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An
Kormann Rockster Recycler GmbH

Wirtschaftszeile West 2

4482 Ennsdorf

20. February 2013

# Acoustical report
## regarding
## Impact crasher mounted on a mobile crawler R700S
## (Raupenmobiler Prallbrecher R700S)
## produced by company Kormann Rockster Recycler GmbH

GA-Nr. 0723/2013/723.0

## Client:

Kormann Rockster Recycler GmbH
Wirtschaftszeile West 2
4482 Ennsdorf

## Topic of the report:

Measurement of the noise level and calculation of the sound power level of an impact crasher mounted on a mobile crawler of company Kormann Rockster Recycler GmbH

## Basis of the report:

- Measurement of the noise level on 19.02.2013
- ÖNORM S 5004, measurement of noise immissions
- ÖNORM EN ISO 3746 – Definition of sound power level of point sound sources of measuring the emission sound pressure, survey method using an enveloping measurement surface over a reflecting area, issued on 1.5.1996 [Bestimmung der Schallleistungspegel von Geräuschquellen aus Schalldruckmessungen, Hüllflächenverfahren der Genauigkeitsklasse 3 über einer reflektierenden Ebene; Ausgabedatum 1. Mai 1996"
- Indications of company Kormann Rockster Recycler GmbH
- Product description of company Kormann Rockster Recycler GmbH

## Number of pages of the report:

Pages 14

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## Contents

## 1. Facts

The sound power level of an „impact crasher mounted on a mobile crawler, Type R700S, should be checked on request of company Kormann Rockster Recycler GmbH. This impact crasher is used first of all for breaking down demolishing waste or similiar products.

The measurements of the impact crasher were realised in a gravel pit in Prien, belonging to company Georg Wohlschlager GmbH, Ludwigstraße 31 a, 83209 Prien, in Bavaria, on 19.2.2013. The terrain measured is typical for a gravel pit, the imapct crasher as well as the measurement equipment were situated in a way that the results were not influenced by reflecting walls or similiar. The terrain is appropriate for measurements according to Ö-Norm EN ISO 3746.

The surrounding noises were more than 10 dB (A) lower than the lowest measured value of the measured equipment and therefore have no influence on the measurement results ($K_1 = 0$).

The digger which feeds the material was turned off during the measurement periods resp. the digger feeding the material was not heard during the measurement periods and had, therefore, no influence on the measurement results regarding the impact crasher.

| Equipment type | Brand |
|---|---|
| Raupenmobiler Prallbrecher<br>impact crasher mounted on a mobile crawler | R700S mit Siebsystem<br>R700S with a screen system |
| Dimensions: | L x W x H = 14,1 m x 4,2 m x 3,48 m |

The sound level measurements were based on „ÖNORM EN ISO 3746 – Definition of sound power level of point sound sources of measuring the emission sound pressure, survey method using an enveloping measurement surface over a reflecting area, issued on 1.5.1996".

The European standard EN ISO 3746 has the status of an Austrian standard.

The sound level measurements were realised in a measurement area in shape of a cuboid, in a distance of d = 2,0 m from the equipment. The accurate measurement points can be seen in the measurement report resp. the sketch.

Photos of the equipment which was measured can be seen in the enclosures.

The measurements of the single positions was done until steady condition of the equivalent continuous sound pressure level could be seen, as the norm indicates the time used was at least 30 seconds.

## 2. Measurement equipment used / measuring conditions

For the sound level measurement there was used

- precision sound level measuring device „brand RION, Type NA28".

The calibration before and after the measurement was done with

- Sound source for checking class 03, (Prüfschallquelle Klasse 03), brand "Fabrikat Larson Davis, Typ CAL200, SN2499"

The indicated devices are within calibration period.

**Date of measurement:** 19.02.2013

**Conditions during the measurement:**

approx. 0 ° C
cloudy
Wind < 1 m/sec

There was practically no influence on the measurement results caused by the weather.

### 2.1 Results of the measurement / remarks

All measurement results are „A-weighted" and indicated in dB. Time weighting „fast".

