



TEST Reg.nr. 361

ALS Denmark A/S  
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**ANALYSERAPPORT**

COWI  
Parallelvej 2  
2800 Lyngby  
Att.: COWI

**Udskrevet:** 09-08-2023  
**Version:** 1  
**Modtaget:** 20-06-2023  
**Analyseperiode:** 20-06-2023 -  
09-08-2023  
**Ordrenr.:** 794297

**Sagsnavn:** A094372  
**Lokalitet:** Auktionsbassin, Skagen Havn  
**Udtaget:** 19-06-2023  
**Prøvetype:** Sediment  
**Prøvetager:** COWI/FSN/MEND  
**Kunde:** COWI, Parallelvej 2, 2800 Lyngby, Att. Sandra M. Bollwerk, PersonRef.  
smbk@cowi.com

Prøvenr.:	148031/23	148032/23	148033/23	148034/23	148035/23		
Prøve ID:	A1- 0-0.3 m	A2 - 1 m	B4 - 0-0.3 m	B5 - 1 m	C7 - 0-0.3 m		
Kommentar	*1	*1	*1	*1	*1		
Parameter						Enhed	Metode
Tørstofindhold	72.6	73.7	73.7	81.1	73.1	%	DS 204:1980
BOD5	# 610	540	800	400	1300	mg/kg TS	DS/R 254:1977
Glødetab af tørstof	0.91	2.0	1.3	0.85	1.4	% af TS	DS 204:1980
Glødetab af total prøve	0.66	1.5	0.95	0.69	1.0	%	DS 204:1980
Arsen, As	1.4	2.4	1.3	2.0	2.9	mg/kg TS	DS 259:2003+DS/EN 16170:2016
Bly, Pb	3.7	9.5	2.8	11	10	mg/kg TS	DS 259:2003+DS/EN 16170:2016
Cadmium, Cd	0.083	0.24	0.072	0.13	0.093	mg/kg TS	DS 259:2003+DS/EN 16170:2016
Chrom (total), Cr	2.2	3.6	2.2	2.5	3.6	mg/kg TS	DS 259:2003+DS/EN 16170:2016
Kobber, Cu	20	26	22	23	42	mg/kg TS	DS 259:2003+DS/EN 16170:2016
Kviksølv, Hg	0.016	0.098	0.013	0.057	0.086	mg/kg TS	DS 259:2003+DS/EN 16175- 1:2016
Nikkel, Ni	1.8	2.4	1.8	2.2	2.2	mg/kg TS	DS 259:2003+DS/EN 16170:2016
Zink, Zn	38	100	34	66	76	mg/kg TS	DS 259:2003+DS/EN 16170:2016
Total kvælstof, N	690	510	490	470	690	mg/kg TS	DS/EN 16168:2012
Total fosfor, P	180	280	210	600	430	mg/kg TS	DS 259:2003+DS/EN 16170:2016
<b>PAH'er, 16 EPA i sediment</b>						-	REFLAB 4:2008
Naphtalen	<10	10	20	<10	18	µg/kg TS	REFLAB 4:2008
Acenaphtylen	<10	38	20	47	18	µg/kg TS	REFLAB 4:2008
Acenaphten	<10	<10	<10	<10	<10	µg/kg TS	REFLAB 4:2008
Phenanthren	<10	41	22	38	18	µg/kg TS	REFLAB 4:2008
Anthracen	9.7	35	21	38	13	µg/kg TS	REFLAB 4:2008
Fluoren	<10	17	12	11	<10	µg/kg TS	REFLAB 4:2008
Fluoranthren	30	130	90	350	69	µg/kg TS	REFLAB 4:2008
Pyren	40	200	100	330	78	µg/kg TS	REFLAB 4:2008
Benzo(a)anthracen	13	49	35	110	29	µg/kg TS	REFLAB 4:2008
Chrysen	23	83	66	160	47	µg/kg TS	REFLAB 4:2008
Benzo(b+j)fluoranthren	26	120	70	180	57	µg/kg TS	REFLAB 4:2008
Benzo(k)fluoranthren	24	130	43	120	49	µg/kg TS	REFLAB 4:2008
Benz(a)pyren	32	120	62	190	54	µg/kg TS	REFLAB 4:2008
Indeno(1,2,3-cd)pyren	24	82	36	120	39	µg/kg TS	REFLAB 4:2008
Dibenzo(a,h)anthracen	<10	29	13	37	16	µg/kg TS	REFLAB 4:2008

