



CARACTERIZAÇÃO DE SOLOS/SEDIMENTOS

ESTALEIRO NAVAL NAVE PEGOS

Relatório de Monitorização Ambiental Ref. ART.641.2024



Avaliação efetuada conforme requisitos:

Portaria n.º 1450/2007, de 12 de novembro

Data do Relatório: 22 de julho de 2024

Responsável Técnico

A handwritten signature in blue ink, appearing to read "N. H. Antão".

Nuno Henriques Antão, Eng. (C.P. 61072)
Documento assinado digitalmente

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1. OBJETIVOS

A presente monitorização tem como objetivo efetuar a caracterização de solos/sedimentos provenientes de área específica do estaleiro naval Nave Pegos (consultar planta do gabinete de arquitetura Tierri farias). A caracterização teve como referência o especificado na Portaria n.º 1450/2007, de 12 de novembro. São apresentadas análises quantitativas para classificação dos materiais existentes na zona especificada e numa profundidade de 6 metros em cada uma das estações de monitorização selecionadas para uma caracterização homogénea e representativa da área em estudo.

2. EQUIPA TÉCNICA

A equipa técnica interveniente nos diferentes processos de amostragem, transporte de amostras, análise laboratorial de sedimentos e execução do relatório de monitorização ambiental envolveu diferentes profissionais com formação técnica e experiência profissional comprovada.

Tabela 1 – Equipa técnica e descrição dos trabalhos executados

Entidades Intervenientes	Trabalhos
Arteste Nuno Henriques Antão Eng.º do Ambiente	Coordenação dos trabalhos, análises e execução do relatório técnico de monitorização ambiental.
Duarte Nuno Ramos Duarte Doutor em Geologia Marinha	Colheita de amostras e caracterização geológica.
Gabinete de Arquitetura Tierri Farias Tierri farias Arquiteto	Localização das estações de recolha de amostras para análise
SGS Institut Fresenius GmbH Stefan Leushacke, Christine Fohrmann	Laboratório de análise dos parâmetros: Percentagem de sólidos, condutividade, carbono orgânico total, metais e compostos orgânicos (PAH, PCB, HCB).
Universidade do Algarve Laboratório de Análises Químicas Paulo Pedro Responsável Técnico do Laboratório, Doutor	Caracterização de granulometria.
UPS of Portugal	Transporte de amostras.

3. ENQUADRAMENTO LEGAL

Caracterização e avaliação de sedimentos marinhos em função dos critérios de qualidade estabelecidos na tabela 2 da Portaria n.º 1450/2007, de 12 de novembro.

Tabela 2 – Adaptada da tabela n.º 2, Portaria n.º 1450/2007, de 12 de novembro. Classificação de materiais de acordo com o grau de contaminação: metais (mg/kg), compostos orgânicos (µg/kg)

Parâmetro	Classe 1	Classe 2	Classe 3	Classe 4	Classe 5
Metais:					
Arsénio	< 20	20 – 50	50 – 100	100 – 500	> 500
Cádmio	< 1	1 – 3	3 – 5	5 – 10	> 10
Crómio	< 50	50 – 100	100 – 400	400 – 1000	> 1000
Cobre	< 35	35 – 150	150 – 300	300 – 500	> 500
Mercurio	< 0,5	0,5 – 1,5	1,5 – 3,0	3,0 – 10	> 10
Chumbo	< 50	50 – 150	150 – 500	500 – 1000	> 1000
Níquel	< 30	30 – 75	75 – 125	125 – 250	> 250
Zinco	< 100	100 – 600	600 – 1500	1500 – 5000	> 5000
Compostos orgânicos:					
PCB (soma)	< 5	5 – 25	25 – 100	100 – 300	> 300
PAH (soma)	< 300	300 – 2000	2000 – 6000	6000 – 20000	> 20000
HCB	< 0,5	0,5 – 2,5	2,5 – 10	10 – 50	> 50

A cada uma das classes de qualidade, identificada na tabela anterior, está associada a seguinte forma de eliminação dos materiais dragados:

Classe 1: Material dragado limpo – pode ser depositado no meio aquático ou repostado em locais sujeitos a erosão ou utilizado para alimentação de praias sem normas restritivas.

Classe 2: Material dragado com contaminação vestigiária – pode ser imerso no meio aquático tendo em atenção as características do meio recetor e o uso legítimo do mesmo.

Classe 3: Material dragado ligeiramente contaminado – pode ser utilizado para terraplenos ou no caso de imersão necessita de estudo aprofundado do local de deposição e monitorização posterior do mesmo.

Classe 4: Material dragado contaminado – preposição em terra, em local impermeabilizado, com a recomendação de posterior cobertura de solos impermeáveis.

Classe 5: Material muito contaminado – idealmente não deverá ser dragado e em caso imperativo, deverão os dragados ser encaminhados para tratamento prévio e ou deposição em aterro de resíduos devidamente autorizado, sendo proibida a sua imersão.

4. LOCALIZAÇÃO DOS PONTOS DE AMOSTRAGEM

Excerto da planta original do Gabinete de Arquitetura Tierri farias (original em anexo)



Tabela 3 – Referência e localização dos pontos de amostragem (cortes verticais contínuos em profundidade)

Origem da Amostra	Localização das Amostras Coordenadas geográficas	Altura da Coluna de Solo/Sedimento	Ref. Amostra / Relatório
Amostra 1, Ponto S01	X = 16747.87115 Y = -293702.47361	H = 6 m	240552966 SGS IF 47841 LAQ UAlg
Amostra 2, Ponto S02	X = 16713.67729 Y = -293629.16945	H = 6 m	240552967 SGS IF 47841 LAQ UAlg
Amostra 3, Ponto S03	X = 16649.87513 Y = -293660.82500	H = 6 m	240552968 SGS IF 47841 LAQ UAlg
Amostra 4, Ponto S04	X = 16590.78144 Y = -293688.29106	H = 6 m	240552969 SGS IF 47841 LAQ UAlg
Amostra 5, Ponto S05	X = 16580.93266 Y = -293737.06595	H = 6 m	240552970 SGS IF 47841 LAQ UAlg
Amostra 6, Ponto S06	X = 16625.66933 Y = -293758.94670	H = 6 m	240552971 SGS IF 47841 LAQ UAlg
Amostra 7, Ponto S07	X = 16678.24704 Y = -293722.10433	H = 6 m	240552972 SGS IF 47841 LAQ UAlg

Notas: SGS IF – SGS Institut Fresenius GmbH; LAQ UAlg – Laboratório de análises químicas da Universidade do Algarve

A recolha das amostras foi efetuada por uma equipa especializada em 19 de maio de acordo com o disposto na Portaria n.º 1450/2007, de 12 de novembro, designadamente o Anexo III. Foram selecionadas 7 estações de monitorização distribuídas no espaço de forma a representativa de toda a área a intervir e volume de inertes a movimentar. Com recurso a equipamento técnico adequado foram efetuadas 7 escavações verticais contínuas com 6 m de profundidade em cada um dos pontos referenciados na tabela 3 e recolhidas amostras representativas de toda a coluna de solo/sedimento. As amostras, preparadas em laboratório, são representativas da coluna de solo/sedimentos com 6 m de profundidade.

5. RELATÓRIOS ANALÍTICOS COM RESULTADOS E CLASSIFICAÇÃO LEGISLATIVA

As tabelas das folhas 9 a 22 discriminam os resultados analíticos obtidos e o enquadramento legislativo com os limites da classe em que se enquadram os resultados de cada amostra. Os relatórios originais são apresentados em anexo. Em laboratório foram preparadas amostras compostas, representativas da coluna de solos/sedimentos (profundidade de 6 m) nas sete estações de monitorização selecionadas.

Laboratório de Ensaios: SGS Institut Fresenius GmbH
Certificado de Acreditação D-PL-14115-02-02/14
Certificados do Laboratório SGS Institut Fresenius GmbH em anexo

Preparação das amostras conforme DIN 19747 (2009-07)

Sumário dos métodos de teste utilizados:

DIN 38404-5	2009-07
DIN 38407-2	1993-02
DIN EN 13657	2003-01
DIN EN 14346	2007-03
DIN EN 1483	2007-07
DIN EN 15936	2012-11
DIN EN ISO 11885	2009-09
DIN ISO 11265	1997-06
DIN ISO 18287	2006-05
ISO 10390	2006-02

Tabela 4 – Resumo dos resultados obtidos e enquadramento legislativo de classificação de cada amostra de acordo com o grau de contaminação

PARÂMETRO	UNIDADES	Lq	RESULTADOS						
			Amostra 1	Amostra 2	Amostra 3	Amostra 4	Amostra 5	Amostra 6	Amostra 7
Características:									
Matéria seca	% massa	0,1	84,1	83,5	86,6	79,6	82,7	84,0	85,6
Carbono orgânico total	% massa	0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	0,3
PARÂMETRO	UNIDADES	Lq	RESULTADOS						
			Amostra 1	Amostra 2	Amostra 3	Amostra 4	Amostra 5	Amostra 6	Amostra 7
Metais:									
Arsénio	mg/kg m.s.	2	5	6	5	6	9	< 2	8
Cádmio	mg/kg m.s.	0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2	< 0,2
Crómio	mg/kg m.s.	1	10	32	27	34	31	34	50
Cobre	mg/kg m.s.	1	5	14	12	16	14	14	19
Mercúrio	mg/kg m.s.	0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1
Chumbo	mg/kg m.s.	2	6	13	9	11	17	3	18
Níquel	mg/kg m.s.	1	15	19	17	26	24	19	30
Zinco	mg/kg m.s.	1	24	28	23	30	43	86	39
Compostos orgânicos:									
PCB (soma)	µg/kg m.s.	3	< 3 (Lq)	< 3 (Lq)	< 3 (Lq)	< 3 (Lq)	< 3 (Lq)	< 3 (Lq)	< 3 (Lq)
PAH (soma)	µg/kg m.s.	10	< 10 (Lq)	< 10 (Lq)	< 10 (Lq)	< 10 (Lq)	< 10 (Lq)	< 10 (Lq)	< 10 (Lq)
HCB	µg/kg m.s.	0,5	< 0,5 (Lq)	< 0,5 (Lq)	< 0,5 (Lq)	< 0,5 (Lq)	< 0,5 (Lq)	< 0,5 (Lq)	< 0,5 (Lq)
Classificação global da amostra Tabela n.º 2 da Portaria n.º 1450/2007			Classe 1	Classe 1	Classe 1	Classe 1	Classe 1	Classe 1	Classe 1

Notas: Os resultados expressos com < são inferiores ao limite de quantificação do método analítico; Lq - Limite de quantificação do método analítico; m.s – Matéria seca; A soma de um grupo de compostos corresponde ao total de valores quantificados ou, se todos os valores dos parâmetros analisados forem inferiores ao limite de quantificação é considerado o valor mais elevado.

Declaração de conformidade: As amostras apresentam características idênticas com enquadramento na classe 1, da tabela n.º 2 da Portaria 1450/2007, de 12 de novembro.

Relatório de Ensaios N.º 6933894

Nave Pegos, Amostra 1, Estação de monitorização S01 - Amostra SGS IF N.º 24052966

Data de entrada: 03.06.2024

Início dos ensaios: 07.06.2024

Fim dos ensaios: 13.06.2024

CARACTERÍSTICAS DA AMOSTRA				
Parâmetro	Método	Resultado	Unidade	Valor Limite Portaria 1450/2007, Classe 1
Matéria seca	DIN EN 14346	84,1	% massa	-
Carbono orgânico total	DIN EN 15936	< 0,1	% massa	-
METAIS				
Parâmetro	Método	Resultados	Unidades	Valor Limite Portaria 1450/2007, Classe 1
Arsénio	DIN EN ISO 11885	5	mg/kg m. s.	< 20
Cádmio	DIN EN ISO 11885	< 0,2	mg/kg m. s.	< 1
Crómio	DIN EN ISO 11885	10	mg/kg m. s.	< 50
Cobre	DIN EN ISO 11885	5	mg/kg m. s.	< 35
Mercúrio	DIN EN 1483	< 0,1	mg/kg m. s.	< 0,5
Chumbo	DIN EN ISO 11885	6	mg/kg m. s.	< 50
Níquel	DIN EN ISO 11885	15	mg/kg m. s.	< 30
Zinco	DIN EN ISO 11885	24	mg/kg m. s.	< 100
COMPOSTOS ORGÂNICOS				
Parâmetro	Método	Resultados	Unidades	Valor Limite Portaria 1450/2007, Classe 1
Naftaleno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Acenaftileno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Acenafteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Fluoreno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Fenantreno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Antraceno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Fluoranteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Pireno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(a)antraceno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Criseno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(b)fluoranteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(k)fluoranteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(a)pireno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Dibenzo(a,h)antraceno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(g,h,i)perileno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Indeno(1,2,3-c,d)pireno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Total HAP	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	< 300
PCB 28	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 52	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 101	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 118	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 153	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 138	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 180	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
Total PCB	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	< 5
Hexaclorobenzeno	DIN 38407-2	< 0,5 (Lq)	µg/kg m. s.	< 0,5

Relatório de Ensaios N.º 6933894**Nave Pegos, Amostra 1, Estação de monitorização S01 - Relatório UAIG LAQ N.º 47841**

Data de entrada: 28.05.2024

Início dos ensaios: 04.06.2024

Fim dos ensaios: 26.06.2024

CARACTERÍSTICAS DA AMOSTRA**Análise Granulométrica****Método de Ensaio: Gravimetria e difração laser**

Tipo de Amostra: Polimodal, muito pouco distribuída

Grupo de Amostra: Areia lodosa com gravilha

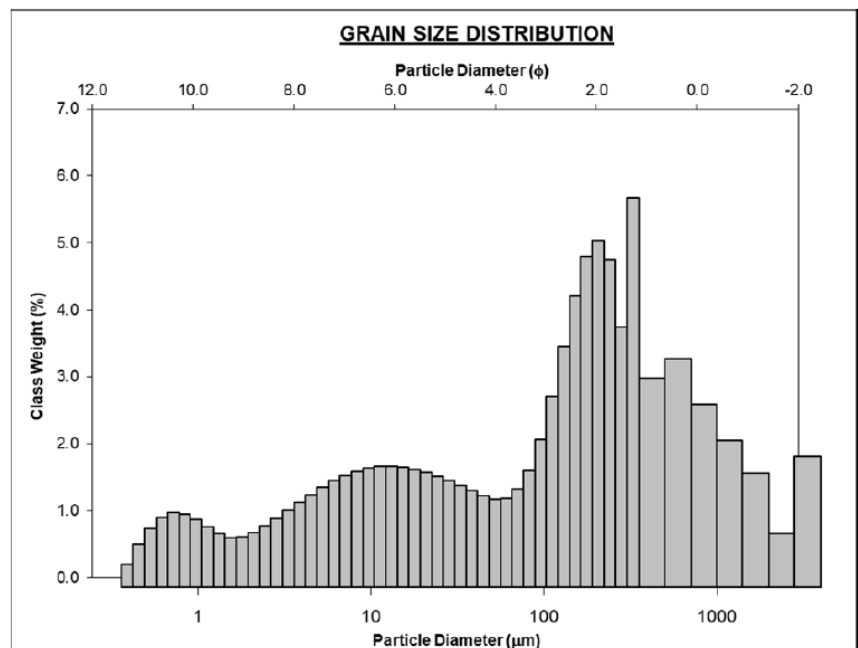
Nome sedimentar: Areia fina medio siltosa com gravilha muito fina

GRANULOMETRIA

Parâmetro	Resultados	Parâmetro	Resultados
Gravilha	10,0 %	Gravilha muito grosseira	0,0 %
Areia	56,3 %	Gravilha grosseira	0,0 %
Argila	33,7 %	Gravilha média	0,0 %
		Gravilha fina	0,0 %
		Gravilha muito fina	10,0 %
		Areia muito grosseira	6,9 %
		Areia grosseira	11,0 %
		Areia média	14,3 %
		Areia fina	16,5 %
		Areia muito fina	7,5 %
		Silte muito grosseiro	5,0 %
		Silte grosseiro	6,0 %
		Silte médio	6,4 %
		Silte fino	5,4 %
		Silte muito fino	3,6 %
		Argila	7,3 %

GRÁFICO COM DISTRIBUIÇÃO GRANULOMÉTRICA

MODA 1 (μm):	328.3
MODA 2 (μm):	206.5
MODA 3 (μm):	605.0
MODA 1 (ϕ):	1.612
MODA 2 (ϕ):	2.280
MODA 3 (ϕ):	0.747
D_{10} (μm):	3.360
D_{50} (μm):	185.79
D_{90} (μm):	2010.2
(D_{90} / D_{10}) (μm):	598.20
$(D_{90} - D_{10})$ (μm):	2006.9
(D_{75} / D_{25}) (μm):	29.363
$(D_{75} - D_{25})$ (μm):	571.37
D_{10} (ϕ):	-1.01
D_{50} (ϕ):	2.43
D_{90} (ϕ):	8.22
(D_{90} / D_{10}) (ϕ):	-8.16
$(D_{90} - D_{10})$ (ϕ):	9.22
(D_{75} / D_{25}) (ϕ):	7.44
$(D_{75} - D_{25})$ (ϕ):	4.88



Relatório de Ensaios N.º 6933894**Nave Pegos, Amostra 1, Estação de monitorização S01 - Amostra SGS IF N.º 240552966**

Data de entrada: 03.06.2024

Início dos ensaios: 07.06.2024

Fim dos ensaios: 13.06.2024

CARACTERÍSTICAS COMPLEMENTARES				
Parâmetro	Método	Resultado	Unidade	Valor Limite
pH	ISO 10390	8,7		-
Temperatura de medição de pH	DIN 38404-5	19,3	°C	-
Condutividade elétrica a 25 °C	DIN ISO 11265	2010	µS/cm	-
Salinidade	Cálculo *	0,997	g/l	-

Declaração de Conformidade

Os resultados da amostra 1, estação de monitorização S01, enquadram-se na classe 1, da tabela n.º 2, Portaria n.º 1450/2007, de 12 de novembro – “Material dragado limpo – pode ser depositado no meio aquático ou repostado em locais sujeitos a erosão ou utilizado para alimentação de praias sem normas restritivas”.

Observações:

O ensaio assinalado com * não é acreditado. O valor de salinidade é um cálculo com base nas características da amostra, nomeadamente a condutividade elétrica. O valor pode diferir se utilizado outro método de cálculo.

Os resultados expressos sob forma <X são inferiores ao limite de quantificação do método analítico. Este documento é confidencial. É proibida a reprodução parcial deste boletim analítico. Os resultados analíticos referem-se exclusivamente à amostra analisada. A declaração de conformidade aplica-se aos parâmetros acreditados.

Relatório de Ensaios N.º 6933894

Nave Pegos, Amostra 2, Estação de monitorização S02 - Amostra SGS IF N.º 24052967

Data de entrada: 03.06.2024

Início dos ensaios: 07.06.2024

Fim dos ensaios: 13.06.2024

CARACTERÍSTICAS DA AMOSTRA				
Parâmetro	Método	Resultado	Unidade	Valor Limite Portaria 1450/2007, Classe 1
Matéria seca	DIN EN 14346	83,5	% massa	-
Carbono orgânico total	DIN EN 15936	< 0,1	% massa	-
METAIS				
Parâmetro	Método	Resultados	Unidades	Valor Limite Portaria 1450/2007, Classe 1
Arsénio	DIN EN ISO 11885	6	mg/kg m. s.	< 20
Cádmio	DIN EN ISO 11885	< 0,2	mg/kg m. s.	< 1
Crómio	DIN EN ISO 11885	32	mg/kg m. s.	< 50
Cobre	DIN EN ISO 11885	14	mg/kg m. s.	< 35
Mercúrio	DIN EN 1483	< 0,1	mg/kg m. s.	< 0,5
Chumbo	DIN EN ISO 11885	13	mg/kg m. s.	< 50
Níquel	DIN EN ISO 11885	19	mg/kg m. s.	< 30
Zinco	DIN EN ISO 11885	28	mg/kg m. s.	< 100
COMPOSTOS ORGÂNICOS				
Parâmetro	Método	Resultados	Unidades	Valor Limite Portaria 1450/2007, Classe 1
Naftaleno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Acenafileno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Acenafteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Fluoreno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Fenantreno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Antraceno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Fluoranteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Pireno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(a)antraceno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Criseno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(b)fluoranteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(k)fluoranteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(a)pireno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Dibenzo(a,h)antraceno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(g,h,i)perileno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Indeno(1,2,3-c,d)pireno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Total HAP	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	< 300
PCB 28	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 52	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 101	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 118	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 153	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 138	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 180	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
Total PCB	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	< 5
Hexaclorobenzeno	DIN 38407-2	< 0,5 (Lq)	µg/kg m. s.	< 0,5

Relatório de Ensaios N.º 6933894

Nave Pegos, Amostra 2, Estação de monitorização S02 - Relatório UAIG LAQ N.º 47842

Data de entrada: 28.05.2024

Início dos ensaios: 04.06.2024

Fim dos ensaios: 26.06.2024

CARACTERÍSTICAS DA AMOSTRA

Análise Granulométrica

Método de Ensaio: Gravimetria e difração laser

Tipo de Amostra: Polimodal, muito pouco distribuída

Grupo de Amostra: Areia lodosa com gravilha

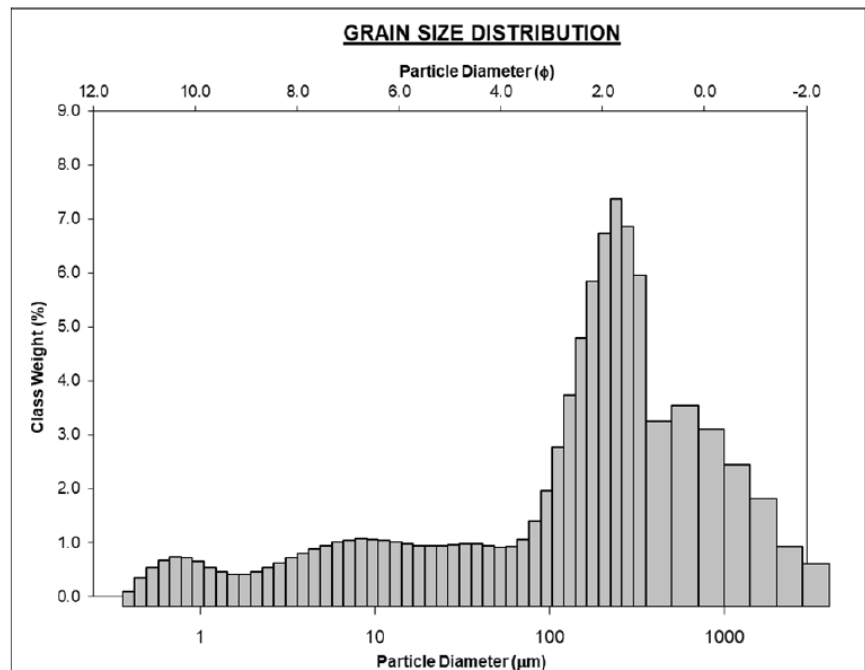
Nome sedimentar: Areia fina medio siltosa com gravilha fina

GRANULOMETRIA

Parâmetro	Resultados	Parâmetro	Resultados
Gravilha	7,5 %	Gravilha muito grosseira	0,0 %
Areia	67,2 %	Gravilha grosseira	0,0 %
Argila	25,3 %	Gravilha média	0,0 %
		Gravilha fina	0,0 %
		Gravilha muito fina	7,5 %
		Areia muito grosseira	8,2 %
		Areia grosseira	12,5 %
		Areia média	18,1 %
		Areia fina	21,1 %
		Areia muito fina	7,2 %
		Silte muito grosseiro	4,0 %
		Silte grosseiro	4,1 %
		Silte médio	4,4 %
		Silte fino	4,1 %
		Silte muito fino	2,8 %
		Argila	6,0 %

GRÁFICO COM DISTRIBUIÇÃO GRANULOMÉTRICA

MODA 1 (μm):	240.6
MODA 2 (μm):	605.0
MODA 3 (μm):	8.4
MODA 1 (ϕ):	2.059
MODA 2 (ϕ):	0.747
MODA 3 (ϕ):	6.907
D ₁₀ (μm):	4.861
D ₅₀ (μm):	227.85
D ₉₀ (μm):	1568.9
(D ₉₀ / D ₁₀) (μm):	322.74
(D ₉₀ - D ₁₀) (μm):	1564.1
(D ₇₅ / D ₂₅) (μm):	10.063
(D ₇₅ - D ₂₅) (μm):	533.59
D ₁₀ (ϕ):	-0.65
D ₅₀ (ϕ):	2.13
D ₉₀ (ϕ):	7.68
(D ₉₀ / D ₁₀) (ϕ):	-11.83
(D ₉₀ - D ₁₀) (ϕ):	8.33
(D ₇₅ / D ₂₅) (ϕ):	5.41
(D ₇₅ - D ₂₅) (ϕ):	3.33



Relatório de Ensaios N.º 6933894**Nave Pegos, Amostra 2, Estação de monitorização S02 - Amostra SGS IF N.º 240552967**

Data de entrada: 03.06.2024

Início dos ensaios: 07.06.2024

Fim dos ensaios: 13.06.2024

CARACTERÍSTICAS COMPLEMENTARES				
Parâmetro	Método	Resultado	Unidade	Valor Limite
pH	ISO 10390	8,7		-
Temperatura de medição de pH	DIN 38404-5	19,7	°C	-
Condutividade elétrica a 25 °C	DIN ISO 11265	2510	µS/cm	-
Salinidade	Cálculo *	1,269	g/l	-

Declaração de Conformidade

Os resultados da amostra 2, estação de monitorização S02, enquadram-se na classe 1, da tabela n.º 2, Portaria n.º 1450/2007, de 12 de novembro – “Material dragado limpo – pode ser depositado no meio aquático ou repostado em locais sujeitos a erosão ou utilizado para alimentação de praias sem normas restritivas”.

