Team Leader	2 (TE1, TE2, TE3, TE4)	MM 21 1622
Mr C Welsh	Team Leader	Trainee	MM 20 1609

Monitoring Methods

Pollutant Species	Standard	Technical Procedure	Testing MCERTS	Analysis Laboratory	Analytical Procedure	Analytical Technique	Analysis MCERTS
Volumetric Flow	BS EN ISO 16911-1	ETC-SE-24a	Yes	Pitot Tube and Thermocouple			
Total Particulate Matter	BS EN 13284-1	ETC-SE-01	Yes	Envirocare	ETC-AP-01	Gravimetric	Yes
Water Vapour	BS EN 14790	ETC-SE-11	Yes	ENV	ETC-SE-11	Gravimetric	Yes

RPS Laboratories Ltd (RPS): 0605 | Marchwood Scientific Services: 1668 | Envirocare: 2522 | Air Spectrum: 8382 | Olfasense UK Ltd: 2430

Equipment Checklist

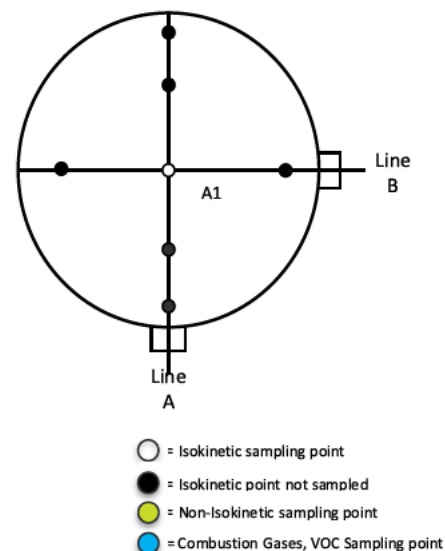
Extractive Sampling		Instrumental Analysers		Miscellaneous Items	
Equipment Type	Equipment I.D.	Equipment Type	Equipment I.D.	Equipment Type	Equipment I.D.
Control Box DGM	8.1	Horiba PG-250	-	Tape Measure	17.07
Box Thermocouples	2.10a	Horiba PG-250 SRM	-	Bevel Box	-
Box Thermocouple In	-	Horiba PG-350	12.01	Stopwatch	10.15
Box Thermocouple Out	-	JCT JCC Cooler	-	Barometer	11.02
Control Box Timer	10.14	MAK10 Cooler	-	Digital Manometer	-
Umbilical	2.1	Horiba PS200 Cooler	-	Digital Temperature Meter	-
Oven Box	9.06	M&C PSS Gas Preparation	3.44b	Dual Channel Heat Controller	6.06
Heated Probe (1)	4.12	Gasmet DX4000 FTIR	-	1m Heated Line	-
Heated Probe (2)	4.2	Gasmet Sampling System	-	3m Heated Line	-
Stack Thermocouple (1)	1.82	SK-Thermo FID	-	5m Heated Line	-
Stack Thermocouple (2)	1.39	Bernath 3006 FID	-	10m Heated Line	5.08
S-Type Pitot (1)	20.065	Testo 350XL	-	20m Heated Line	5.01
S-Type Pitot (2)	-	M&C PSP 4000	-	30m Heated Line	-
L-Type Pitot	-	Easylogger EN-EL-12 Bit	-	Impinger Arm Thermocouple (1)	3.10a
Site Balance	-	Hioki 5043 (V)	-	Impinger Arm Thermocouple (2)	3.07a
500g Check Weight	-	Analyser Temperature Logger	-	Dioxins Kit Thermocouple	-
1KG Check Weight	-	-	4.14	Sample Temperature Logger	29.06
Digital Callipers	16.05	-	1.14	Laboratory Balance	-

Appendix 2: Zeus Spray Booth Results and Calculations

Picture of the sampling location



Sampling Points Diagram



Duct Characteristics

Parameter	Units	Value
Type	-	Circular
Depth	m	1.0
Width	m	-
Area	m ²	0.79
Port Depth	cm	10.0
Orientation of Stack / Duct	-	Vertical
Sampling Port Size	-	Hole
Number of Ports	-	1

Manual Sampling Points	Used / Required
Number of Sampling Lines	1 / 2
Number of Sampling Points	1 / 4
Instrumental Sampling Points	Used / Required
Number of Sampling Lines	N/A
Number of Sampling Points	N/A

Platform Type and Location	
Platform Type - Permanent / Temporary	Temporary
Location - Inside / Outside	Inside

EA Technical Guidance Note M1 Platform Requirements		
Load Baring Capacity	Load bearing capacity of platform sufficient to fulfil the measurement objective	Yes
Position & Work Space	Sufficient work area to manipulate probe & operate the measurement instruments	No
	Depth of work area > internal diameter of stack and wall thickness plus 1.5m	No
	Ports on vertical ducts 1.2m to 1.5m above platform floor	No
	Platform has chains / self closing gates at top of ladders	N/A
Fall Prevention	Platform has adequate drainage to prevent accumulation of free-standing water	N/A
	Platform has 2 levels of handrails (approx. 0.5m & 1.0m high)	Yes
	Gaps between handrails not >0.5m	Yes
Access	Platform has vertical base boards (approx. 0.25m high)	Yes
	Access to sampling ports unhindered by obstructions	No
	Easy & safe access and egress available	Yes

Sampling Location / Platform Recommendations

Due to sampling location restrictions only one sampling line is currently accessible, in an ideal world these restrictions would be removed allowing access to both sampling lines.