Used words, s. also annex 4.

| | |
|---|---|
| $L_{(A)p}$ | sound pressure |
| $L_{(A)eq}$ | equivalent continuous A-weighted sound level |
| $L_{(A)95}$ | percentile A-weighted sound level |
| $L_{(A)1}$ | percentile A-weighted peak level, |
| $L_{(A)max}$ | maximum A-weighted sound level |
| $Sel_{(A)}$ | A-weighted sound exposure level |

## 2.2 Method of measurement

### 2.2.1 Calculation of sound power level

The calculation of sound power level was made on the basis of ÖNORM EN ISO 3746 when measuring emissions. The measurements were made in a defined distance of 2,0 m to the „thought" reference cuboid.

Before starting the sound level measurement there was measured the sound level without equipment working (Ruhepegel). The results of these measurements were used as „foreign noise correction $K_{1A,}$ when analysing the measurements.

The surface sound pressure level $L'_{pfA}$ is being calculated by correcting the measured values by using the correction values $K_{1A}$ and $K_{2A}$ according to the following equation:

$$L'_{pfA} = L'_{pA} - K_{1A} - K_{2A}$$

In this case no correcting values were used due to the local situation.

The sound power level was calculated on the basis of the calculated measurement area and the surface sound pressure level:

$$L_{W,A} = L'_{pfA} + \log (S / S_0)$$

$S_0$ ... Bezugsfläche [1 m²] (reference area)

## 2.3 Results of the sound level measurement

**chart 1 :** measurement area– reference cuboid

| Dimensions | | Measured equipment | | d = | 2,0 | [m] | |
|---|---|---|---|---|---|---|---|
| Length | $L_1$ | 14,10 [m] | $a = 0,5\ L_1 + d$ | a = | 9,05 | [m] | |
| Width | $L_2$ | 4,20 [m] | $b = 0,5\ L_2 + d$ | b = | 4,10 | [m] | |
| Height | $L_3$ | 3,48 [m] | $c = L_3 + d$ | c = | 5,48 | [m] | |
| Measurement area | $S_{Messfl}$ | $= 4\ (ab + bc + ca)$ | | | | | |
| | $S_{Messfl}$ | **436,7 [m]** | | | | | |

**chart 2 :** results of measurement – operating noise – broken down material

| Sp.Pl. | Date | Duration | Position | MP | $L_{(A)max}$ dB | $L_{(A)min}$ dB | $L_{(A)eq}$ dB | $L_{(A)1}$ dB | $L_{(A)95}$ dB |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 19.2.2013 | 30' | s. Messskizze / measurement sketch | 1 | | | 79,9 | | |
| 2 | 19.2.2013 | 30' | | 2 | | | 78,9 | | |
| 3 | 19.2.2013 | 30' | | 3 | | | 80,6 | | |
| 4 | 19.2.2013 | 30' | | 4 | | | 82,6 | | |
| 5 | 19.2.2013 | 30' | | 5 | | | 84,4 | | |
| 6 | 19.2.2013 | 30' | | 6 | | | 87,2 | | |
| 7 | 19.2.2013 | 30' | | 7 | | | 89,3 | | |
| 8 | 19.2.2013 | 30' | | 8 | | | 92,0 | | |
| 9 | 19.2.2013 | 30' | | 9 | | | 90,2 | | |
| 10 | 19.2.2013 | 30' | | 10 | | | 87,0 | | |
| 11 | 19.2.2013 | 30' | | 11 | | | 88,0 | | |
| 12 | 19.2.2013 | 30' | | 12 | | | 90,4 | | |
| 13 | 19.2.2013 | 30' | | 13 | | | 90,9 | | |
| 14 | 19.2.2013 | 30' | | 14 | | | 88,6 | | |
| 15 | 19.2.2013 | 30' | | 15 | | | 84,9 | | |
| 16 | 19.2.2013 | 30' | | 16 | | | 87,7 | | |
| 17 | 19.2.2013 | 30' | | 17 | | | 87,6 | | |
| 18 | 19.2.2013 | 30' | | 18 | | | 86,0 | | |
| 19 | 19.2.2013 | 30' | | 19 | | | 84,3 | | |
| 20 | 19.2.2013 | 30' | | 20 | | | 81,5 | | |
| 21 | 19.2.2013 | 30' | | 21 | | | 84,1 | | |
| 22 | 19.2.2013 | 30' | | 22 | | | 86,7 | | |
| 23 | 19.2.2013 | 30' | | 23 | | | 91,5 | | |
| 24 | 19.2.2013 | 30' | | 24 | | | 89,7 | | |
| 25 | 19.2.2013 | 30' | | 25 | | | 94,0 | | |
| 26 | 19.2.2013 | 30' | | 26 | | | 91,9 | | |
| 27 | 19.2.2013 | 30' | | 27 | | | 93,6 | | |
| 28 | 19.2.2013 | 30' | | 28 | | | 90,4 | | |
| 29 | 19.2.2013 | 30' | | 29 | | | 88,0 | | |
| 30 | 19.2.2013 | 30' | | 30 | | | 86,5 | | |
| | | | Average sound level | $\overline{L'_{pA}}$ | | | 88,8 | | |
| | | | Correction of foreign noises | $K_{1A}$ | | | 0,0 | | |
| | | | Noise correction | $K_{2A}$ | | | 0,0 | | |
| | | | Surface sound pressure level | $L'_{pfA}$ | | | 88,8 | | |
| | | | Measurement area | | 436,67 | m² | 26,4 | | |
| | | | **Schallleistungspegel $L_{A,W}$ Sound power level** | | | | **115,2** | | |