Observações:

O ensaio assinalado com * não é acreditado. O valor de salinidade é um cálculo com base nas características da amostra, nomeadamente a condutividade elétrica. O valor pode diferir se utilizado outro método de cálculo.

Os resultados expressos sob forma <X são inferiores ao limite de quantificação do método analítico. Este documento é confidencial. É proibida a reprodução parcial deste boletim analítico. Os resultados analíticos referem-se exclusivamente à amostra analisada. A declaração de conformidade aplica-se aos parâmetros acreditados.

Relatório de Ensaios N.º 6933894

Nave Pegos, Amostra 3, Estação de monitorização S03 - Amostra SGS IF N.º 24052968

Data de entrada: 03.06.2024

Início dos ensaios: 07.06.2024

Fim dos ensaios: 13.06.2024

CARACTERÍSTICAS DA AMOSTRA				
Parâmetro	Método	Resultado	Unidade	Valor Limite Portaria 1450/2007, Classe 1
Matéria seca	DIN EN 14346	86,6	% massa	-
Carbono orgânico total	DIN EN 15936	< 0,1	% massa	-
METAIS				
Parâmetro	Método	Resultados	Unidades	Valor Limite Portaria 1450/2007, Classe 1
Arsénio	DIN EN ISO 11885	5	mg/kg m. s.	< 20
Cádmio	DIN EN ISO 11885	<0,2	mg/kg m. s.	< 1
Crómio	DIN EN ISO 11885	27	mg/kg m. s.	< 50
Cobre	DIN EN ISO 11885	12	mg/kg m. s.	< 35
Mercúrio	DIN EN 1483	<0,1	mg/kg m. s.	< 0,5
Chumbo	DIN EN ISO 11885	9	mg/kg m. s.	< 50
Níquel	DIN EN ISO 11885	17	mg/kg m. s.	< 30
Zinco	DIN EN ISO 11885	23	mg/kg m. s.	< 100
COMPOSTOS ORGÂNICOS				
Parâmetro	Método	Resultados	Unidades	Valor Limite Portaria 1450/2007, Classe 1
Naftaleno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Acenaftileno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Acenafteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Fluoreno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Fenantreno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Antraceno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Fluoranteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Pireno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(a)antraceno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Criseno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(b)fluoranteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(k)fluoranteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(a)pireno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Dibenzo(a,h)antraceno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(g,h,i)perileno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Indeno(1,2,3-c,d)pireno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Total HAP	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	< 300
PCB 28	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 52	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 101	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 118	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 153	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 138	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 180	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
Total PCB	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	< 5
Hexaclorobenzeno	DIN 38407-2	< 0,5 (Lq)	µg/kg m. s.	< 0,5

Relatório de Ensaios N.º 6933894**Nave Pegos, Amostra 3, Estação de monitorização S03 - Relatório UAIG LAQ N.º 47843**

Data de entrada: 28.05.2024

Início dos ensaios: 04.06.2024

Fim dos ensaios: 26.06.2024

CARACTERÍSTICAS DA AMOSTRA**Análise Granulométrica****Método de Ensaio: Gravimetria e difração laser**

Tipo de Amostra: Bimodal, muito pouco distribuída

Grupo de Amostra: Areia lodosa com alguma gravilha

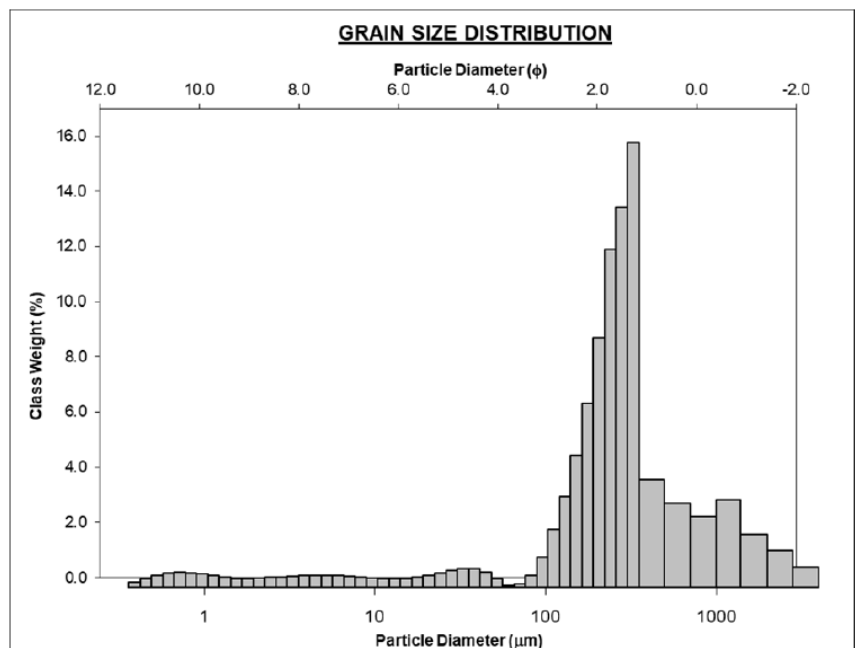
Nome sedimentar: Areia medio siltosa com gravilha muito fina

GRANULOMETRIA

Parâmetro	Resultados	Parâmetro	Resultados
Gravilha	4,5 %	Gravilha muito grosseira	0,0 %
Areia	84,3 %	Gravilha grosseira	0,0 %
Argila	11,2 %	Gravilha média	0,0 %
		Gravilha fina	0,0 %
		Gravilha muito fina	4,5 %
		Areia muito grosseira	9,3 %
		Areia grosseira	10,3 %
		Areia média	34,5 %
		Areia fina	26,4 %
		Areia muito fina	3,7 %
		Silte muito grosseiro	1,7 %
		Silte grosseiro	1,8 %
		Silte médio	1,2 %
		Silte fino	1,5 %
		Silte muito fino	1,4 %
		Argila	3,6 %

GRÁFICO COM DISTRIBUIÇÃO GRANULOMÉTRICA

MODA 1 (μm):	328.3
MODA 2 (μm):	1200.0
MODA 3 (μm):	
MODA 1 (ϕ):	1.612
MODA 2 (ϕ):	-0.243
MODA 3 (ϕ):	
D ₁₀ (μm):	36.147
D ₅₀ (μm):	282.63
D ₉₀ (μm):	1255.8
(D ₉₀ / D ₁₀) (μm):	34.74
(D ₉₀ - D ₁₀) (μm):	1219.6
(D ₇₅ / D ₂₅) (μm):	2.610
(D ₇₅ - D ₂₅) (μm):	296.31
D ₁₀ (ϕ):	-0.33
D ₅₀ (ϕ):	1.82
D ₉₀ (ϕ):	4.79
(D ₉₀ / D ₁₀) (ϕ):	-14.58
(D ₉₀ - D ₁₀) (ϕ):	5.12
(D ₇₅ / D ₂₅) (ϕ):	2.31
(D ₇₅ - D ₂₅) (ϕ):	1.38



Relatório de Ensaios N.º 6933894**Nave Pegos, Amostra 3, Estação de monitorização S03 - Amostra SGS IF N.º 240552968**

Data de entrada: 03.06.2024

Início dos ensaios: 07.06.2024

Fim dos ensaios: 13.06.2024

CARACTERÍSTICAS COMPLEMENTARES				
Parâmetro	Método	Resultado	Unidade	Valor Limite
pH	ISO 10390	9,0		-
Temperatura de medição de pH	DIN 38404-5	19,8	°C	-
Condutividade elétrica a 25 °C	DIN ISO 11265	919	µS/cm	-
Salinidade	Cálculo *	0,426	g/l	-

Declaração de Conformidade

Os resultados da amostra 3, estação de monitorização S03, enquadram-se na classe 1, da tabela n.º 2, Portaria n.º 1450/2007, de 12 de novembro – “Material dragado limpo – pode ser depositado no meio aquático ou repostado em locais sujeitos a erosão ou utilizado para alimentação de praias sem normas restritivas”.

Observações:

O ensaio assinalado com * não é acreditado. O valor de salinidade é um cálculo com base nas características da amostra, nomeadamente a condutividade elétrica. O valor pode diferir se utilizado outro método de cálculo.

Os resultados expressos sob forma <X são inferiores ao limite de quantificação do método analítico. Este documento é confidencial. É proibida a reprodução parcial deste boletim analítico. Os resultados analíticos referem-se exclusivamente à amostra analisada. A declaração de conformidade aplica-se aos parâmetros acreditados.

Relatório de Ensaios N.º 6933894

Nave Pegos, Amostra 4, Estação de monitorização S04 - Amostra SGS IF N.º 24052969

Data de entrada: 03.06.2024

Início dos ensaios: 07.06.2024

Fim dos ensaios: 13.06.2024

CARACTERÍSTICAS DA AMOSTRA				
Parâmetro	Método	Resultado	Unidade	Valor Limite Portaria 1450/2007, Classe 1
Matéria seca	DIN EN 14346	79,6	% massa	-
Carbono orgânico total	DIN EN 15936	< 0,1	% massa	-
METAIS				
Parâmetro	Método	Resultados	Unidades	Valor Limite Portaria 1450/2007, Classe 1
Arsénio	DIN EN ISO 11885	6	mg/kg m. s.	< 20
Cádmio	DIN EN ISO 11885	< 0,2	mg/kg m. s.	< 1
Crómio	DIN EN ISO 11885	34	mg/kg m. s.	< 50
Cobre	DIN EN ISO 11885	16	mg/kg m. s.	< 35
Mercúrio	DIN EN 1483	< 0,1	mg/kg m. s.	< 0,5
Chumbo	DIN EN ISO 11885	11	mg/kg m. s.	< 50
Níquel	DIN EN ISO 11885	26	mg/kg m. s.	< 30
Zinco	DIN EN ISO 11885	30	mg/kg m. s.	< 100
COMPOSTOS ORGÂNICOS				
Parâmetro	Método	Resultados	Unidades	Valor Limite Portaria 1450/2007, Classe 1
Naftaleno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Acenaftileno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Acenafteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Fluoreno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Fenantreno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Antraceno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Fluoranteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Pireno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(a)antraceno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Criseno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(b)fluoranteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(k)fluoranteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(a)pireno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Dibenzo(a,h)antraceno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(g,h,i)perileno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Indeno(1,2,3-c,d)pireno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Total HAP	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	< 300
PCB 28	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 52	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 101	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 118	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 153	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 138	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 180	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
Total PCB	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	< 5
Hexaclorobenzeno	DIN 38407-2	< 0,5 (Lq)	µg/kg m. s.	< 0,5

Relatório de Ensaios N.º 6933894**Nave Pegos, Amostra 4, Estação de monitorização S04 - Relatório UAIG LAQ N.º 47844**

Data de entrada: 28.05.2024

Início dos ensaios: 04.06.2024

Fim dos ensaios: 26.06.2024

CARACTERÍSTICAS DA AMOSTRA**Análise Granulométrica****Método de Ensaio: Gravimetria e difração laser**

Tipo de Amostra: Polimodal, muito pouco distribuída

Grupo de Amostra: Lodo arenoso ligeiramente gravilhoso

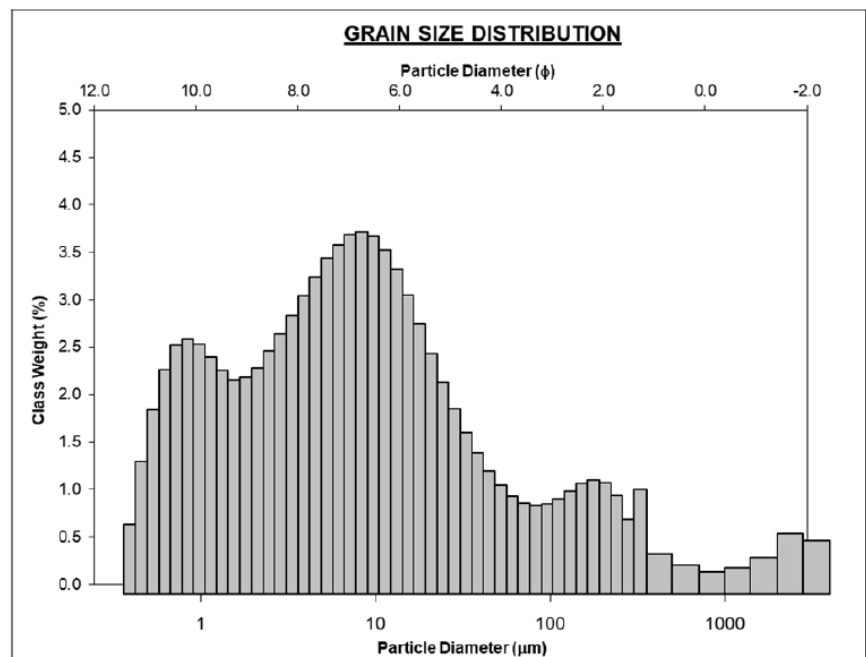
Nome sedimentar: Silte medio com areia fina e ligeira gravilha muito fina

GRANULOMETRIA

Parâmetro	Resultados	Parâmetro	Resultados
Gravilha	3,2 %	Gravilha muito grosseira	0,0 %
Areia	14,8 %	Gravilha grosseira	0,0 %
Argila	82,0 %	Gravilha média	0,0 %
		Gravilha fina	0,0 %
		Gravilha muito fina	3,2 %
		Areia muito grosseira	1,4 %
		Areia grosseira	1,2 %
		Areia média	3,0 %
		Areia fina	5,0 %
		Areia muito fina	4,2 %
		Silte muito grosseiro	5,8 %
		Silte grosseiro	10,6 %
		Silte médio	15,6 %
		Silte fino	15,4 %
		Silte muito fino	11,8 %
		Argila	22,8 %

GRÁFICO COM DISTRIBUIÇÃO GRANULOMÉTRICA

MODA 1 (μm):	8.4
MODA 2 (μm):	0.8
MODA 3 (μm):	177.3
MODA 1 (ϕ):	6.907
MODA 2 (ϕ):	10.212
MODA 3 (ϕ):	2.500
D ₁₀ (μm):	0.845
D ₅₀ (μm):	7.82
D ₉₀ (μm):	210.5
(D ₉₀ / D ₁₀) (μm):	249.26
(D ₉₀ - D ₁₀) (μm):	209.7
(D ₇₅ / D ₂₅) (μm):	12.513
(D ₇₅ - D ₂₅) (μm):	26.10
D ₁₀ (ϕ):	2.25
D ₅₀ (ϕ):	7.00
D ₉₀ (ϕ):	10.21
(D ₉₀ / D ₁₀) (ϕ):	4.54
(D ₉₀ - D ₁₀) (ϕ):	7.96
(D ₇₅ / D ₂₅) (ϕ):	1.71
(D ₇₅ - D ₂₅) (ϕ):	3.65



Relatório de Ensaios N.º 6933894**Nave Pegos, Amostra 4, Estação de monitorização S04 - Amostra SGS IF N.º 240552969**

Data de entrada: 03.06.2024

Início dos ensaios: 07.06.2024

Fim dos ensaios: 13.06.2024

CARACTERÍSTICAS COMPLEMENTARES				
Parâmetro	Método	Resultado	Unidade	Valor Limite
pH	ISO 10390	9,1		-
Temperatura de medição de pH	DIN 38404-5	19,8	°C	-
Condutividade elétrica a 25 °C	DIN ISO 11265	924	µS/cm	-
Salinidade	Cálculo *	0,428	g/l	-

Declaração de Conformidade

Os resultados da amostra 4, estação de monitorização S04, enquadram-se na classe 1, da tabela n.º 2, Portaria n.º 1450/2007, de 12 de novembro – “Material dragado limpo – pode ser depositado no meio aquático ou repostado em locais sujeitos a erosão ou utilizado para alimentação de praias sem normas restritivas”.

Observações:

O ensaio assinalado com * não é acreditado. O valor de salinidade é um cálculo com base nas características da amostra, nomeadamente a condutividade elétrica. O valor pode diferir se utilizado outro método de cálculo.

Os resultados expressos sob forma <X são inferiores ao limite de quantificação do método analítico. Este documento é confidencial. É proibida a reprodução parcial deste boletim analítico. Os resultados analíticos referem-se exclusivamente à amostra analisada. A declaração de conformidade aplica-se aos parâmetros acreditados.

Relatório de Ensaios N.º 6933894

Nave Pegos, Amostra 5, Estação de monitorização S05 - Amostra SGS IF N.º 24052970

Data de entrada: 03.06.2024

Início dos ensaios: 07.06.2024

Fim dos ensaios: 13.06.2024

CARACTERÍSTICAS DA AMOSTRA				
Parâmetro	Método	Resultado	Unidade	Valor Limite Portaria 1450/2007, Classe 1
Matéria seca	DIN EN 14346	82,7	% massa	-
Carbono orgânico total	DIN EN 15936	< 0,1	% massa	-
METAIS				
Parâmetro	Método	Resultados	Unidades	Valor Limite Portaria 1450/2007, Classe 1
Arsénio	DIN EN ISO 11885	9	mg/kg m. s.	< 20
Cádmio	DIN EN ISO 11885	< 0,2	mg/kg m. s.	< 1
Crómio	DIN EN ISO 11885	31	mg/kg m. s.	< 50
Cobre	DIN EN ISO 11885	14	mg/kg m. s.	< 35
Mercurio	DIN EN 1483	< 0,1	mg/kg m. s.	< 0,5
Chumbo	DIN EN ISO 11885	17	mg/kg m. s.	< 50
Níquel	DIN EN ISO 11885	24	mg/kg m. s.	< 30
Zinco	DIN EN ISO 11885	43	mg/kg m. s.	< 100
COMPOSTOS ORGÂNICOS				
Parâmetro	Método	Resultados	Unidades	Valor Limite Portaria 1450/2007, Classe 1
Naftaleno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Acenaftileno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Acenafteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Fluoreno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Fenantreno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Antraceno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Fluoranteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Pireno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(a)antraceno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Criseno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(b)fluoranteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(k)fluoranteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(a)pireno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Dibenzo(a,h)antraceno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(g,h,i)perileno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Indeno(1,2,3-c,d)pireno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Total HAP	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	< 300
PCB 28	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 52	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 101	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 118	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 153	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 138	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 180	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
Total PCB	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	< 5
Hexaclorobenzeno	DIN 38407-2	< 0,5 (Lq)	µg/kg m. s.	< 0,5

Relatório de Ensaios N.º 6933894

Nave Pegos, Amostra 5, Estação de monitorização S05 - Relatório UAIG LAQ N.º 47845

Data de entrada: 28.05.2024

Início dos ensaios: 04.06.2024

Fim dos ensaios: 26.06.2024

CARACTERÍSTICAS DA AMOSTRA

Análise Granulométrica

Método de Ensaio: Gravimetria e difração laser

Tipo de Amostra: Polimodal, muito pouco distribuída

Grupo de Amostra: Lodo arenoso ligeiramente gravilhoso

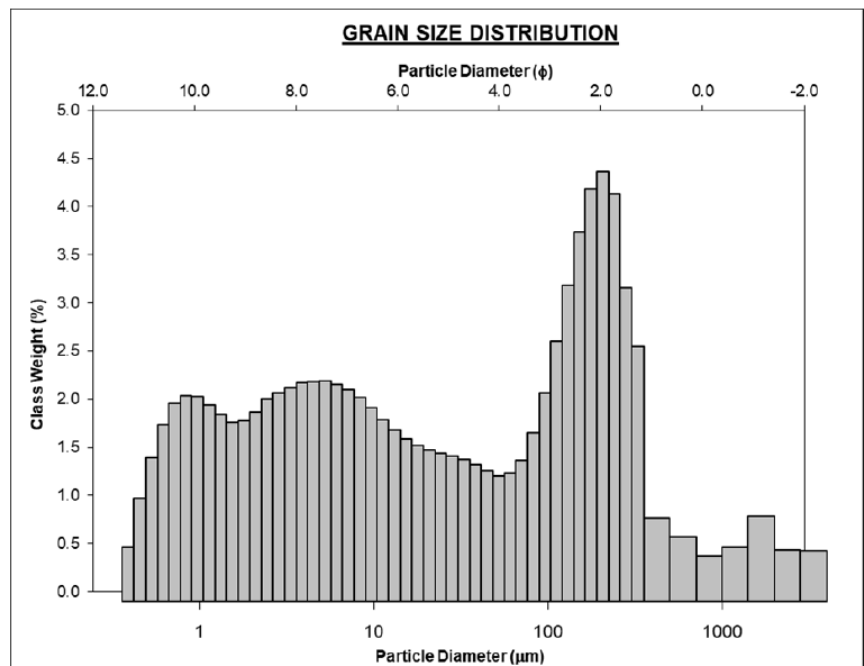
Nome sedimentar: Silte fino com areia fina e ligeira gravilha muito fina

GRANULOMETRIA

Parâmetro	Resultados	Parâmetro	Resultados
Gravilha	3,7 %	Gravilha muito grosseira	0,0 %
Areia	39,5 %	Gravilha grosseira	0,0 %
Argila	56,7 %	Gravilha média	0,0 %
		Gravilha fina	0,0 %
		Gravilha muito fina	3,7 %
		Areia muito grosseira	3,1 %
		Areia grosseira	2,4 %
		Areia média	8,4 %
		Areia fina	17,1 %
		Areia muito fina	8,6 %
		Silte muito grosseiro	5,8 %
		Silte grosseiro	6,6 %
		Silte médio	8,1 %
		Silte fino	9,5 %
		Silte muito fino	9,0 %
		Argila	17,7 %

GRÁFICO COM DISTRIBUIÇÃO GRANULOMÉTRICA

MODA 1 (μm):	206.5
MODA 2 (μm):	5.3
MODA 3 (μm):	0.8
MODA 1 (ϕ):	2.280
MODA 2 (ϕ):	7.568
MODA 3 (ϕ):	10.212
D ₁₀ (μm):	1.020
D ₅₀ (μm):	28.31
D ₉₀ (μm):	430.0
(D ₉₀ / D ₁₀) (μm):	421.63
(D ₉₀ - D ₁₀) (μm):	428.9
(D ₇₅ / D ₂₅) (μm):	54.714
(D ₇₅ - D ₂₅) (μm):	185.57
D ₁₀ (ϕ):	1.22
D ₅₀ (ϕ):	5.14
D ₉₀ (ϕ):	9.94
(D ₉₀ / D ₁₀) (ϕ):	8.16
(D ₉₀ - D ₁₀) (ϕ):	8.72
(D ₇₅ / D ₂₅) (ϕ):	3.40
(D ₇₅ - D ₂₅) (ϕ):	5.77



Relatório de Ensaios N.º 6933894**Nave Pegos, Amostra 5, Estação de monitorização S05 - Amostra SGS IF N.º 240552970**

Data de entrada: 03.06.2024

Início dos ensaios: 07.06.2024

Fim dos ensaios: 13.06.2024

CARACTERÍSTICAS COMPLEMENTARES				
Parâmetro	Método	Resultado	Unidade	Valor Limite
pH	ISO 10390	9,3		-
Temperatura de medição de pH	DIN 38404-5	19,4	°C	-
Condutividade elétrica a 25 °C	DIN ISO 11265	501	µS/cm	-
Salinidade	Cálculo *	0,219	g/l	-

Declaração de Conformidade

Os resultados da amostra 5, estação de monitorização S05, enquadram-se na classe 1, da tabela n.º 2, Portaria n.º 1450/2007, de 12 de novembro – “Material dragado limpo – pode ser depositado no meio aquático ou repostado em locais sujeitos a erosão ou utilizado para alimentação de praias sem normas restritivas”.

