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| Issuing Entity: | Bulletin No.: SB-025_02 |
| Vekoma Rides Parts & Services B.V. | Release Date: February 12, 2018 |
| Schaapweg 18 | Effective Date: February 12, 2018 |
| 6063 BA VLODRUP | Supersedes: SB-025_00 and SB-025_01 |
| The Netherlands | Completion Date: March 12, 2018 |
| CoC Number: 12049585 | |

Service Bulletin

| | |
|-------------------------------------|--------------------------------|
| Original Ride Manufacturer: Table 1 | Affected Production Dates: All |
| Ride Name: MK12xx sit down series | Affected Serial Nos: Table 1 |
| Model No: - | |

Abstract of issue:

This Service Bulletin requires additional weld inspections for the MK12xx sit down chassis.

Reason for release:

During NDT examination on a MK 1212 sit down chassis a linear indication in a chassis weld seam has been found. Due to this knowledge it is required to change the inspection intervals.

Action to be taken:

Immediate magnetic testing or dye penetrant testing of welded joints of the chassis within the completion date of this document; only required in case this inspection has not been performed within the last year.

Visual inspection of welded joints of the chassis on a weekly basis.

Eddy current testing, magnetic testing or dye penetrant testing of welded joints of the chassis on a monthly basis.

Magnetic testing or dye penetrant testing of welded joints of the chassis on a yearly basis.

| Date | Revision | Comment |
|---------------|----------|---|
| November 2012 | 00 | Initial version |
| January 2018 | 01 | Removed lifetime requirement of 10 years Changed ride cycles interval Updated figures |
| February 2018 | 02 | Changed visual testing to visual inspection Added eddy current testing on a monthly basis Added dye penetrant testing as option for yearly inspection |

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Details of issue continued:

| IB-nr. | Original Ride Manufacturer | Project number |
|--------|--|----------------|
| 10505 | Vekoma Rides Manufacturing B.V.* | 91178 |
| 27001 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 99292 |
| 27002 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 97134 |
| 27003 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 91018 |
| 27502 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 83515 |
| 27503 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 83530 |
| 27505 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 91685 |
| 27506 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 84545 |
| 27507 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 84555 |
| 27509 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 85590 |
| 27510 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 86785 |
| 27511 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 86780 |
| 27514 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 86715 |
| 27515 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 86640 |
| 27517 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 93104 |
| 27518 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 87610 |
| 27521 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 89605 |
| 27523 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 90510 |
| 27524 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 90523 |
| 27525 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 91678 |
| 27526 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 95115 |
| 27527 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 95163 |

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| 27528 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 96378 |
| 27529 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 96372 |
| 27530 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 96340 |
| 27531 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 96293 |
| 27532 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 97105 |
| 27533 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 97117 |
| 27534 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 97153 |
| 27535 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 97128 |
| 27536 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 97196 |
| 27537 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 98113 |
| 27538 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 98111 |
| 27539 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 99306 |
| 27540 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 97333 |
| 27541 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 99269 |
| 27542 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 98112 |
| 27543 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 20151 |
| 27544 | Vekoma Rides Manufacturing B.V.* | 91008 |
| 27545 | Vekoma Rides Manufacturing B.V.* | 91228 |
| 27546 | Vekoma Rides Manufacturing B.V.* | 60022 |
| 28001 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 93102 |
| 28503 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 86770 |
| 28504 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 87580 |
| 28505 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 88692 |
| 28506 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 92511 |
| 28507 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 97121 |

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| 29003 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 78830 |
| 29501 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 80880 |
| 29502 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 82550 |
| 29504 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 84535 |
| 31002 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 95116 |
| 32501 | Vekoma Rides Manufacturing B.V.* | 91050 |
| 33002 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 87640 |
| 33501 | Vekoma International B.V./Vekoma Manufacturing B.V.* | 80710 |

Table 1: Affected serial Nos.

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Details of issue continued:

1.1 Why this service bulletin

This service bulletin is a result of a linear indication found in an MK1212 sit down chassis. VRPS therefore recommends increasing the number of NDT inspections as stated in the following paragraphs for all chassis with similar weld details and loading conditions.

1.1.1 Involved weld seams

This service bulletin is applicable to all MK12xx sit down chassis types.

The typical weld details for MK12xx sit down chassis are illustrated in figures 1 and 2.