| | |
|---|---|
| **Schallleistungspegel:** | **Rockster Recycler R700S mit Siebsystem** |
| **Sound power level:** | **Rockster Recycler R700 S with screen system** |
| **Schallleistungspegel:** | **$L_{W,A}$ = 115 dB** |
| **Sound power level:** | **$L_{W,A}$ = 115 dB** |

Hallein, 20. February 2013

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In case of any discrepancies between the German original and the English translation, the German version is the valid one.

# 3. Enclosures

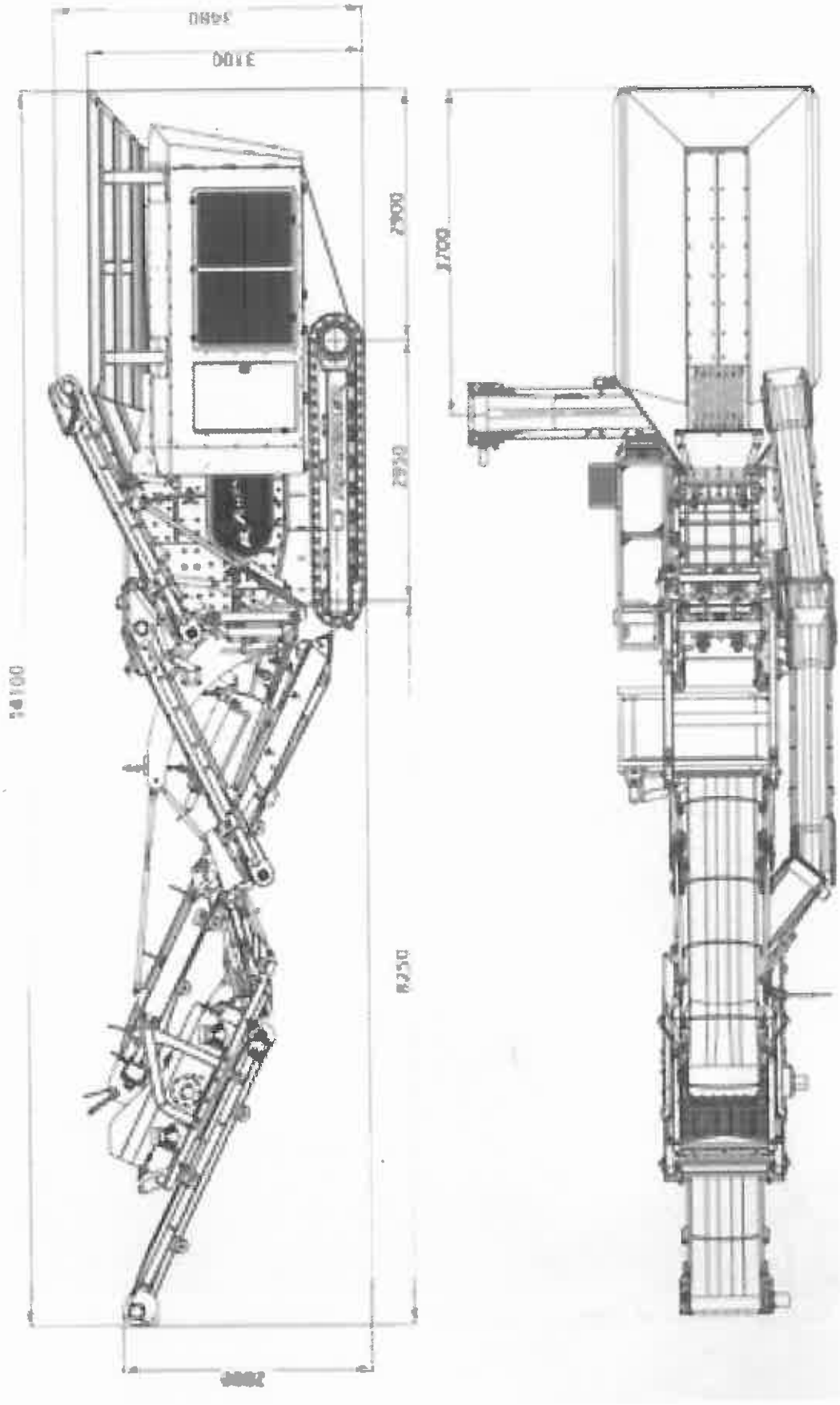
## 3.1 Maps

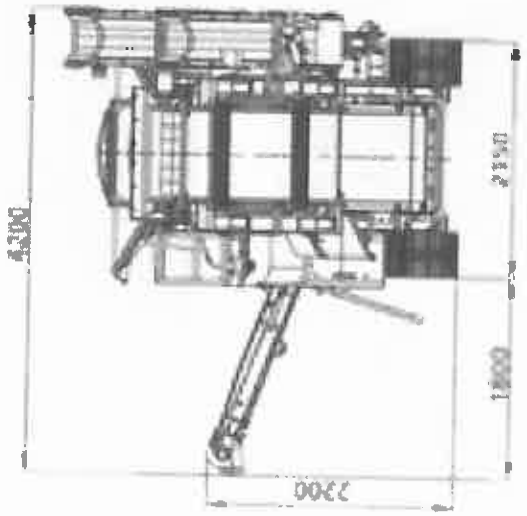
### 3.1.1 Site map


Map of measured area of company Georg Wohlschlager GmbH in Prien


Map of measured area of company Georg Wohlschlager GmbH in Prien

## 3.2 Plans of equipment

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## 3.3 Measurement report

### 3.3.1 Photo documentation

Impact crasher – front

Impact crasher – right

Impact crasher – back

Impact crasher – left

### 3.3.2 Sketch of measuring points

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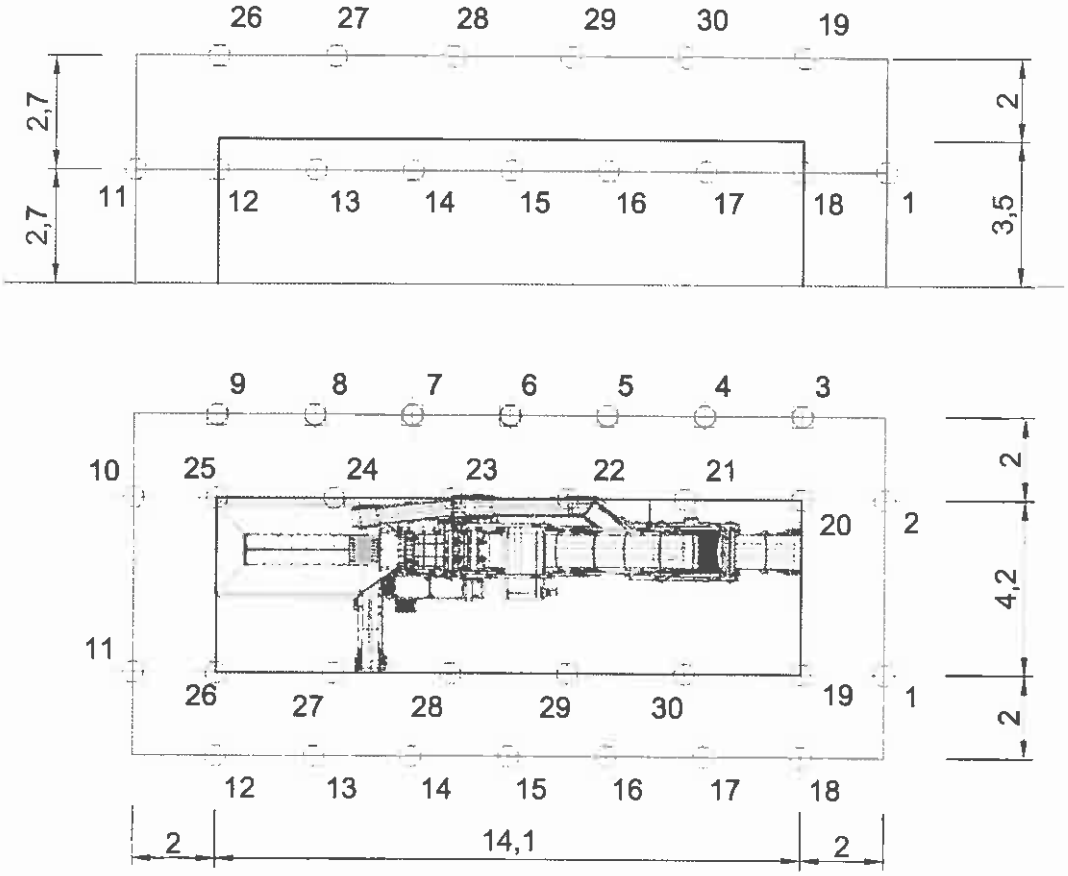


