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PERFORMANCE DATA

Life Protected Sorbent

PRODUCT CODE	PRODUCT DESCRIPTION	SHELF LIFE	PRESENT IN
LDC2FO	250ml sachet of sarbout rougher	I sachet of sorbent powder 5 years	All-in-one Biohazard
LPS350	350mi sachet of sorbent powder		Spill Pack (MJZ005)

RECCOMENDED USE

A component used in emergency decontamination systems for environmental surfaces. Used for sorption of hazardous liquid chemical and biological spills to immobilise in a solid format to easily and safely collect and dispose. Can be used on organic and inorganic liquids which can be hydrophilic, hydrophobic and omniphobic (excluding Hydrofluoric acid¹).

PROPERTY	VALUE	UNIT
Mater carbanes capacitus	400	ml H₂O
Water sorbance capacity ²	4.76	ml H ₂ O/g (powder)
Monoprotic acid neutralisation capacity ²	8.9x10 ⁻⁴	moles
Cation exchange capacity (CEC) ³	0.23 - 0.29	meq/g
Monovalent cation sequestration capacity ²	18.9 – 23.9	mmol
Divalent cation sequestration capacity ^{2,4}	46.9 – 49.5	mmol

- LPS350 should never be used for the sorption of Hydrofluoric acid (HF, CAS No. 7664-39-3) because it contains natural silicate
- 1 minerals, which react with Hydrofluoric acid to create Silicone tetrafluoride (SiF₄, CAS No. 7783-61-1) which is a toxic gas. For Hydrofluoric acid spill decontamination, please follow local policies and/or regulations.
- 2 Based on nominal powder weight of 84g
 - Based on measured values of the zeolite component using the ammonium acetate method, involving a 1M ammonium acetate
- solution and quantification with ICP-AES (Inductively coupled plasma optical emission spectroscopy). The unit of measurement (meq/g) stands for milliequivalents per gram, equivalent to millimoles of monovalent cations exchanged per gram of powder.
- 4 Based on contributions from cation exchange with the zeolite component and precipitation with the bicarbonate component.



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Substances proven to undergo sorption by LPS350⁵