Flow Criteria Measurements

Duct Diameter (m)	Cross Sectional Area (m ²)	Barometric Pressure (mbar)	Ambient Temperature (°C)	Mean Oxygen (%)	Mean Carbon Dioxide (%)	Mean Water Vapour (%)	Stack Gas Molecular mass (g/mol)	Pitot Coefficient
1.0	0.79	1012	12.0	20.8	0.06	0.3	28.7	0.853

Sample Line	Traverse Point	Position (cm)	Differential Pressure Reading (cmH ₂ O)				Stack Velocity (m/s)	Stack Temp (°C)	Angle of Swirl
			1	2	3	Average			
A	A1	50.0	1.9	1.9	1.9	1.9	14.9	14	-

Parameter	Mean Duct Velocity	Velocity Ratio (Max:Min)	Mean Stack Temperature	Mean Stack Temperature	Stack Gas Volume Flow	Stack Gas Volume Flow @ STP Wet	Stack Gas Volume Flow @ REF Conditions
Value	14.9	1.0:1	14	287	42164	40068	40068
Units	m/s	-	°C	K	m ³ /hr	Nm ³ /hr	Nm ³ /hr

Total Particulate Matter - Run 1 Calculations

Parameter	Value	Unit
Meter Box Number	8.1	-
Gas Meter Coefficient	1.060	-
Pitot Coefficient	0.85	-
Stack Gas Molecular Weight	29.0	g/mole
Static Pressure in Stack	0.10	cmH ₂ O

Parameter	Value	Unit
Nozzle Diameter	6.1	mm
Average Gas Meter Temperature	10.0	°C
Average Stack Temperature	14.0	°C
Average Stack Velocity	14.4	m/s
Isokineticity	105.5	%
Total Sampling Time	30	min
Gas Meter Difference	740	L
Corrected Gas Meter Volume	784	L
Mean Sampling Rate	26.1	L/min

Date	Operators
28/04/2023	ZH/CW

Parameter	Before	After	Unit
Barometric Pressure	1012	1012	mbar
Ambient Temperature	11.0	11.0	°C
Leak Check	0.28	-	L/min
Time	10:57	11:27	-

Parameter	Value	Unit
Gas Meter Volume (STP Dry)	0.756	Nm ³
Gas Meter Volume (REF)	0.758	Nm ³
Stack Gas Water Vapour Content	0.25	% v/v
Stack Gas Oxygen Content	N/A	% v/v
TPM Concentration (REF)	3.6	mg/Nm ³
TPM Mass Emissions (REF)	146	g/hr

Reference conditions (REF) are: 273k, 101.3kPa, Wet Gas

Total Particulate Matter - Run 2 Calculations

Parameter	Value	Unit
Meter Box Number	8.1	-
Gas Meter Coefficient	1.060	-
Pitot Coefficient	0.85	-
Stack Gas Molecular Weight	29.0	g/mole
Static Pressure in Stack	0.1	cmH ₂ O

Parameter	Value	Unit
Nozzle Diameter	6.1	mm
Average Gas Meter Temperature	10.0	°C
Average Stack Temperature	14.0	°C
Average Stack Velocity	14.4	m/s
Isokineticity	107.0	%
Total Sampling Time	30	min
Gas Meter Difference	750	L
Corrected Gas Meter Volume	795	L
Mean Sampling Rate	26.5	L/min

Date	Operators
28/04/2023	ZH/CW

Parameter	Before	After	Unit
Barometric Pressure	1012	1012	mbar
Ambient Temperature	11.0	11.0	°C
Leak Check	0.26	-	L/min
Time	11:36	12:06	-

Parameter	Value	Unit
Gas Meter Volume (STP Dry)	0.766	Nm ³
Gas Meter Volume (REF)	0.769	Nm ³
Stack Gas Water Vapour Content	0.39	% v/v
Stack Gas Oxygen Content	N/A	% v/v
TPM Concentration (REF)	1.8	mg/Nm ³
TPM Mass Emissions (REF)	73.7	g/hr

Reference conditions (REF) are: 273k, 101.3kPa, Wet Gas

Total Particulate Matter - Run 3 Calculations

Parameter	Value	Unit
Meter Box Number	8.1	-
Gas Meter Coefficient	1.060	-
Pitot Coefficient	0.85	-
Stack Gas Molecular Weight	29.0	g/mole
Static Pressure in Stack	0.1	cmH ₂ O

Parameter	Value	Unit
Nozzle Diameter	6.1	mm
Average Gas Meter Temperature	21.0	°C
Average Stack Temperature	23.0	°C
Average Stack Velocity	13.8	m./s
Isokineticity	101.3	%
Total Sampling Time	30	min
Gas Meter Difference	690	L
Corrected Gas Meter Volume	731	L
Mean Sampling Rate	24.4	L/min

Date	Operators
28/04/2023	ZH/CW

Parameter	Before	After	Unit
Barometric Pressure	1012	1012	mbar
Ambient Temperature	11.0	11.0	°C
Leak Check	0.10	-	L/min
Time	12:12	12:42	-