Messskizze

Kormann Rockster Recycler GmbH
Raupenmobilbagger R700S mit Siebsystem

(sketch)

## 4. Erläuterung schalltechnischer Begriffe

***$L_{(A)eq}$ energieäquivalenter Dauerschallpegel***

Der energieäquivalente Dauerschallpegel wird als jener Schalldruckpegel errechnet, der bei dauernder Einwirkung dem unterbrochenen Geräusch mit schwankendem Schalldruckpegel energieäquivalent ist.

Der energieäquivalente Dauerschallpegel dient zur Beschreibung von Schallereignissen mit schwankendem Schalldruckpegel.

***$L_{(A)E}$ Schallereignispegel***

***$L_{(A)G}$ Grundgeräuschpegel***

Der geringste an einem Ort während eines bestimmten Zeitraumes gemessene A-bewertete Schalldruckpegel, der durch entfernte Geräusche verursacht wird und bei dessen Einwirkung Ruhe empfunden wird. Er ist der niedrigste Wert, auf welchen die Anzeige des Schallpegelmessers bei Einstellung "fast" der Anzeigedynamik, wiederholt zurück fällt.

Er kann nur ermittelt werden, wenn benachbarte oder sonstige Schallquellen, die an der Entstehung von deutlich erkennbaren Schallereignissen beteiligt sind, abgeschaltet werden können.

Liegt eine Schallpegelhäufigkeitsverteilung vor, ist der in 95% des Messzeitraumes überschrittene Schalldruckpegel, also der Basispegel, als Grundgeräuschpegel einzusetzen.

***$L_{(A)95}$ Basispegel***

Der Basispegel ist der in 95% der Messzeit überschrittene Schalldruckpegel der Schallpegel- Häufigkeitsverteilung eines beliebigen Geräusches.

***$L_{(A)1}$ mittlerer Spitzenpegel***

Der mittlere Spitzenpegel ist der in 1% der Messzeit überschrittene Schalldruckpegel.

***$L_{(A)max}$ Maximalpegel***

Der höchste während der Messzeit auftretende Schalldruckpegel.

***$L_{(A)r}$ Beurteilungspegel***

Der Beurteilungspegel ist der auf die Bezugszeit bezogene energieäquivalente Dauerschallpegel des zu beurteilenden Geräusches, der, wenn erforderlich, mit Zuschlägen versehen ist. Er ist die wesentliche Basis für die Beurteilung einer Schallimmissionssituation.

***$L_p$ unbewerteter Schalldruckpegel***