0.1M Acetic acid solution (in deionised water) equivalent to pH of human vomit 7647-01-0 Inorganic acid solution 10% Calcium chloride solution (10% CaCl., 2H-0 in deionised water) Aqueous mixture 10,000PPM active chlorine solution in tap water (created with SoChlor TAB 1.7g) N/A Aqueous mixture 10,000PPM active chlorine solution in tap water (created with SoChlor TAB 1.7g) N/A Aqueous mixture 11-8-Butanol 111-87-5 Alcohol 111-87-5 Alcohol 1-0-ctanol 111-87-5 Alcohol 1-0-ctanol 111-87-5 Alcohol 1-0-ctanol 1336-21-6 Ammonia 2-Propanol (Isopropanol) 67-63-0 Alcohol 2-Propanol (Isopropanol) solution (in deionised water) 67-63-0 Alcohol 70% 2-Propanol (Isopropanol) solution (in deionised water) 67-63-0 Aqueous mixture Acetone 67-63-0 Aqueous mixture Artifical blood* N/A Aqueous mixture Artifical blood* N/A Aqueous mixture Artifical blood* N/A Aqueous mixture Polionised water N/A Aqueous mixture Polionised water 7732-18-5 Water University of the Polionised water 7732-18-5 Water University of the Polionised water 7732-18-5 Water University of the Polionised water 7732-18-5 Water Dipropylene glycol 25265-71-8 Glycol ether Alcohol 64-7-5	SUBSTANCE IDENTITY	CAS NO.	ТҮРЕ
Aqueous mixture 10,000PPM active chlorine solution in tap water (created with SoChlor TAB 1.7g)	0.1M Acetic acid solution (in deionised water)	64-19-7	Organic acid solution
10,000PPM active chlorine solution in tap water (created with SoChlor TAB 1.7g)	0.1M HCl solution (in deionised water) - equivalent to pH of human vomit	7647-01-0	Inorganic acid solution
1-Butano 71-36-3	10% Calcium chloride solution (10% CaCl ₂ .2H ₂ O in deionised water)		Aqueous mixture
1-Octanol 111-87-5	10,000PPM active chlorine solution in tap water (created with SoChlor TAB 1.7g)	N/A	Aqueous mixture
25% Ammonia solution 1336-21-6 Ammonia 2-Propanol (Isopropanol) 67-63-0 Alcohol 70% 2-Propanol (Isopropanol) solution (in deionised water) 67-63-0 Aqueous mixture Actone 67-64-1 Ketone Artifical blood ⁶ N/A Aqueous mixture Concentrated cleaning solution (Decon 90) Aqueous mixture Deionised water 7732-18-5 Water Dimethyl sulfxoxide (DMSO) 200-664-3 Sulfoxide Dipropylene glycol 25265-71-8 Glycol ether Ethanol 64-17-5 Alcohol Ethylene glycol mono-butyl ether (EGMBE, Butyl glycol) 8049-87 Glycol ether Glycerol (Glycerine) 56-81-5 Alcohol Half saline/Hypotonic saline solution (0.45% NaCl in deionised water) Aqueous mixture Hypertonic saline solution (3% NaCl in deionised water) Aqueous mixture Hypertonic saline solution (0.9% NaCl in deionised water) Aqueous mixture Hypertonic saline solution (0.9% NaCl in deionised water) Aqueous mixture Hypertonic saline solution (0.9% NaCl in deionised water) Aqueous mixture Non-aqueous mi	1-Butanol	71-36-3	Alcohol
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70% 2-Propanol (Isopropanol) solution (in deionised water) 67-63-0 Aqueous mixture Actone 67-64-1 Ketone Artifical blood* N/A Aqueous mixture Artifical urine* N/A Aqueous mixture Concentrated cleaning solution (Decon 90) Aqueous mixture Deionised water 7732-18-5 Water Dimethyl sulfoxide (DMSO) 200-664-3 Sulfoxide Dipropylene glycol 25265-71-8 Glycol ether Ethanol 64-17-5 Alcohol Ethylene glycol mono-butyl ether (EGMBE, Butyl glycol) 8049-98-7 Glycol ether Glycorol (Glycerine) 56-81-5 Alcohol Half saline/Hypotonic saline solution (0.45% NaCl in deionised water) Aqueous mixture Hexane 110-54-3 Hydrocarbon Hypertonic saline solution (3% NaCl in deionised water) Aqueous mixture Methylated spirits (ethanol, propan-2-ol, butanone) Non-aqueous mixture Milk (cow's milk, semi-skinned) 8049-98-7 Aqueous mixture Milk (cow's milk, semi-skinned) 8049-98-7 Aqueous mixture Milk (cow's milk, semi-skinned	25% Ammonia solution	1336-21-6	Ammonia
Acetone Artifical blood ⁶ Artifical blood ⁶ Artifical urine ⁶ N/A Aqueous mixture Concentrated cleaning solution (Decon 90) Deionised water Deionised water Dimethyl sulfoxide (DMSO) Dipropylene glycol Dipropylene glycol Ethanol Ethylene glycol mono-butyl ether (EGMBE, Butyl glycol) Ethylene glycol mono-butyl ether (EGMBE, Butyl glycol) Ballier Solution (0.45% NaCl in deionised water) Hypertonic saline solution (3% NaCl in deionised water) Hypertonic saline solution (3% NaCl in deionised water) Monitylated spirits (ethanol, propan-2-ol, butanone) Miki (cow's mikl, semi-skinned) Mineral Oil Monoethylene glycol Dipropylene glycol Di	2-Propanol (Isopropanol)	67-63-0	Alcohol