1.2 Recommended inspection intervals

1.2.1 Immediate inspection

Perform magnetic testing or dye penetrant testing of all welds as specified in figure 1 and 2 on 100% of the vehicle chassis in the ride system; only required in case this inspection has not been performed within the last year. NDT examination has to be executed according to the codes as mentioned in table 2. These NDT examinations must be completed before the completion date of this document. If necessary for NDT accessibility, it is required to disassemble the body to access the weld seams.

1.2.2 Weekly maintenance (corresponds with approximately 700 ride cycles)

Perform visual inspection of all welds as specified in figure 1 and 2 on 100% of the vehicle chassis in the ride system. For visual inspection it is not necessary to disassemble any components, only check the welds which are visible without removing components.

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Details of issue continued:

1.2.3 Monthly maintenance (corresponds with approximately 2500 ride cycles)

Perform Eddy current testing, magnetic testing or dye penetrant testing of all welds as specified in figure 1 and 2 on 100% of the vehicle chassis in the ride system. NDT examinations need to be executed according to the codes as mentioned in table 2. For Eddy current testing, magnetic testing and dye penetrant testing it is not necessary to disassemble any components, only check the welds which are accessible without removing components.

1.2.4 Yearly maintenance (corresponds with approximately 30.000 ride cycles)

Every year the same NDT examinations have to be performed as described in paragraph 1.2.1.

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Details of issue continued:

1.3 Non destructive testing

The NDT examinations as recommended by VRPS have to be performed according to the procedures and standards as mentioned in this paragraph.

1.3.1 Related codes and standards

Parts should be inspected according to the related standards and codes as mentioned in table 2:

| NDT Method | Codes (Examination) | Codes (Acceptance level) | Acceptance level |
|---|----------------------|--|------------------|
| Visual inspection | - | Indications not allowed. | |
| PT (Penetrant Testing) | ISO 3452-1 | ISO 23277 | Level 1 |
| MT (Magnetic particle Testing) | ISO 17638 or EN 1290 | ISO 23278 | Level 1 |
| ET (Eddy current Testing) ¹⁾ | ISO 17643 | Acceptance level 5 x 1 mm (length x height) Reference EDM NotCh ²⁾ | |

Table 2: Related standards and codes

- 1) Corrections for coating thicknesses are as per approved procedure by means of shimmers. The reference level shall be checked are recorded on a 4 hourly basis and on the start- and finish of a shift / examination
- 2) All indications observed with ET are subject to confirmation by PT or MT.

1.3.2 NDT personnel

NDT personnel must be:

- Instructed and trained, by an independent and recognized inspection authority
- Qualified and certified to the EN 473 or ISO 9712 or SNTC-TC-1A, level II



1.3.3 Results of NDT

If any indications are found by visual inspection (per section 1.2.2) or eddy current testing (per section 1.2.3), perform magnetic testing or dye penetrant testing on all ride chassis.

If any indications are found by magnetic testing always contact VRPS.

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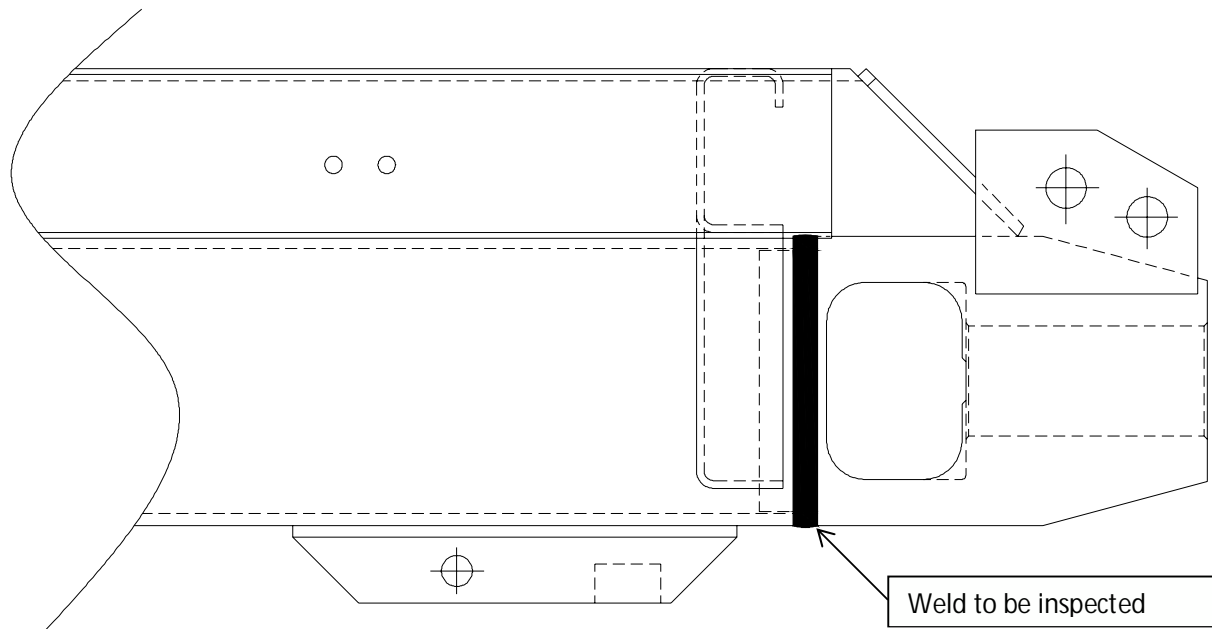