Parameter	Value	Unit
Gas Meter Volume (STP Dry)	0.678	Nm ³
Gas Meter Volume (REF)	0.680	Nm ³
Stack Gas Water Vapour Content	0.27	% v/v
Stack Gas Oxygen Content	N/A	% v/v
TPM Concentration (REF)	0.94	mg/Nm ³
TPM Mass Emissions (REF)	38	g/hr

Reference conditions (REF) are: 273k, 101.3kPa, Wet Gas

Total Particulate Matter - Analysis Results

Sampling Run Number	Filter Reference	Filter Type	Filter Mass	Probe Wash Mass (mg)	Total Mass Deposit (mg)
			Change (mg)		
Blank	47-4486	47mm GFA	0.12	<0.25	0.37
1	47-4487	47mm GFA	0.59	2.18	2.76
2	47-4488	47mm GFA	0.95	0.46	1.4
3	47-4489	47mm GFA	0.20	0.44	0.64

Sampling Run Number	Measured	Impinger Mass (g)				Collected Mass (g)
		1	2	3	4	
1	Before	1139	1871	1456	1484	2
	After	1139	1872	1456	1484	
2	Before	1139	1872	1456	1484	2
	After	1142	1872	1456	1484	
3	Before	1142	1872	1456	1484	2
	After	1142	1872	1457	1484	

Parameter	Value	Unit
Emission Limit Value (ELV)	-	mg/m ³
Overall Blank Value (OBV)	0.50	mg/m ³
OBV <10% of ELV	-	-

Date of Analysis	11/05/2023
Analytical Laboratory	Envirocare
Analytical Method	Gravimetric
Accreditation	MCERTS

Uncertainty

Uncertainty of Total Particulate Matter - Run 1

Parameter	Value	Unit
Emission Limit Value (ELV)	-	mg/m ³
Mean Sampling Rate	26.1	L/min
Leak Rate	0.28	L/min
Barometric Pressure	1012	mbar
Average Stack Temperature	14.0	°C
Sampled Stack Gas Volume	740	L

Parameter	Value	Unit
Mean Emission Concentration	3.6	mg/m ³
Monitoring Duration	30	min
Console ID	8.1	-
Temperature Uncertainty	0.24	°C
Gas Meter Uncertainty	0.37	%
Barometer Uncertainty	1.0	mbar

Source of Uncertainty	ASD*	BS EN 13284-1		Envirocare Certified Value	Units	% Actual Value	Source Uncertainty u	Combined Uncertainty u ²
		Uncertainty Criteria	Max. Value					
Weighing Procedure	Std	5% of limit value	-	0.28	mg	-	0.28	0.08
Leak Rate	Rect	<2% of sampling rate	0.52	0.28	L/min	1.07	0.02	0.0005
Time	Std	1sec in 1 hour = 0.028%	2.0	0.5	sec	0.03	0.001	0.000001
Gasmeter Volume	Std	<2%	14.8	2.7	L	0.37	0.01	0.0002
Temperature	Std	1% of value	0.1	0.24	°C	1.71	0.06	0.004
Pressure	Std	1% of value	10.1	1.0	mbar	0.10	0.004	0.00001
Total								0.08
Combined Standard Uncertainty [(sum u ²) ^{0.5}]								0.29
Expanded Total Uncertainty as a % of emission conc. (95% confidence)								15.5
Expanded Total Uncertainty (mg/m ³) (95% confidence)								0.56
Expanded Total Uncertainty as a % of emission limit value (95% confidence)								-

Uncertainty of Total Particulate Matter - Run 2

Parameter	Value	Unit
Emission Limit Value (ELV)	-	mg/m ³
Mean Sampling Rate	26.5	L/min
Leak Rate	0.26	L/min
Barometric Pressure	1012	mbar
Average Stack Temperature	14	°C
Sampled Stack Gas Volume	750	L

Parameter	Value	Unit
Mean Emission Concentration	1.8	mg/m ³
Monitoring Duration	30	min
Console ID	8.1	-
Temperature Uncertainty	0.24	°C
Gas Meter Uncertainty	0.37	%
Barometer Uncertainty	1.0	mbar

Source of Uncertainty	ASD*	BS EN 13284-1		Envirocare Certified Value	Units	% Actual Value	Source Uncertainty u	Combined Uncertainty u ²
		Uncertainty Criteria	Max. Value					
Weighing Procedure	Std	5% of limit value	-	0.28	mg	-	0.28	0.08
Leak Rate	Rect	<2% of sampling rate	0.53	0.26	L/min	0.98	0.01	0.0001
Time	Std	1sec in 1 hour = 0.028%	2.0	0.50	sec	0.03	0.0005	0.000003
Gasmeter Volume	Std	<2%	15.0	2.8	L	0.37	0.01	0.00005
Temperature	Std	1% of value	0.1	0.24	°C	1.71	0.03	0.001
Pressure	Std	1% of value	10.1	1.0	mbar	0.10	0.002	0.000003
Total								0.08
Combined Standard Uncertainty [(sum u ²) ^{0.5}]								0.28
Expanded Total Uncertainty as a % of emission conc. (95% confidence)								30.1
Expanded Total Uncertainty (mg/m ³) (95% confidence)								0.55
Expanded Total Uncertainty as a % of emission limit value (95% confidence)								-