side 1 af 3

Laboratoriet er akkrediteret af DANAK. Analyseresultaterne gælder kun for de(n) analyserede prøve(r).  
Analyserapporten må kun gengives i sin helhed, medmindre skriftlig godkendelse forligger plysninger om målesikkerhed  
findes på www.alsglobal.dk

Tegnforklaring, Resultat:  
i.p.: Ikke påvist, -: analysen er ikke udført  
# i rapporten betyder ikke akkrediteret



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## ANALYSERAPPORT

Prøvenr.:	148031/23	148032/23	148033/23	148034/23	148035/23		
<b>Prøve ID:</b>	A1- 0-0.3 m	A2 - 1 m	B4 - 0-0.3 m	B5 - 1 m	C7 - 0-0.3 m		
<b>Kommentar</b>	*1	*1	*1	*1	*1		
<b>Parameter</b>						<b>Enhed</b>	<b>Metode</b>
Benzo(ghi)perylen	27	94	40	140	45	µg/kg TS	REFLAB 4:2008
Sum af PAH'er 9 komp. Klapningsbek.	# 200	830	470	1500	390	µg/kg TS	REFLAB 4:2008
PAH, sum (EPA - 16 komp.)	# 250	1200	650	1900	550	µg/kg TS	REFLAB 4:2008
Kornstørrelsesfordeling	*2 se vedhæftede	se vedhæftede	se vedhæftede	se vedhæftede	se vedhæftede	-	ISO 11277:2020
Tørstofindhold	*4 84.3	83.9	77.1	84.4	80.6	%	DIN ISO 11465: 1996
<b>PAH'er i sediment, GBA lav DL</b>						-	
<b>PCB i sediment</b>						-	DIN ISO 10382: 2003-05
PCB congen 28	*4 <0.00010	0.00013	<0.00010	<0.00010	<0.00010	mg/kg TS	DIN ISO 10382: 2003-05
PCB congen 52	*4 <0.00010	0.00055	0.00013	0.00031	0.00028	mg/kg TS	DIN ISO 10382: 2003-05
PCB congen 101	*4 0.00047	0.0019	0.00082	0.0013	0.0014	mg/kg TS	DIN ISO 10382: 2003-05
PCB congen 118	*4 0.00025	0.0011	0.00042	0.00072	0.00072	mg/kg TS	DIN ISO 10382: 2003-05
PCB congen 138	*4 0.00058	0.0016	0.0010	0.0011	0.0012	mg/kg TS	DIN ISO 10382: 2003-05
PCB congen 153	*4 0.00058	0.0018	0.0012	0.0015	0.0016	mg/kg TS	DIN ISO 10382: 2003-05
PCB congen 180	*4 0.00039	0.00072	0.00089	0.00058	0.00070	mg/kg TS	DIN ISO 10382: 2003-05
PCB, sum af 7 congener	*4 0.00227	0.00780	0.00446	0.00551	0.00590	mg/kg TS	DIN ISO 10382: 2003-05
<b>Organotinforbindinger, TBT</b>						-	SS-EN ISO 23161:2018
Tributyltin, TBT-Sn	*3 17.11	178.86	20.06	46.66	51.57	µg Sn/kg TS	SS-EN ISO 23161:2018 + beregning
Tributyltin-cation (TBT)	*3 41.8	437	49.0	114	126	µg/kg TS	SS-EN ISO 23161:2018
<b>Prøvenr.:</b>	148036/23						
<b>Prøve ID:</b>	C8 - 1 m						
<b>Kommentar</b>	*1						
<b>Parameter</b>						<b>Enhed</b>	<b>Metode</b>
Tørstofindhold	80.4					%	DS 204:1980
BOD5	# 660					mg/kg TS	DS/R 254:1977
Glødetab af tørstof	1.0					% af TS	DS 204:1980
Glødetab af total prøve	0.85					%	DS 204:1980
Arsen, As	3.4					mg/kg TS	DS 259:2003+DS/EN 16170:2016
Bly, Pb	6.3					mg/kg TS	DS 259:2003+DS/EN 16170:2016
Cadmium, Cd	0.095					mg/kg TS	DS 259:2003+DS/EN 16170:2016
Chrom (total), Cr	2.4					mg/kg TS	DS 259:2003+DS/EN 16170:2016
Kobber, Cu	28					mg/kg TS	DS 259:2003+DS/EN 16170:2016
Kviksølv, Hg	0.052					mg/kg TS	DS 259:2003+DS/EN 16175-1:2016
Nikkel, Ni	1.8					mg/kg TS	DS 259:2003+DS/EN 16170:2016
Zink, Zn	110					mg/kg TS	DS 259:2003+DS/EN 16170:2016
Total kvælstof, N	840					mg/kg TS	DS/EN 16168:2012
Total phosphor, P	750					mg/kg TS	DS 259:2003+DS/EN 16170:2016
<b>PAH'er, 16 EPA i sediment</b>						-	REFLAB 4:2008
Naphtalen	12					µg/kg TS	REFLAB 4:2008
Acenaphtylen	48					µg/kg TS	REFLAB 4:2008
Acenaphten	<10					µg/kg TS	REFLAB 4:2008
Phenanthren	30					µg/kg TS	REFLAB 4:2008