Figure 1 Typical weld location of block connected to chassis with overlapping profile

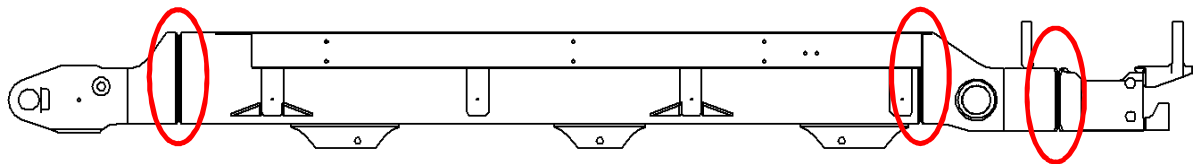


Figure 2 Typical weld locations of block connections to chassis with single weld around

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Details of issue continued:

1.3.4 Inspection procedure



WARNING

Contact VRPS if indications are found.

Prepare

- 1 Disassemble the part (not necessary for visual inspection or ET).
- 2 Remove moisture, oil, grease and dirt.
- 3 Remove the paint (not necessary for visual inspection or ET), e.g. by sand blast or with the help of a liquid paint remover. Do not use steel grit blast. Make sure that the whole surface is free from paint.
- 4 Remove any slag and spatter (if still present) from welded joints.

Inspect

- 1 Inspect the part or weld according to the applicable NDT method.
 - the inspection company shall use their own NDT procedure. The applicable procedure must be referring to the relevant EN- or ISO standards;
 - the used NDT procedure must be approved by an inspector, qualified and certified to EN 473 / ISO 9712 level III or ASNT-TC-1A level III.
- 2 Only for visual inspection on welds:
 - pay special attention to indications or signs of corrosion in the paint;
- 3 Only for visual inspection and ET on parts: If indications are found or if there is any doubt, check all parts with the same function by PT or MT.
- 4 If indications are found, replace the part or repair the weld.
- 5 Fill out all the inspections and repairs performed on parts of the amusement ride.
- 6 Use the inspection and repair list, both added in the logbook.

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Finish

- 1 Paint the part.
- 2 Assemble the part.
- 3 Re-apply the rust preventive coating to all parts.

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| Schaapweg 18 | Effective Date: February 12, 2018 |
| 6063 BA VLODROP | Supersedes: SB-025_00 and SB-025_01 |
| The Netherlands | Completion Date: March 12, 2018 |
| CoC Number: 12049585 | |

Details of issue continued:

According to the ASTM F853/ F1193 latest revision:

Supplemental bulletins delivered by the manufacturer to the owner / operator that were not provided at the time of hand over of the amusement ride and contain new information or newly recommended inspections or testing, or both, will be released as a Safety Alert, Service Bulletin or an Notification, with the following criteria in order to carry the force and effect of this practice:

- “Safety Alert” For notifications that recommend immediate action.
- “Service Bulletin” For notifications that do not recommend immediate action but do recommend future action.
- “Notification” For notifications that do not necessarily recommend future action but are promulgation of information.



For additional information contact Vekoma Rides Parts & Services B.V.:

P.O. Box 8006, 6060 AA Posterholt
Schaapweg 18, 6063 BA Vlodrop,
The Netherlands

Tel: +31 (0) 475-409222 (office hours)
Cellphone: +31 (0) 6-10917506 (outside office hours)
Fax: +31 (0) 475-403415

Email: service@vekoma.com

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