Uncertainty of Total Particulate Matter - Run 3

Parameter	Value	Unit
Emission Limit Value (ELV)	-	mg/m ³
Mean Sampling Rate	24.4	L/min
Leak Rate	0.10	L/min
Barometric Pressure	1012	mbar
Average Stack Temperature	23	°C
Sampled Stack Gas Volume	690	L

Parameter	Value	Unit
Mean Emission Concentration	0.9	mg/m ³
Monitoring Duration	30	min
Console ID	8.1	-
Temperature Uncertainty	0.24	°C
Gas Meter Uncertainty	0.37	%
Barometer Uncertainty	1.0	mbar

Source of Uncertainty	ASD*	BS EN 13284-1		Envirocare Certified Value	Units	% Actual Value	Source Uncertainty u	Combined Uncertainty u ²
		Uncertainty Criteria	Max. Value					
Weighing Procedure	Std	5% of limit value	-	0.28	mg	-	0.28	0.08
Leak Rate	Rect	<2% of sampling rate	0.49	0.1	L/min	0.41	0.002	0.000005
Time	Std	1 sec in 1 hour = 0.028%	2.0	0.50	sec	0.03	0.0003	0.0000007
Gasmeter Volume	Std	<2%	13.8	2.6	L	0.37	0.003	0.00001
Temperature	Std	1% of value	0.2	0.24	°C	1.04	0.010	0.0001
Pressure	Std	1% of value	10.1	1.0	mbar	0.10	0.001	0.000001
Total								0.08
Combined Standard Uncertainty [(sum u ²) ^{0.5}]								0.28
Expanded Total Uncertainty as a % of emission conc. (95% confidence)								58.4
Expanded Total Uncertainty (mg/m ³) (95% confidence)								0.55
Expanded Total Uncertainty as a % of emission limit value (95% confidence)								-

Uncertainty of Volumetric Flow - Run 1

Parameter	Value	Unit
Measured Volumetric Flow Rate Actual	42164	L/min

Performance Characteristics & Source Value	Value	Units
Standard Uncertainty - Pitot tube Coefficient	0.005	-
Standard Uncertainty - Mean Local Dynamic Pressure	1.1	Pa
Standard Uncertainty - Molar Mass of Stack Gas	0.0000	-
Standard Uncertainty - Stack Gas Temperature	0.50	K
Standard Uncertainty - Absolute Pressure in Duct	176	Pa
Standard Uncertainty - Density of Stack Gas	0.04	-
Standard Uncertainty - Mean Velocity	0.28	m/s
Expanded Uncertainty Mean Velocity (95% confidence)	0.55	m/s
Expanded Uncertainty Mean Velocity (95% Confidence), Relative	3.7	%
Standard Uncertainty - Volumetric Flow Rate	1257	-
Standard Uncertainty - Volumetric Flow Rate (95% Confidence)	2464	m ³ /hr
Standard Uncertainty - Volumetric Flow Rate (95% Confidence), Relative	5.8	%

95% confidence interval factor - 1.96

Document Version Number	Record of change within different version numbers
V1	Original version of the document issued to client.

Technical Data Sheet

DUREPOX HIGH PERFORMANCE CLEAR

DESCRIPTION	SUITABLE SUBSTRATE
A 2-pack epoxy urethane CLEAR coating formulated for the Marine and Industrial markets. It can be used as a clear coating for substrates that are coated with pigmented Durepox primer/topcoat or directly over bare carbon fibre and fibreglass, veneer coated ply and most wood substrates and concrete.	Durepox Clear can be applied over pigmented Durepox primer or directly over correctly prepared: • G.R.P. (Fibreglass) • Carbon Fibre • Pigmented Durepox • Veneer coated ply wood & most wood finishes • Concrete

SPECIFICATION DATA	
Product Type: Epoxy Urethane Clear Colour: Slightly Yellow Tone Pot Life: 45 minutes with Durepox Hardener & reducer at 20°C Induction Time: 5-10 Minutes Density: 0.95-1.00kg/L Recommended D.F.T: 25-35 microns DFT per coat Theoretical Coverage: 10m ² /L @ 40 Microns DFT V.O.C: 515 g/L Volume Solids: 41%(non catalyzed)	Recoat ability: Can be coated with itself within a 2hour period at 20 °C. Outside 2 hour detail sand and recoat. Dry Time @ 20°C: • Touch Dry: 1 Hour • Handle: 12 Hours • Self recoat @ 20°C: between 0 and 2 hours. After 2 hours must be detailed sanded to ensure intercoat adhesion. Like most 2pack products the higher the temperature the shorter the pot life.

Lower temperatures will slow drying; adding of up to 5% by volume of **RAPC 62C Accelerator** to mixed clear and hardener will approximately halve curing and pot life times. Reduce addition to 1-2% **RAPC 62C Accelerator** when drying with IR lamps. Misuse of **62C Accelerator** can cause loss of adhesion and poor flow-out.

High temperatures can increase drying time and reduce pot life, the use of 910 Slow Reducer can help in these circumstances. Always be mindful of recoat times in warm conditions as in over 25°C.