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Laboratoriet er akkrediteret af DANAK. Analyseresultaterne gælder kun for de(n) analyserede prøve(r). Analyserapporten må kun gengives i sin helhed, medmindre skriftlig godkendelse forligger plysninger om målesikkerhed findes på [www.alsglobal.dk](http://www.alsglobal.dk)

Tegnforklaring, Resultat:  
i.p.: Ikke påvist, -: analysen er ikke udført  
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## ANALYSERAPPORT

<b>Prøvenr.:</b>	148036/23		
<b>Prøve ID:</b>	C8 - 1 m		
<b>Kommentar</b>	*1		
<b>Parameter</b>		<b>Enhed</b>	<b>Metode</b>
Anthracen	28	µg/kg TS	REFLAB 4:2008
Fluoren	14	µg/kg TS	REFLAB 4:2008
Fluoranthen	230	µg/kg TS	REFLAB 4:2008
Pyren	470	µg/kg TS	REFLAB 4:2008
Benzo(a)anthracen	150	µg/kg TS	REFLAB 4:2008
Chrysen	150	µg/kg TS	REFLAB 4:2008
Benzo(b+j)fluoranthen	140	µg/kg TS	REFLAB 4:2008
Benzo(k)fluoranthen	120	µg/kg TS	REFLAB 4:2008
Benzo(a)pyren	170	µg/kg TS	REFLAB 4:2008
Indeno(1,2,3-cd)pyren	88	µg/kg TS	REFLAB 4:2008
Dibenzo(a,h)anthracen	33	µg/kg TS	REFLAB 4:2008
Benzo(ghi)perylene	110	µg/kg TS	REFLAB 4:2008
Sum af PAH'er 9 komp. Kløpningsbek.	# 1400	µg/kg TS	REFLAB 4:2008
PAH, sum (EPA - 16 komp.)	# 1800	µg/kg TS	REFLAB 4:2008
Kornstørrelsesfordeling	*2 se vedhæftede	-	ISO 11277:2020
Tørstofindhold	*4 81.5	%	DIN ISO 11465: 1996
<b>PAH'er i sediment, GBA lav DL</b>		-	
<b>PCB i sediment</b>		-	DIN ISO 10382: 2003-05
PCB congen 28	*4 0.00012	mg/kg TS	DIN ISO 10382: 2003-05
PCB congen 52	*4 0.00055	mg/kg TS	DIN ISO 10382: 2003-05
PCB congen 101	*4 0.0024	mg/kg TS	DIN ISO 10382: 2003-05
PCB congen 118	*4 0.0015	mg/kg TS	DIN ISO 10382: 2003-05
PCB congen 138	*4 0.0013	mg/kg TS	DIN ISO 10382: 2003-05
PCB congen 153	*4 0.0037	mg/kg TS	DIN ISO 10382: 2003-05
PCB congen 180	*4 0.00093	mg/kg TS	DIN ISO 10382: 2003-05
PCB, sum af 7 congener	*4 0.0105	mg/kg TS	DIN ISO 10382: 2003-05
<b>Organotinforbindelser, TBT</b>		-	SS-EN ISO 23161:2018
Tributyltin, TBT-Sn	*3 82.27	µg Sn/kg TS	SS-EN ISO 23161:2018 + beregning
Tributyltin-cation (TBT)	*3 201	µg/kg TS	SS-EN ISO 23161:2018