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Concentrated cleaning solution (Decon 90) Deionised water Dimethyl sulfoxide (DMSO) Dipropylene glycol Ethylene glycol (EGMBE, Butyl glycol) Ethylene glycol mono-butyl ether (EGMBE, Butyl glycol) Ethylene glycol mono-butyl ether (EGMBE, Butyl glycol) Byerol (Glycerine) Half saline/Hypotonic saline solution (0.45% NaCl in deionised water) Hexane Hexane 110-54-3 Hydrocarbon Hypertonic saline solution (9.9% NaCl in deionised water) Hypertonic saline solution (0.9% NaCl in deionised water) Hypertonic saline solution (9.9% NaCl in deionised water) Morbitated spirits (ethanol, propan-2-ol, butanone) Milk (cow's milk, semi-skinned) Monoethylene glycol N.N-Dimethylformamide (DMF) Monoethylene glycol N.N-Dimethylformamide (DMF) Halfer solution Halfer solution Halfer solution Halfer solution Polyethylene glycol 400 Propylene carbonate Propylene glycol 400 Propylene carbonate Propylene glycol 400 Rapeseed oil Ringers solution (0.017% CaCl ₂ :2H ₂ O, 0.72% w/v & 0.037% KCl in deionised water) Sodium hypochlorite solution (6-14% active chlorine) Sodium hypochlorite solution (6-14% active chlorine) Sodium hypochlorite solution (6-14% active chlorine) Friethanolamine Triethanolamine Aqueous mixture Triethanolamine Triethanolamine Aqueous mixture	Artifical blood ⁶	N/A	Aqueous mixture
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Dimethyl sulfoxide (DMSO)200-664-3SulfoxideDipropylene glycol25265-71-8Glycol etherEthanol64-17-5AlcoholEthylene glycol mono-butyl ether (EGMBE, Butyl glycol)8049-98-7Glycol etherGlycerol (Glycerine)56-81-5AlcoholHalf saline/Hypotonic saline solution (0.45% NaCl in deionised water)Aqueous mixtureHexane110-54-3HydrocarbonHypertonic saline solution (3% NaCl in deionised water)Aqueous mixtureIsotonic saline solution (0.9% NaCl in deionised water)Aqueous mixtureMethylated spirits (ethanol, propan-2-ol, butanone)Non-aqueous mixtureMilk (cow's milk, semi-skinned)8049-98-7Aqueous mixtureMineral Oil8042-47-5HydrocarbonMonoethylene glycol107-21-1GlycolN,N-Dimethylformamide (DMF)68-12-2AmideOleic acid112-80-1AcidPH 10 buffer solutionAqueous mixturePH 7 buffer solutionAqueous mixturePH 7 buffer solutionAqueous mixturePropylene glycol 40025322-68-3PolyetherPropylene glycol 40025322-68-3PolyetherPropylene glycol 40057-55-6GlycolRapesed oil8002-13-9Fatty acid triglycerideRingers solution (0.017% CaCl _{2.} 2H ₂ O, 0.72% w/v & 0.037% KCl in deionised water)Aqueous mixtureSilicone Oil63148-62-9SiliconeSodium hypochlorite solution (6-14% active chlorine)7681-52-9Oxidising agentSodium silicate solution (Concentrated cleaning solution (Decon 90)		Aqueous mixture
Dipropylene glycol25265-71-8Glycol etherEthanol64-17-5AlcoholEthylene glycol mono-butyl ether (EGMBE, Butyl glycol)8049-98-7Glycol etherGlycerol (Glycerine)56-81-5AlcoholHalf saline/Hypotonic saline solution (0.45% NaCl in deionised water)Aqueous mixtureHexane110-54-3HydrocarbonHypertonic saline solution (0.9% NaCl in deionised water)Aqueous mixtureIsotonic saline solution (0.9% NaCl in deionised water)Non-aqueous mixtureMethylated spirits (ethanol, propan-2-ol, butanone)Non-aqueous mixtureMilk (cow's milk, semi-skinned)8049-98-7Aqueous mixtureMineral Oil8042-47-5HydrocarbonMonoethylene glycol107-21-1GlycolN,N-Dimethylformamide (DMF)68-12-2AmideOleic acid112-80-1AcidPH 1 buffer solutionAqueous mixturePH 4 buffer solutionAqueous mixturePH 7 buffer solutionAqueous mixturePolyethylene glycol 40025322-68-3PolyetherPropylene carbonate108-32-7Alkylene carbonatePropylene glycol57-55-6GlycolRapeseed oil8002-13-9Fatty acid triglycerideRingers solution (0.017% CaCl ₂ .2H ₂ O, 0.72% w/v & 0.037% KCl in deionised water)Aqueous mixtureSilicone Oil63148-62-9SiliconeSodium hypochlorite solution (6-14% active chlorine)67-64-1SilicateTriethanolamine102-71-6Amine	Deionised water	7732-18-5	Water
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Ethanol 64-17-5 Alcohol Ethylene glycol mono-butyl ether (EGMBE, Butyl glycol) 8049-98-7 Glycol ether Glycerine) 56-81-5 Alcohol Half saline/Hypotonic saline solution (0.45% NaCl in deionised water) Aqueous mixture Hexane 110-54-3 Hydrocarbon Hypertonic saline solution (3% NaCl in deionised water) Aqueous mixture Isotonic saline solution (0.9% NaCl in deionised water) Aqueous mixture Methylated spirits (ethanol, propan-2-ol, butanone) Non-aqueous mixture Milk (cow's milk, semi-skinned) 8042-47-5 Hydrocarbon Monoethylene glycol 107-21-1 Glycol N.N-Dimethylformamide (DMF) 68-12-2 Amide Oleic acid 112-80-1 Acid 11	Dipropylene glycol	25265-71-8	Glycol ether
