Shape Corp
GTR09 NA vs EU Vehicle
Modified Round Robin
**Shape Corp Flex PLI Testing**

1. Vehicle #1 Test Setup
2. Vehicle #1 EU & NA
3. Vehicle #2 Test Setup
4. Vehicle #2 EU & NA + IWG RR Tests
5. General Testing Observations
6. Ground Line Adjustment Required in CAE

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**Legform Detail**

<table>
<thead>
<tr>
<th>SN</th>
<th>Version</th>
<th>Status*</th>
<th>Mass</th>
<th>Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td>SN01</td>
<td>Flex GTR</td>
<td>Master</td>
<td>13.32kg</td>
<td>Humanetics</td>
</tr>
<tr>
<td>VRTC</td>
<td>Flex GTR</td>
<td>Master</td>
<td>13.18kg</td>
<td>NHTSA</td>
</tr>
</tbody>
</table>

*Master = Latest eng level (bone cores/long rubber) & meets cert corridors*
Vehicle #1

Test Locations

- GTR Test Area
- Y0
- Y365

NA vehicle w/ EU system applied

*Offset location established from EuroNCAP protocol*
Vehicle #1: EU & NA

- EU
- NA

<table>
<thead>
<tr>
<th>Location</th>
<th>Leg</th>
<th>ACL/PCL</th>
<th>MCL</th>
<th>Max Tibia</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU Y0</td>
<td>VRTC</td>
<td></td>
<td>13</td>
<td>22</td>
</tr>
<tr>
<td>NA Y0</td>
<td>VRTC</td>
<td></td>
<td>10.7</td>
<td>28.6</td>
</tr>
<tr>
<td>EU Y365</td>
<td>VRTC</td>
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<td>6.1</td>
<td>19.1</td>
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<tr>
<td>NA Y365</td>
<td>VRTC</td>
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<td>7.5</td>
<td>24.1</td>
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</table>
Vehicle #2

Test Locations

*Offset location established from EuroNCAP protocol
Vehicle #2: EU & NA + IWG RR Tests

SN01 = Round Robin Testing

Injury Limit (%)

- EU
- NA
- VRTC

Location: SN01

<table>
<thead>
<tr>
<th>Location</th>
<th>Leg</th>
<th>EU Y0</th>
<th>EU Y0</th>
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<td>VRTC</td>
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<td>VRTC</td>
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<td>ACL/PCL</td>
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<td>3.9</td>
<td>4.1</td>
<td>3.3</td>
<td>6.0</td>
<td>8.0</td>
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<tr>
<td>MCL</td>
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<td>9.2</td>
<td>10.4</td>
<td>11.4</td>
<td>13.9</td>
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<td>16.8</td>
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<tr>
<td>Max Tibia</td>
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<td>208.5</td>
<td>206.4</td>
<td>184.9</td>
<td>360.6</td>
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<td>366.1</td>
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</table>
- Both VRTC & SN01 legforms at “master” level containing updated bone cores, tibia long rubber and within newly defined certification corridors
- Slight launch plate modifications required to keep tibia bending below 10Nm during free flight.
  (a) bottom plate extension
  (b) material removed at center for knee joint clearance
- Friction differences in roller bracket required launch pressure differences between legs
- Wire exit base/clamp (top of tibia) were not being used on either legform (wires loose)
- DAS cable connection socket damaged when impacting floor.
- Zipper durability is an issue, several openings occurred during Y-offset tests
- During CAE correlation it was discovered the LS-DYNA Flex PLI Ver2 legform does not include the plastic endcap at tibia bottom. Measurement to ground line should be compensated by 8.6mm (see next page).
End cap not included in V1 or V2 CAE model. Adjust leg to ground line by 8.6mm.