### Kommentar

- \*1 Ingen kommentar
- \*2 Underleverandør: ALS Czech Republic s.r.o, CAI L1163
- \*3 Underleverandør: ALS Scandinavia AB, SWEDAC 2030
- \*4 Underleverandør: GBA Gesellschaft für Bioanalytik mbH, DAkKS D-PL-14170-01-00

Sofie Askjær Hass



**Attachment no. 1 to the certificate of analysis for work order PR2370542**

Method: S-GRAINSIZ

Issue Date: 12.07.2023

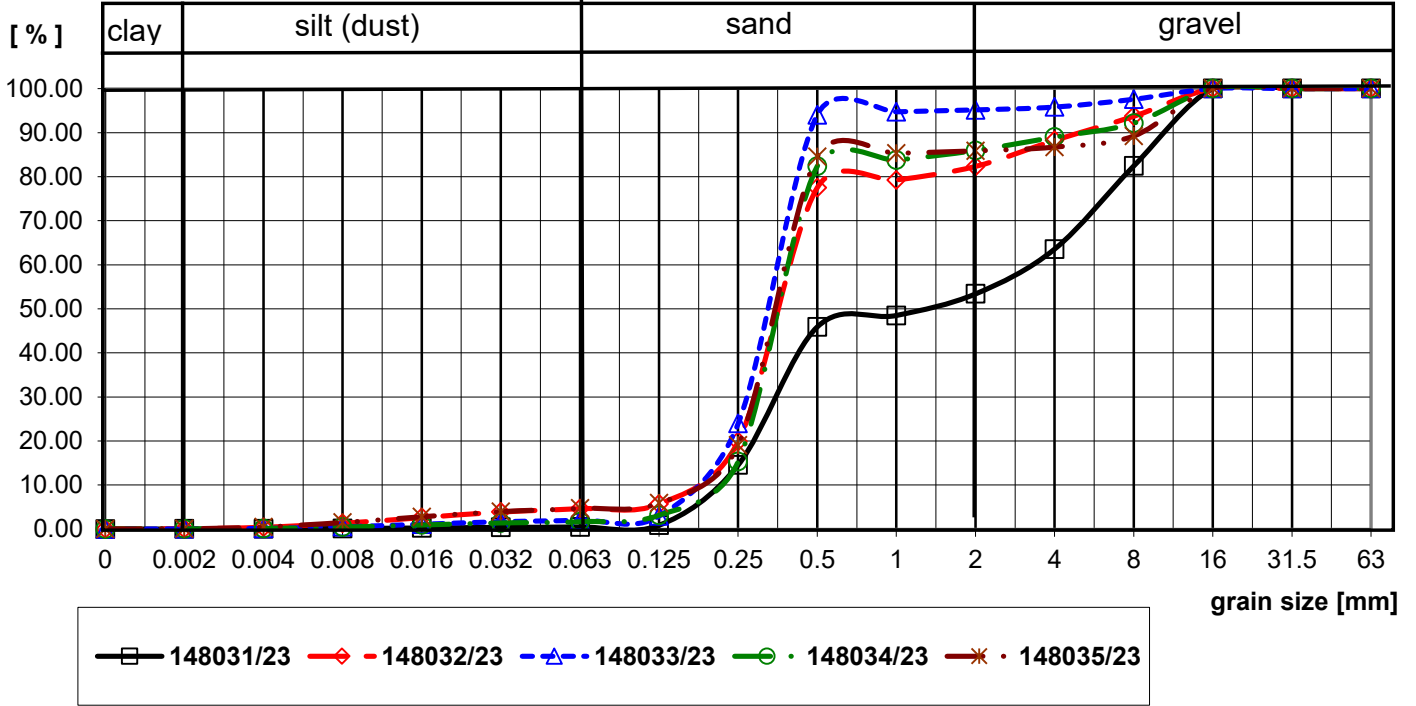
Sample label:	148031/23	148032/23	148033/23	148034/23	148035/23
Lab. ID:	001	002	003	004	005
Total weight of sample: [g]	61.54	97.34	57.70	64.28	71.93
q < 0.002 mm [%]	0.00	0.05	0.02	0.01	0.05
q 0.002-0.004 mm [%]	0.03	0.35	0.12	0.11	0.41
q 0.004-0.008 mm [%]	0.08	0.89	0.36	0.31	1.01
q 0.008-0.016 mm [%]	0.13	1.29	0.59	0.48	1.32
q 0.016-0.032 mm [%]	0.13	1.26	0.57	0.47	1.18
q 0.032-0.063 mm [%]	0.10	0.78	0.36	0.27	0.72
q < 0.063 mm [%]	0.47	4.63	2.02	1.66	4.68
q 0.063-0.125 mm [%]	0.37	1.05	0.91	1.48	1.19
q 0.125-0.250 mm [%]	13.68	14.18	21.01	12.17	13.17
q 0.250-0.500 mm [%]	31.36	57.63	70.12	67.07	65.52
q 0.500-1.000 mm [%]	2.60	1.75	0.68	1.40	0.75