Glycerol (Glycerine)56-81-5AlcoholHalf saline/Hypotonic saline solution (0.45% NaCl in deionised water)110-54-3HydrocarbonHypertonic saline solution (3% NaCl in deionised water)Aqueous mixtureIsotonic saline solution (0.9% NaCl in deionised water)Aqueous mixtureMethylated spirits (ethanol, propan-2-ol, butanone)Non-aqueous mixtureMilk (cow's milk, semi-skinned)8049-98-7Aqueous mixtureMineral Oil8042-47-5HydrocarbonMonoethylene glycol107-21-1GlycolN,N-Dimethylformamide (DMF)68-12-2AmideOleic acid112-80-1AcidpH 10 buffer solutionAqueous mixturepH 4 buffer solutionAqueous mixturepH 7 buffer solutionAqueous mixtureProlyethylene glycol 40025322-68-3PolyetherPropylene carbonate108-32-7Alkylene carbonatePropylene glycol57-55-6GlycolRapeseed oil8002-13-9Fatty acid triglycerideRingers solution (0.017% CaCl ₂ .2H ₂ O, 0.72% w/v & 0.037% KCl in deionised water)Aqueous mixtureSilicone Oil63148-62-9SiliconeSodium hypochlorite solution (6-14% active chlorine)67-64-1SilicateTriethanolamine7732-18-5WaterTriethanolamine102-71-6Amine	1 17 07	64-17-5	Alcohol
Glycerol (Glycerine)56-81-5AlcoholHalf saline/Hypotonic saline solution (0.45% NaCl in deionised water)110-54-3HydrocarbonHypertonic saline solution (3% NaCl in deionised water)Aqueous mixtureIsotonic saline solution (0.9% NaCl in deionised water)Aqueous mixtureMethylated spirits (ethanol, propan-2-ol, butanone)Non-aqueous mixtureMilk (cow's milk, semi-skinned)8049-98-7Aqueous mixtureMineral Oil8042-47-5HydrocarbonMonoethylene glycol107-21-1GlycolN,N-Dimethylformamide (DMF)68-12-2AmideOleic acid112-80-1AcidpH 10 buffer solutionAqueous mixturepH 4 buffer solutionAqueous mixturepH 7 buffer solutionAqueous mixtureProlyethylene glycol 40025322-68-3PolyetherPropylene carbonate108-32-7Alkylene carbonatePropylene glycol57-55-6GlycolRapeseed oil8002-13-9Fatty acid triglycerideRingers solution (0.017% CaCl ₂ .2H ₂ O, 0.72% w/v & 0.037% KCl in deionised water)Aqueous mixtureSilicone Oil63148-62-9SiliconeSodium hypochlorite solution (6-14% active chlorine)67-64-1SilicateTriethanolamine7732-18-5WaterTriethanolamine102-71-6Amine	Ethylene glycol mono-butyl ether (EGMBE, Butyl glycol)	8049-98-7	Glycol ether
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Isotonic saline solution (0.9% NaCl in deionised water) Methylated spirits (ethanol, propan-2-ol, butanone) Milk (cow's milk, semi-skinned) Milk (cow's milk, semi-skinned) Monoethylene glycol N,N-Dimethylformamide (DMF) Oleic acid pH 10 buffer solution pH 4 buffer solution pH 5 buffer solution Polyethylene glycol 400 Propylene carbonate Propylene glycol Rapeseed oil Rapeseed oil Ringers solution (0.017% CaCl ₂₋ 2H ₂ O, 0.72% w/v & 0.037% KCl in deionised water) Sodium hypochlorite solution (6-14% active chlorine) Sodium silicate solution (30% w/w) Tiethanolamine Aqueous mixture Aqueous mixtu	Hypertonic saline solution (3% NaCl in deionised water)		Aqueous mixture
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Monoethylene glycol 107-21-1 Glycol N,N-Dimethylformamide (DMF) 68-12-2 Amide Oleic acid 112-80-1 Acid pH 10 buffer solution Aqueous mixture pH 4 buffer solution Aqueous mixture pH 7 buffer solution Aqueous mixture Polyethylene glycol 400 25322-68-3 Polyether Propylene carbonate 108-32-7 Alkylene carbonate Propylene glycol 57-55-6 Glycol Rapeseed oil 8002-13-9 Fatty acid triglyceride Ringers solution (0.017% CaCl ₂₋ 2H ₂ O, 0.72% w/v & 0.037% KCl in deionised water) Aqueous mixture Silicone Oil 63148-62-9 Silicone Sodium hypochlorite solution (6-14% active chlorine) 7681-52-9 Oxidising agent Sodium silicate solution (30% w/w) 67-64-1 Silicate Tap water 7732-18-5 Water Triethanolamine	Milk (cow's milk, semi-skinned)	8049-98-7	Agueous mixture
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Sodium silicate solution (30% w/w)67-64-1SilicateTap water7732-18-5WaterTriethanolamine102-71-6Amine			
Tap water7732-18-5WaterTriethanolamine102-71-6Amine	,		
Triethanolamine 102-71-6 Amine	, , ,		
			+
	White spirit (Hydrocarbons, C9-C12, n-alkanes, isoalkanes, cyclics, aromatics (2-25%) 100%)		Non-aqueous mixture

