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A microdrill assessment of the 4 posts of the well head at

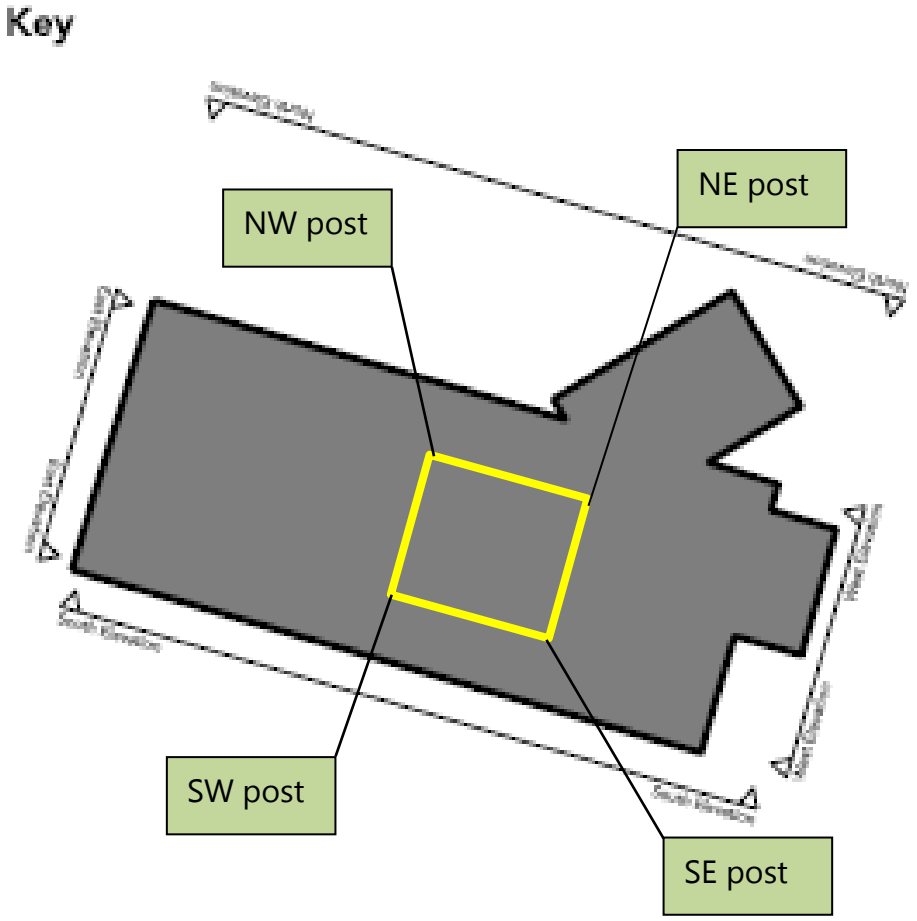
MURGATYOYD'S BRINE PUMP.

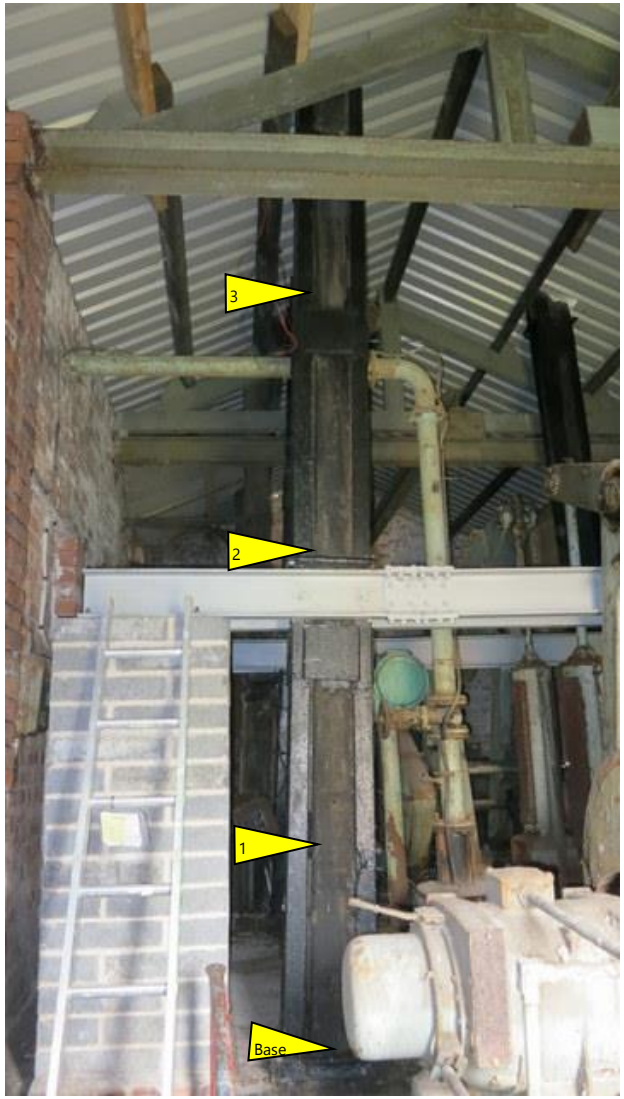
INTRODUCTION

Following instructions from Steve Eccleshare of Bullen Conservation Ltd, I visited the above building on 15.02.17. The object of the survey is to determine extent of decay in the 4 posts of the Well Head, referred to as shown opposite.

Each post was assessed at 7 (safely accessible) points. If the extent of decay was not obvious, a microdrill was used to assess extent of decay. The 7 points are shown in the 2 photos of the NW post below – but were the same for all posts.

The results are tabulated below. Where used, the micro drill graphs (MDs) are referenced in the observation and appended to the end of the report, together with a short note on how to interpret them.




3
2
1
Base


6
5
4

	NW Post	NE Post	SE Post	SW Post
Position 6	MD10 - Sound	MD14 - sound	MD16 - Sound	MD11 – Loss of central section
5	MD9 – Loss of section 40-100mm.	MD13 – Loss of central section	MD15 - Sound	Clearly decayed
4	MD8 - Sound	MD12 - Sound	Clearly decayed	Clearly decayed
3	MD4 – Decayed	MD6 - Sound	Clearly decayed	Clearly decayed
2	MD3 - Sound	MD5 - Sound	Clearly decayed	Clearly decayed
1	MD2 - Sound	Clearly decayed	Clearly decayed	Clearly decayed
Base	MD1 - Sound	Clearly decayed	MD7 - Sound	Clearly decayed

DISCUSSION

Where the term 'clearly decayed' has been used, a screwdriver could be pressed easily into the timber. The photo opposite shows position 4 on the SE post – note the screwdriver.

The timbers were wet within the confines of the steel angle brackets. In places in water ran out of the timbers when probed in positions 1 – 3.

Tim Floyd – February 2017

MICRDRILL

The micro drill drills a 2mm diameter needle into the timber, measuring both the torque generated by the drill motor to turn the drill bit – known as 'drill' (dark green shaded curve on the graph) and-more importantly- the resistance being experienced by the motor responsible for sliding the whole mechanism forward at a pre-set rate – known as 'feed' (light green shaded curve).

The torque generated in the drill and the resistance experienced by the feed mechanism are generally correlative. However wet timber - or the existence of other materials such as resin which may have been used in past repair - can affect the drill to a greater or lesser extent than the feed.