q 1.000-2.000 mm [%]	4.89	3.08	0.43	2.18	0.56
q 2.000-4.000 mm [%]	10.17	5.91	0.64	3.03	0.86
q 4.000-8.000 mm [%]	18.87	5.48	1.77	3.16	2.50
q 8.000-16.000 mm [%]	17.58	6.29	2.43	7.86	10.77
q 16.00-31.50 mm [%]	0.00	0.00	0.00	0.00	0.00
q 31.50-63.00 mm [%]	0.00	0.00	0.00	0.00	0.00
q > 63.00 mm [%]	0.00	0.00	0.00	0.00	0.00
Q < 0,002 mm [%]	0.00	0.05	0.02	0.01	0.05
Q < 0.004 mm [%]	0.03	0.40	0.14	0.13	0.46
Q < 0.008 mm [%]	0.11	1.30	0.50	0.43	1.47
Q < 0.016 mm [%]	0.24	2.59	1.09	0.92	2.78
Q < 0.032 mm [%]	0.37	3.86	1.66	1.39	3.96
Q < 0.063 mm [%]	0.47	4.63	2.02	1.66	4.68
Q < 0.125 mm [%]	0.84	5.68	2.93	3.14	5.87
Q < 0.250 mm [%]	14.53	19.87	23.94	15.31	19.04
Q < 0.500 mm [%]	45.89	77.50	94.06	82.37	84.56
Q < 1.000 mm [%]	48.49	79.25	94.73	83.77	85.31
Q < 2.000 mm [%]	53.38	82.33	95.17	85.95	85.86
Q < 4.000 mm [%]	63.55	88.24	95.81	88.99	86.72
Q < 8.000 mm [%]	82.42	93.71	97.57	92.14	89.23
Q < 16.00 mm [%]	100.00	100.00	100.00	100.00	100.00
Q < 31.50 mm [%]	100.00	100.00	100.00	100.00	100.00
Q < 63.000 mm [%]	100.00	100.00	100.00	100.00	100.00

q -fraction percentage part, Q - fraction cumulative part.