- 5 All sorption tests performed with 1g of LPS350 and 2g of liquid. Process only deemed successful is liquid undergoes complete sorption into the powder with the resultant material retaining the liquid in a solid state.
- **6** Refer to the relevant table in the appendix at the end of this document for compositional information.



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APPENDIX

ARTIFICAL BLOOD FORMULATION				
COMPONENT	CONC (w/v)			
Deionised water	42.101			
Xanthan	0.075			
Glycerol	50			
Acid Red 1	0.05			
Lactalbumin	7			
Sodium chloride	0.72			
Potassium chloride	0.037			
Calcium chloride	0.017			

- table 1 -

ARTIFICAL URINE FORMULATION			
COMPONENT	CONC (w/v)		
Urea	1.20		
Uric acid	0.02		
Creatinine	0.05		
Sodium citrate tribasic dihydrate	0.15		
Sodium chloride	0.32		
Potassium chloride	0.22		
Ammonium chloride	0.08		
Calcium chloride dihydrate	0.04		
Magnesium sulphate heptahydrate	0.05		
Sodium bicarbonate	0.02		
Sodium oxalate	0.00		
Sodium sulphate	0.13		
Sodium phosphate monobasic dihydrate	0.06		
Sodium phosphate dibasic	0.01		
Tartrazine	0.01		
Deionised water	97.66		

- table 2 -

Approved by:

For and on behalf of GV Health Ltd., Duncan Holdsworth, Head of Technical

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