Peaks in the graphs represent torque/resistance being experienced by the drill/feed. The Y axis is magnitude of resistance/torque, with 100(%) representing that value where the motor can no longer move the feed mechanism at its pre-set feed speed (which would require a reduction in the feed speed).

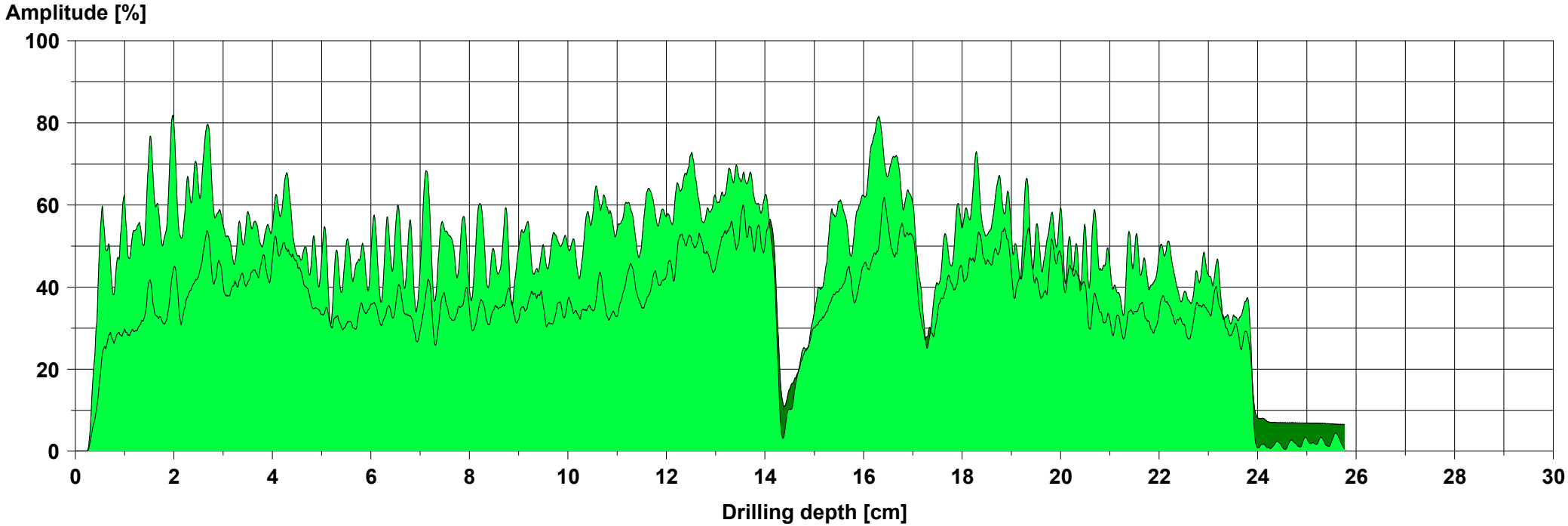
The machine has 5 pre set feed speeds that can be used – dependent on the nature of the timber. For example, dense medieval oak generally requires a low feed speed of 25 - 100cm/min, softwood requires 100 – 150cm/min. The faster feed speeds of 175 and 250cm/min are more applicable to living trees (another application for this equipment). Adhering to these criteria means that any reading over around 30% amplitude (on the Y-axis) represents dense and sound timber – especially when lower feed speeds are used.

Information regarding the individual drilling points is presented on the graphs which are included at the end of the report – either as comments (bottom right) or in the status panel (top left) which shows details such as feed speed and orientation of the drill – shown as 'Tilt' and measured in degrees from horizontal.

Close centred peaks and troughs in the graph represent the early wood late wood boundaries (growth rings) – with early rapid spring growth resulting in softer material, producing a trough, and the later summer growth being slower, producing a narrower and denser growth phase marked by a peak in the graph.

Measuring / object data

Measurement no.	: 1	**Needle speed**	: 2500 r/min	**Diameter**	:
ID number	: MURG	**Needle state**	: ---	**Level**	:
Drilling depth	: 25,76 cm	**Tilt**	: -3°	**Direction**	:
Date	: 15.02.2017	**Offset**	: 102/278	**Species**	:
Time	: 12:10:59	**Avg. curve**	: off	**Location**	:
Feed speed	: 100 cm/min			**Name**	:



Assessment

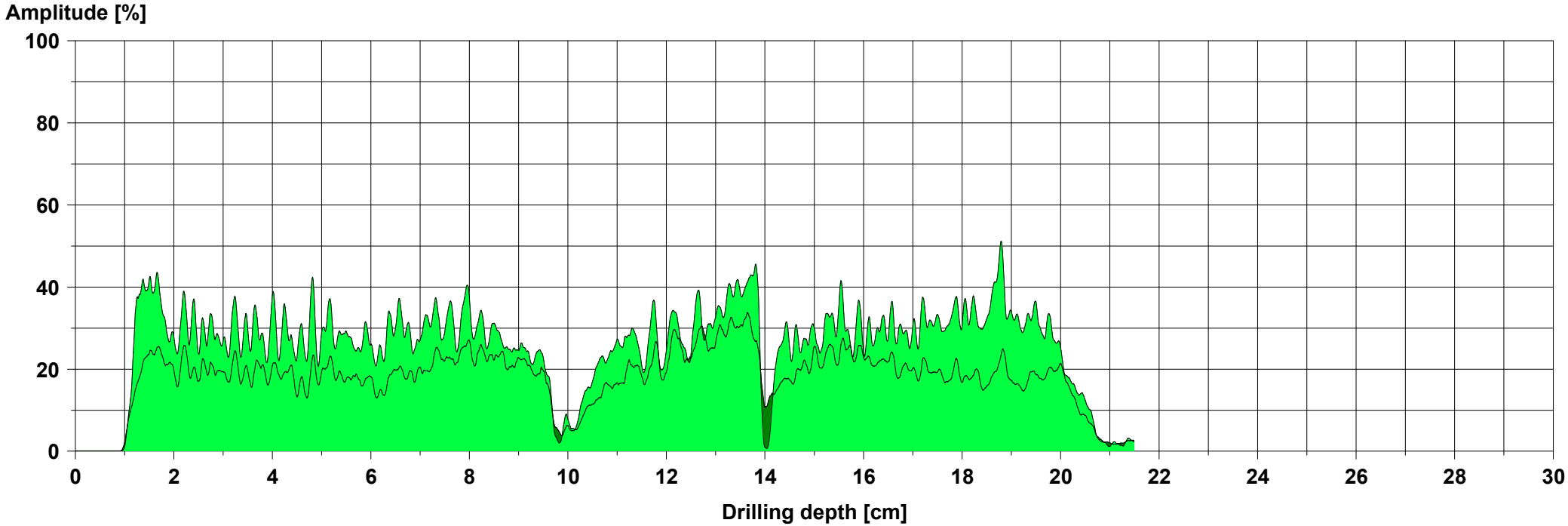
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :

Comment

NW BASE

Measuring / object data

Measurement no.	: 2	**Needle speed**	: 2500 r/min	**Diameter**	:
ID number	: MURG	**Needle state**	: ---	**Level**	:
Drilling depth	: 21,49 cm	**Tilt**	: -5°	**Direction**	:
Date	: 15.02.2017	**Offset**	: 88/263	**Species**	:
Time	: 12:11:55	**Avg. curve**	: off	**Location**	:
Feed speed	: 50 cm/min			**Name**	:



Assessment

☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
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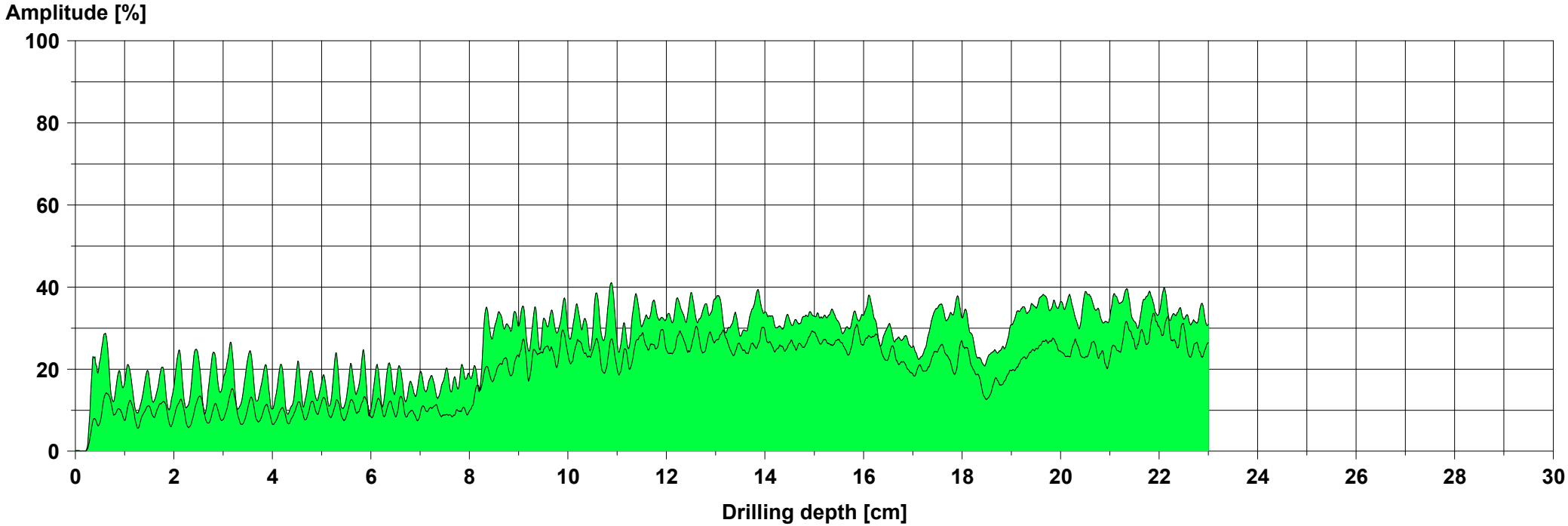
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :

Comment

NW +1

Measuring / object data

Measurement no.	: 3	**Needle speed**	: 2500 r/min	**Diameter**	:
ID number	: MURG	**Needle state**	: ---	**Level**	:
Drilling depth	: 23,00 cm	**Tilt**	: -2°	**Direction**	:
Date	: 15.02.2017	**Offset**	: 86/260	**Species**	:
Time	: 12:14:09	**Avg. curve**	: off	**Location**	:
Feed speed	: 50 cm/min			**Name**	:



Assessment

☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
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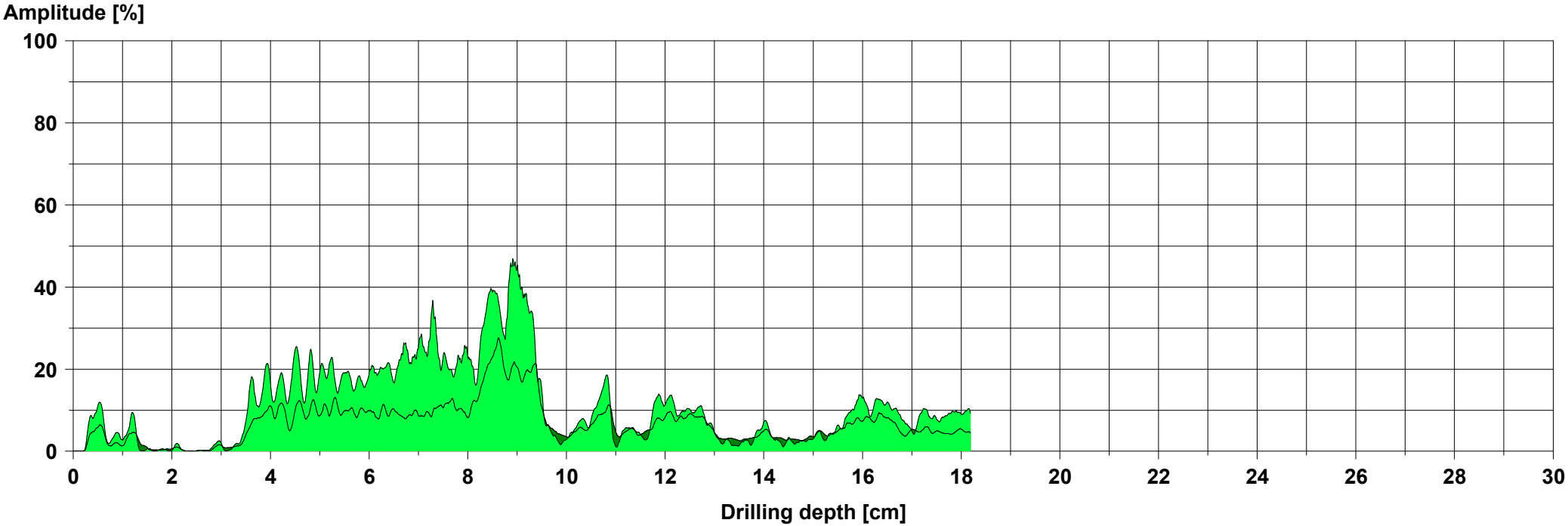
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :

Comment

NW +2

Measuring / object data

Measurement no.	: 4	**Needle speed**	: 2500 r/min	**Diameter**	:
ID number	: MURG	**Needle state**	: ---	**Level**	:
Drilling depth	: 18,19 cm	**Tilt**	: 0°	**Direction**	:
Date	: 15.02.2017	**Offset**	: 93/256	**Species**	:
Time	: 12:15:15	**Avg. curve**	: off	**Location**	:
Feed speed	: 50 cm/min			**Name**	:



Assessment

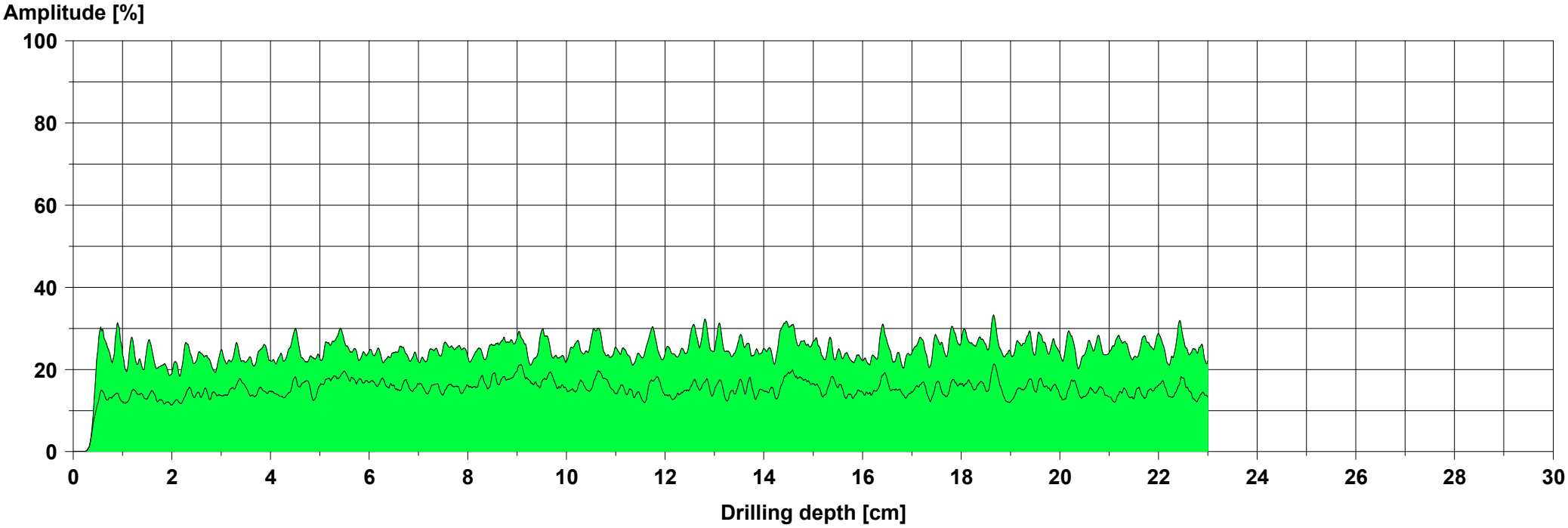
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :

Comment

NW +3

Measuring / object data

Measurement no.	: 5	**Needle speed**	: 2500 r/min	**Diameter**	:
ID number	: MURG	**Needle state**	: ---	**Level**	:
Drilling depth	: 23,00 cm	**Tilt**	: -3°	**Direction**	:
Date	: 15.02.2017	**Offset**	: 88/258	**Species**	:
Time	: 12:22:54	**Avg. curve**	: off	**Location**	:
Feed speed	: 50 cm/min			**Name**	:



Assessment

☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
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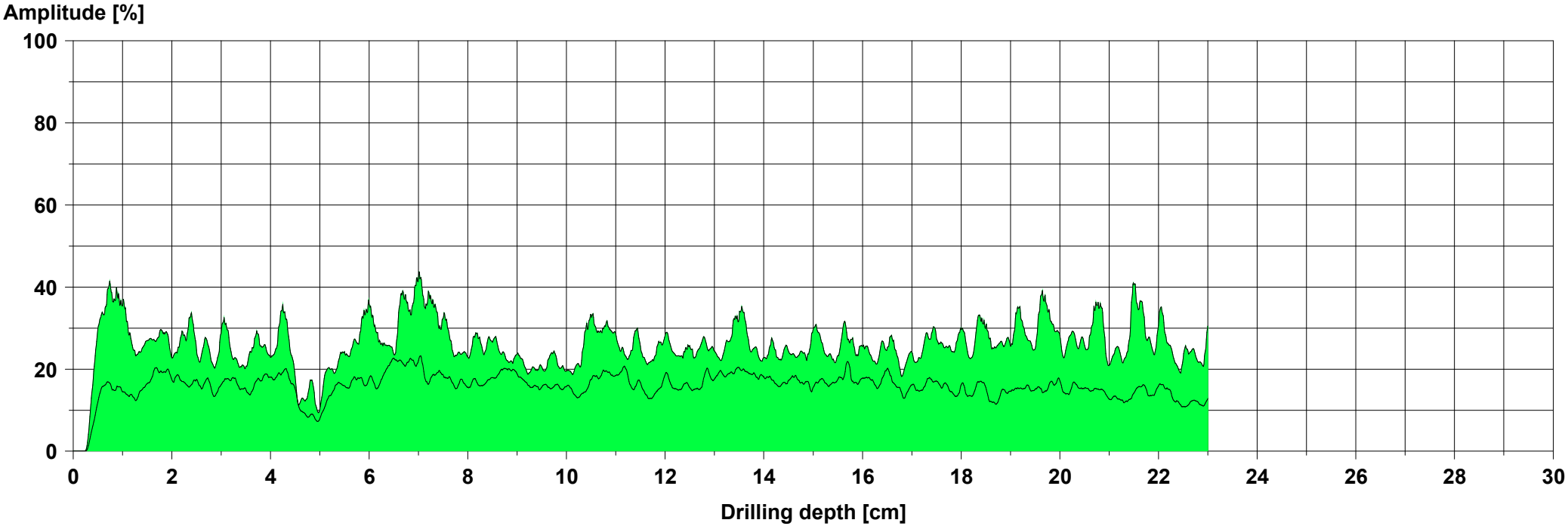
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :

Comment

NE +2

Measuring / object data

Measurement no.	: 6	**Needle speed**	: 2500 r/min	**Diameter**	:
ID number	: MURG	**Needle state**	: ---	**Level**	:
Drilling depth	: 23,00 cm	**Tilt**	: 0°	**Direction**	:
Date	: 15.02.2017	**Offset**	: 95/255	**Species**	:
Time	: 12:24:05	**Avg. curve**	: off	**Location**	:
Feed speed	: 50 cm/min			**Name**	:



Assessment

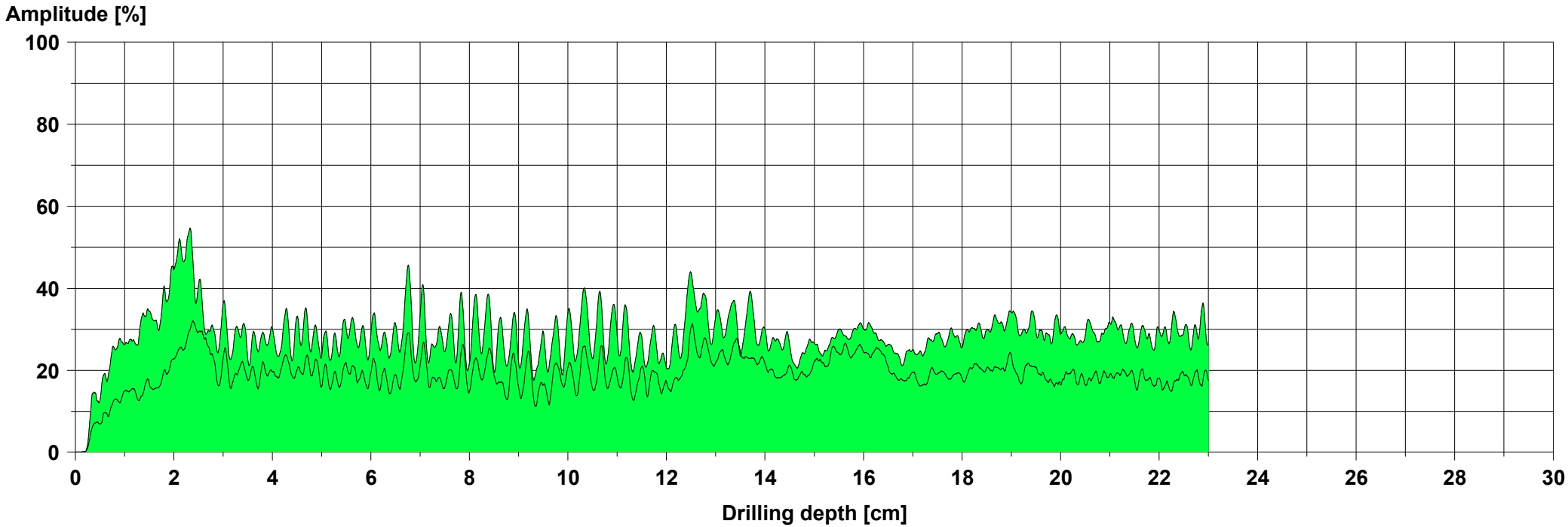
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :

Comment

NE +3

Measuring / object data

Measurement no.	: 7	**Needle speed**	: 2500 r/min	**Diameter**	:
ID number	: MURG	**Needle state**	: ---	**Level**	:
Drilling depth	: 23,00 cm	**Tilt**	: -8°	**Direction**	:
Date	: 15.02.2017	**Offset**	: 88/258	**Species**	:
Time	: 12:27:58	**Avg. curve**	: off	**Location**	:
Feed speed	: 50 cm/min			**Name**	:



Assessment

☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
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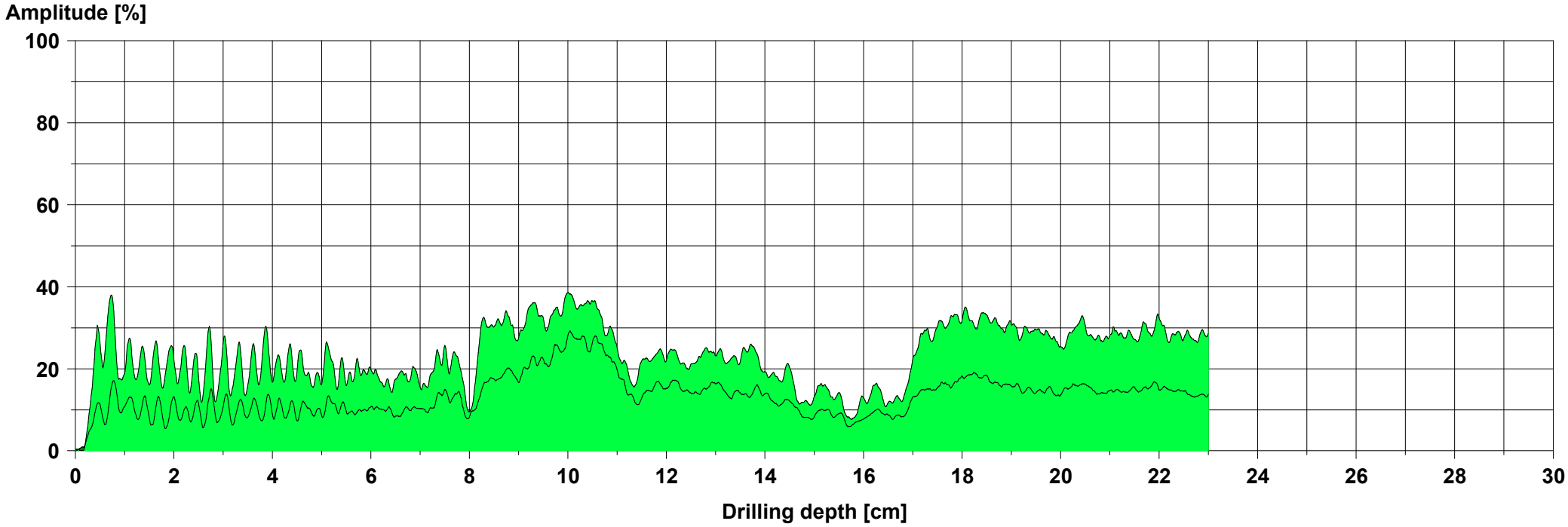
☐	**From**	0,0 cm	**to**	0,0 cm :

Comment

SE Base

Measuring / object data

Measurement no.	: 8	**Needle speed**	: 2500 r/min	**Diameter**	:
ID number	: MURG	**Needle state**	: ---	**Level**	:
Drilling depth	: 23,00 cm	**Tilt**	: 0°	**Direction**	:
Date	: 15.02.2017	**Offset**	: 91/276	**Species**	:
Time	: 12:51:26	**Avg. curve**	: off	**Location**	:
Feed speed	: 50 cm/min			**Name**	:



Assessment

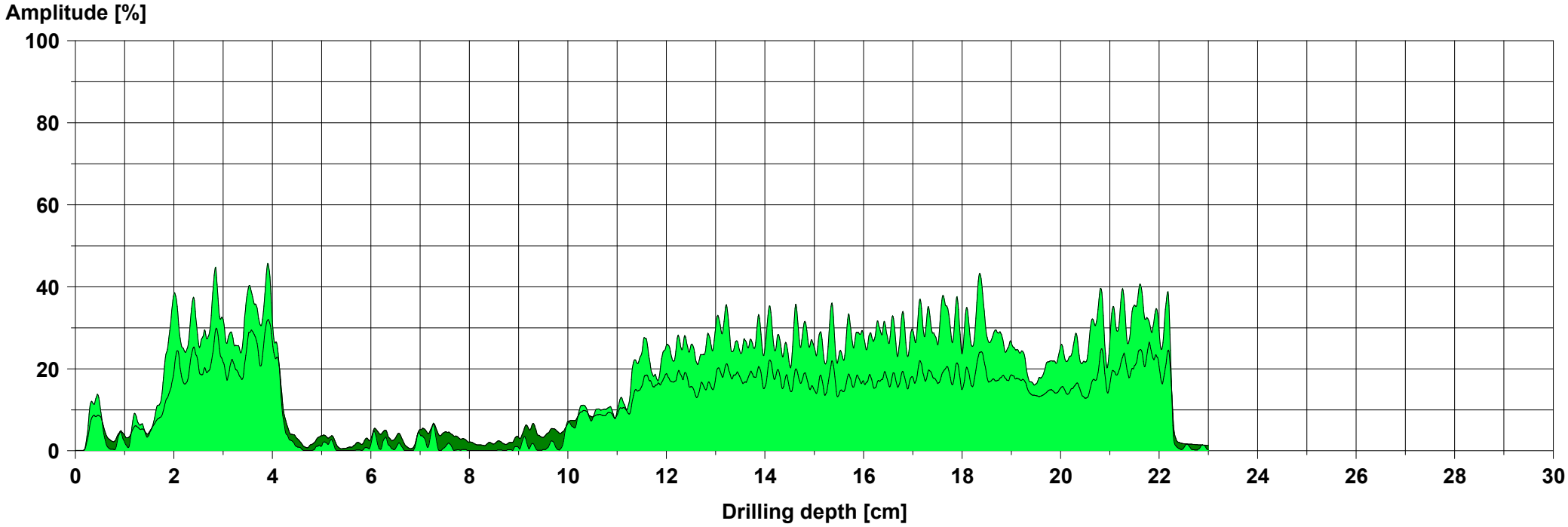
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :

Comment

NW 4

Measuring / object data

Measurement no.	: 9	**Needle speed**	: 2500 r/min	**Diameter**	:
ID number	: MURG	**Needle state**	: ---	**Level**	:
Drilling depth	: 23,00 cm	**Tilt**	: -1°	**Direction**	:
Date	: 15.02.2017	**Offset**	: 95/260	**Species**	:
Time	: 12:52:33	**Avg. curve**	: off	**Location**	:
Feed speed	: 50 cm/min			**Name**	:



Assessment

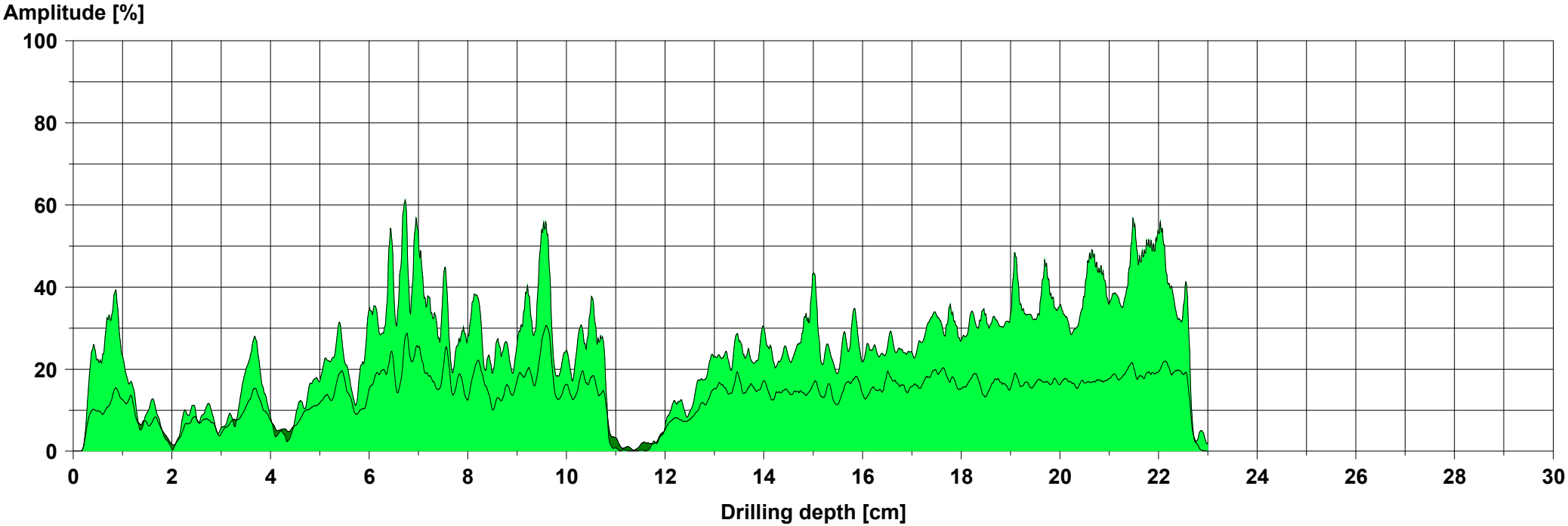
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :

Comment

NW 5

Measuring / object data

Measurement no.	: 10	**Needle speed**	: 2500 r/min	**Diameter**	:
ID number	: MURG	**Needle state**	: ---	**Level**	:
Drilling depth	: 23,00 cm	**Tilt**	: +2°	**Direction**	:
Date	: 15.02.2017	**Offset**	: 97/257	**Species**	:
Time	: 12:54:01	**Avg. curve**	: off	**Location**	:
Feed speed	: 50 cm/min			**Name**	:



Assessment

☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
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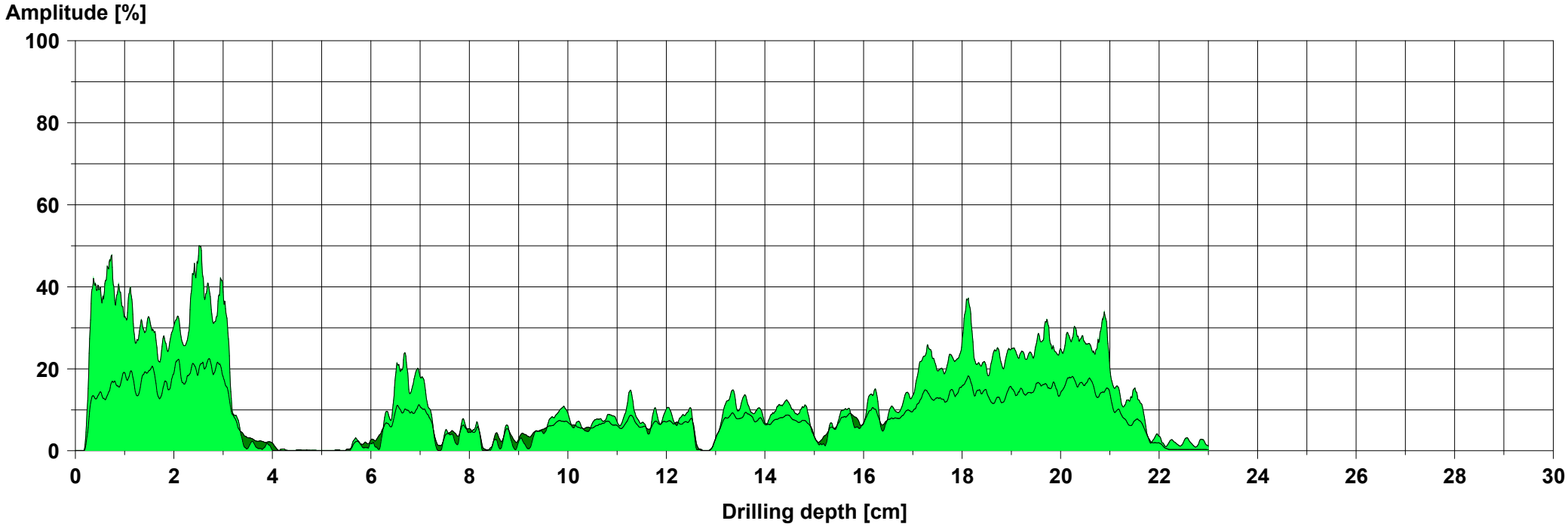
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :

Comment

NW 6

Measuring / object data

Measurement no.	: 11	**Needle speed**	: 2500 r/min	**Diameter**	:
ID number	: MURG	**Needle state**	: ---	**Level**	:
Drilling depth	: 23,00 cm	**Tilt**	: 0°	**Direction**	:
Date	: 15.02.2017	**Offset**	: 97/255	**Species**	:
Time	: 12:55:52	**Avg. curve**	: off	**Location**	:
Feed speed	: 50 cm/min			**Name**	:



Assessment

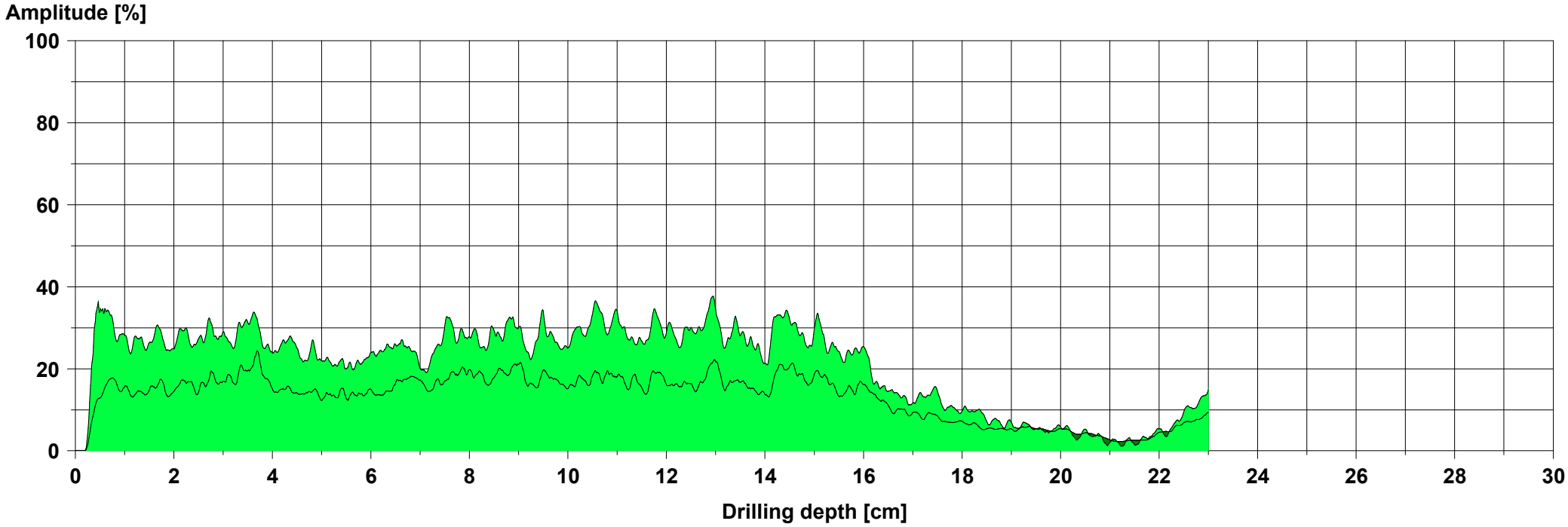
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :

Comment

SW6

Measuring / object data

Measurement no.	: 12	**Needle speed**	: 2500 r/min	**Diameter**	:
ID number	: MURG	**Needle state**	: ---	**Level**	:
Drilling depth	: 23,00 cm	**Tilt**	: +9°	**Direction**	:
Date	: 15.02.2017	**Offset**	: 92/253	**Species**	:
Time	: 12:59:00	**Avg. curve**	: off	**Location**	:
Feed speed	: 50 cm/min			**Name**	:



Assessment

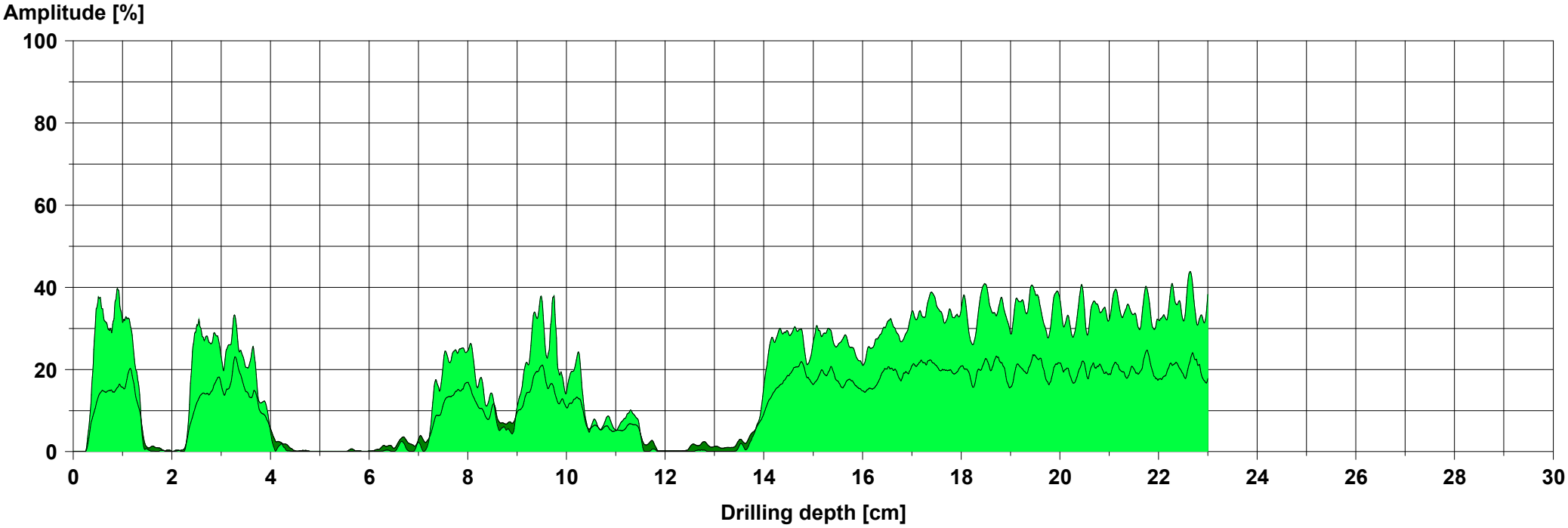
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :

Comment

NE 4

Measuring / object data

Measurement no.	: 13	**Needle speed**	: 2500 r/min	**Diameter**	:
ID number	: MURG	**Needle state**	: ---	**Level**	:
Drilling depth	: 23,00 cm	**Tilt**	: -8°	**Direction**	:
Date	: 15.02.2017	**Offset**	: 93/252	**Species**	:
Time	: 13:01:30	**Avg. curve**	: off	**Location**	:
Feed speed	: 50 cm/min			**Name**	:



Assessment

☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
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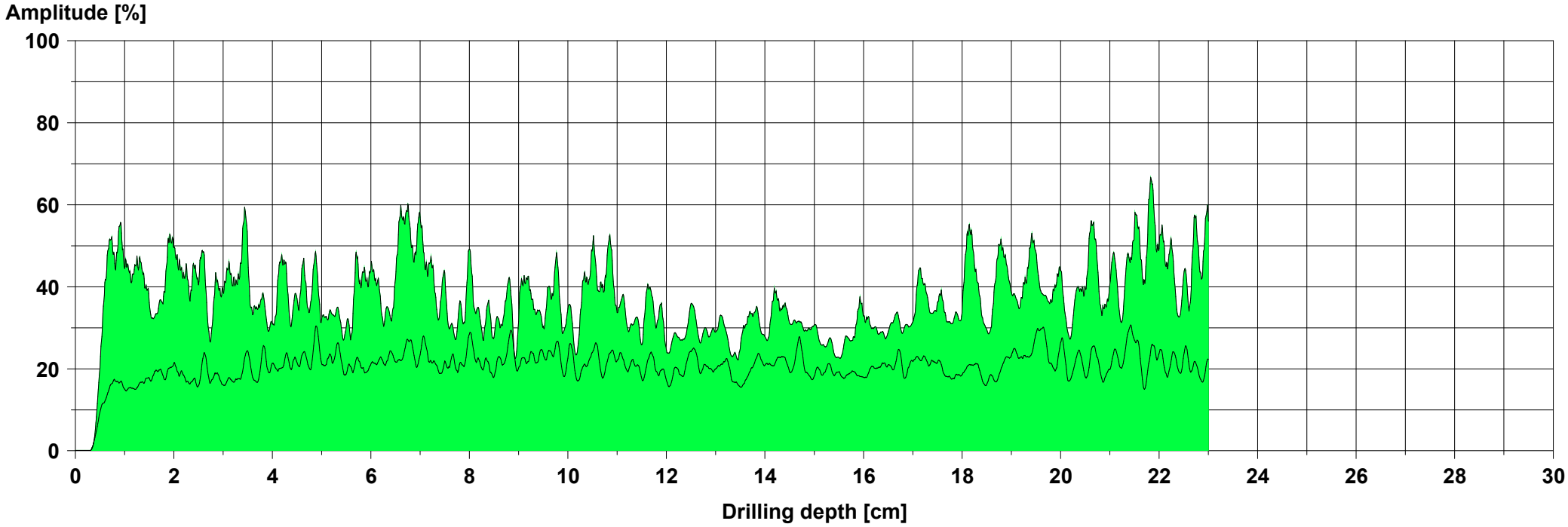
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :

Comment

NE 5

Measuring / object data

Measurement no.	: 14	**Needle speed**	: 2500 r/min	**Diameter**	:
ID number	: MURG	**Needle state**	: ---	**Level**	:
Drilling depth	: 23,00 cm	**Tilt**	: +3°	**Direction**	:
Date	: 15.02.2017	**Offset**	: 99/247	**Species**	:
Time	: 13:02:47	**Avg. curve**	: off	**Location**	:
Feed speed	: 50 cm/min			**Name**	:



Assessment

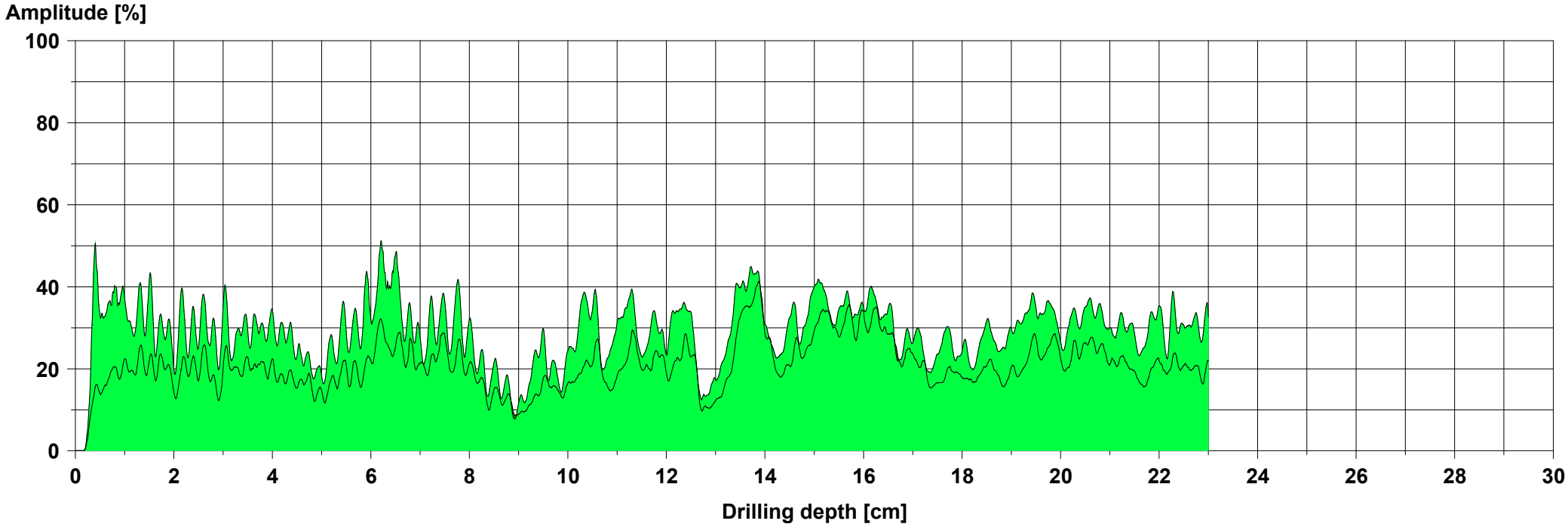
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :

Comment

NE 6

Measuring / object data

Measurement no.	: 15	**Needle speed**	: 2500 r/min	**Diameter**	:
ID number	: MURG	**Needle state**	: ---	**Level**	:
Drilling depth	: 23,00 cm	**Tilt**	: -2°	**Direction**	:
Date	: 15.02.2017	**Offset**	: 91/256	**Species**	:
Time	: 13:07:37	**Avg. curve**	: off	**Location**	:
Feed speed	: 50 cm/min			**Name**	:



Assessment

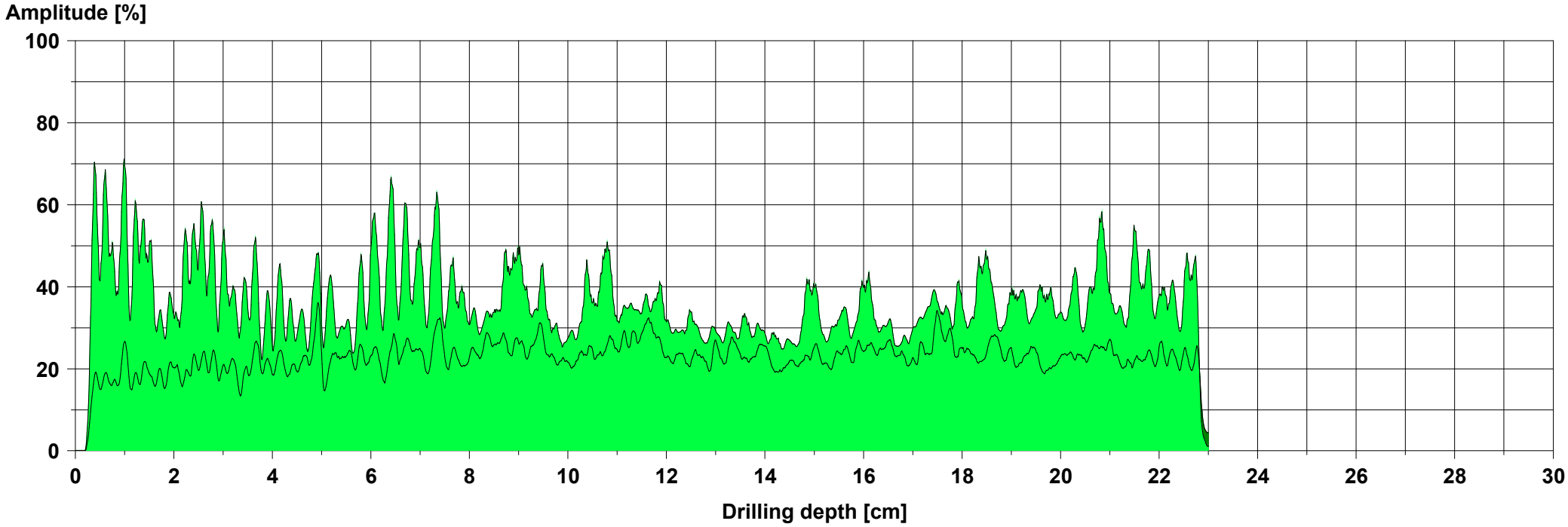
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :

Comment

SE 5

Measuring / object data

Measurement no.	: 16	**Needle speed**	: 2500 r/min	**Diameter**	:
ID number	: MURG	**Needle state**	: ---	**Level**	:
Drilling depth	: 23,00 cm	**Tilt**	: +2°	**Direction**	:
Date	: 15.02.2017	**Offset**	: 98/249	**Species**	:
Time	: 13:10:53	**Avg. curve**	: off	**Location**	:
Feed speed	: 50 cm/min			**Name**	:



Assessment

☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :
☐	**From**	0,0 cm	**to**	0,0 cm :

Comment

SE 6