Observações:

O ensaio assinalado com * não é acreditado. O valor de salinidade é um cálculo com base nas características da amostra, nomeadamente a condutividade elétrica. O valor pode diferir se utilizado outro método de cálculo.

Os resultados expressos sob forma <X são inferiores ao limite de quantificação do método analítico. Este documento é confidencial. É proibida a reprodução parcial deste boletim analítico. Os resultados analíticos referem-se exclusivamente à amostra analisada. A declaração de conformidade aplica-se aos parâmetros acreditados.

Relatório de Ensaios N.º 6933894

Nave Pegos, Amostra 6, Estação de monitorização S06 - Amostra SGS IF N.º 240552971

Data de entrada: 03.06.2024

Início dos ensaios: 07.06.2024

Fim dos ensaios: 13.06.2024

CARACTERÍSTICAS DA AMOSTRA				
Parâmetro	Método	Resultado	Unidade	Valor Limite Portaria 1450/2007, Classe 1
Matéria seca	DIN EN 14346	84,0	% massa	-
Carbono orgânico total	DIN EN 15936	< 0,1	% massa	-
METAIS				
Parâmetro	Método	Resultados	Unidades	Valor Limite Portaria 1450/2007, Classe 1
Arsénio	DIN EN ISO 11885	< 2	mg/kg m. s.	< 20
Cádmio	DIN EN ISO 11885	<0,2	mg/kg m. s.	< 1
Crómio	DIN EN ISO 11885	34	mg/kg m. s.	< 50
Cobre	DIN EN ISO 11885	14	mg/kg m. s.	< 35
Mercúrio	DIN EN 1483	<0,1	mg/kg m. s.	< 0,5
Chumbo	DIN EN ISO 11885	3	mg/kg m. s.	< 50
Níquel	DIN EN ISO 11885	19	mg/kg m. s.	< 30
Zinco	DIN EN ISO 11885	86	mg/kg m. s.	< 100
COMPOSTOS ORGÂNICOS				
Parâmetro	Método	Resultados	Unidades	Valor Limite Portaria 1450/2007, Classe 1
Naftaleno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Acenaftileno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Acenafteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Fluoreno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Fenantreno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Antraceno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Fluoranteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Pireno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(a)antraceno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Criseno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(b)fluoranteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(k)fluoranteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(a)pireno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Dibenzo(a,h)antraceno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(g,h,i)perileno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Indeno(1,2,3-c,d)pireno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Total HAP	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	< 300
PCB 28	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 52	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 101	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 118	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 153	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 138	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 180	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
Total PCB	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	< 5
Hexaclorobenzeno	DIN 38407-2	< 0,5 (Lq)	µg/kg m. s.	< 0,5

Relatório de Ensaios N.º 6933894**Nave Pegos, Amostra 6, Estação de monitorização S06 - Relatório UAIG LAQ N.º 47846**

Data de entrada: 28.05.2024

Início dos ensaios: 04.06.2024

Fim dos ensaios: 26.06.2024

CARACTERÍSTICAS DA AMOSTRA**Análise Granulométrica****Método de Ensaio: Gravimetria e difração laser**

Tipo de Amostra: Trimodal, muito pouco distribuída

Grupo de Amostra: Areia lodosa com gravilha

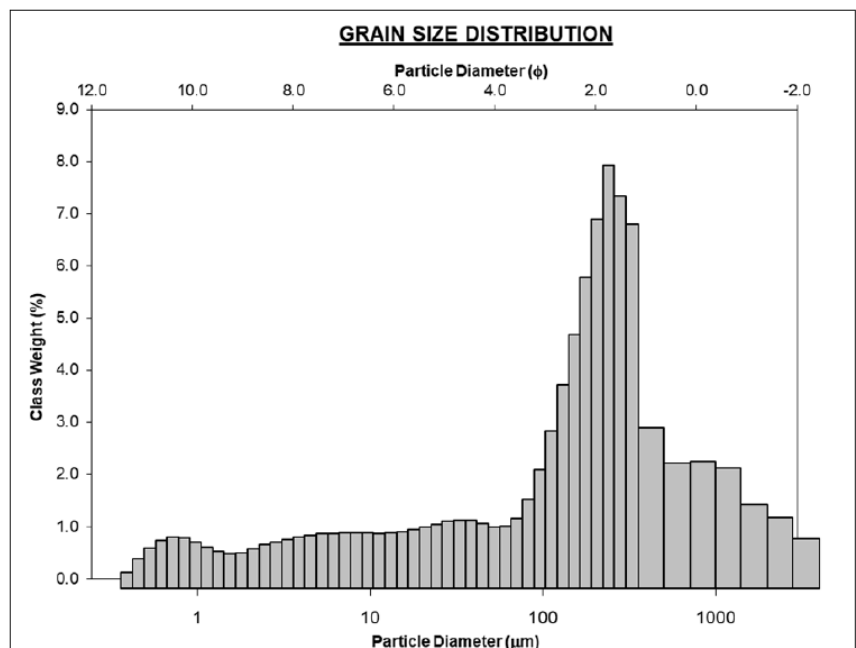
Nome sedimentar: Areia fina com siltes grosseiros e gravilhas muito finas

GRANULOMETRIA

Parâmetro	Resultados	Parâmetro	Resultados
Gravilha	12,1 %	Gravilha muito grosseira	0,0 %
Areia	62,4 %	Gravilha grosseira	0,0 %
Argila	25,5 %	Gravilha média	0,0 %
		Gravilha fina	0,0 %
		Gravilha muito fina	12,1 %
		Areia muito grosseira	6,9 %
		Areia grosseira	8,5 %
		Areia média	18,5 %
		Areia fina	21,1 %
		Areia muito fina	7,5 %
		Silte muito grosseiro	4,4 %
		Silte grosseiro	4,2 %
		Silte médio	3,8 %
		Silte fino	3,7 %
		Silte muito fino	3,1 %
		Argila	6,4 %

GRÁFICO COM DISTRIBUIÇÃO GRANULOMÉTRICA

MODA 1 (μm):	240.6
MODA 2 (μm):	855.0
MODA 3 (μm):	33.0
MODA 1 (ϕ):	2.059
MODA 2 (ϕ):	0.247
MODA 3 (ϕ):	4.924
D ₁₀ (μm):	4.318
D ₅₀ (μm):	226.42
D ₉₀ (μm):	2691.2
(D ₉₀ / D ₁₀) (μm):	623.19
(D ₉₀ - D ₁₀) (μm):	2686.9
(D ₇₅ / D ₂₅) (μm):	10.660
(D ₇₅ - D ₂₅) (μm):	553.28
D ₁₀ (ϕ):	-1.43
D ₅₀ (ϕ):	2.14
D ₉₀ (ϕ):	7.86
(D ₉₀ / D ₁₀) (ϕ):	-5.50
(D ₉₀ - D ₁₀) (ϕ):	9.28
(D ₇₅ / D ₂₅) (ϕ):	5.80
(D ₇₅ - D ₂₅) (ϕ):	3.41



Relatório de Ensaios N.º 6933894**Nave Pegos, Amostra 6, Estação de monitorização S06 - Amostra SGS IF N.º 240552971**

Data de entrada: 03.06.2024

Início dos ensaios: 07.06.2024

Fim dos ensaios: 13.06.2024

CARACTERÍSTICAS COMPLEMENTARES				
Parâmetro	Método	Resultado	Unidade	Valor Limite
pH	ISO 10390	8,8		-
Temperatura de medição de pH	DIN 38404-5	19,8	°C	-
Condutividade elétrica a 25 °C	DIN ISO 11265	1060	µS/cm	-
Salinidade	Cálculo *	0,497	g/l	-

Declaração de Conformidade

Os resultados da amostra 6, estação de monitorização S06, enquadram-se na classe 1, da tabela n.º 2, Portaria n.º 1450/2007, de 12 de novembro – “Material dragado limpo – pode ser depositado no meio aquático ou repostos em locais sujeitos a erosão ou utilizado para alimentação de praias sem normas restritivas”.

Observações:

O ensaio assinalado com * não é acreditado. O valor de salinidade é um cálculo com base nas características da amostra, nomeadamente a condutividade elétrica. O valor pode diferir se utilizado outro método de cálculo.

Os resultados expressos sob forma <X são inferiores ao limite de quantificação do método analítico. Este documento é confidencial. É proibida a reprodução parcial deste boletim analítico. Os resultados analíticos referem-se exclusivamente à amostra analisada. A declaração de conformidade aplica-se aos parâmetros acreditados.

Relatório de Ensaios N.º 6933894

Nave Pegos, Amostra 7, Estação de monitorização S07 - Amostra SGS IF N.º 24052972

Data de entrada: 03.06.2024

Início dos ensaios: 07.06.2024

Fim dos ensaios: 13.06.2024

CARACTERÍSTICAS DA AMOSTRA				
Parâmetro	Método	Resultado	Unidade	Valor Limite <small>Portaria 1450/2007, Classe 1</small>
Matéria seca	DIN EN 14346	85,6	% massa	-
Carbono orgânico total	DIN EN 15936	0,3	% massa	-
METAIS				
Parâmetro	Método	Resultados	Unidades	Valor Limite <small>Portaria 1450/2007, Classe 1</small>
Arsénio	DIN EN ISO 11885	8	mg/kg m. s.	< 20
Cádmio	DIN EN ISO 11885	< 0,2	mg/kg m. s.	< 1
Crómio	DIN EN ISO 11885	50	mg/kg m. s.	< 50
Cobre	DIN EN ISO 11885	19	mg/kg m. s.	< 35
Mercúrio	DIN EN 1483	< 0,1	mg/kg m. s.	< 0,5
Chumbo	DIN EN ISO 11885	18	mg/kg m. s.	< 50
Níquel	DIN EN ISO 11885	30	mg/kg m. s.	< 30
Zinco	DIN EN ISO 11885	39	mg/kg m. s.	< 100
COMPOSTOS ORGÂNICOS				
Parâmetro	Método	Resultados	Unidades	Valor Limite <small>Portaria 1450/2007, Classe 1</small>
Naftaleno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Acenaftileno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Acenafteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Fluoreno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Fenantreno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Antraceno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Fluoranteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Pireno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(a)antraceno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Criseno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(b)fluoranteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(k)fluoranteno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(a)pireno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Dibenzo(a,h)antraceno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Benzo(g,h,i)perileno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Indeno(1,2,3-c,d)pireno	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	
Total HAP	DIN ISO 18287	< 10 (Lq)	µg/kg m. s.	< 300
PCB 28	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 52	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 101	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 118	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 153	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 138	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
PCB 180	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	
Total PCB	DIN 38407-2	< 3 (Lq)	µg/kg m. s.	< 5
Hexaclorobenzeno	DIN 38407-2	< 0,5 (Lq)	µg/kg m. s.	< 0,5

Relatório de Ensaios N.º 6933894**Nave Pegos, Amostra 7, Estação de monitorização S07 - Relatório UAIG LAQ N.º 47847**

Data de entrada: 28.05.2024

Início dos ensaios: 04.06.2024

Fim dos ensaios: 26.06.2024

CARACTERÍSTICAS DA AMOSTRA**Análise Granulométrica****Método de Ensaio: Gravimetria e difração laser**

Tipo de Amostra: Polimodal, muito pouco distribuída

Grupo de Amostra: Areia lodosa com gravilha

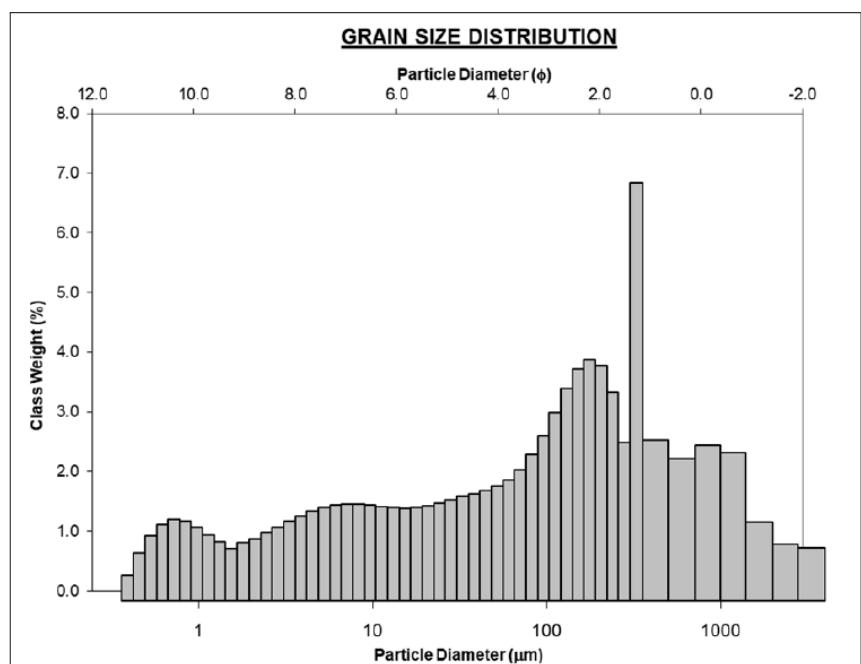
Nome sedimentar: Areia fina com siltes grosseiros e gravilhas muito finas

GRANULOMETRIA

Parâmetro	Resultados	Parâmetro	Resultados
Gravilha	5,1 %	Gravilha muito grosseira	0,0 %
Areia	55,4 %	Gravilha grosseira	0,0 %
Argila	39,5 %	Gravilha média	0,0 %
		Gravilha fina	0,0 %
		Gravilha muito fina	5,1 %
		Areia muito grosseira	7,2 %
		Areia grosseira	9,5 %
		Areia média	14,2 %
		Areia fina	14,5 %
		Areia muito fina	10,1 %
		Silte muito grosseiro	7,1 %
		Silte grosseiro	6,2 %
		Silte médio	6,0 %
		Silte fino	5,9 %
		Silte muito fino	4,6 %
		Argila	9,6 %

GRÁFICO COM DISTRIBUIÇÃO GRANULOMÉTRICA

MODA 1 (μm):	328.3
MODA 2 (μm):	177.3
MODA 3 (μm):	855.0
MODA 1 (ϕ):	1.612
MODA 2 (ϕ):	2.500
MODA 3 (ϕ):	0.247
D_{10} (μm):	2.085
D_{50} (μm):	128.10
D_{90} (μm):	1182.1
(D_{90} / D_{10}) (μm):	566.86
$(D_{90} - D_{10})$ (μm):	1180.0
(D_{75} / D_{25}) (μm):	29.609
$(D_{75} - D_{25})$ (μm):	388.08
D_{10} (ϕ):	-0.24
D_{50} (ϕ):	2.96
D_{90} (ϕ):	8.91
(D_{90} / D_{10}) (ϕ):	-36.90
$(D_{90} - D_{10})$ (ϕ):	9.15
(D_{75} / D_{25}) (ϕ):	4.71
$(D_{75} - D_{25})$ (ϕ):	4.89



Relatório de Ensaios N.º 6933894**Nave Pegos, Amostra 7, Estação de monitorização S07 - Amostra SGS IF N.º 240552972**

Data de entrada: 03.06.2024

Início dos ensaios: 07.06.2024

Fim dos ensaios: 13.06.2024

CARACTERÍSTICAS COMPLEMENTARES				
Parâmetro	Método	Resultado	Unidade	Valor Limite
pH	ISO 10390	8,5		-
Temperatura de medição de pH	DIN 38404-5	19,6	°C	-
Condutividade elétrica a 25 °C	DIN ISO 11265	1020	µS/cm	-
Salinidade	Cálculo *	0,476	g/l	-

Declaração de Conformidade

Os resultados da amostra 7, estação de monitorização S07, enquadram-se na classe 1, da tabela n.º 2, Portaria n.º 1450/2007, de 12 de novembro – “Material dragado limpo – pode ser depositado no meio aquático ou repostado em locais sujeitos a erosão ou utilizado para alimentação de praias sem normas restritivas”.

Observações:

O ensaio assinalado com * não é acreditado. O valor de salinidade é um cálculo com base nas características da amostra, nomeadamente a condutividade elétrica. O valor pode diferir se utilizado outro método de cálculo.

Os resultados expressos sob forma <X são inferiores ao limite de quantificação do método analítico. Este documento é confidencial. É proibida a reprodução parcial deste boletim analítico. Os resultados analíticos referem-se exclusivamente à amostra analisada. A declaração de conformidade aplica-se aos parâmetros acreditados.

6. CONCLUSÃO E DECLARAÇÃO DE CONFORMIDADE

As análises efetuadas evidenciam resultados homogéneos nas sete estações de monitorização, obtendo-se um enquadramento de todas as amostras na **classe 1, da tabela n.º 2, Portaria n.º 1450/2007, de 12 de novembro – “Material dragado limpo – pode ser depositado no meio aquático ou repostado em locais sujeitos a erosão ou utilizado para alimentação de praias sem normas restritivas”**.

Verifica-se ainda um valor baixo de salinidade e de condutividade elétrica: Amostra 1, Estação de monitorização S01 – 2010 $\mu\text{S/cm}$; Amostra 2, Estação de monitorização S02 – 2510 $\mu\text{S/cm}$; Amostra 3, Estação de monitorização S03 – 919 $\mu\text{S/cm}$; Amostra 4, Estação de monitorização S04 – 924 $\mu\text{S/cm}$; Amostra 5, Estação de monitorização S05 – 501 $\mu\text{S/cm}$; Amostra 6, Estação de monitorização S06 – 1060 $\mu\text{S/cm}$; Amostra 7, Estação de monitorização S07 – 1020 $\mu\text{S/cm}$.

SGS INSTITUT FRESENIUS GmbH Am Technologiepark 10 D-45699 Herten

Arteste, Lda.
Praceta Doutor Clementino de Brito Pinto, N.º 4,
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8000-327 FARO
PORTUGAL

Test Report 6957108

Order No. 7028128

Customer No. 10136825

Ms. Christine Fohrmann
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fax +49 2366 305-611
Christine.Fohrmann@sgs.com



Deutsche
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D-PL-14115-02-13
D-PL-14115-02-14

Industries & Environment

SGS INSTITUT FRESENIUS GmbH
Am Technologiepark 10
D-45699 Herten

Herten, 05.07.2024

your order/project: 02.2024

your order: .

date of order: 21.05.2024

time of investigation from 07.06.2024 until 13.06.2024

first sample no. 240552966

date of receipt sample 03.06.2024

This (e)Report amends the (e)Report No. 6933894 dated 20.06.2023 issued by SGS INSTITUT FRESENIUS GmbH.

Reason: Addition of further parameter(s).

SGS INSTITUT FRESENIUS GmbH

i.A. Christine Fohrmann
Customer Service

i.A. Stefan Leushacke
Customer Service

page 1 of 8

02.2024

certificate no. 6957108
order no. 7028128

page 2 of 8
05.07.2024

sent by you	matrix: soil						
sample no.	240552966	240552967	240552968				
description	Nave Pegos Sample 1	Nave Pegos Sample 2	Nave Pegos Sample 3				
date of receipt:	03.06.2024	03.06.2024	03.06.2024				
parameter	unit				determination method limit	lab	
Testing of solid :							
Sample preparation					DIN 19747	HE	
Dry substance	mass-%	84,1	83,5	86,6	0,1	DIN EN 14346	HE
pH value (H ₂ O)		8,7	8,7	9,0		ISO 10390	HE
Temperature pH measurement	°C	19,3	19,7	19,8		DIN 38404-5	HE
Electr. conductivity 25°C	µS/cm	2010	2510	919	15	DIN ISO 11265	HE
TOC	mass-% DR	< 0,1	< 0,1	< 0,1	0,1	DIN EN 15936	HE
Metals in solid samples :							
Aqua regia digestion						DIN EN 13657	HE
Antimony	mg/kg DR	< 2	< 2	< 2	2	DIN EN ISO 11885	HE
Arsenic	mg/kg DR	5	6	5	2	DIN EN ISO 11885	HE
Barium	mg/kg DR	20	67	59	0,2	DIN EN ISO 11885	HE
Lead	mg/kg DR	6	13	9	2	DIN EN ISO 11885	HE
Cadmium	mg/kg DR	< 0,2	< 0,2	< 0,2	0,2	DIN EN ISO 11885	HE
Chromium	mg/kg DR	10	32	27	1	DIN EN ISO 11885	HE
Copper	mg/kg DR	5	14	12	1	DIN EN ISO 11885	HE
Molybdenum	mg/kg DR	< 1	< 1	< 1	1	DIN EN ISO 11885	HE
Nickel	mg/kg DR	15	19	17	1	DIN EN ISO 11885	HE
Mercury	mg/kg DR	< 0,1	< 0,1	< 0,1	0,1	DIN EN 1483	HE
Selenium	mg/kg DR	< 3	< 3	< 3	3	DIN EN ISO 11885	HE
Zinc	mg/kg DR	24	28	23	1	DIN EN ISO 11885	HE

02.2024

certificate no. 6957108
order no. 7028128

page 3 of 8
05.07.2024

sample no.	240552966	240552967	240552968			
description	Nave Pegos Sample 1	Nave Pegos Sample 2	Nave Pegos Sample 3			
PAH (EPA) :						
Naphthalene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287 HE
Acenaphthylene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287 HE
Acenaphthene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287 HE
Fluorene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287 HE
Phenanthrene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287 HE
Anthracene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287 HE
Fluoranthene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287 HE
Pyrene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287 HE
Benz(a)anthracene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287 HE
Chrysene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287 HE
Benzo(b)fluoranthene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287 HE
Benzo(k)fluoranthene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287 HE
Benzo(a)pyrene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287 HE
Dibenzo(a,h)anthracene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287 HE
Benzo(g,h,i)perylene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287 HE
Indeno(1,2,3-c,d)pyrene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287 HE
Total PAH according to EPA	mg/kg DR	-	-	-		DIN ISO 18287 HE
Chlorinepesticides :						
Hexachlorobenzene	mg/kg DR	< 0,005	< 0,005	< 0,005	0,005	DIN 38407-2 HE
PCB 28	mg/kg DR	< 0,003	< 0,003	< 0,003	0,003	DIN 38407-2 HE
PCB 52	mg/kg DR	< 0,003	< 0,003	< 0,003	0,003	DIN 38407-2 HE
PCB 101	mg/kg DR	< 0,003	< 0,003	< 0,003	0,003	DIN 38407-2 HE
PCB 118	mg/kg DR	< 0,003	< 0,003	< 0,003	0,003	DIN 38407-2 HE
PCB 153	mg/kg DR	< 0,003	< 0,003	< 0,003	0,003	DIN 38407-2 HE
PCB 138	mg/kg DR	< 0,003	< 0,003	< 0,003	0,003	DIN 38407-2 HE
PCB 180	mg/kg DR	< 0,003	< 0,003	< 0,003	0,003	DIN 38407-2 HE
Total 6 PCB DIN	mg/kg DR	-	-	-		