**Test method specification:** CZ\_SOP\_D06\_07\_120 (CSN EN ISO 17892-4; CSN EN 933-1; CSN EN 933-2; BS ISO 11277; pokyn TOM 23/1) Determination of graininess by the combined method of the suspension density, sieve analyses and calculation of permeability from measured values according to USBSC; CZ\_SOP\_D06\_07\_123 (ISO 13320) Determination of particle size and distribution using laser diffraction



Attachment no. 1 to the certificate of analysis for work order PR2370542



The end of result part of the attachment the certificate of analysis



**Attachment no. 2 to the certificate of analysis for work order PR2370542**

**Method: S-GRAINSIZ**

**Issue Date: 12.07.2023**

<b>Sample label:</b>				<b>148036/23</b>
<b>Lab. ID:</b>				006
<b>Total weight of sample:</b>			[g]	63.43
<b>q</b>	<b>&lt; 0.002</b>	mm	[%]	0.06
<b>q</b>	<b>0.002-0.004</b>	mm	[%]	0.41
<b>q</b>	<b>0.004-0.008</b>	mm	[%]	1.04
<b>q</b>	<b>0.008-0.016</b>	mm	[%]	1.41
<b>q</b>	<b>0.016-0.032</b>	mm	[%]	1.26
<b>q</b>	<b>0.032-0.063</b>	mm	[%]	0.72
<b>q</b>	<b>&lt; 0.063</b>	mm	[%]	4.89
<b>q</b>	<b>0.063-0.125</b>	mm	[%]	1.27
<b>q</b>	<b>0.125-0.250</b>	mm	[%]	12.91
<b>q</b>	<b>0.250-0.500</b>	mm	[%]	76.74
<b>q</b>	<b>0.500-1.000</b>	mm	[%]	0.95
<b>q</b>	<b>1.000-2.000</b>	mm	[%]	1.20
<b>q</b>	<b>2.000-4.000</b>	mm	[%]	1.04
<b>q</b>	<b>4.000-8.000</b>	mm	[%]	1.01
<b>q</b>	<b>8.000-16.000</b>	mm	[%]	0.00
<b>q</b>	<b>16.00-31.50</b>	mm	[%]	0.00
<b>q</b>	<b>31.50-63.00</b>	mm	[%]	0.00
<b>q</b>	<b>&gt; 63.00</b>	mm	[%]	0.00
<b>Q</b>	<b>&lt; 0,002</b>	mm	[%]	0.06
<b>Q</b>	<b>&lt; 0.004</b>	mm	[%]	0.47
<b>Q</b>	<b>&lt; 0.008</b>	mm	[%]	1.51
<b>Q</b>	<b>&lt; 0.016</b>	mm	[%]	2.91
<b>Q</b>	<b>&lt; 0.032</b>	mm	[%]	4.17
<b>Q</b>	<b>&lt; 0.063</b>	mm	[%]	4.89
<b>Q</b>	<b>&lt; 0.125</b>	mm	[%]	6.16
<b>Q</b>	<b>&lt; 0.250</b>	mm	[%]	19.07
<b>Q</b>	<b>&lt; 0.500</b>	mm	[%]	95.81
<b>Q</b>	<b>&lt; 1.000</b>	mm	[%]	96.75
<b>Q</b>	<b>&lt; 2.000</b>	mm	[%]	97.95
<b>Q</b>	<b>&lt; 4.000</b>	mm	[%]	98.99
<b>Q</b>	<b>&lt; 8.000</b>	mm	[%]	100.00
<b>Q</b>	<b>&lt; 16.00</b>	mm	[%]	100.00
<b>Q</b>	<b>&lt; 31.50</b>	mm	[%]	100.00
<b>Q</b>	<b>&lt; 63.000</b>	mm	[%]	100.00