SURFACE PREPARATION
G.R.P (Fibreglass) & Carbon Fibre: Strongly advise testing a small area for coating success due to the amount of variables in fibreglass & carbon fibre resins. Wash with warm detergent solution e.g. C-Power solution. Degrease with Wax & Grease Remover using the 'wipe-on-wipe-off' method. Abrade with dry sand paper finishing no coarser than 400 dry using dustless dry sanding machine. Use Wax & Grease remover using the 'wipe-on-wipe-off' method. Detail blow clean using tack cloth for final wipe down ready for clear coating. Apply at least two full wet coats; more coats can be applied if needed. Pigmented Durepox: Two options are available when coating pigmented Durepox, you can simply use Durepox High Performance Clear as another coat using WOW method. This will provide you a satin finish when applied via spraying equipment. Alternatively you can mix the clear to pigmented Durepox 30/70 clear to colour or up to equal parts. Please note the more clear the less opacity. It is possible to reduce the gloss of DHPC to a satin finish of 35% gloss with the addition of 2% by weight of AF41 matting powder (available to be shaken in from RAPC Mt Wellington).

Technical Data Sheet

SURFACE PREPARATION cont.

Concrete:

Strongly advise testing a small area for coating success due to the amount of variables in concrete and release agents for tilt slab walls & floors. Acid etch or abrasive blast new or aged concrete. Ensure it is dry and free from dirt, grease and oil deposits. Durepox High Performance Clear can be applied directly to suitably prepared concrete or in conjunction with Durepox pigmented colour. Great for workshop & garage floors & walls.

Please note when using a roller we highly recommend the use of PAL Contract Series Roller 5mm Mohair Blend. These rollers work best to help reduce any bubbles in the clear or alternatively lay off with a soft brush or broom. Avoid all bubbling as this affect appearance and the coating clean ability. Use Durepox colour & or clear at 4:1 and only add reducer for warm temperatures up to 5%.

Veneer Coated Plywood & General Timbers:

Strongly advise testing a small are for coating success due to the amount of variables in veneers & timbers. Ensure surface is dirt, dust & grease free. Depending on the particular wood substrate most can be coated on day one, left for overnight drying in warm temperatures (20°C at least) 400 grit detail dry sand and recoated the following day. This will result in a full gloss durable long lasting finish.

DIRECTIONS FOR USE

Strain mixed product prior to application.

Mixing Ratio: 4 parts Durepox Clear

(Volume) 1 part Durepox Hardener

Thinning: Up to 20-40% 400 Reducer or 910 Slow Reducer

Spray Equipment:

- Conventional suction and gravity feed guns.
- Tip Size: 1.5 - 2 mm
- Spray pressure: 275-380KPA (40-55 p.s.i.)
- Number of coats: 2 coats (5-10 minutes flash between coats)
- Air less/Air assisted airless& electrostatic follow equipment manufactures recommendations.

Although Durepox Clear can be applied without thinning, best results are obtained by thinning up to 20% by volume with 400 Reducer or 910 Slow Reducer. This allows for different gun set-ups and techniques, and assists flow and levelling.

Remarks: Do not use activated material beyond pot life time or by reducing it further to get the viscosity down again. This procedure results in poor flow and adhesion failures.

For large surface areas in conjunction with temperatures over 20 deg C it is highly recommended to use 910 Slow Reducer.

HEALTH & SAFETY

For detailed information refer to Material Safety Data Sheet. Mixed product contains isocyanates. Inhalation of vapours or dust from sanding may cause respiratory sensitisation. Splashes to eyes will cause irritation. Contact with skin may cause irritation. Applicators should use protective clothing and respiratory equipment. Product is flammable, use and store away from heat and ignition sources