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sent by you		matrix: soil					
sample no.		240552969	240552970	240552971			
description		Nave Pegos Sample 4	Nave Pegos Sample 5	Nave Pegos Sample 6			
date of receipt:		03.06.2024	03.06.2024	03.06.2024			
parameter	unit				determination method limit	lab	
Testing of solid :							
Sample preparation						DIN 19747	HE
Dry substance	mass-%	79,6	82,7	84,0	0,1	DIN EN 14346	HE
pH value (H ₂ O)		9,1	9,3	8,8		ISO 10390	HE
Temperature pH measurement	°C	19,8	19,4	19,8		DIN 38404-5	HE
Electr. conductivity 25°C	µS/cm	924	501	1060	15	DIN ISO 11265	HE
TOC	mass-% DR	< 0,1	< 0,1	< 0,1	0,1	DIN EN 15936	HE
Metals in solid samples :							
Aqua regia digestion						DIN EN 13657	HE
Antimony	mg/kg DR	< 2	< 2	< 2	2	DIN EN ISO 11885	HE
Arsenic	mg/kg DR	6	9	< 2	2	DIN EN ISO 11885	HE
Barium	mg/kg DR	67	120	60	0,2	DIN EN ISO 11885	HE
Lead	mg/kg DR	11	17	3	2	DIN EN ISO 11885	HE
Cadmium	mg/kg DR	< 0,2	< 0,2	< 0,2	0,2	DIN EN ISO 11885	HE
Chromium	mg/kg DR	34	31	34	1	DIN EN ISO 11885	HE
Copper	mg/kg DR	16	14	14	1	DIN EN ISO 11885	HE
Molybdenum	mg/kg DR	< 1	< 1	1	1	DIN EN ISO 11885	HE
Nickel	mg/kg DR	26	24	19	1	DIN EN ISO 11885	HE
Mercury	mg/kg DR	< 0,1	< 0,1	< 0,1	0,1	DIN EN 1483	HE
Selenium	mg/kg DR	< 3	< 3	< 3	3	DIN EN ISO 11885	HE
Zinc	mg/kg DR	30	43	86	1	DIN EN ISO 11885	HE

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sample no. description	240552969 Nave Pegos Sample 4	240552970 Nave Pegos Sample 5	240552971 Nave Pegos Sample 6
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PAH (EPA) :

	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287	HE
Naphthalene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287	HE
Acenaphthylene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287	HE
Acenaphthene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287	HE
Fluorene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287	HE
Phenanthrene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287	HE
Anthracene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287	HE
Fluoranthene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287	HE
Pyrene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287	HE
Benz(a)anthracene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287	HE
Chrysene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287	HE
Benzo(b)fluoranthene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287	HE
Benzo(k)fluoranthene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287	HE
Benzo(a)pyrene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287	HE
Dibenzo(a,h)anthracene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287	HE
Benzo(g,h,i)perylene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287	HE
Indeno(1,2,3-c,d)pyrene	mg/kg DR	< 0,01	< 0,01	< 0,01	0,01	DIN ISO 18287	HE
Total PAH according to EPA	mg/kg DR	-	-	-		DIN ISO 18287	HE

Chlorinepesticides :

	mg/kg DR	< 0,005	< 0,005	< 0,005	0,005	DIN 38407-2	HE
Hexachlorobenzene	mg/kg DR	< 0,005	< 0,005	< 0,005	0,005	DIN 38407-2	HE
PCB 28	mg/kg DR	< 0,003	< 0,003	< 0,003	0,003	DIN 38407-2	HE
PCB 52	mg/kg DR	< 0,003	< 0,003	< 0,003	0,003	DIN 38407-2	HE
PCB 101	mg/kg DR	< 0,003	< 0,003	< 0,003	0,003	DIN 38407-2	HE
PCB 118	mg/kg DR	< 0,003	< 0,003	< 0,003	0,003	DIN 38407-2	HE
PCB 153	mg/kg DR	< 0,003	< 0,003	< 0,003	0,003	DIN 38407-2	HE
PCB 138	mg/kg DR	< 0,003	< 0,003	< 0,003	0,003	DIN 38407-2	HE
PCB 180	mg/kg DR	< 0,003	< 0,003	< 0,003	0,003	DIN 38407-2	HE
Total 6 PCB DIN	mg/kg DR	-	-	-			HE

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sample no. 240552972
description Nave Pegos
Sample 7

PAH (EPA) :

Naphthalene	mg/kg DR	< 0,01	0,01	DIN ISO 18287	HE
Acenaphthylene	mg/kg DR	< 0,01	0,01	DIN ISO 18287	HE
Acenaphthene	mg/kg DR	< 0,01	0,01	DIN ISO 18287	HE
Fluorene	mg/kg DR	< 0,01	0,01	DIN ISO 18287	HE
Phenanthrene	mg/kg DR	< 0,01	0,01	DIN ISO 18287	HE
Anthracene	mg/kg DR	< 0,01	0,01	DIN ISO 18287	HE
Fluoranthene	mg/kg DR	< 0,01	0,01	DIN ISO 18287	HE
Pyrene	mg/kg DR	< 0,01	0,01	DIN ISO 18287	HE
Benz(a)anthracene	mg/kg DR	< 0,01	0,01	DIN ISO 18287	HE
Chrysene	mg/kg DR	< 0,01	0,01	DIN ISO 18287	HE
Benzo(b)fluoranthene	mg/kg DR	< 0,01	0,01	DIN ISO 18287	HE
Benzo(k)fluoranthene	mg/kg DR	< 0,01	0,01	DIN ISO 18287	HE
Benzo(a)pyrene	mg/kg DR	< 0,01	0,01	DIN ISO 18287	HE
Dibenzo(a,h)anthracene	mg/kg DR	< 0,01	0,01	DIN ISO 18287	HE
Benzo(g,h,i)perylene	mg/kg DR	< 0,01	0,01	DIN ISO 18287	HE
Indeno(1,2,3-c,d)pyrene	mg/kg DR	< 0,01	0,01	DIN ISO 18287	HE
Total PAH according to EPA	mg/kg DR	-		DIN ISO 18287	HE

Chlorinepesticides :

Hexachlorobenzene	mg/kg DR	< 0,005	0,005	DIN 38407-2	HE
PCB 28	mg/kg DR	< 0,003	0,003	DIN 38407-2	HE
PCB 52	mg/kg DR	< 0,003	0,003	DIN 38407-2	HE
PCB 101	mg/kg DR	< 0,003	0,003	DIN 38407-2	HE
PCB 118	mg/kg DR	< 0,003	0,003	DIN 38407-2	HE
PCB 153	mg/kg DR	< 0,003	0,003	DIN 38407-2	HE
PCB 138	mg/kg DR	< 0,003	0,003	DIN 38407-2	HE
PCB 180	mg/kg DR	< 0,003	0,003	DIN 38407-2	HE
Total 6 PCB DIN	mg/kg DR	-			HE

Summary of used test methods:

DIN 19747	2009-07
DIN 38404-5	2009-07
DIN 38407-2	1993-02
DIN EN 13657	2003-01
DIN EN 14346	2007-03
DIN EN 1483	2007-07
DIN EN 15936	2012-11
DIN EN ISO 11885	2009-09
DIN ISO 11265	1997-06
DIN ISO 18287	2006-05
ISO 10390	2005-02

The laboratory sites of the SGS group Germany according to the abbreviations mentioned above including the corresponding accreditation process numbers are listed at

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05.07.2024

<http://www.institut-fresenius.de/filestore/89/laborstandortkuerzelsgs.pdf>.

*** End of test report ***

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NÚMERO 2015/CEP.4816

Number

O Sistema de Gestão da Qualidade da

The Quality Management System of

ARTESTE, LDA.

Praceta Dr. Clementino de Brito Pinto, 4 - 4º Dto.

8000-327 FARO

PORTUGAL

implementado em consultoria ambiental no âmbito da avaliação e controlo da qualidade do ar, realização de ensaios analíticos, elaboração de projetos ambientais, legionella safe building, ações de formação, cumpre os requisitos da norma

implemented in the environmental consulting within the assessment and monitoring of air quality, realization of analytical tests, development of environmental projects, legionella safe building, training actions, meets the requirements of the standard

NP EN ISO 9001:2015



José Leitão
CEO

Emitido em 2021-03-02

Date of issue

Válido até 2024-04-27

Valid until



THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

APCER has issued an IQNet recognized certificate that
the organization

ARTESTE, LDA.

Praceta Dr. Clementino de Brito Pinto, 4 - 4º Dto.
8000-327 FARO - PORTUGAL

has implemented and maintains a

Quality Management System

for the following scope:

environmental consulting within the assessment and monitoring of air quality, realization of analytical tests, development of environmental projects, legionella safe building, training actions

which fulfils the requirements of the following standard

ISO 9001:2015

Issued on: 2021-03-02
Expires on: 2024-04-27

This attestation is directly linked to the IQNet Partner's original certificate and shall not be used as a stand-alone document

Registration Number: PT- 2015/CEP.4816



*Alex Stoichitoiu
President of IQNet*

*José Leitão
APCER CEO*



IQNet Partners*:

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* The list of IQNet partners is valid at the time of issue of this certificate. Updated information is available under www.iqnet-certification.com

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-PL-14115-02-07 according to DIN EN ISO/IEC 17025:2018

Valid from: 01.04.2021

Date of issue: 24.09.2021

Holder of certificate:

SGS INSTITUT FRESENIUS GmbH

at the locations

**Am Technologiepark 10, 45699 Herten
Rödingsmarkt 16, 20459 Hamburg**

Tests in the fields:

Physical, physico-chemical and chemical analysis of water (groundwater, waste water, water from barrages and lakes and running waters, swimming pool and bathing pool water, leachate), sludge, sediments, waste, materials for recycling, soil and soil gas;

Selected chemical analysis in accordance with the German Drinking Water Ordinance;

Sampling of wastewater, raw and drinking water, water from barrages and lakes, aquifers, running waters, sludges, sediments, waste, solid recovered fuels and soil gas;

Sampling for microbiological analysis of industrial water in accordance with Section 3 (8) 42nd BImSchV;

Analysis of waste for deposition in accordance with the German Landfill Ordinance, Annex 4;

Selected sampling and analysis of indoor and outdoor air;

Specialist modules for water, soil, contaminated sites and waste

The management system requirements of DIN EN ISO/IEC 17025 are written in the language relevant to the operations of testing laboratories. Laboratories that conform to the requirements of this standard, operate generally in accordance with the principles of DIN EN ISO 9001.

The certificate together with the annex reflects the status as indicated by the date of issue.

The current status of any given scope of accreditation can be found in the directory of accredited bodies maintained by Deutsche Akkreditierungsstelle GmbH at <https://www.dakks.de/en/content/accredited-bodies-dakks>.

Abbreviations used: see last page

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This document is a translation. The definitive version is the original German annex to the accreditation certificate.

Annex to the accreditation certificate D-PL-14115-02-07

For the test areas marked with *, the testing laboratory is permitted to freely select standard test methods or equivalent methods without obtaining prior notification and consent from DAkkS.

The test methods listed are given by way of example.

Within sections 1 to 4, 6 and 7, the testing laboratory is permitted to apply the listed standardised or equivalent test methods with different versions of the standards without obtaining prior notification and consent from DAkkS.

The testing laboratory has an up-to-date list of all test methods within the flexible scope of accreditation.

The identifiers after the testing and sampling methods indicate the location for which competence is confirmed:

He = Herten location

HH = Hamburg location

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1 Analysis of water (groundwater, waste water, water from barrages and lakes and running waters, swimming pool and bathing pool water, leachate) and aqueous eluates

1.1 Sampling

ISO 5667-11 2009-04	Water quality - Sampling - Part 11: Guidance on sampling of groundwaters	He
DIN EN ISO 22475-1 2007-01	Geotechnical investigation and testing - Sampling methods and groundwater measurements - Part 1: Technical principles for execution	He
DIN EN ISO 5667-1 (A 4) 2007-04	Water quality - Sampling - Part 1: Guidance on the design of sampling programmes and sampling techniques	He, HH
DIN EN ISO 5667-6 2016-12	Water quality - Sampling - Part 6: Guidance on sampling of rivers and streams	
DIN 38402-A 11 2009-02	Sampling of waste water	He
DIN 38402-A 12 1985-06	Sampling from barrages and lakes	He
DIN 38402-A 13 1985-12	Sampling from aquifers	He
DIN 38402-A 15 2010-04	Sampling from running waters	He
DIN EN ISO 5667-3 (A 21) 2013-03	Water quality - Sampling - Part 3: Preservation and handling of water samples	He, HH
DIN 38402-A 30 1998-07	Pretreatment, homogenisation and aliquotation of non-homogeneous water samples	He
DIN 38402-A 62 2014-12	Plausibility check of analytical data by performing an ion balance	He
DIN EN ISO 19458 (K 19) Sections 4.4.3 and 4.4.4.1 2006-12	Water quality - Sampling for microbiological analysis <i>(Here for sampling of swimming pool and bathing pool water)</i>	He

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DIN 4030-2 2008-06	Assessment of water, soil and gases for their aggressiveness to concrete; collection and examination of water and soil samples	He
DVWK W 111 1997-03	Planning, implementation and evaluation of pumping tests for water development	He
DVGW W 112 2011-10	Principles of groundwater sampling from groundwater monitoring wells	He
LAWA Groundwater Guideline, Part 3 1993-03	German Working Group on Water Issues (LAWA), Groundwater Guideline, Part 3: Groundwater quality	He

1.2 Sensor technology

DIN EN 1622 (B 3) 2006-10	Water quality - Determination of the threshold odour number (TON) and threshold flavour number (TFN); Annex C	He, HH
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1.3 Digestion methods

DIN EN ISO 15587-1 2002-07	Digestion for the determination of selected elements in water - Part 1: Aqua regia digestion	He
DIN EN ISO 15587-2 2002-7	Digestion for the determination of selected elements in water - Part 2: Nitric acid digestion	He

1.4 Physical and physico-chemical parameters

DIN EN ISO 7887 (C 1) 2012-04	Water quality - Examination and determination of colour	He
DIN 38404-C 4 1976-12	Physical and physico-chemical parameters, determination of temperature	He, HH
DIN EN ISO 10523 (C 5) 2012-04	Water quality - Determination of pH	He, HH
DIN 38404-C 6 1984-05	Physical and physico-chemical parameters, determination of the oxidation reduction (redox) potential	He, HH

Valid from: 01.04.2021
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DIN EN 27888 (C 8) 1993-11	Water quality; Determination of electrical conductivity	He, HH
DEV C 9 1979	Determination of density	He
DIN 38404 - C 10 2012-12	Calculation of the calcite saturation of water	He
DIN EN ISO 9963-1 (C 23) 1996-02	Water quality - Determination of alkalinity - Part 1: Determination of total and composite alkalinity	He
NF T 90-008 2001-02	Qualité de l'eau - Détermination du pH	He

1.5 Anions

DIN 38405-D 4 1985-07	Determination of fluoride	He
DEV D 8 1985-01	Calculation of free carbonic acid, carbonate ion and hydrogen carbonate ion	He

1.5.1 By ion chromatography *

DIN 38405-D 7-1 2002-04	Determination of cyanides in low polluted water by chromatography of ions	He
DIN EN ISO 10304-1 (D 20) 2009-07	Water quality - Determination of dissolved anions by liquid chromatography of ions - Part 1: Determination of bromide, chloride, fluoride, nitrate, nitrite, phosphate and sulphate	He
DIN EN ISO 10304-3 (D 22) 1997-11	Water quality - Determination of dissolved anions by liquid chromatography of ions - Part 3: Determination of chromate, iodide, sulphite, thiocyanate and thiosulphate (Modification: <i>Only sulphite and thiocyanate</i>)	He
DIN EN ISO 10304-4 (D 25) 1999-07	Water quality - Determination of dissolved anions by liquid chromatography of ions - Part 4: Determination of chlorate, chloride and chlorite in water with low contamination	He

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DIN EN ISO 15061 (D 34) 2001-12	Water quality - Determination of dissolved bromate - Method by liquid chromatography of ions	He
DIN EN ISO 11206 (D 48) 2013-05	Water quality - Determination of dissolved bromate - Method using ion chromatography (IC) and post column reaction (PCR)	He
EPA 9056 1994-09	Determination of inorganic anions by ion chromatography	He

1.5.2 By photometry *

ISO 11083 1994-08	Water quality - Determination of chromium(VI) - Spectrometric method with 1.5-diphenyl carbazide	He
DIN ISO 15923-1 2014-07	Water quality - Determination of selected parameters by discrete analysis systems - Part 1: Ammonium, nitrate, nitrite, chloride, orthophosphate, sulfate and silicate with photometric detection <i>(Modification: Application also for fluoride, Fe(II) and chromium(VI) but not for silicate)</i>	He
DIN EN ISO 14403-2 (D 3) 2012-10	Water quality - Determination of total cyanide and free cyanide using flow analysis (FIA and CFA) - Part 2: Method using continuous flow analysis (CFA)	He
DIN EN 26777 (D 10) 1993-04	Water quality - Determination of nitrite - Spectrometric method	He
DIN EN ISO 6878 (D 11) 2004-09	Water quality - Determination of phosphorus - Ammonium molybdate photometric method	He
DIN 38405-D 13 2011-04	Determination of cyanides (total and readily liberated)	He
DIN 38405-D 24 1987-05	Photometric determination of chromium(VI) using 1,5-diphenylcarbonohydrazide	He
DIN 38405-D 27 2017-10	Determination of sulphide by gas extraction <i>(Restriction: Here only photometric determination)</i>	He
DIN EN ISO 18412 (D 40) 2007-02	Water quality - Determination of chromium(VI) - Photometric method for weakly contaminated water	He

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DIN ISO 15923-1 (D 49) 2014-07	Water quality - Determination of selected parameters by discrete analysis systems - Part 1: Ammonium, nitrate, nitrite, chloride, orthophosphate, sulphate and silicate with photometric detection	He
NF T90-043 1988-10	Analysis of water - Determination of chromium(VI) - Photometric method	He

1.5.3 By electrochemical methods

DIN 38405-D 27 2017-10	Determination of sulphide by gas extraction <i>(Restriction: Here only electrochemical detection)</i>	He
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1.6 Cations

1.6.1 By photometry *

DIN ISO 15923-1 (D 49) 2014-07	Water quality - Determination of selected parameters by discrete analysis systems - Part 1: Ammonium, nitrate, nitrite, chloride, orthophosphate, sulphate and silicate with photometric detection <i>(Modification: Determination of iron(II))</i>	He
DIN 38406-E 1 1983-05	Determination of iron	He
DIN 38406-E 5 1983-10	Determination of ammonium nitrogen	He
DIN EN ISO 11732 (E 32) 2005-05	Water quality - Determination of ammonium nitrogen - Method by flow analysis (CFA and FIA) and spectrometric detection	He

1.6.2 By means of atomic absorption spectrometry (GF-AAS, hydride AAS) *

ISO 17378-2 2014-02	Water quality -Determination of arsenic and antimony - Part 2: Method using hydride generation atomic absorption spectrometry (HG-AAS)	He
DIN EN 1483 2007-07	Water quality - Determination of mercury - Method using atomic absorption spectrometry	He

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DIN EN ISO 12846 (E 12) 2012-08	Water quality - Determination of mercury - Method using atomic absorption spectrometry (AAS) with and without enrichment	He
DIN EN ISO 11969 (D 18) 1996-11	Water quality - Determination of arsenic - Atomic absorption spectrometric method (hydride technique)	He
DIN 38405-D 23 1994-10	Determination of selenium by atomic absorption spectrometry (AAS)	He
DIN 38405-D 32 2000-05	Determination of antimony by atomic absorption spectrometry	He

1.6.3 By ICP-MS *

DIN EN ISO 17294-2 (E 29) 2014-12	Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS) - Part 2: Determination of 62 elements	He
EPA 6020 A 2007-02	Inductively coupled plasma mass-spectrometry (ICP-MS)	He

1.6.4 By ICP-OES

DIN EN ISO 11885 (E 22) 2009-09	Water quality - Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES)	He
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1.7 Jointly determinable substance groups

1.7.1 By gas chromatography with conventional detectors (GC-ECD, GC-FID) *

ISO 8165-2 1999-07	Water quality - Determination of selected phenols - Part 2: Method by derivatisation and gas chromatography (Modification: <i>Adjust to pH 9, extraction with n-hexane, derivatisation with pentafluorobenzoyl chloride, detection GC-ECD</i>)	He
DIN EN ISO 6468 (F 1) 1997-02	Water quality - Determination of certain organochlorine insecticides, polychlorinated biphenyls and chlorobenzenes - Gas chromatographic method after liquid-liquid extraction	He

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DIN 38407-F 2 1993-02	Determination of low volatile halogenated hydrocarbons by gas chromatography	He
DIN EN ISO 10301 (F 4) 1997-08	Water quality - Determination of highly volatile halogenated hydrocarbons - Gas-chromatographic methods	He
DIN 38407-F 9 1991-05	Determination of benzene and some of its derivatives by gas chromatography	He
DIN EN 12673 (F 15) 1999-05	Water quality - Gas chromatographic determination of some selected chlorophenols in water	He
DIN 38407-F 16 1999-06	Determination of aniline derivatives by gas chromatography	He
DIN 38407-F 17 1999-02	Determination of selected nitroaromatic compounds by gas-liquid chromatography	He
DIN EN ISO 15680 (F 19) 2004-04	Water quality - Gas chromatographic determination of a number of monocyclic aromatic hydrocarbons, naphthalene and several chlorinated compounds using purge and trap and thermal desorption	He

1.7.2 By gas chromatography with mass selective detectors(GC-MS) *

DIN EN ISO 18856 (F 26) 2005-11	Water quality - Determination of selected phthalates using gas chromatography/mass spectrometry	He
DIN EN ISO 18857-1 (F 31) 2007-02	Water quality - Determination of selected alkylphenols - Part 1: Method for non-filtered samples using liquid-liquid extraction and gas chromatography with mass selective detection	He
DIN 38407-F 37 2013-11	Determination of organochlorine pesticides, polychlorinated biphenyls and chlorobenzene in water - Method using gas chromatography and mass spectrometric detection (GC-MS) after liquid-liquid extraction	He
DIN 38407-F 39 2011-09	Water quality - Determination of selected polycyclic aromatic hydrocarbons (PAHs) - Method using gas chromatography with mass spectrometric detection (GC-MS)	He

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DIN ISO 28540 (F 40) 2014-05	Water quality - Determination of 16 polycyclic aromatic hydrocarbons (PAH) in water - Method using gas chromatography with mass spectrometric detection (GC-MS)	He
DIN 38407-F 43 2014-10	Determination of selected easily volatile organic compounds in water - Method using gas chromatography and mass spectrometry by static headspace technique (HS-GC-MS)	He
EPA 8081 A 1996-12	Organochlorine pesticides by gas chromatography	He
EPA 8082 1996-1	Polychlorinated biphenyls (PCBs) by gas chromatography	He
EPA 8260 B 1996-12	Volatile organic compounds by gas chromatography / mass spectrometry	He
EPA 8270 C 1996-12	Semivolatile organic compounds (SVOC) by gas chromatography/mass spectrometry (GC/MS)	He
In-house method SOP M 2189 2014-05	Determination of heterocycles in water samples by liquid/liquid extraction and GC/MS	He
ISO 11423-1 1997-06	Water quality - Determination of benzene and some derivatives - Part 1: Head-space gas chromatographic method	He

1.7.3 By HPLC

DIN EN ISO 17993 (F 18) 2004-03	Water quality - Determination of 15 polycyclic aromatic hydrocarbons (PAHs) in water by HPLC with fluorescence detection after liquid-liquid extraction	He
VDI 3862 Blatt 2 2000-12	Measurement of gaseous emissions - Measurement of aliphatic and aromatic aldehydes and ketones using the DNPH method - Gas washing bottle method (Modification: <i>Application to water matrix</i>)	He
In-house method SOP M 1073 2007-03	Determination of linear alkyl benzene sulfonates (LAS) in soil, sewage sludge and water by HPLC-UV/VIS detection	He
In-house method SOP M 1734 2010-08	Determination of selected heterocycles by HPLC	He

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1.8 Gaseous components

DIN ISO 17289 (G 25) 2014-12	Water quality - Determination of dissolved oxygen - Optical sensor method	He, HH
DIN EN ISO 7393-2 (G 4) 2000-04	Water quality - Determination of free chlorine and total chlorine - Part 2: Colorimetric method using N,N-diethyl-1,4-phenylenediamine, for routine control purposes	He, HH
DIN EN ISO 5814 (G 22) 2013-02	Water quality - Determination of dissolved oxygen - Electrochemical probe method	He, HH

1.9 Summary indices of actions and substances

ISO 5815-1 2003-04	Water quality - Determination of biochemical oxygen demand after n days (BOD _n) - Part 1: Dilution and seeding method with allylthiourea acid addition	He
ISO 6060 1989-10	Water quality - Determination of chemical oxygen demand	He
DIN ISO 11349 2015-12	Water quality - Determination of low-volatility lipophilic substances - Gravimetric method	He
DIN 38409-H 1 1987-01	Determination of total dry residue, filtrate dry residue and residue on ignition	He
DIN EN 1484 (H 3) 1997-08	Water quality - Guidelines for the determination of total organic carbon (TOC) and dissolved organic carbon (DOC)	He
DIN EN ISO 8467 (H 5) 1995-05	Water quality - Determination of permanganate index	He
DIN 38409-H 6 1986-01	Water hardness	He
DIN 38409-H 7 2005-12	Determination of acid and base-neutralising capacities	He
DIN 38409-H 8 1984-09	Determination of extractable organically bonded halogens (EOX)	He