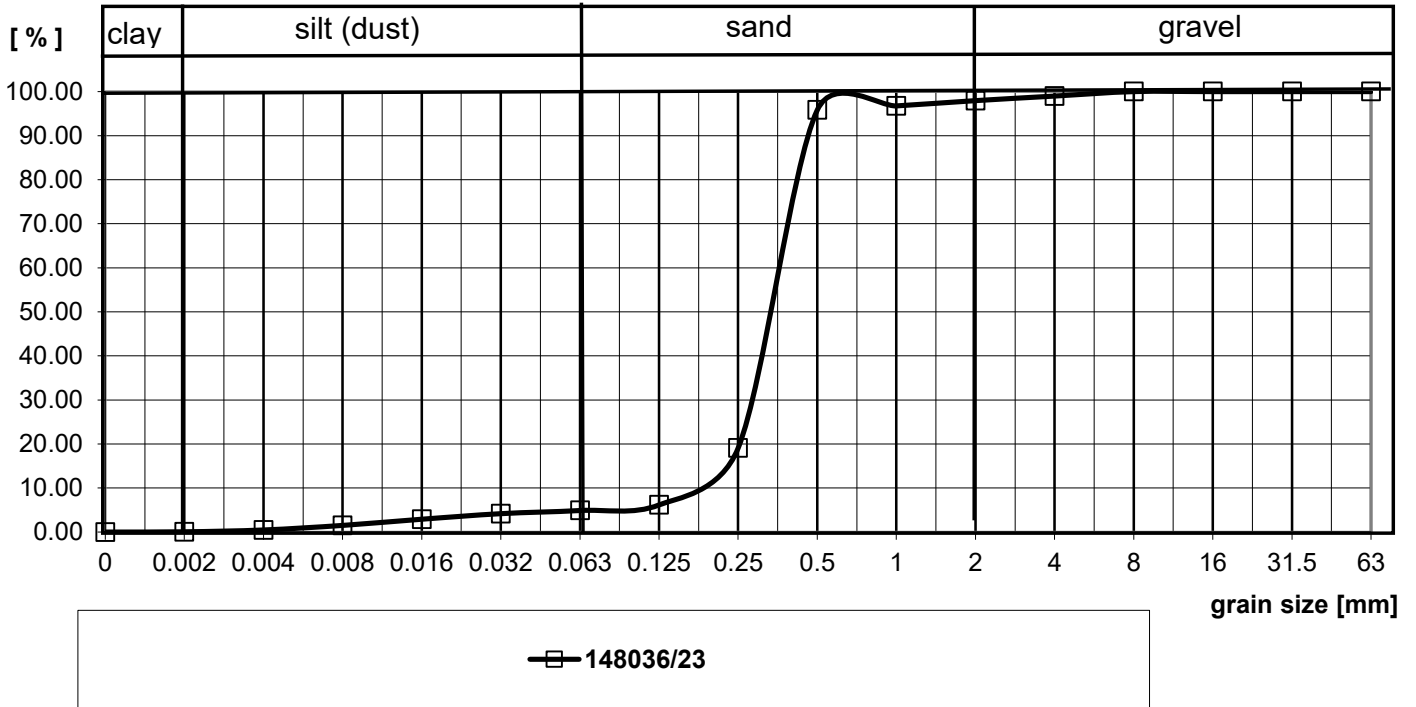
**q** -fraction percentage part, **Q** - fraction cumulative part.

**Test method specification:** CZ\_SOP\_D06\_07\_120 (CSN EN ISO 17892-4; CSN EN 933-1; CSN EN 933-2; BS ISO 11277; pokyn TOM 23/1) Determination of graininess by the combined method of the suspension density, sieve analyses and calculation of permeability from measured values according to USBSC; CZ\_SOP\_D06\_07\_123 (ISO 13320) Determination of particle size and distribution using laser diffraction



**Attachment no. 2 to the certificate of analysis for work order PR2370542**

148036/23



**The end of result part of the attachment the certificate of analysis**