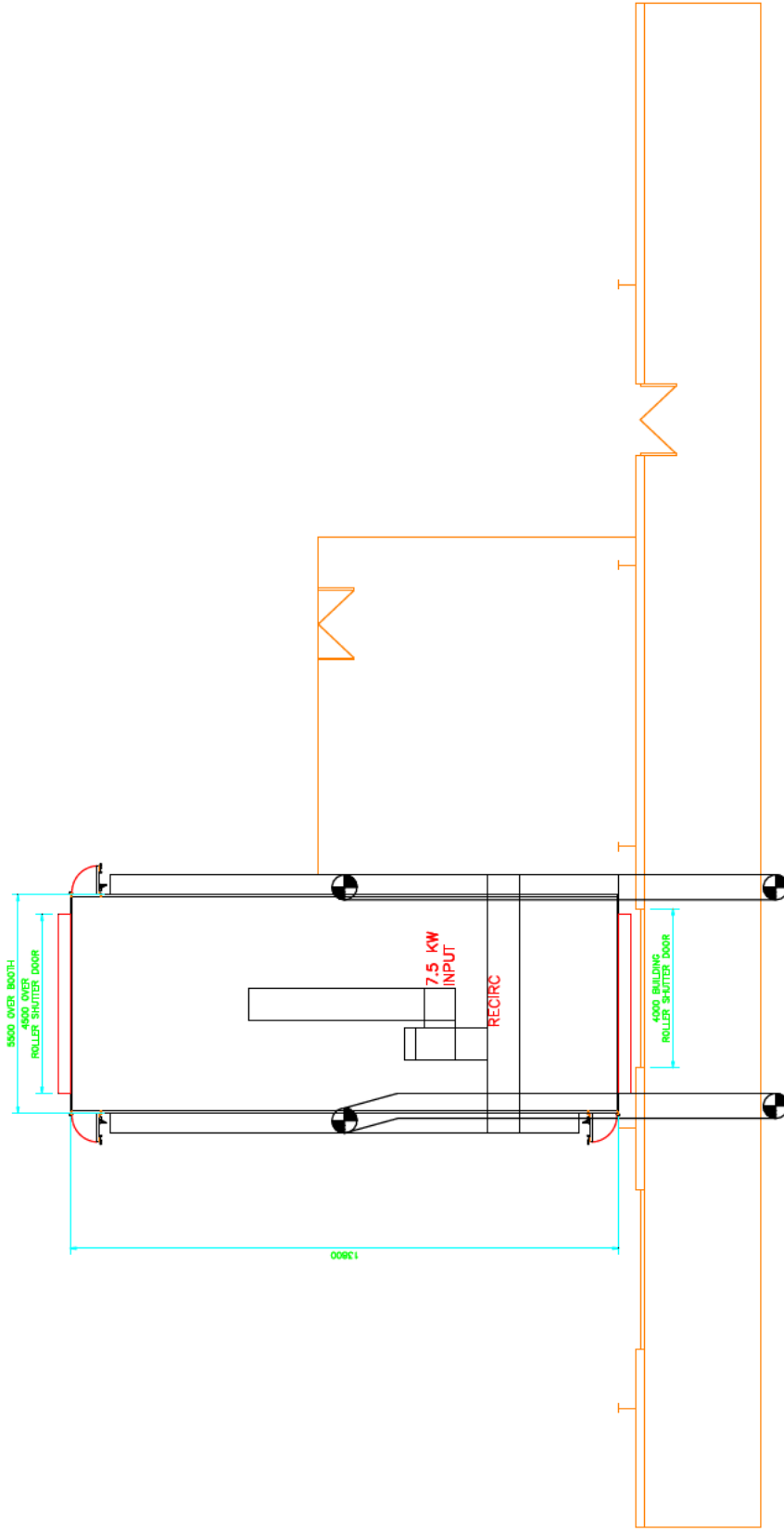
Technical Data Sheet

TRANSPORT & STORAGE

Sizes:	4Lt
<u>Dangerous Goods:</u>	3A
<u>UN:</u>	No 1263
<u>Hazchem:</u>	3(Y)E
<u>Packing Group:</u>	II
<u>Shipment name:</u>	PAINT Flammable Liquid Low Flash Point
<u>Flash point:</u>	Below 23°C

DISCLAIMER

No warranty either expressed or implied is made by Resene Automotive and Performance Coatings in this document, which is a technical data information sheet. The description of the product and its properties is for the sole purpose of identifying the product and does not constitute a warranty that the product or its properties shall conform to that description, nor is the description of the product and its properties a warranty by Resene Automotive and Performance Coatings that the goods are suitable for a particular purpose.



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REV MODIFICATION

DATE



IF IN DOUBT ASK !

Title:-

GENERAL ARRANGEMENT
 SAIL GP

Drawing Number:-
 PD 4941

Rev:-
 A

Drawn By:-
 J. TODD

Date:-

Scale:-

Chk'd:-

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CERTIFICATE OF CONFORMITY DEFRA PG6/34(11)

ISSUED BY: TODD ENGINEERING LTD

DATE OF ISSUE: 25/03/2023
VALID TO: 25/03/2024*

CERTIFICATE NO: EC0000



TODD ENGINEERING LTD
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Rugeley, Staffordshire, WS15 1PW
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Email: service@toddengineering.co.uk

APPROVED SIGNATORY

FOR: Todd Engineering Ltd
LOCATION: Gregory Works
Armitage Road
Rugeley
Staffordshire
WS15 1PW
CONTACT: Lee Todd
SPRAYBOOTH ID: Zeus-Todd/SB0001
HRS RUN: 00000

A TURNER
Sales Manager

This is to certify that the spraybooth specified above has been designed, commissioned and tested, to meet the following requirements of DEFRA PG6/34(11).

<u>Para 5.6</u>	Introduction of pressure gauge/audible alarm equipment shutdown facility.
<u>Para 5.14</u>	Extract vent height raised to Local Authority requirements, <u>Without cap. Actual height</u> 3m
<u>Para 5.17</u>	<i>Booth Extract</i> <i>Duct:</i> Discharge vent diameter..... 800 mm diameter Efflux velocity..... 15.00m/sec
<u>Para 5.7</u>	To reduce particulate matter discharge below 10mg/Nm ³
<u>Extract Filtration</u> <u>Emission Abatement</u>	Stage 1: Paint Stop 220g/m ² Glass Fibre 50mm (EU2) Stage 2: Blue Synthetic Fibre Filter G3 FL200 20mm (EU3) Combined Total Arrestance (clean)...98.74%
<u>Extract Air Velocity</u>	15.75 m³ second (Actual)