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DIN 38409-H 9 1980-07	Determination of the settleable matter by volume in water and waste water	He
DIN EN 25663 (H 11) 1993-11	Water quality - Determination of Kjeldahl nitrogen - Method after digestion with selenium	He
DIN EN ISO 9562 (H 14) 2005-02	Water quality - Determination of adsorbable organically bound halogens (AOX)	He
DIN 38409-H 16 1984-06	Water quality - Determination of the phenol index	He
Blaudruck DEV H 25 1989-01	Determination of organically bound halogens amenable to purging (POX)	He
DIN EN 872 (H 33) 2005-04	Water quality - Determination of suspended solids - Method by filtration through glass fibre filters	He
DIN EN ISO 14402 (H 37) 1999-12	Water quality - Determination of phenol index by flow analysis (FIA and CFA)	He
DIN 38409-H 41 1980-12	Determination of chemical oxygen demand (COD) in the range over 15 mg/l	He
DIN EN 1899-1 (H 51) 1998-05	Water quality - Determination of biochemical oxygen demand after n days (BOD _n)	He
DIN EN ISO 9377-2 (H 53) 2001-07	Water quality - Determination of hydrocarbon oil index - Part 2: Method using solvent extraction and gas chromatography	He
DIN 38409-H 56 2009-06	Gravimetric determination of low volatile lipophilic substances after solvent extraction	He
NF-T 90-029 2002-08	Détermination des résidus secs à 105 °C et 180 °C	He
NF-T 90-101 2001-02	Détermination de la demande chimique en oxygène (DCO)	He

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1.10 Individual components

DIN ISO 15923-1 (D 49) 2014-07	Water quality - Determination of selected parameters by discrete analysis systems - Part 1: Ammonium, nitrate, nitrite, chloride, orthophosphate, sulphate and silicate with photometric detection (Here additionally: <i>Urea</i>)	He
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2 Tests in accordance with the German Drinking Water Ordinance - TrinkwV

Sampling

Method	Title	Location
DIN EN ISO 5667-1 (A 4) 2007-04	Water quality - Sampling - Part 1: Guidance on the design of sampling programmes and sampling techniques	He, HH
DIN ISO 5667-5 (A 14) 2011-02	Water quality - Sampling - Part 5: Guidance on sampling of drinking water from treatment works and piped distribution systems	He, HH
DIN EN ISO 5667-3 (A 21) 2013-03	Water quality - Sampling - Part 3: Preservation and handling of water samples	
DIN EN ISO 19458 (K 19) 2006-12	Water quality - Sampling for microbiological analysis	He, HH
Recommendation of the Federal Environment Agency 18 December 2018	Assessment of the quality of drinking water with respect to the parameters lead, copper and nickel	He, HH

ANNEX 1: MICROBIOLOGICAL PARAMETERS

PART I: General requirements for drinking water

Not used

PART II: Requirements for drinking water intended for transfer in sealed containers

Not used

ANNEX 2: CHEMICAL PARAMETERS

PART I: Chemical parameters whose concentration does not usually increase in the distribution network, including the drinking water installation

No.	Parameter	Method	Location
1	Acrylamide	Not used	
2	Benzene	DIN 38407-F 9 1991-05	HE
		DIN EN ISO 15680 (F 19) 2004-04	
		DIN 38407-F 43 2014-10	
3	Boron	DIN EN ISO 11885 (E 22) 2009-09	HE
		DIN EN ISO 17294-2 (E 29) 2014-12	
4	Bromate	DIN EN ISO 15061 (D 34) 2001-12	HE
		DIN EN ISO 11206 (D 48) 2013-05	
5	Chromium	DIN EN ISO 11885 (E 22) 2009-09	HE
		DIN EN ISO 17294-2 (E 29) 2014-12	
6	Cyanide	DIN EN ISO 14403-2 (D 3) 2012-10	HE
		DIN 38405-D 13 2011-04	
7	1,2-dichloroethane	DIN EN ISO 10301 (F 4) 1997-08	HE
		DIN EN ISO 15680 (F 19) 2004-04	
		DIN 38407-F 43 2014-10	
8	Fluoride	DIN 38405-D 4 1985-07	HE
		DIN EN ISO 10304-1 (D 20) 2009-07	
9	Nitrate	DIN EN ISO 10304-1 (D 20) 2009-07	HE
		DIN ISO 15923-1 (D 49) 2014-07	
10	Plant protection product active ingredients and biocidal product active ingredients	Not used	
11	Plant protection product active ingredients and biocidal product active ingredients total	Not used	
12	Mercury	DIN EN ISO 1483 (E 12) 2007-07	HE
		DIN EN ISO 12846 (E 12) 2012-08	
13	Selenium	DIN 38405-D 23 1994-10	HE
		DIN EN ISO 11885 (E 22) 2009-09	
		DIN EN ISO 17294-2 (E 29) 2014-12	
14	Tetrachloroethene and trichloroethylene	DIN EN ISO 10301 (F 4) 1997-08	HE
		DIN EN ISO 15680 (F 19) 2004-04	
		DIN 38407-F 43 2014-10	
15	Uranium	DIN EN ISO 17294-2 (E 29) 2014-12	HE

PART II: Chemical parameters whose concentration may increase in the distribution network, including the drinking water installation

No.	Parameter	Method	Location
1	Antimony	DIN 38405-D 32 2000-05	HE
		DIN EN ISO 11885 (E 22) 2009-09	
		DIN EN ISO 17294-2 (E 29) 2014-12	
2	Arsenic	DIN 38405-D 32 2000-05	HE
		DIN EN ISO 11885 (E 22) 2009-09	
		DIN EN ISO 17294-2 (E 29) 2014-12	
3	Benzo[a]pyrene	DIN EN ISO 17294-2 (E 29) 2014-12	HE
		DIN 38407-F 39 2011-09	
4	Lead	DIN EN ISO 11885 (E 22) 2009-09	HE
		DIN EN ISO 17294-2 (E 29) 2014-12	
5	Cadmium	DIN EN ISO 11885 (E 22) 2009-09	HE
		DIN EN ISO 17294-2 (E 29) 2014-12	
6	Epichlorohydrin	Not used	
7	Copper	DIN EN ISO 11885 (E 22) 2009-09	HE
		DIN EN ISO 17294-2 (E 29) 2014-12	
8	Nickel	DIN EN ISO 11885 (E 22) 2009-09	HE
		DIN EN ISO 17294-2 (E 29) 2014-12	
9	Nitrite	DIN EN 26777 (D 10) 1993-04	HE
		DIN EN ISO 10304-1 (D 20) 2009-07	
		DIN ISO 15923-1 (D 49) 2014-07	
10	Polycyclic aromatic hydrocarbons (PAH)	DIN EN ISO 17993 (F 18) 2004-03	HE
		DIN 38407-F 39 2011-09	
11	Trihalomethanes (THM)	DIN EN ISO 10301 (F 4) 1997-08	HE
		DIN EN ISO 15680 (F 19) 2004-04	
		DIN 38407-F 43 2014-10	
12	Vinyl chloride	DIN EN ISO 10301 (F 4) 1997-08	HE
		DIN EN ISO 15680 (F 19) 2004-04	
		DIN 38407-F 43 2014-10	

ANNEX 3: INDICATOR PARAMETERS

Part I: General indicator parameters

No.	Parameter	Method	Location
1	Aluminium	DIN EN ISO 11885 (E 22) 2009-09	He
		DIN EN ISO 17294-2 (E 29) 2014-12	
2	Ammonium	DIN ISO 15923-1 (D 49) 2014-07	He
		DIN 38406-E 5 1983-10	
		DIN EN ISO 11732 (E 23) 2005-05	
3	Chloride	DIN EN ISO 10304-1 (D 20) 2009-07	He
		DIN ISO 15923-1 (D 49) 2014-07	
4	Clostridium perfringens (including spores)	Not used	
5	Coliform bacteria	Not used	
6	Iron	DIN EN ISO 11885 (E 22) 2009-09	He
		DIN EN ISO 17294-2 (E 29) 2014-12	
7	Colouring (spectral absorption coefficient Hg 436 nm)	DIN EN ISO 7887 (C 1-2) 2012-04	He
8	Odour (as TON)	DIN EN 1622 (B 3) 2006-10	He, HH
		DIN EN 1622 (B 3) 2006-10 (Annex C)	
9	Taste	DIN EN 1622 (B 3) 2006-10	He, HH
10	Colony count at 22 °C	Not used	
11	Colony count at 36 °C	Not used	
12	Electrical conductivity	DIN EN 27888 (C 8) 1993-11	He, HH
13	Manganese	DIN EN ISO 11885 (E 22) 2009-09	He
		DIN EN ISO 17294-2 (E 29) 2014-12	
14	Sodium	DIN EN ISO 11885 (E 22) 2009-09	He
15	Organically bound carbon (TOC)	DIN EN 1484 (H 3) 2014-12	He, HH
16	Oxidisability	DIN EN ISO 8467 (H 5) 1995-05	He
17	Sulphate	DIN EN ISO 10304-1 (D 20) 2009-07	He
		DIN ISO 15923-1 (D 49) 2014-07	
18	Turbidity	DIN EN ISO 7027 (C 2) 2000-04	He
19	Hydrogen ion concentration	DIN EN ISO 10523 (C 5) 2012-04	He, HH
20	Calcite dissolving capacity	DIN 38404-C 10 2012-12 (Calculation Method 3)	He

Part II: Specific requirements for drinking water in systems in the drinking water installation

Not used

APPENDIX 3a: Requirements for drinking water with regard to radioactive substances

Not used

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Parameters not included in Annexes 1 to 3 of the German Drinking Water Ordinance

Additional periodic testing

Parameter	Method	Location
Calcium	DIN EN ISO 11885 (E 22) 2009-09	He
Potassium	DIN EN ISO 11885 (E 22) 2009-09	He
Magnesium	DIN EN ISO 11885 (E 22) 2009-09	He
Acid and base capacity	DIN 38409-H 7 2005-12	He
Phosphate	DIN EN ISO 6878 (D 11) 2004-09	He
	DIN EN ISO 10304-1 (D 20) 2009-07	He
	DIN ISO 15923-1 (D 49) 2014-07	He

The accreditation does not replace the recognition or approval procedure of the competent authority pursuant to Section 15 (4) TrinkwV.

3 Sampling for microbiological analysis of industrial water in accordance with Section 3 (8) 42nd BImSchV at the Herten (He) and Hamburg (HH) locations

Sampling

Method	Title
DIN EN ISO 19458 (K 19) 2006-12	Water quality - Sampling for microbiological analysis ----- Recommendation of the Federal Environmental Agency for the sampling and detection of Legionella in evaporative cooling plants, cooling towers and wet separators dated 06.03.2020, Sections C and D

Microbiological analyses

Not used

4 Analysis of soil, sludge, sediments, waste and materials for recycling

4.1 Sampling

DIN EN 15442 2011-05	Solid recovered fuels - Methods for sampling	He
DIN 19698-1 2014-05	Characterisation of waste - Sampling of solid and semi-solid waste - Part 1: Guidance for the segmental sampling of stockpiles of unknown composite	He

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Date of issue: 24.09.2021

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DIN 38414-S 11 1987-08	Sampling of sediments	He
LAGA PN 98 2019-05	Guideline on procedures for physical, chemical and biological examination in connection with the recycling/disposal of waste	He

4.2 Sample preparation

DIN ISO 11464 2006-12	Soil quality - Pretreatment of samples for physico-chemical analysis	He
DIN ISO 14507 2004-07	Soil quality - Pretreatment of samples for determination of organic contaminants in soils	He
DIN EN 15002 2015-07	Characterisation of waste - Preparation of test portions from the laboratory sample	He
DIN EN 16179 2012-11	Sludge, treated biowaste and soil - Guidance for sample pretreatment	He
DIN 19682-13 2009-01	Determination of carbonate, sulfide, pH-value and iron(II)-ions	He
DIN 19747 2009-07	Investigation of solids - Pretreatment, preparation and processing of samples for chemical, biological and physical investigations	He
DIN 38414-S 22 2000-09	Determination of dry residue by freezing and preparation of the freeze-dried mass of sludge	He

4.3 Sample preparation by shaking, extraction and elution methods

DIN ISO 11466 1997-06	Soil quality - Extraction of trace elements soluble in aqua regia	He
DIN ISO 19730 2009-07	Soil quality - Extraction of trace elements from soil using ammonium nitrate solution	He

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DIN EN 12457-1 2003-01	Characterisation of waste - Leaching - Compliance test for leaching of granular waste materials and sludges - Part 1: One stage batch test at a liquid to solid ratio of 2 l/kg with particle size below 4 mm (without or with size reduction)	He
DIN EN 12457-2 2003-01	Characterisation of waste - Leaching - Compliance test for leaching of granular waste materials and sludges - Part 2: One stage batch test at a liquid to solid ratio of 10 l/kg with particle size below 4 mm (without or with size reduction)	He
DIN EN 12457-3 2003-01	Characterisation of waste - Leaching - Compliance test for leaching of granular waste materials and sludges - Part 3: Two stage batch test at a liquid to solid ratio of 2 l/kg and 8 l/kg for materials with high solid content with particle size below 4 mm (without or with size reduction)	He
DIN EN 12457-4 2003-01	Characterisation of waste - Leaching - Compliance test for leaching of granular waste materials and sludges - Part 4: One stage batch test at a liquid to solid ratio of 10 l/kg for materials with particle size below 10 mm (without or with size reduction)	He
DIN EN 13346 (S 7a) 2001-04	Characterisation of sludges - Determination of trace elements and phosphorus - Aqua regia extraction methods	He
DIN EN 13657 2003-01	Characterisation of waste - Digestion for subsequent determination of aqua regia soluble portion of elements in waste	He
DIN EN 14405 2017-05	Characterisation of waste - Leaching behaviour tests - Up-flow percolation test (under specified conditions)	He
DIN EN 16173 2012-11	Sludge, treated biowaste and soil - Digestion of nitric acid soluble fractions of elements	He
DIN EN 16174 2012-11	Sludge, treated biowaste and soil - Digestion of aqua regia soluble fractions of elements	He
DIN 19527 2012-08	Leaching of solid materials - Batch test for the examination of the leaching behaviour of organic substances at a liquid to solid ratio of 2 l/kg	He
DIN 19528 2009-01	Leaching of solid materials - Percolation method for the joint examination of the leaching behaviour of inorganic and organic substances	He

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DIN 19529 2015-12	Leaching of solid materials - Batch test for the examination of the leaching behaviour of inorganic and organic substances at a liquid to solid ratio of 2 l/kg	He
DIN 19738 2017-06	Soil quality - Absorption availability of organic and inorganic pollutants from contaminated soil material	He
DIN 38414-S 4 1984-10	Determination of leachability with water	He
BBodSchV Annex 1, Section 3.1.2 12.07.1999	Preparation of the soil saturation extract	He
BTR RC-StB02 Brandenburg 2002; Methods of analysis in the field of waste and contaminated sites FOEN; Swiss Confederation 2013	Implementation of CO ₂ -fumigated eluate tests for inert substances and residues suitable for final disposal	He
LAGA EW 98 2019-09	Guideline on procedures for the physical, chemical examination of waste, contaminated soils and materials from brownfields - Preparation and analysis of aqueous eluates - EW 98 S: Determination of leachability with water in batch test - EW 98 T: Determination of leachability with water in trough test - EW 98 p: Determination of leachability with aqueous media at constant pH value	He
Data Sheet of LUA-NRW Nr. 20 2000-03	Recommendations for the implementation and evaluation of column tests in accordance with the Federal Soil Protection and Contaminated Sites Ordinance (BBodSchV)	He

4.4 Determination of foreign bodies

DIN CEN/TS 16202 2013-12	Sludge, treated biowaste and soil - Determination of impurities and stones	He
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4.5 Physical and physico-chemical parameters

DIN EN ISO 11272 2017-07	Soil quality - Determination of dry bulk density	He
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DIN ISO 11265 1997-06	Soil quality - Determination of specific electrical conductivity	He
DIN ISO 11277 2002-08	Soil quality - Determination of particle size distribution in mineral soil material - Method by sieving and sedimentation	He
DIN EN 15933 2012-11	Sludge, treated biowaste and soil - Determination of pH	He
DIN CEN/TS 15937 2013-08	Sludge, treated biowaste and soil - Determination of specific electrical conductivity	He
VDLUFA I, D 2.1 1997	Determination of soil texture of fine soil with the feel test	He

4.6 Determination of loss on ignition and loss on drying and of dissolved solids by gravimetry *

DIN EN 12879 (S 3a) 2001-02	Characterisation of sludges - Determination of loss on ignition of dry mass	He
DIN EN 12880 (S 2a) 2001-02	Characterisation of sludges - Determination of dry residue and water content	He
DIN EN 14346 2007-03	Characterisation of waste - Calculation of dry matter by determination of dry residue or water content	He
DIN EN 15169 2007-05	Characterisation of waste - Determination of loss on ignition in waste, sludge and sediments	He
DIN EN 15216 2019-11	Characterisation of waste - Determination of total dissolved solids (TDS) in water and eluates	He
DIN EN 15934 2012-11	Sludge, treated biowaste, soil and waste - Calculation of dry matter fraction after determination of dry residue or water content	He
DIN EN 15935 2012-11	Sludge, treated biowaste, soil and waste - Determination of loss on ignition	He

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4.7 Determination of elements

4.7.1 By ICP-OES *

DIN EN ISO 11885 (E 22) 2009-09	Water quality - Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES) (Modification: <i>Application to aqua regia extracts from waste, soils, sludge, sediment</i>)	He
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DIN ISO 22036 2009-06	Soil quality - Determination of trace elements in extracts of soil by inductively coupled plasma atomic emission spectrometry (ICP-AES)	He
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4.7.2 By ICP-MS

DIN EN ISO 17294-2 (E 29) 2014-12	Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS) - Part 2: Determination of 62 elements (Modification: <i>Application to aqua regia extracts from waste, soils, sludge, sediment</i>)	He
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4.7.3 By means of atomic absorption spectrometry (GF-AAS, hydride AAS) *

DIN EN ISO 11969 (D 18) 1996-11	Water quality - Determination of arsenic - Atomic absorption spectrometric method (hydride technique) (Modification for soils: <i>determination in aqua regia extraction solution</i>)	He
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DIN ISO 16772 2005-06	Soil quality - Determination of mercury in aqua regia soil extracts with cold-vapour atomic spectrometry or cold-vapour atomic fluorescence spectrometry (Here: <i>Cold vapour atomic absorption spectrometry</i>)	He
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DIN ISO 20280 2010-05	Soil quality - Determination of arsenic, antimony and selenium in aqua regia soil extracts with electrothermal or hydride-generation atomic absorption spectrometry	He
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4.8 Determination of non-metals and anions

4.8.1 By ion chromatography *

DIN ISO 11262 2012-04	Soil quality - Determination of total cyanide	He
DIN ISO 14255 1998-11	Soil quality - Determination of nitrate nitrogen, ammonium nitrogen and total soluble nitrogen in air-dry soils using calcium chloride solution as extractant (Here: <i>Nitrate nitrogen</i>)	He
VDLUF A I, A 6.1.4.1 2002	Determination of mineral nitrogen (nitrate and ammonium) in soil profiles (N_{\min} laboratory method) (Here: <i>Nitrate nitrogen</i>)	He

4.8.2 By flow analysis *

DIN ISO 14255 1998-11	Soil quality - Determination of nitrate nitrogen, ammonium nitrogen and total soluble nitrogen in air-dry soils using calcium chloride solution as extractant (Here: <i>Ammonium nitrogen</i>)	He
DIN EN ISO 17380 2013-10	Soil quality - Determination of total cyanide and easily liberatable cyanide - Continuous flow analysis method	He
VDLUF A I, A 6.1.4.1 2002	Determination of mineral nitrogen (nitrate and ammonium) in soil profiles (N_{\min} laboratory method) (Here: <i>Ammonium</i>)	He

4.8.3 By photometry *

DIN EN 15192 2007-02	Characterisation of waste and soil - Determination of Chromium(VI) in solid material by alkaline digestion and ion chromatography with spectrophotometric detection (Modification: <i>Determination without prior ion chromatographic separation</i>)	He
DIN 38406-E 5 1983-10	Determination of ammonium nitrogen (Modification for soils: <i>Elutriation with phosphate-buffered solution</i>)	He

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4.9 Summary indices of actions and substances

ISO 11261 1995-03	Soil quality - Determination of total nitrogen - Modified Kjeldahl method	He
DIN EN ISO 16558-1 2015-12	Soil quality - Risk-based petroleum hydrocarbons - Part 1: Determination of aliphatic and aromatic fractions of HIGHLY volatile petroleum hydrocarbons using gas chromatography with flame ionization detection (GC/FID)	He
DIN CEN ISO/TS 16558-2 2015-12	Soil quality - Risk-based petroleum hydrocarbons - Part 2: Determination of aliphatic and aromatic fractions of semi-volatile petroleum hydrocarbons using gas chromatography with flame ionization detection (GC/FID)	He
DIN ISO 11349 2015-12	Water quality - Determination of low-volatility lipophilic substances - Gravimetric method (Modification: <i>Application to waste, soils, sludge, sediment</i>)	He
DIN EN 13137 2001-12	Characterisation of waste - Determination of total organic carbon (TOC) in waste, sludges and sediments	He
DIN EN 13342 2001-01	Characterisation of sludges - Determination of Kjeldahl nitrogen	He
DIN EN 14039 2005-01	Characterisation of waste - Determination of hydrocarbon content in the range of C ₁₀ to C ₄₀ by gas chromatography	He
DIN EN 15936 2012-11	Sludge, treated biowaste, soil and waste - Determination of total organic carbon (TOC) by dry combustion	He
DIN EN 16166 2012-11	Sludge, treated biowaste and soil - Determination of adsorbable organically bound halogens (AOX)	He
DIN EN 16169 2012-11	Sludge, treated biowaste and soil - Determination of Kjeldahl nitrogen	He
DIN 19539 2016-12	Investigation of solids - Temperature-dependent differentiation of total carbon (TOC ₄₀₀ , ROC, TIC ₉₀₀)	He
DIN 38409-H 16 1984-06	Photometric determination of the phenol index (Modification for soils: <i>Elutriation of samples with distilled water, pH = 4; steam distillation, photometry</i>)	He

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DIN 38409-H 16-1 1984-06	Photometric determination of the phenol index (Modification for soils: <i>Hot extraction with NaOH 1 mol/l, photometry</i>)	He
DIN 38409-H 56 2009-06	Gravimetric determination of low volatile lipophilic substances after solvent extraction (Modification: <i>Application to waste, soils, sludge, sediment</i>)	He
DIN 38414-S 17 2017-01	Determination of the organically bound halogens amenable to purging and extraction	He
DIN 38414-S 18 2019-06	Determination of adsorbed organically bound halogens (AOX)	He
LAGA KW 2/85 1993-03	Guideline on procedures for physical and chemical examination in connection with the disposal of waste; determination of hydrocarbons	He
LAGA KW 04 2019-09	Determination of the content of hydrocarbons in waste	He
BVGB-Handbuch Blatt 4.4.2.1 1993-01	Determination of organic carbon in waste incineration slags taking into account the coke carbon content (Modification: <i>Only section 8.3, determination of the residual carbon content (RC)</i>)	He

4.10 Jointly determinable substance groups

4.10.1 Determination of organic compounds by gas chromatography with conventional detectors (GC-ECD, GC-FID, GC-WLD) *

ISO 8165-2 1999-07	Water quality - Determination of selected phenols - Part 2: Method by derivatisation and gas chromatography (Modification for soil: <i>Acidification to pH 1, adjust to pH 9, extraction with i-hexane, derivatisation with pentafluorobenzoyl chloride, detection GC-ECD</i>)	He
ISO 13876 2013-11	Soil quality - Determination of polychlorinated biphenyls (PCB) - Methods using GC-MS and GC-ECD	He
ISO 13913 2014-02	Soil quality - Determination of selected phthalates using capillary gas chromatography with mass spectrometric detection (GC/MS)	He