*CERTIFICATE VALID TO DATE SHOWN UNLESS 1000HRS OPERATION IS REACHED BEFORE EXPIRATION DATE

Technical data of the fan: REM 11-0560-4W-19-C

fulfills the ErP-directive 2015

Description	Value	Dimension
Specified duty point		
Air flow rate (V)	12000	m³/h
Static pressure rise (dp _{fa})	500	Pa
Actual duty point		
Installation acc. DIN 24163 Part 1	B	
Reference density (Rho1)	1.20	kg/m³
Medium temperature (t)	20	°C
Air flow rate (V)	12240	m³/h
Total pressure rise (dp _t)	628	Pa
Dynamic pressure at discharge (pd ₂)	107	Pa
Static pressure increase (dp _{fa})	520	Pa
fan speed (n _v)	-	min ⁻¹
Absorbed power (P ₁)	3.75	kW
Current (I)	-	A
Total system efficiency (ETA _{ts})	-	%
Static system efficiency (ETA _{faS})	-	%
Specific Fan Power (SFP-factor)	-	W/(m³/s)
Nozzle calibration factor (K ₁₀)	280	m²s/h
Differential pressure on nozzle (dp _D)	1147	Pa
Velocity at discharge area (c)	13.4	m/s
Fan weight	100	kg
A-weighted sound power level discharge/intake LwA _{4/7}	88/88	dB
Unweighted octave sound power level	Octave mid frequencies ¹⁾	
	63/125/250/500/1k/2k/4k/8k	Hz
	90/85/83/85/83/79/75/66	dB discharge LwOkt ₄
	78/80/80/86/82/80/76/69	dB intake LwOkt ₇

¹⁾ The octave sound power levels can be higher at octave bands at or close to blade passing frequency.

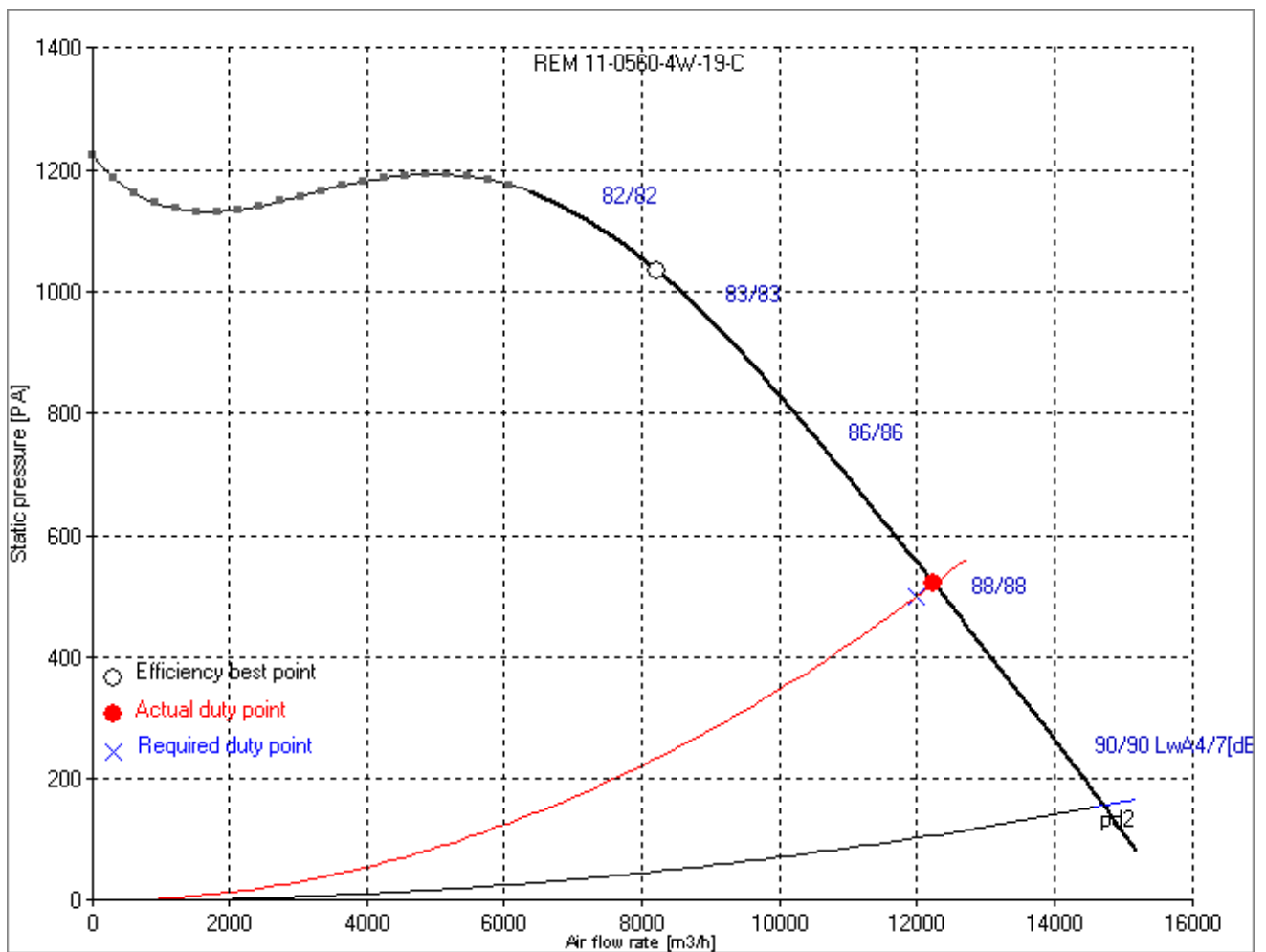
Rated data

Phase-Voltage-Frequency	3~400 D-50	V-Hz
Frame size-poles:	112M / IE2-4	
Motor rating (P _N)	4	kW
Max. absorbed power (P _{1max})	-	kW
Rated motor speed (n _N)	1445	min ⁻¹
Rated motor current (I _N)	8,12	A
Capacitor (C)	-	µF
Temperature range of conveying medium (t _{min} ... t _{max})	-20...60	°C