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DIN EN 16181 2019-08	Soil, treated biowaste and sludge - Determination of polycyclic aromatic hydrocarbons (PAH) by gas chromatography (GC) and high performance liquid chromatography (HPLC)	He
DIN ISO 10382 2003-05	Soil quality - Determination of organochlorine pesticides and polychlorinated biphenyls - Gas chromatographic method with electron capture detection	He
DIN ISO 14154 2005-12	Soil quality - Determination of selected chlorophenols - Gas chromatographic method with electron capture detection	He
DIN EN ISO 15009 2016-07	Soil quality - Gas chromatographic determination of the content of volatile aromatic hydrocarbons, naphthalene and volatile halogenated hydrocarbons - Purge-and-trap method with thermal desorption	He
DIN EN ISO 15009 2014-11 Draft	Soil quality - Determination of selected explosives and related compounds - Part 2: Method using gas chromatography (GC) with electron capture detection (ECD) or mass spectrometric detection (MS)	He
DIN EN ISO 16703 2011-09	Soil quality - Determination of content of hydrocarbon in the range C ₁₀ bis C ₄₀ by gas chromatography	He
DIN EN ISO 22155 2016-07	Soil quality - Gas chromatographic quantitative determination of volatile aromatic and halogenated hydrocarbons and selected ethers - Static headspace method	He
DIN EN 15308 2008-05	Characterisation of waste - Determination of selected polychlorinated biphenyls (PCB) in solid waste by using capillary gas chromatography with electron capture or mass spectrometric detection	He
DIN 38407-F 2 1993-02	Determination of low volatile halogenated hydrocarbons by gas chromatography (Modification for soils: <i>Standard Soxhlet extraction with iso-hexane, in exceptional cases also other solvents</i>)	He
DIN 38407-F 9-2 1991-05	Determination of benzene and some of its derivatives by gas chromatography after extraction (Modification for soils: <i>Overlay with pentane</i>)	He
DIN 38407-F 17 1999-02	Determination of selected nitroaromatic compounds by gas-liquid chromatography (Modification: <i>Application of the standard for soil</i>)	He

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DIN 38414-F 20 1996-01	Determination of 6 polychlorinated biphenyls (PCB)	He
EPA 8081 A 1996-12	Organochlorine pesticides by gas chromatography using GC/ECD	He
EPA 8082 1996-1	Polychlorinated biphenyls (PCBs) by gas chromatography	He
EPA 8270 C 1996-12	Semivolatile compounds (SVOC) by gas chromatography/mass spectrometry	He
ÖNORM L 1200 2003-01	Determination of polycyclic aromatic hydrocarbons (PAH) in soils, sewage sludges and composts	He
HLUG Handbuch Altlasten Volume 7, Part 4 2000-10	Determination of BTEX/LHKW in solids from brownfields	He
HLUG Handbuch Altlasten Volume 7, Part 1 1998-01	Determination of polycyclic aromatic hydrocarbons (PAH) in solids from brownfields	He
Information Sheet LUA-NRW No. 6 1994-06	Determination of polychlorinated biphenyls (PCB) in soil samples	He

4.10.2 Determination of organic compounds by gas chromatography with mass selective detectors (GC-MS) *

In-house method SOP M 640 2015-08	GC-MS screening; qualitative and semi-quantitative orientation analysis of water, soil, waste and other solid samples after extraction with toluene, in exceptional cases also other solvents	He
EPA 8260 B 1996-12	Volatile organic compounds by gas chromatography/mass spectrometry (GC-MS)	He
EPA 8260 B 1996-12	Volatile organic compounds by gas chromatography/mass spectrometry (GC-MS)	He
DIN EN 15527 2008-09	Characterisation of waste - Determination of polycyclic aromatic hydrocarbons (PAHs) in waste using gas chromatography mass spectrometry (GC/MS)	He

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DIN 19742 2014-08	Soil quality - Determination of selected phthalates in sludge, sediment, solid waste and soil after extraction and determination using gas chromatography mass spectrometry (GC-MS)	He
DIN ISO 18287 2006-05	Soil quality - Determination of polycyclic aromatic hydrocarbons (PAH) - Gas chromatographic method with mass spectrometric detection (GC-MS) (Modification: <i>Extraction with dichloromethane, additional determination of phthalates, aniline derivatives and chlorine pesticides</i>)	He

4.10.3 By HPLC

DIN ISO 13877 2000-01	Soil quality - Determination of polynuclear aromatic hydrocarbons - Method using high-performance liquid chromatography	He
DIN CEN/TS 16181 2013-12	Soil, treated biowaste and sludge - Determination of polycyclic aromatic hydrocarbons (PAH) by gas chromatography (GC) and high performance liquid chromatography (HPLC)	He
DIN 38414-S 23 2002-02	Determination of 15 polycyclic aromatic hydrocarbons (PAHs) by high performance liquid chromatography (HPLC) and fluorescence detection (Modification: <i>Extraction with 2-butanol, additional UV detection, 16 PAHs</i>)	He
In-house method SOP M 1073 2007-03	Determination of linear alkyl benzene sulfonates (LAS) in soil, sewage sludge and water by HPLC-UV/VIS detection	He
In-house method SOP M 1734 2010-08	Determination of selected heterocycles by HPLC	He

5 Sampling, sample preparation and analysis of waste in accordance with the German Landfill Ordinance, Annex 4 - at the Herten location

DepV, Annex 4	Parameter	Section 8 (1), (3) and (5) DepV	
2	Sampling	LAGA PN 98 (December 2001)	<input checked="" type="checkbox"/>
3	Determination of total content in solid and elutable fraction		
3.1	Determination of total content in solid		

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DepV, Annex 4	Parameter	Section 8 (1), (3) and (5) DepV	
3.1.1	Sample preparation	DIN 19747 (July 2009)	<input checked="" type="checkbox"/>
3.1.2	Digestion method (aqua regia)	DIN EN 13657 (January 2003)	<input checked="" type="checkbox"/>
3.1.3	Organic portion of the dry residue of the original substance		
3.1.3.1	Loss on ignition	DIN EN 15169 (May 2007)	<input checked="" type="checkbox"/>
3.1.3.2	TOC (total organic carbon)	DIN EN 13137 (December 2001)	<input checked="" type="checkbox"/>
3.1.4	BTEX (benzene, toluene, ethylbenzene, o, m, p-xylene, styrene, cumene)	DIN 38407-F 9 (May 1991)	<input checked="" type="checkbox"/>
		Handbuch Altlasten HLUG, Volume 7, Part 4 (2000)	<input checked="" type="checkbox"/>
3.1.5	PCB (polychlorinated biphenyls - Sum of the 7 PCB congeners, PCB 28, 52, 101, 118, 138, 153, 180)	DIN EN 15308 (May 2008)	<input checked="" type="checkbox"/>
3.1.6	Petroleum hydrocarbons (C 10 to C 40)	DIN EN 14039 (January 2005) in conjunction with LAGA KW/04 (December 2009)	<input checked="" type="checkbox"/>
3.1.7	PAH (polycyclic aromatic hydrocarbons)	DIN ISO 18287 (May 2006)	<input checked="" type="checkbox"/>
3.1.8	Density	DIN 18125-2 (March 2011)	<input type="checkbox"/>
3.1.9	Gross calorific value	DIN EN 15170 (May 2009)	<input type="checkbox"/>
3.1.10	Cadmium, chromium, copper, nickel, lead, zinc	DIN ISO 11047 (May 2003)	<input type="checkbox"/>
		DIN ISO 22036 (June 2009)	<input checked="" type="checkbox"/>
		DIN EN ISO 11885 (E 22) (September 2009)	<input checked="" type="checkbox"/>
3.1.11	Mercury	DIN EN ISO 12846 (E 12) (August 2012)	<input checked="" type="checkbox"/>
		DIN EN ISO 17852 (E 35) (April 2008)	<input checked="" type="checkbox"/>
3.1.12	Extractable lipophilic substances	LAGA KW/04 (December 2009)	<input checked="" type="checkbox"/>
3.2	Determination of contents in eluate		
3.2.1	Eluate preparation		
3.2.1.1	Eluate preparation with liquid/solid ratio 10/1	DIN EN 12457-4 (January 2003)	<input checked="" type="checkbox"/>
3.2.1.2	Eluate preparation each with constant pH 4 and 11 / acid neutralisation capacity	LAGA Guideline EW 98 (2002)	<input checked="" type="checkbox"/>
3.2.2	Up-flow percolation test	DIN 19528 (January 2009)	<input checked="" type="checkbox"/>
		DIN CEN/TS 14405 (September 2004)	<input checked="" type="checkbox"/>
3.2.3	pH value of eluate	DIN 38404-5 (July 2009)	<input checked="" type="checkbox"/>
3.2.4	DOC (dissolved organic carbon)		
3.2.4.1	DOC	DIN EN 1484 (H 3) (August 1997)	<input checked="" type="checkbox"/>
3.2.4.2	DOC at a pH between 7.5 and 8	LAGA Guideline EW 98 (2002)	<input checked="" type="checkbox"/>

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DepV, Annex 4	Parameter	Section 8 (1), (3) and (5) DepV	
3.2.5	Phenols	DIN 38409-H 16 (June 1984)	<input checked="" type="checkbox"/>
		DIN EN ISO 14402 (H 37) (December 1999)	<input checked="" type="checkbox"/>
3.2.6	Arsenic	DIN EN ISO 11969 (D 18) (November 1996)	<input checked="" type="checkbox"/>
		DIN ISO 22036 (June 2009)	<input checked="" type="checkbox"/>
		DIN EN ISO 11885 (E 22) (September 2009)	<input checked="" type="checkbox"/>
		DIN EN ISO 15586 (E 4) (February 2004)	<input type="checkbox"/>
3.2.7	Lead	DIN EN ISO 17294-2 (E 29) (February 2005)	<input checked="" type="checkbox"/>
		DIN EN ISO 15586 (E 4) (February 2004)	<input type="checkbox"/>
		DIN ISO 22036 (June 2009)	<input checked="" type="checkbox"/>
		DIN EN ISO 11885 (E 22) (September 2009)	<input checked="" type="checkbox"/>
3.2.8	Cadmium	DIN EN ISO 17294-2 (E 29) (February 2005)	<input checked="" type="checkbox"/>
		DIN EN ISO 15586 (E 4) (February 2004)	<input type="checkbox"/>
		DIN ISO 22036 (June 2009)	<input checked="" type="checkbox"/>
		DIN EN ISO 11885 (E 22) (September 2009)	<input checked="" type="checkbox"/>
3.2.9	Copper	DIN EN ISO 17294-2 (E 29) (February 2005)	<input checked="" type="checkbox"/>
		DIN EN ISO 15586 (E 4) (February 2004)	<input type="checkbox"/>
		DIN ISO 22036 (June 2009)	<input checked="" type="checkbox"/>
		DIN EN ISO 11885 (E 22) (September 2009)	<input checked="" type="checkbox"/>
3.2.10	Nickel	DIN EN ISO 17294-2 (E 29) (February 2005)	<input checked="" type="checkbox"/>
		DIN EN ISO 15586 (E 4) (February 2004)	<input type="checkbox"/>
		DIN ISO 22036 (June 2009)	<input checked="" type="checkbox"/>
		DIN EN ISO 11885 (E 22) (September 2009)	<input checked="" type="checkbox"/>

DepV, Annex 4	Parameter	Section 8 (1), (3) and (5) DepV	
3.2.11	Mercury	DIN EN ISO 12846 (E 12) (August 2012)	<input checked="" type="checkbox"/>
		DIN EN ISO 17852 (E 35) (April 2008)	<input type="checkbox"/>
3.2.12	Zinc	DIN EN ISO 15586 (E 4) (February 2004)	<input type="checkbox"/>
		DIN EN ISO 17294-2 (E 29) (February 2005)	<input checked="" type="checkbox"/>
		DIN ISO 22036 (June 2009)	<input checked="" type="checkbox"/>
		DIN EN ISO 11885 (E 22) (September 2009)	<input checked="" type="checkbox"/>
3.2.13	Chloride	DIN EN ISO 10304-1 (D 20) (July 2009)	<input checked="" type="checkbox"/>
		DIN 38405-D 1 (December 1985)	<input type="checkbox"/>
		DIN EN ISO 15682 (D 31) (January 2002)	<input type="checkbox"/>
3.2.14	Sulphate	DIN EN ISO 10304-1 (D 20) (July 2009)	<input checked="" type="checkbox"/>
		DIN 38405-D 5 (January 1985)	<input type="checkbox"/>
3.2.15	Cyanide, readily liberated	DIN 38405-D 13 (April 2011)	<input checked="" type="checkbox"/>
		In waste containing sulphide: DIN ISO 17380 (May 2006)	<input checked="" type="checkbox"/>
		DIN EN ISO 14403-1 (D 2) (October 2012)	<input type="checkbox"/>
3.2.16	Fluoride	DIN 38405-D 4 (July 1985)	<input checked="" type="checkbox"/>
		DIN EN ISO 10304-1 (D 20) (July 2009)	<input checked="" type="checkbox"/>
3.2.17	Barium	DIN ISO 22036 (June 2009)	<input checked="" type="checkbox"/>
		DIN EN ISO 11885 (E 22) (September 2009)	<input checked="" type="checkbox"/>
		DIN EN ISO 17294-2 (E 29) (February 2005)	<input checked="" type="checkbox"/>
3.2.18	Chromium, total	DIN ISO 22036 (June 2009)	<input checked="" type="checkbox"/>
		DIN EN ISO 11885 (E 22) (September 2009)	<input checked="" type="checkbox"/>
		DIN EN ISO 15586 (E 4) (February 2004)	<input type="checkbox"/>
		DIN EN ISO 17294-2 (E 29) (February 2005)	<input checked="" type="checkbox"/>

DepV, Annex 4	Parameter	Section 8 (1), (3) and (5) DepV	
3.2.19	Molybdenum	DIN ISO 22036 (June 2009)	<input checked="" type="checkbox"/>
		DIN EN ISO 11885 (E 22) (September 2009)	<input checked="" type="checkbox"/>
		DIN EN ISO 17294-2 (E 29) (February 2005)	<input checked="" type="checkbox"/>
3.2.20	Antimony	DIN ISO 22036 (June 2009)	<input checked="" type="checkbox"/>
		DIN EN ISO 11885 (E 22) (September 2009)	<input checked="" type="checkbox"/>
		DIN EN ISO 15586 (E 4) (February 2004)	<input type="checkbox"/>
		DIN 38405-E 32 (May 2000)	<input type="checkbox"/>
		DIN EN ISO 17294-2 (E 29) (February 2005)	<input checked="" type="checkbox"/>
3.2.21	Selenium	DIN ISO 22036 (June 2009)	<input checked="" type="checkbox"/>
		DIN EN ISO 11885 (E 22) (September 2009)	<input checked="" type="checkbox"/>
		DIN EN ISO 17294-2 (E 29) (February 2005)	<input checked="" type="checkbox"/>
3.2.22	Total dissolved solids	DIN EN 15216 (January 2008)	<input checked="" type="checkbox"/>
		DIN 38409-H 1 (January 1987)	<input checked="" type="checkbox"/>
		DIN 38409-H 2 (March 1987)	<input checked="" type="checkbox"/>
3.2.23	Conductivity of eluate	DIN EN 27888 (C 8) (November 1993)	<input checked="" type="checkbox"/>
3.2.24	Determination of dry residue	DIN EN 14346 (March 2007)	<input checked="" type="checkbox"/>
3.3	Biodegradability of the dry residue of the original substance		
3.3.1	Breathability over 4 days (AT ₄)		<input type="checkbox"/>
3.3.2	Gas formation rate in fermentation test over 21 days (GB ₂₁)		<input type="checkbox"/>

6 Soil gas

6.1 Sampling and on-site parameters

DIN ISO 10381-7 2007-10 Soil quality - Sampling - Part 7: Guidance on sampling of soil gas He

VDI 3865 Blatt 1 2005-06 Measurement of organic soil pollutants - Planning of measurements for the determination of volatile organic compounds in soil gas He

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VDI 3865 Blatt 2 1998-01	Measurement of organic soil pollutants - Techniques of active sampling of soil gas (variants 2 and 5)	He
In-house method SOP M 771 2004-08	Determination of the on-site parameters CO ₂ , CH ₄ , H ₂ S, O ₂ and trace gas sum parameters	He

6.2 Determination of organic substances

6.2.1 By gas chromatography with conventional detectors *

DIN EN ISO 10301 (F 4) 1997-08	Determination of highly volatile of halogenated hydrocarbons - Gas chromatographic methods (Modification for soil gas: <i>Enrichment on activated carbon, desorption with CS₂</i>)	He
DIN 38407-F 2 1993-02	Determination of low volatile of halogenated hydrocarbons - Gas chromatographic methods (Modification for soil gas: <i>Sampling on Florisil and extraction with iso-hexane</i>)	He
DIN 38407-F 9-1 1991-05	Determination of benzene and some of its derivatives by gas chromatography using headspace analysis (Modification for soil gas: <i>Enrichment on activated carbon, desorption with CS₂</i>)	He
In-house method SOP M 310 2014-12	Determination of nitrogen, oxygen, carbon dioxide, carbon monoxide, methane and argon from soil gas sample tubes by gas chromatography	He

6.2.2 By HPLC

In-house method SOP M 057 2017-02	Determination of aldehydes and ketones in liquid matrix, solids and gases by HPLC	He
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7 Sampling of outdoor air and analysis of indoor and outdoor air

7.1 Sampling

DIN ISO 16000-3 2013-01	Indoor air - Part 3: Measurement of formaldehyde and other carbonyl compounds - Active sampling method (Modification: <i>Here only for outdoor air</i>)	He
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7.2 Determination of organic substances

7.2.1 By GC *

ISO 11338-2 2003-06	Stationary source emissions - Determination of gas and particle- phase polycyclic aromatic hydrocarbons - Part 2: Sample preparation, clean-up and determination	He
DIN CEN/TS 13649 2015-03	Stationary source emissions - Determination of the mass concentration of individual gaseous organic compounds - Sorption sampling method followed by solvent extraction or thermal desorption	He
VDI 3865 Blatt 3 1998-06	Measurement of organic soil pollutants - Gas-chromatographic determination of volatile organic compounds in soil gas adsorption at activated carbon and desorption with organic solvents	He
VDI 4301 Blatt 6 2012-09	Measurement of indoor air pollution - Measurement of phthalates with GC-MS	He

7.2.2 By HPLC

In-house method SOP M 057 2017-02	Determination of aldehydes and ketones in liquid matrix, solids and gases by HPLC	He
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7.3 Determination of inorganic constituents

VDI 2454 Blatt 2 1982-03	Measurement of gaseous immissions; measurement of hydrogen sulphide concentration - Methylene blue impinger method	He
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8 List of test methods for the specialist module for water - at the Herten location

Revised: LAWA 18/10/2018

Section 1: Sampling and general parameters

Parameter	Method	Was	Sur	Raw
Sampling of waste water	DIN 38402-A 11: 2009-02	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sampling from running waters	DIN EN ISO 5667-6: 2016-12 (A 15	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Sampling from aquifers	DIN 38402-A 13: 1985-12	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sampling from barrages and lakes	DIN 38402-A 12: 1985-06	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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Parameter	Method	Was	Sur	Raw
Homogenisation of samples	DIN 38402-A 30: 1998-07	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Temperature	DIN 38404-C 4: 1976-12	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
pH value	DIN EN ISO 10523: 2012-04 (C 5)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Conductivity (25 °C)	DIN EN 27888: 1993-11 (C 8)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Odour	DIN EN 1622: 2006-10 (B 3) Annex C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Colouring	DIN EN ISO 7887: 2012-04 (C 1), Method A	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Turbidity	DIN EN ISO 7027: 2000-04 (C 2)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Oxygen	DIN EN ISO 5814: 2013-03 (G 22)		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN ISO 17289: 2014-12 (G 25)		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN 25813: 1993-01 (G 21)		<input type="checkbox"/>	<input type="checkbox"/>
Redox potential	DIN 38404-C 6: 1984-05	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>

Section 2: Photometry, ion chromatography, titrimetry

Parameter	Method	Was	Sur	Raw
Absorption at 254 nm (SAC 254)	DIN 38404-C 3: 2005-07		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Absorption at 436 nm (SAC 436)	DIN EN ISO 7887: 2012-04 (C 1), Method B	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Ammonium nitrogen	DIN EN ISO 11732: 2005-05 (E 23)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN 38406-E 5: 1983-10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 14911: 1999-12 (E 34)		<input type="checkbox"/>	<input type="checkbox"/>
	DIN ISO 15923-1: 2014-07 (D 49)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Nitrite nitrogen	DIN EN 26777: 1993-04 (D 10)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 10304-1: 2009-07 (D 20)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 13395: 1996-12 (D 28)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN ISO 15923-1: 2014-07 (D 49)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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Parameter	Method	Was	Sur	Raw
Nitrate nitrogen	DIN EN ISO 10304-1: 2009-07 (D 20)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 13395: 1996-12 (D 28)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN 38405-D 9: 2011-09	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN 38405-D 29: 1994-11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN ISO 15923-1: 2014-07 (D 49)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Phosphorus, total (see also section 3)	DIN EN ISO 6878: 2004-09 (D 11)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 15681-1: 2005-05 (D 45)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 15681-2: 2005-05 (D 46)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Orthophosphate	DIN EN ISO 10304-1: 2009-07 (D 20)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 6878: 2004-09 (D 11)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 15681-1: 2004-07 (D 45)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 15681-2: 2005-05 (D 46)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN ISO 15923-1: 2014-07 (D 49)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Fluoride (dissolved)	DIN 38405-D 4-1, 1985-07	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 10304-1: 2009-07 (D 20)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Chloride	DIN EN ISO 10304-1: 2009-07 (D 20)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 15682: 2002-01 (D 31)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN ISO 15923-1: 2014-07 (D 49)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 10304-4: 1999-07 (D 25)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN 38405-D 1-1 and D 1-2: 1985-12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN 38405-D 1-3 and D 1-4: 1985-12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sulphate	DIN EN ISO 10304-1: 2009-07 (D 20)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN 38405-D 5-1: 1985-01	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN 38405 D 5-2:1985-01	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN ISO 15923-1: 2014-07 (D 49)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Cyanide (readily liberated)	DIN 38405-D 13-2: 1981-02	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 14403-1: 2012-10 (D 2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 14403-2: 2012-10 (D 3)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN 38405-D 7: 2002-04	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Parameter	Method	Was	Sur	Raw
Cyanide (total)	DIN 38405-D 13-1: 1981-02	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 14403-1: 2012-10 (D 2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 14403-2: 2012-10 (D 3)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN 38405-D 7: 2002-04	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chromium(VI)	DIN 38405-D 24: 1987-05	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 10304-3: 1997-11 (D 22), Section 6 (dissolved chromate)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 23913: 2009-09 (D 41)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 18412: 2007-02 (D 40)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sulphide (readily liberated)	DIN 38405-D 27: 1992-07	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Section 3: Elemental analysis

Parameter	Method	Was	Sur	Raw
Aluminium	DIN EN ISO 11885: 2009-09 (E 22)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 12020: 2000-05 (E 25)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 17294-2: 2017-01 (E 29)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 15586: 2004-02 (E 4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Arsenic	DIN EN ISO 11969: 1996-11 (D 18)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 11885: 2009-09 (E 22)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 17294-2: 2017-01 (E 29)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 15586: 2004-02 (E 4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN 38405-D 35: 2004-09	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead	DIN EN ISO 11885: 2009-09 (E 22)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN 38406-E 6: 1998-07	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 17294-2: 2017-01 (E 29)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 15586: 2004-02 (E 4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Parameter	Method	Was	Sur	Raw
Cadmium	DIN EN ISO 11885: 2009-09 (E 22)	<input checked="" type="checkbox"/>		
	DIN EN ISO 5961: 1995-05 (E 19)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 17294-2: 2017-01 (E 29)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 15586: 2004-02(E 4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Calcium	DIN EN ISO 11885: 2009-09 (E 22)		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN 38406-E 3: 2002-03		<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 7980: 2000-07 (E 3a)		<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 17294-2: 2017-01 (E 29)		<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 14911: 1999-12 (E 34)		<input type="checkbox"/>	<input type="checkbox"/>
Chromium	DIN EN ISO 11885: 2009-09 (E 22)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN 1233: 1996-08 (E 10)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 17294-2: 2017-01 (E 29)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 15586: 2004-02 (E 4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Iron	DIN EN ISO 11885: 2009-09 (E 22)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN 38406-E 32: 2000-05	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 15586: 2004-02 (E 4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 17294-2: 2017-01 (E 29)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Potassium	DIN 38406-E 13: 1992-07		<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 11885: 2009-09 (E 22)		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 17294-2: 2017-01 (E 29)		<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 14911: 1999-12 (E 34)		<input type="checkbox"/>	<input type="checkbox"/>
Copper	DIN EN ISO 11885: 2009-09 (E 22)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN 38406-E 7: 1991-09	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 17294-2: 2017-01 (E 29)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 15586: 2004-02 (E 4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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Parameter	Method	Was	Sur	Raw
Manganese	DIN EN ISO 11885: 2009-09 (E 22)			<input checked="" type="checkbox"/>
	DIN EN ISO 17294-2: 2017-01 (E 29)			<input checked="" type="checkbox"/>
	DIN 38406-E 33: 2000-06			<input type="checkbox"/>
	DIN EN ISO 15586: 2004-02 (E 4)			<input type="checkbox"/>
	DIN EN ISO 14911: 1999-12 (E 34)			<input type="checkbox"/>
Sodium	DIN 38406-E 14: 1992-07		<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 11885: 2009-09 (E 22)		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 17294-2: 2017-01 (E 29)		<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 14911: 1999-12 (E 34)		<input type="checkbox"/>	<input type="checkbox"/>
Nickel	DIN EN ISO 11885: 2009-09 (E 22)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN 38406-E 11: 1991-09	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 17294-2: 2017-01 (E 29)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 15586: 2004-02 (E 4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mercury	DIN EN ISO 17852: 2008-04 (E 35)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 12846: 2012-08 (E 12)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Zinc	DIN EN ISO 11885: 2009-09 (E 22)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN 38406-E 8: 2004-10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 17294-2: 2017-01 (E 29)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 15586: 2004-02 (E 4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boron	DIN EN ISO 11885: 2009-09 (E 22)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 17294-2: 2017-01 (E 29)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Magnesium	DIN EN ISO 11885: 2009-09 (E 22)		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN 38406-E 3: 2002-03		<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 7980: 2000-07 (E 3a)		<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 17294-2: 2017-01 (E 29)		<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN ISO 14911: 1999-12 (E 34)		<input type="checkbox"/>	<input type="checkbox"/>
Phosphorus, total (see also section 2)	DIN EN ISO 11885: 2009-09 (E 22)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 17294-2: 2017-01 (E 29)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section 4/5: Group and sum parameters

Parameter	Method	Was	Sur	Raw
Biological oxygen demand (BOD ₅)	DIN EN 1899-1: 1998-05 (H 51)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN 1899-2: 1998-05 (H 52)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chemical oxygen demand (COD)	DIN 38409-H 41: 1980-12	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN 38409-H 44: 1992-05	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN ISO 15705: 2003-01 (H 45)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Phenol index	DIN 38409-H 16-2: 1984-06	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN 38409-H 16-1: 1984-06	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 14402: 1999-12 (H 37) Method as per section 4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Filterable solids	DIN EN 872: 2005-04 (H 33)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	DIN 38409-H 2-3: 1987-03	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Acid and base capacity	DIN 38409-H 7: 2005-12	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Total organic carbon (TOC)	DIN EN 1484: 1997-08 (H 3)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Dissolved organic carbon (DOC)	DIN EN 1484: 1997-08 (H 3)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Total bound nitrogen (TN _b)	DIN EN 12260: 2003-12 (H 34)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 11905-1: 1998-08 (H 36)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Adsorbable organic halogens (AOX)	DIN EN ISO 9562: 2005-02 (H 14)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Section 6: Gas chromatographic methods

Parameter	Method	Was	Sur	Raw
Volatile halogenated hydrocarbons (VOC)	DIN EN ISO 10301: 1997-08 (F 4)*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN 38407-F 43: 2014-10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 15680: 2004-04 (F 19)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 17943: 2016-11 (F 41)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Benzene and derivatives (BTEX)	DIN 38407-F 9: 1991-05*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN 38407-F 43: 2014-10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 15680: 2004-04 (F 19)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 17943: 2016-11 (F 41)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Parameter	Method	Was	Sur	Raw
Organochlorine insecticides (OCP)	DIN EN ISO 6468: 1997-02 (F 1)*		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN 38407-F 37: 2013-11		<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN 16693: 2015-12 (F 51)		<input type="checkbox"/>	<input type="checkbox"/>
Polychlorinated biphenyls (PCB)	DIN EN ISO 6468: 1997-02 (F 1)*		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN 38407-F 3: 1998-07		<input type="checkbox"/>	<input type="checkbox"/>
	DIN 38407-F 37: 2013-11		<input type="checkbox"/>	<input type="checkbox"/>
Mono, dichlorobenzenes	DIN EN ISO 15680: 2004-04 (F 19)		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN 38407-F 43: 2014-10		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Tri to hexachlorobenzene	DIN EN ISO 6468: 1997-02 (F 1)*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN 38407-F 2: 1993-02	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN ISO 15680 (F19):2004-04**	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN 38407-F 43: 2014-10**	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN 38407-F 37: 2013-11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DIN EN 16693: 2015-12 (F 51)***		<input type="checkbox"/>	<input type="checkbox"/>
Chlorophenols	DIN EN 12673: 1999-05 (F 15)		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Organophosphorus and organic nitrogen compounds	DIN EN ISO 10695: 2000-11 (F 6) *		<input type="checkbox"/>	<input type="checkbox"/>
Polycyclic aromatic hydrocarbons (PAHs)**	DIN 38407-F 39: 2011-09	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN ISO 28540: 2014-05 (F 40)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN EN 16691: 2015-12 (F 50)		<input type="checkbox"/>	<input type="checkbox"/>
Hydrocarbon index	DIN EN ISO 9377-2: 2001-07 (H 53)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

* Mass spectrometric detection allowed

** Only applicable to trichlorobenzene

*** Only applicable to hexachlorobenzene

Section 7: HPLC methods

Parameter	Method	Was	Sur	Raw
Polycyclic aromatic hydrocarbons (PAH)* <i>(see also section 6)</i>	DIN EN ISO 17993: 2004-03 (F 18)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Plant protection products and pesticides (PPP) <i>(The methods should be applied according to substance-specific requirements.)</i>	DIN EN ISO 11369: 1997-11 (F 12)*		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	DIN 38407-F 35: 2010-10		<input type="checkbox"/>	<input type="checkbox"/>
	DIN 38407-F 36: 2014-09		<input type="checkbox"/>	<input type="checkbox"/>

* Mass spectrometric detection allowed

Section 8: Microbiological methods

Not used

Section 9.1: Biological methods, bio-assays (part 1)

Not used

Section 9.2: Biological methods, bio-assays (part 2)

Not used

9 List of test methods for the specialist module for soil and contaminated sites - at the Herten location

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Test area 1: Solids

Section 1.1: Sampling and on-site examination

Test parameters	Methods/notes	Method	
Sampling plans		BBodSchV DIN ISO 10381-1: 2003 DIN ISO 10381-5: 2007	<input checked="" type="checkbox"/>
Sampling for the analysis of suspected contaminated sites and contaminated sites	Hand drilling, sampling on excavations, small percussion bore holes 50 - 80 mm, samples in undisturbed bedding	DIN ISO 10381-2: 2003 DIN EN ISO 22475-1: 2007	<input checked="" type="checkbox"/>
	Stockpile sampling	LAGA PN 98: 2001	

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Test parameters	Methods/notes	Method	
Sampling after soil digestion for analysis of suspected contaminated sites and contaminated sites for volatile pollutants	The extraction agent must be present in the sample vessels prior to sampling	Handbuch Altlasten, Volume 7, Part 4, HLUG 2000	<input checked="" type="checkbox"/>
Sampling for investigation of natural, near-natural and cultivated sites		DIN ISO 10381-4: 2004 VDLUF A Methodenhandbuch Volume 1, A1	<input type="checkbox"/>
Sampling of sediments		DIN 38414-11: 1987	<input checked="" type="checkbox"/>
Sampling of suspended solids - optional		DIN 38402-24: 2007	<input type="checkbox"/>
Sample description		Arbeitshilfe für die Bodenansprache im vor- und nachsorgenden Bodenschutz, excerpt from KA5, 2009 Bodenkundliche Kartieranleitung 5th Edition (KA5): 2005	<input checked="" type="checkbox"/>
	Series of standards on geotechnical investigation and testing	DIN EN ISO 14688-1: 2011 DIN EN ISO 14689-1: 2011 DIN EN ISO 22475-1: 2007	<input type="checkbox"/>
Determination of soil texture	Feel test in the field	Arbeitshilfe für die Bodenansprache im vor- und nachsorgenden Bodenschutz, excerpt from KA5, 2009 Bodenkundliche Kartieranleitung 5th Edition (KA5): 2005 DIN 19682-2: 2007	<input checked="" type="checkbox"/>
Sample storage, sample pretreatment in the field, sample transport		DIN 19747: 2009 DIN ISO 10381-1: 2003 DIN ISO 10831-2: 2003 DIN ISO 18512: 2009	<input checked="" type="checkbox"/>
	Overlay of soil with solvent in the field for analysis for volatile pollutants	DIN ISO 22155: 2006	

Section 1.2: Laboratory - Analysis of inorganic parameters

Basic parameters and sample preparation			
Test parameters	Methods/notes	Method	
Sample preparation and processing		DIN 19747: 2009	<input checked="" type="checkbox"/>
Dry matter		DIN ISO 11465: 1996	<input checked="" type="checkbox"/>
		DIN EN 14346: 2007	<input checked="" type="checkbox"/>
Organic carbon and total carbon after dry combustion (TOC)	Air-dried soil samples	DIN ISO 10694: 1996	<input checked="" type="checkbox"/>
		DIN EN 13137: 2001	<input checked="" type="checkbox"/>
		DIN EN 15936: 2012	<input checked="" type="checkbox"/>
pH value (CaCl ₂)		DIN ISO 10390: 2005	<input checked="" type="checkbox"/>
Gross density - optional		DIN ISO 11272: 2001	<input type="checkbox"/>
Particle size distribution - optional	Pipette analysis	DIN ISO 11277: 2002	<input type="checkbox"/>
	Hydrometer method	DIN 18123: 2011 with LAGA PN98	<input type="checkbox"/>

Analysis of inorganic parameters			
Test parameters	Methods/notes	Method	
Aqua regia extract	Thermal, open vessel	DIN ISO 11466: 1997	<input checked="" type="checkbox"/>
	Microwave digestion	DIN EN 13657: 2003	<input checked="" type="checkbox"/>
Ammonium nitrate extract		DIN 19730: 2009	<input checked="" type="checkbox"/>
Alkaline digestion method - optional	Metaborate fusion for chromium(VI) analysis	DIN EN 15192: 2007	<input type="checkbox"/>
Extraction for determination of thallium - optional	HNO ₃ , H ₂ O ₂	DIN ISO 20279: 2006	<input type="checkbox"/>
Arsenic (As) Antimony (Sb)	ICP-OES	DIN ISO 22036: 2009	<input checked="" type="checkbox"/>
	ICP-MS	DIN EN ISO 17294-2: 2005	<input checked="" type="checkbox"/>
	ET-AAS or hydride AAS	DIN ISO 20280: 2010	<input type="checkbox"/>
Cadmium (Cd) Chromium (Cr), total Cobalt (Co) Copper (Cu) Nickel (Ni) Lead (Pb) Zinc (Zn)	ET-AAS	DIN ISO 11047: 2003	<input type="checkbox"/>
	ICP-OES	DIN ISO 22036: 2009	<input checked="" type="checkbox"/>
Mercury (Hg)	ICP-MS	DIN EN ISO 17294-2: 2005	<input checked="" type="checkbox"/>
	AAS	DIN EN 1483: 2007	<input checked="" type="checkbox"/>
Mercury (Hg)	Cold vapour AAS or cold vapour AFS	DIN ISO 16772: 2005	<input checked="" type="checkbox"/>
		DIN ISO 17380: 2011	<input checked="" type="checkbox"/>
Cyanide		DIN ISO 11262: 2012	<input checked="" type="checkbox"/>
		DIN EN 15192: 2007	<input type="checkbox"/>
Chromium(VI) - optional	IC with photometric detection	DIN EN 15192: 2007	<input type="checkbox"/>
Molybdenum (Mo)	ICP-OES	DIN ISO 22036: 2009	<input checked="" type="checkbox"/>

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Analysis of inorganic parameters			
Test parameters	Methods/notes	Method	
Vanadium (V) - optional	ICP-MS	DIN EN ISO 17294-2: 2005	<input checked="" type="checkbox"/>
Selenium (Se) - optional	ICP-OES	DIN ISO 22036: 2009	<input checked="" type="checkbox"/>
	ICP-MS	DIN EN ISO 17294-2: 2005	<input checked="" type="checkbox"/>
	ET-AAS or hydride AAS	DIN ISO 20280: 2010	<input type="checkbox"/>
Thallium (Tl) from the HNO ₃ /H ₂ O ₂ -extract - optional	ET-AAS	DIN ISO 20279: 2006	<input type="checkbox"/>
	ICP-OES	DIN ISO 22036: 2009	<input checked="" type="checkbox"/>
	ICP-MS	DIN EN ISO 17294-2: 2005	<input checked="" type="checkbox"/>
Uranium (U)	ICP-OES	DIN ISO 22036: 2009	<input type="checkbox"/>
Tungsten (W) - optional	ICP-MS	DIN EN ISO 17294-2: 2005	<input checked="" type="checkbox"/>

Section 1.3: Laboratory - Analysis of organic parameters

Basic parameters and sample preparation			
Test parameters	Methods/notes	Method	
Sample preparation and processing		DIN 19747: 2009	<input checked="" type="checkbox"/>
Dry matter		DIN ISO 11465: 1996	<input checked="" type="checkbox"/>
		DIN EN 14346: 2007	<input checked="" type="checkbox"/>
Organic carbon and total carbon after dry combustion (TOC)	Air-dried soil samples	DIN ISO 10694: 1996	<input checked="" type="checkbox"/>
		DIN EN 13137: 2001	<input checked="" type="checkbox"/>
		DIN EN 15936: 2012	<input checked="" type="checkbox"/>
pH value (CaCl ₂)		DIN ISO 10390: 2005	<input checked="" type="checkbox"/>
Gross density - optional		DIN ISO 11272: 2001	<input type="checkbox"/>
Particle size distribution - optional	Pipette analysis	DIN ISO 11277: 2002	<input type="checkbox"/>
	Hydrometer method	DIN 18123: 2011 with LAGA PN98	<input type="checkbox"/>

Analysis of organic parameters			
Test parameters	Methods/notes	Method	
Polycyclic aromatic hydrocarbons (PAH) 16 PAH (EPA)	GC-MS	DIN ISO 18287: 2006	<input checked="" type="checkbox"/>
	HPLC-UV/F Acenaphthylene cannot be determined by fluorescence detector	DIN ISO 13877: 2000	<input checked="" type="checkbox"/>
		DIN 38414-23: 2002	<input checked="" type="checkbox"/>
Hexachlorobenzene	GC - ECD, GC - MS	DIN ISO 10382: 2006	<input checked="" type="checkbox"/>
Pentachlorophenol	GC - ECD, GC - MS	DIN ISO 14154: 2005	<input checked="" type="checkbox"/>
Aldrin, DDT, HCH mixture	GC - ECD, GC - MS	DIN ISO 10382: 2003	<input checked="" type="checkbox"/>
		DIN EN 15308: 2008	<input type="checkbox"/>

Analysis of organic parameters			
Test parameters	Methods/notes	Method	
Polychlorinated biphenyls (PCB)	GC-ECD, GC-MS Extraction with acetone/petroleum ether or Soxhlet extraction The type of summation must be indicated (PCB6/PCB7)	DIN ISO 10382: 2003	<input checked="" type="checkbox"/>
		DIN EN 15308: 2008	<input type="checkbox"/>
		DIN 38414-20: 1996	<input checked="" type="checkbox"/>
Typical explosive compounds (HPLC) - optional	Extraction with methanol or acetonitrile and quantification using HPLC-UV/DAD	E DIN ISO 11916-1: 2011	<input type="checkbox"/>
Typical explosive compounds (GC) - optional	Extraction with methanol. Dissolution in toluene and quantification using GC-ECD or GC-MS	E DIN ISO 11916-2: 2011	<input type="checkbox"/>
Petroleum hydrocarbons (C ₁₀ -C ₄₀) - optional	GC-FID	DIN ISO 16703: 2005	<input checked="" type="checkbox"/>
		LAGA KW/04: 2009	<input checked="" type="checkbox"/>
BTEX aromatic compounds, VOC - optional	Headspace, GC	DIN ISO 22155: 2006	<input checked="" type="checkbox"/>

Test area 1.4: Analysis - Dioxins and furans

Not used

Test area 2: Eluates and percolates, aqueous media

Section 2.1: Sampling and on-site examination

Sampling			
Test parameters	Methods/notes	Method	
Sampling programmes and sampling techniques		DIN EN ISO 5667-1: 2007	<input checked="" type="checkbox"/>
Sampling of groundwater	AQS Data Sheet P 8/2: 1996	ISO 5667-11: 2009 DIN 38402-13: 1985 DVGW Work Sheet S W 112: 2011	<input checked="" type="checkbox"/>
Sampling of leachate		No standardised method currently available Where applicable E-DWA-M 905: 2008	<input checked="" type="checkbox"/>
Sampling of surface water (running waters)	AQS Data Sheet P 8/3: 1998	DIN 38402-15: 2010	<input checked="" type="checkbox"/>
Sampling of surface water (barrages and lakes)		DIN 38402-12: 1985	<input checked="" type="checkbox"/>

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On-site testing			
Test parameters	Methods/notes	Method	
Colouring		DIN EN ISO 7887: 2012	<input checked="" type="checkbox"/>
Turbidity		DIN EN ISO 7027: 2000	<input checked="" type="checkbox"/>
Odour		DEV B1/2 1971	<input checked="" type="checkbox"/>
Temperature		DIN 38404-4: 1976	<input checked="" type="checkbox"/>
pH value		DIN EN ISO 10523: 2012	<input checked="" type="checkbox"/>
Oxygen content		DIN EN 25814: 1992	<input checked="" type="checkbox"/>
Electrical conductivity		DIN EN 27888: 1993	<input checked="" type="checkbox"/>
Redox potential		DIN 38404-6: 1984	<input checked="" type="checkbox"/>
Sample storage, sample pretreatment, sample transport		DIN EN ISO 5667-3: 2004	<input checked="" type="checkbox"/>

Section 2.2: Laboratory - Analysis of eluates/percolates for inorganic parameters

Eluates/percolates			
Test parameters	Methods/notes	Method	
Batch test - Elution of inorganic substances		DIN 19529: 2009	<input checked="" type="checkbox"/>
Batch test - Elution of organic substances		DIN 19527: 2012	<input checked="" type="checkbox"/>
Batch test - Elution of inorganic substances - optional		DIN EN 12457-4: 2003	<input checked="" type="checkbox"/>
Percolation method for organic and inorganic substances - optional		DIN 19528: 2009	<input checked="" type="checkbox"/>
Examination for absorption availability - optional		DIN 19738: 2004	<input checked="" type="checkbox"/>

Analysis - Inorganic parameters			
Test parameters	Methods/notes	Method	
Antimony (Sb) Arsenic (As)	ICP-OES	DIN EN ISO 11885: 2009	<input checked="" type="checkbox"/>
	ICP-OES	DIN ISO 22036: 2009	<input checked="" type="checkbox"/>
	ICP-MS	DIN EN ISO 17294-2: 2005	<input checked="" type="checkbox"/>
	ET-AAS or hydride AAS	DIN ISO 20280: 2010	<input checked="" type="checkbox"/>

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Analysis - Inorganic parameters			
Test parameters	Methods/notes	Method	
Lead (Pb) Cadmium (Cd) Chromium (Cr), total Cobalt (Co) Copper (Cu) Molybdenum (Mo) Nickel (Ni) Zinc (Zn)	ET-AAS	DIN EN ISO 15586: 2004	<input type="checkbox"/>
	ICP-OES	DIN EN ISO 11885: 2009	<input checked="" type="checkbox"/>
	ICP-OES	DIN ISO 22036: 2009	<input checked="" type="checkbox"/>
	ICP-MS	DIN EN ISO 17294-2: 2005	<input checked="" type="checkbox"/>
Mercury (Hg)	AAS	DIN EN 1483: 2007	<input checked="" type="checkbox"/>
	Cold vapour AAS or cold vapour AFS	DIN ISO 16772: 2005	<input checked="" type="checkbox"/>
Cyanide (CN ⁻), total Cyanide, readily liberated	Spectrophotometry	DIN EN ISO 14403: 2002	<input checked="" type="checkbox"/>
		DIN 38405-13: 2011	<input checked="" type="checkbox"/>
		DIN EN ISO 17380: 2011	<input checked="" type="checkbox"/>
Fluoride, chloride, sulphate	Ion chromatography	DIN EN ISO 10304-1:2009	<input checked="" type="checkbox"/>
	Individual method	DIN 38405-1, -4, -5: 1985	<input type="checkbox"/>
Vanadium (V) - optional	ET-AAS	DIN EN ISO 15586: 2004	<input type="checkbox"/>
	ICP-OES	DIN EN ISO 11885: 2009	<input checked="" type="checkbox"/>
	ICP-OES	DIN ISO 22036: 2009	<input checked="" type="checkbox"/>
	ICP-MS	DIN EN ISO 17294-2: 2005	<input checked="" type="checkbox"/>
Uranium (U) - optional	ICP-MS	DIN EN ISO 17294-2: 2005	<input checked="" type="checkbox"/>
Tin (Sn) Thallium (Tl) Tungsten (W) - optional	ICP-OES	DIN EN ISO 11885: 2009	<input checked="" type="checkbox"/>
	ICP-OES	DIN ISO 22036: 2009	<input checked="" type="checkbox"/>
	ICP-MS	DIN EN ISO 17294-2: 2005	<input checked="" type="checkbox"/>
Selenium (Se) - optional	ET-AAS	DIN EN ISO 15586: 2004	<input type="checkbox"/>
	ICP-OES	DIN EN ISO 11885: 2009	<input checked="" type="checkbox"/>
	ICP-OES	DIN ISO 22036: 2009	<input checked="" type="checkbox"/>
	ICP-MS	DIN EN ISO 17294-2: 2005	<input checked="" type="checkbox"/>
	ET-AAS or hydride AAS	DIN ISO 20280: 2010	<input checked="" type="checkbox"/>

Analysis - Inorganic parameters			
Test parameters	Methods/notes	Method	
Chromium (Cr VI)	Spectrophotometry	DIN 38405-24: 1987	<input checked="" type="checkbox"/>
	Ion chromatography	DIN EN ISO 10304-3: 1997	<input type="checkbox"/>

Section 2.3: Laboratory - Analysis of eluates/percolates for organic parameters

Eluates/percolates			
Test parameters	Methods/notes	Method	
Batch test - Elution of inorganic substances		DIN 19529: 2009	<input checked="" type="checkbox"/>
Batch test - Elution of organic substances		DIN 19527: 2012	<input checked="" type="checkbox"/>
Batch test - Elution of inorganic substances - optional		DIN EN 12457-4: 2003	<input checked="" type="checkbox"/>
Percolation method for organic and inorganic substances - optional		DIN 19528: 2009	<input checked="" type="checkbox"/>
Examination for absorption availability - optional		DIN 19738: 2004	<input checked="" type="checkbox"/>

Analysis - Organic parameters			
Test parameters	Methods/notes	Method	
Aromatics (BTEX)	Purge + trap / desorption, GC-MS	DIN EN ISO 15680: 2004	<input checked="" type="checkbox"/>
	Liquid extraction and headspace, GC	DIN 38407-9: 1991	<input checked="" type="checkbox"/>
	Headspace-SPME, GC-MS	DIN 38407-41: 2011	<input type="checkbox"/>
Volatile halogenated hydrocarbons (VOC)	Purge + trap / desorption, GC-MS	DIN EN ISO 15680: 2004	<input checked="" type="checkbox"/>
	Liquid extraction and headspace, GC	DIN EN ISO 10301: 1997	<input checked="" type="checkbox"/>
	Headspace-SPME, GC-MS	DIN 38407-41: 2011	<input type="checkbox"/>