ErP - Data at optimum efficiency and density 1.20 kg/m³

measurement- / efficiency category	B / total
design status of VSD	without VSD
overall efficiency (ETA_{opt})	69.8 %
achieved efficiency grade (N_{ist})	74.5
required efficiency grade in 2013 / 2015 (N)	61 / 64
Air flow rate (V_{opt})	8218 m³/h
pressure rise (dp_{opt})	1083 Pa
Fan speed (n_{vopt})	1460 min ⁻¹
motor power input ($P_{1\text{opt}}$)	3.54 kW
specific ratio (d_{dpopt})	1.011

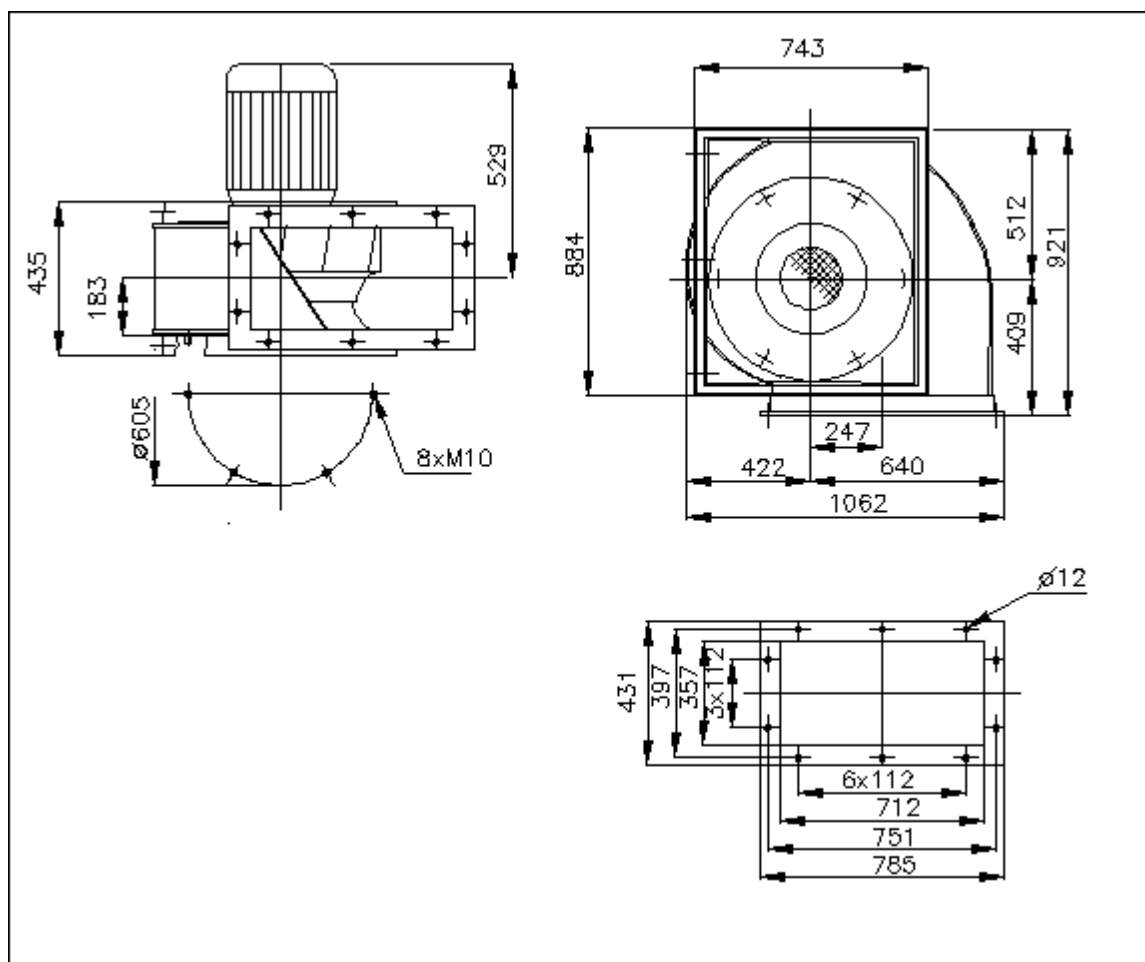
Fan curve to REM 11-0560-4W-19-C



Dimensions to REM 11-0560-4W-19-C

Rotation:
Handing:

RD
90



Synthetic Media – G3 FL200 White

Middle Arrestance: 89%

Air Volume: 1.5m/s

Initial Resistance: 23pa

Final Recommended Resistance: 250pa

Temperature Resistance: 100°C

Maximum Operating Humidity: 100%

Dust Holding Capacity: 550g

Filter Depth: Nominal 20mm

Classification: G3

Flame Resistance: DIN53438 F1

Special Features: Material is Oeko-Tex approved (see attached certificate)

Dimensions: Any width up to 2mtrs and 20mtrs long

Please note that all media is tested in accordance to EN779:2002





MADE IN
BRITAIN

TODD
CV Series Freezers

Todd