Analysis - Organic parameters			
Test parameters	Methods/notes	Method	
Aldrin	GC-ECD, GC-MS	DIN EN ISO 6468: 1997	<input checked="" type="checkbox"/>
		DIN 38407-2: 1993	<input checked="" type="checkbox"/>
Dichlorodiphenyltrichloroethane (DDT)	GC-ECD, GC-MS	DIN EN ISO 6468: 1997	<input checked="" type="checkbox"/>
		DIN 38407-2: 1993	<input checked="" type="checkbox"/>
Chlorophenols	GC-ECD, GC-MS	DIN EN 12673: 1999	<input checked="" type="checkbox"/>
Chlorobenzenes (Cl3-Cl6)	GC-ECD, GC-MS	DIN 38407-2: 1993	<input checked="" type="checkbox"/>
	Liquid extraction, GC-ECD, GC-MS	DIN EN ISO 6468: 1997	<input checked="" type="checkbox"/>
Chlorobenzenes (Cl1-Cl3)	Liquid extraction and headspace, GC-ECD, MS where applicable	DIN EN ISO 10301: 1997	<input checked="" type="checkbox"/>
Polychlorinated biphenyls (PCB)	GC-ECD, GC-MS Type of summation (PCB6 / PCB7) must be specified	DIN 38407-2: 1993	<input checked="" type="checkbox"/>
		DIN 38407-3: 1998	<input type="checkbox"/>
16 PAH (EPA)	HPLC-F	DIN EN ISO 17993: 2004	<input checked="" type="checkbox"/>
	GC-MS	DIN 38407-39: 2011	<input checked="" type="checkbox"/>
Naphthalene	GC-FID, GC-MS	DIN EN ISO 15680: 2004	<input checked="" type="checkbox"/>
		DIN 38407-9: 1991	<input checked="" type="checkbox"/>
Petroleum hydrocarbons (MKW, C ₁₀ -C ₄₀)	GC-FID	DIN EN ISO 9377-2: 2001	<input checked="" type="checkbox"/>
Typical explosive compounds (HPLC) - optional	HPLC / UV detection	DIN EN ISO 22478: 2006	<input type="checkbox"/>
Typical explosive compounds (GC) - optional	Determination of selected nitroaromatic compounds using GC	DIN 38407-17: 1999	<input type="checkbox"/>
Phenols - optional	GC-ECD, GC-MS	ISO 8165-2: 1999	<input checked="" type="checkbox"/>
		DIN EN 12673: 1999	<input checked="" type="checkbox"/>

Test area 3 - Soil gas, landfill gas
Section 3.1: Sampling and on-site examination

Sampling			
Test parameters	Methods/notes	Method	
Pile core probing		DIN ISO 10381-2: 2003 DIN EN ISO 22475-1: 2007	<input type="checkbox"/>
Sampling of soil gas		VDI 3865 Blatt 2: 1998 VDI 3865 Blatt 1: 2005 DIN ISO 10381-7: 2007	<input checked="" type="checkbox"/>

On-site testing			
Test parameters	Methods/notes	Method	
Carbon dioxide (CO ₂)	Direct-display instrument		<input checked="" type="checkbox"/>
Methane (CH ₄)	Direct-display instrument		<input checked="" type="checkbox"/>
Hydrogen sulphide (H ₂ S)	Direct-display instrument		<input checked="" type="checkbox"/>
Oxygen (O ₂)	Direct-display instrument		<input checked="" type="checkbox"/>
Sum parameter trace gases	Direct-display instrument		<input checked="" type="checkbox"/>

Section 3.2: Laboratory - Analysis of soil gas, landfill gas

Test parameters	Methods/notes	Method	
Aromatics (BTEX)		VDI 3865 Blatt 3: 1998	<input checked="" type="checkbox"/>
		VDI 3865 Blatt 4: 2000	<input type="checkbox"/>
Volatile halogenated hydrocarbons (VOC)		VDI 3865 Blatt 3: 1998	<input checked="" type="checkbox"/>
		VDI 3865 Blatt 4: 2000	<input type="checkbox"/>

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10 List of test methods for the specialist module for waste 2018-05 - at the Herten location
Revised: LAGA, May 2018

Test area 1: Sewage sludge

	Sections / Parameters	Basis / Methods	
		AbfklärV	
1.1	Sampling and sample preparation	Section 32 (3) and (4) AbfklärV	
a)	Sampling	DIN EN ISO 5667-13 (08.11) and DIN 19698-1 (05.14)	<input checked="" type="checkbox"/>
b)	Sample preparation	DIN 19747 (07.09)	<input checked="" type="checkbox"/>
1.2	Heavy metals and chromium VI¹	Section 5 (1) (1) AbfklärV	
	Heavy metals		
	Aqua regia digestion	DIN EN 16174 (11.12)	<input checked="" type="checkbox"/>
		DIN EN 16174 Method A (11.12)	<input type="checkbox"/>
		DIN EN 13346 Method A (04.01)	<input checked="" type="checkbox"/>
	Arsenic, lead, cadmium, chromium, copper, nickel, zinc, iron (from aqua regia digestion)	DIN EN ISO 11885 (09.09)	<input checked="" type="checkbox"/>
		DIN ISO 11047 (05.03)	<input type="checkbox"/>
		DIN EN ISO 17294-2 (01.17)	<input checked="" type="checkbox"/>
		DIN EN 16170 (01.17)	<input checked="" type="checkbox"/>
		DIN EN 16171 (01.17)	<input checked="" type="checkbox"/>
		CEN/TS 16172; DIN SPEC 91258 (04.13)	<input type="checkbox"/>
		DIN ISO 22036 (06.09)	<input checked="" type="checkbox"/>

¹ By way of derogation from Part III No. 1, proof of competence for section 1.2 may also be provided without chromium VI.

	Sections / Parameters	Basis / Methods	
	Thallium (from aqua regia digestion)	DIN EN ISO 11885 (09.09)	<input checked="" type="checkbox"/>
		DIN ISO 11047 (05.03)	<input type="checkbox"/>
		DIN EN ISO 17294-2 (01.17)	<input checked="" type="checkbox"/>
		DIN 38406-26 (07.97)	<input type="checkbox"/>
		DIN EN 16170 (01.17)	<input checked="" type="checkbox"/>
		DIN EN 16171 (01.17)	<input checked="" type="checkbox"/>
		CEN/TS 16172; DIN SPEC 91258 (04.13)	<input type="checkbox"/>
		DIN ISO 22036 (06.09)	<input type="checkbox"/>
	Mercury (from aqua regia digestion)	DIN EN ISO 17852 (04.08)	<input type="checkbox"/>
		DIN EN 16175-1 (12.16)	<input checked="" type="checkbox"/>
		DIN EN 16175-2 (12.16)	<input type="checkbox"/>
		DIN EN 16171 (01.17)	<input type="checkbox"/>
		DIN EN ISO 12846 (08.12)	<input type="checkbox"/>
	Chromium VI (from alkaline hot extract) ²	DIN EN 16318 (07.16)	<input checked="" type="checkbox"/>
		DIN EN 15192 (02.07)	<input type="checkbox"/>
		DIN 10304-3 (11.97) ³	<input type="checkbox"/>
		DIN EN ISO 17294-2 (01.17) ⁵	<input type="checkbox"/>
1.3	Adsorbed organic bound halogens	Section 5 (1) (2) AbfklärV	
	AOX (from dry residue)	DIN 38414-18 (11.89)	<input checked="" type="checkbox"/>
		DIN EN 16166 (11.12)	<input checked="" type="checkbox"/>
1.4	Physical parameters, nutrients	Section 5 (1) (3) - (9) AbfklärV	
	Dry residue	DIN EN 15934 (11.12)	<input checked="" type="checkbox"/>
		DIN EN 12880 (02.01)	<input checked="" type="checkbox"/>
	Organic substance as loss on ignition (from dry residue)	DIN EN 15935 (11.12)	<input checked="" type="checkbox"/>
		DIN EN 12879 (02.01)	<input checked="" type="checkbox"/>

² For the alkaline hot extract, the DIN EN 16318 or DIN EN 15192 methods must be used.

³ Instead of post-column derivatisation with 1,5-diphenylcarbonohydrazide, determination of Cr(IV) after separation by ion chromatography in accordance with DIN 10304-3 can also be carried out by coupling with ICP-MS detection based on DIN EN ISO 17294-2.

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Sections / Parameters	Basis / Methods	
pH value	DIN EN 15933 (11.12)	<input checked="" type="checkbox"/>
	DIN 38414-5 (07.09)	<input checked="" type="checkbox"/>
Alkaline agents as CaO	VDLUFÄ Methodenbuch Volume II.2, Method 4.5.1	<input checked="" type="checkbox"/>
Ammonium nitrogen (NH ₄ -N)	DIN 38406-5 (10.83)	<input checked="" type="checkbox"/>
Total nitrogen (N _{total})	DIN EN 13342 (01.01)	<input checked="" type="checkbox"/>
	DIN EN 16169 (11.12)	<input checked="" type="checkbox"/>
	DIN ISO 11261 (05.97)	<input checked="" type="checkbox"/>
Aqua regia digestion	DIN EN 16174 (11.12)	<input checked="" type="checkbox"/>
	DIN EN 13346 Method A (04.01)	<input checked="" type="checkbox"/>
Phosphorus (P) (from aqua regia digestion) (conversion: phosphorus (P) = 2,291 for phosphorus pentoxide (P ₂ O ₅))	DIN EN ISO 11885 (09.09)	<input checked="" type="checkbox"/>
	DIN EN ISO 6878 (09.04)	<input type="checkbox"/>
	DIN EN ISO 17294-2 (01.17)	<input type="checkbox"/>
	DIN EN 16171 (01.17)	<input checked="" type="checkbox"/>
	DIN EN 16170 (01.17)	<input type="checkbox"/>

Sections 1.5 and 1.6

Not used

1.7	Benzo(a)pyrene (BaP)	DIN EN 15527 (09.08)	<input checked="" type="checkbox"/>
		DIN 38414-23 (02.02)	<input type="checkbox"/>
		DIN CEN/TS 16181; DIN SPEC 91243 (12.13)	<input type="checkbox"/>

Section 1.8

Not used

Test area 2: Base

	Sections / Parameters	Basis / Methods	
		AbfklärV and BioAbfV	
2.1	Sampling and sample preparation	Section 32 (2) AbfklärV and Section 9 BioAbfV	
a)	Sampling	DIN ISO 10381-1 (08.03) and DIN ISO 10381-4 (04.04)	<input checked="" type="checkbox"/>
b)	Sample preparation	DIN ISO 19747 (07.09)	<input checked="" type="checkbox"/>
2.2	Heavy metals	Section 4 (1) AbfklärV Section 9 (2) BioAbfV	
	Aqua regia digestion	DIN EN 16174 (11.12)	<input checked="" type="checkbox"/>
		DIN EN 13657 (01.03)	<input checked="" type="checkbox"/>
	Lead, cadmium, chromium, copper, nickel, zinc, (from aqua regia digestion)	DIN ISO 11047 (05.03)	<input type="checkbox"/>
		DIN EN ISO 17294-2 (01.17)	<input checked="" type="checkbox"/>
		DIN ISO 22036 (06.09)	<input checked="" type="checkbox"/>
		DIN EN 16170 (01.17)	<input checked="" type="checkbox"/>
		DIN EN 16171 (01.17)	<input checked="" type="checkbox"/>
		DIN EN ISO 11885 (09.09)	<input checked="" type="checkbox"/>
	Mercury (from aqua regia digestion)	DIN ISO 16772 (06.05)	<input checked="" type="checkbox"/>
		DIN EN 12846 (08.12)* a method incorrectly specified in legislation; DIN EN ISO 12846 (08.12) correct	<input type="checkbox"/>
		EN 16175-1 (12.16)	<input checked="" type="checkbox"/>
		EN 16175-2 (12.16)	<input type="checkbox"/>
		DIN EN 16171 (01.17)	<input type="checkbox"/>
		DIN EN ISO 17852 (04.08)	<input type="checkbox"/>

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	Sections / Parameters	Basis / Methods	
2.3	Physical parameters, phosphate	Section 4 (1) AbfKlärV Section 9 (2) BioAbfV	
	Phosphate (from CAL/DL extract; P-content determination must be converted to o-phosphate)	VDLUF A Methodenbuch, Volume I, Method A 6.2.1.1 (6th Part 2012)	<input checked="" type="checkbox"/>
		VDLUF A Methodenbuch, Volume I, Method A 6.2.1.2 (Main Volume)	<input type="checkbox"/>
		DIN EN ISO 10304-1 (07.09)	<input checked="" type="checkbox"/>
		DIN ISO 22036 (06.09)	<input type="checkbox"/>
	Soil texture (clay content)	DIN 19682-2 (07.14)	<input checked="" type="checkbox"/>
		DIN 18123 (04.11)	<input type="checkbox"/>
	pH value	DIN EN 15933 (11.12)	<input checked="" type="checkbox"/>
		ISO 10390 (02.05)	<input type="checkbox"/>
		VDLUF A Methodenhandbuch I A 5.1.1	<input type="checkbox"/>
	Dry residue	DIN EN 15934 (11.12)	<input checked="" type="checkbox"/>
		DIN EN 12880 (02.01)	<input type="checkbox"/>

Section 2.4

Not used

2.5	Benzo(a)pyrene (BaP)	DIN ISO 18287 (05.06)	<input checked="" type="checkbox"/>
		DIN CEN TS 16181; DIN SPEC 91243 (12.13)	<input type="checkbox"/>
		DIN 38414-23 (02.02)	<input type="checkbox"/>

Test area 3: Biowaste

Not used

Test area 4: Waste oil, insulating liquid

Not used

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Test area 5: Landfill waste

	Sections/ Parameter	Basis/ Method	
		Section 6 (2), Section 8 (1), (3) and (5) DepV	
5.1	Sampling	LAGA PN 98 (12.01)	<input checked="" type="checkbox"/>
5.2	Determination of total content in solid		
	Sample preparation	DIN 19747 (07.09)	<input checked="" type="checkbox"/>
	Digestion method (aqua regia)	DIN EN 13657 (01.03)	<input checked="" type="checkbox"/>
	Loss on ignition	DIN EN 15169 (05.07)	<input checked="" type="checkbox"/>
	TOC (total organic carbon)	DIN EN 13137 (12.01)	<input checked="" type="checkbox"/>
	BTEX (benzene and derivatives)	DIN 38407-F9 (05.91) Handbuch Altlasten HLUG, Volume 7, Methods of analysis, Part 4 (2000)	<input checked="" type="checkbox"/>
		DIN EN ISO 22155 (07.16)	<input checked="" type="checkbox"/>
	PCB (polychlorinated biphenyls)	DIN EN 15308 (05.08)	<input checked="" type="checkbox"/>
	Petroleum hydrocarbons	DIN EN 14039 (01.05) in conjunction with LAGA KW/04 (12.09)	<input checked="" type="checkbox"/>
	PAH (polycyclic aromatic hydrocarbons)	DIN ISO 18287 (05.06)	<input checked="" type="checkbox"/>
	Density	DIN 18125- 2 (03.11)	<input type="checkbox"/>
	Gross calorific value	DIN EN 15170 (05.09)	<input type="checkbox"/>
	Cadmium, chromium, copper, nickel, lead and zinc	DIN ISO 11047 (05.03)	<input type="checkbox"/>
		DIN EN ISO 11885 (09.09)	<input checked="" type="checkbox"/>
		DIN ISO 22036 (06.09)	<input checked="" type="checkbox"/>
	Mercury	DIN EN 12846 (08.12)* a method incorrectly specified in legislation; DIN EN ISO 12846 (08.12) correct	<input checked="" type="checkbox"/>
		DIN EN ISO 17852 (04.08)	<input checked="" type="checkbox"/>
	Extractable lipophilic substances	LAGA KW/04 (12.09)	<input checked="" type="checkbox"/>

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	Sections/ Parameter	Basis/ Method	
5.3	Determination of contents in eluate		
	Eluate preparation with liquid/solid ratio 10/1	DIN EN 12457- 4 (01.03)	<input checked="" type="checkbox"/>
	Eluate preparation each with constant pH 4 and 11 / acid neutralisation capacity	LAGA Guideline EW 98 (2002)	<input checked="" type="checkbox"/>
	Up-flow percolation test	DIN CEN/TS 14405 (09.04)	<input checked="" type="checkbox"/>
		DIN 19528 (01.09)	<input checked="" type="checkbox"/>
	pH value of eluate	DIN 38404- 5 (07.09)	<input checked="" type="checkbox"/>
	DOC	DIN EN 1484 (08.97)	<input checked="" type="checkbox"/>
	DOC at a pH between 7.5 and 8	LAGA Guideline EW 98 p (2002)	<input checked="" type="checkbox"/>
	Phenols	DIN 38409- 16 (06.84)	<input checked="" type="checkbox"/>
		DIN EN ISO 14402 (12.99)	<input checked="" type="checkbox"/>
		DIN 38407- 27 (10.12)	<input type="checkbox"/>
	Arsenic	DIN EN ISO 11969 (11.96)	<input checked="" type="checkbox"/>
		DIN EN ISO 11885 (09.09)	<input checked="" type="checkbox"/>
		DIN ISO 22036 (06.09)	<input checked="" type="checkbox"/>
		DIN EN ISO 15586 (02.04)	<input type="checkbox"/>
		DIN EN ISO 17294- 2 (02.05)	<input checked="" type="checkbox"/>
		DIN EN ISO 17294-2 (01.17)	<input type="checkbox"/>
	Lead, cadmium, copper, nickel, zinc, chromium	DIN EN ISO 15586 (02.04)	<input type="checkbox"/>
		DIN EN ISO 17294- 2 (02.05)	<input checked="" type="checkbox"/>
		DIN EN ISO 11885 (09.09)	<input checked="" type="checkbox"/>
		DIN ISO 22036 (06.09)	<input checked="" type="checkbox"/>
		DIN EN ISO 17294-2 (01.17)	<input type="checkbox"/>
	Mercury	DIN EN ISO 12846 (08.12)	<input checked="" type="checkbox"/>
		DIN EN ISO 17852 (04.08)	<input type="checkbox"/>
	Barium, molybdenum, selenium	DIN ISO 22036 (06.09)	<input checked="" type="checkbox"/>
		DIN EN ISO 11885 (09.09)	<input checked="" type="checkbox"/>
		DIN EN ISO 17294- 2 (02.05)	<input checked="" type="checkbox"/>
		DIN EN ISO 17294-2 (01.17)	<input type="checkbox"/>

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Sections/ Parameter	Basis/ Method	
Antimony	DIN ISO 22036 (06.09)	<input checked="" type="checkbox"/>
	DIN EN ISO 11885 (09.09)	<input checked="" type="checkbox"/>
	DIN EN ISO 15586 (02.04)	<input type="checkbox"/>
	DIN 38405- 32 (05.00)	<input type="checkbox"/>
	DIN EN ISO 17294- 2 (02.05)	<input checked="" type="checkbox"/>
	DIN EN ISO 17294-2 (01.17)	<input type="checkbox"/>
Total dissolved solids	DIN EN 15216 (01.08)	<input checked="" type="checkbox"/>
	DIN 38409- 1 (01.87)	<input checked="" type="checkbox"/>
	DIN 38409- 2 (03.87)	<input checked="" type="checkbox"/>
Conductivity of eluate	DIN EN 27888 (11.93)	<input checked="" type="checkbox"/>
Determination of dry residue	DIN EN 14346 (03.07)	<input checked="" type="checkbox"/>
Chloride	DIN EN ISO 10304- 1 (07.09)	<input checked="" type="checkbox"/>
	DIN 38405- 1 (12.85)	<input type="checkbox"/>
	DIN EN ISO 15682 (01.02)	<input type="checkbox"/>
Sulphate	DIN EN ISO 10304- 1 (07.09)	<input checked="" type="checkbox"/>
	DIN 38405- 5 (01.85)	<input type="checkbox"/>
Cyanide, readily liberated	DIN 38405- 13 (04.11)	<input checked="" type="checkbox"/>
	In waste containing sulphide: DIN ISO 17380 (05.06)	<input checked="" type="checkbox"/>
	DIN EN ISO 14403- 1 (10.12)	<input type="checkbox"/>
Fluoride	DIN 38405- 4 (07.85)	<input checked="" type="checkbox"/>
	DIN EN ISO 10304- 1 (07.09)	<input checked="" type="checkbox"/>

Section 5.4

Not used

Test area 6: Wood waste

Not used

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Date of issue: 24.09.2021

Abbreviations used

AbfklärV	German Sewage Sludge Ordinance
DFG	Deutsche Forschungsgemeinschaft (German Research Foundation)
DIN	Deutsches Institut für Normung e. V. (German Institute for Standardization)
DVWK	Deutscher Verband für Wasserwirtschaft und Kulturbau (German Association for Water Management and Land Improvement)
EN	European standard
EPA	Environmental Protection Agency, USA
In-house method SOP	In-house method of SGS INSTITUT FRESENIUS GmbH
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
LABO	Bund-/Länderarbeitsgemeinschaft Bodenschutz (Federal/Regional Working Group on Soil Protection)
LAGA	Bund-/Länderarbeitsgemeinschaft Abfall (Regional Working Group on Waste)
LAWA	Bund-/Länderarbeitsgemeinschaft Wasser (Federal/Regional Working Group on Water)
LUA NRW	Landesumweltamt Nordrhein-Westfalen (State Environment Office North Rhine-Westphalia)
VDI	Verein deutscher Ingenieure (Association of German Engineers)

Deutsche Akkreditierungsstelle GmbH

Entrusted according to Section 8 subsection 1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV

Signatory to the Multilateral Agreements of EA, ILAC and IAF for Mutual Recognition

Accreditation



The Deutsche Akkreditierungsstelle GmbH attests that the testing laboratory

SGS INSTITUT FRESENIUS GmbH

at the locations

**Am Technologiepark 10, 45699 Herten
Rödingsmarkt 16, 20459 Hamburg**

is competent under the terms of DIN EN ISO/IEC 17025:2018 to carry out tests in the following fields:

Physical, physico-chemical and chemical analysis of water (groundwater, waste water, water from barrages and lakes and running waters, swimming pool and bathing pool water, leachate), sludge, sediments, waste, materials for recycling, soil and soil gas; Selected chemical analysis in accordance with the German Drinking Water Ordinance; Sampling of wastewater, raw and drinking water, water from barrages and lakes, aquifers, running waters, sludges, sediments, waste, solid recovered fuels and soil gas; Sampling for microbiological analysis of industrial water in accordance with Section 3 (8) 42nd BImSchV; Analysis of waste for deposition in accordance with the German Landfill Ordinance, Annex 4; Selected sampling and analysis of indoor and outdoor air; Specialist modules for water, soil, contaminated sites and waste


The accreditation certificate shall only apply in connection with the notice of accreditation of 01.04.2021 with the accreditation number D-PL-14115-02. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 60 pages.

Registration number of the certificate: **D-PL-14115-02-07**

Berlin,
24.09.2021

Dipl.-Ing. Andrea Valbuena
Head of Division

Translation issued:
22.02.2022


Head of Division

The certificate together with the annex reflects the status as indicated by the date of issue.

The current status of any given scope of accreditation can be found in the directory of accredited bodies maintained by Deutsche Akkreditierungsstelle GmbH at <https://www.dakks.de/en/accredited-bodies-search.html>.

This document is a translation. The definitive version is the original German accreditation certificate.

See notes overleaf.

Deutsche Akkreditierungsstelle GmbH

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Spittelmarkt 10
10117 Berlin

Standort Frankfurt am Main
Europa-Allee 52
60327 Frankfurt am Main

Standort Braunschweig
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The publication of extracts of the accreditation certificate is subject to the prior written approval by Deutsche Akkreditierungsstelle GmbH (DAkKS). Exempted is the unchanged form of separate disseminations of the cover sheet by the conformity assessment body mentioned overleaf.

No impression shall be made that the accreditation also extends to fields beyond the scope of accreditation attested by DAkKS.

The accreditation was granted pursuant to the Act on the Accreditation Body (AkkStelleG) and the Regulation (EC) No 765/2008 of the European Parliament and of the Council setting out the requirements for accreditation and market surveillance relating to the marketing of products. DAkKS is a signatory to the Multilateral Agreements for Mutual Recognition of the European co-operation for Accreditation (EA), International Accreditation Forum (IAF) and International Laboratory Accreditation Co-operation (ILAC). The signatories to these agreements recognise each other's accreditations.

The up-to-date state of membership can be retrieved from the following websites:

EA: www.european-accreditation.org

ILAC: www.ilac.org

IAF: www.iaf.nu