



# LARS

## RIDER

Lars

## SITE

,

## FITTER

Peter

## BIKE

**MAKE/MODEL:** Specialized , Epic

**SIZE:** XL

**YEAR:** 2017

**TYPE:** MTB

## SUMMARY OF SESSION

# ASSESSMENT REPORT

## CONCERNS & PREVIOUS INJURIES

**NECK:** prive  
**SHOULDERS:** prive  
**MID-BACK:** prive  
**LOW-BACK:** prive  
**LLD:** M prive  
**HIPS:** prive  
**KNEES:** Rprivef  
**ANKLES:** prive  
**FEET:** prive  
**ORTHOTICS:** prive  
**HANDS:** prive  
**MISC:**

## EXPERIENCE

**CYCLING BACKGROUND:** Fietservaring 29 jaar, alle disciplines  
**RIDING STYLE:** Serieus  
**HOURS PER WEEK:** 5-10  
**OTHER ACTIVITIES:** Hardlopen, schaatsen, klimmen  
**GOALS:** Plezier op de fiets, technisch rijden met controle en comfort  
**CYCLING DISCOMFORT:**  
**OCCUPATION:** prive  
**NOTES:**

## ISCHIAL TUBEROSITY MEASUREMENT

**ISCHIAL TUBEROSITY WIDTH:** 110

FEET	LEFT	RIGHT
<b>FOREFOOT ANGULATION:</b>	VARUS, AANZIENLIJK	VARUS, AANZIENLIJK
<b>REAR FOOT STRUCTURE:</b>	VALGUS, AANZIENLIJK	VALGUS, AANZIENLIJK
<b>ARCH:</b>	HOGЕ VOETBOOG	HOGЕ VOETBOOG
<b>ANKLE DORSI FLEXION:</b>	VOLLEDIGE ROM, SYMMETRISCH	
<b>ANKLE PLANTAR FLEXION:</b>	BEPERKTE ROM, ASYMMETRISCH	
	Rechtervoet iets minder verre pantarflexie	

LEGS	LEFT	RIGHT
<b>LOWER EXTREMITY ALIGNMENT:</b>	NEUTRAAL	
<b>LOWER EXTREMITY ALIGNMENT 2:</b>		
<b>HAMSTRING FLEXIBILITY:</b>	FULL ROM	FULL ROM
<b>HAMSTRING FLEXIBILITY MEASUREMENT:</b>	55	60
<b>HIP ROM:</b>	VOLLEDIGE ROM	
<b>HIP ROM MEASUREMENT:</b>	135	130
<b>LLD RESULT:</b>	GELIJK	
	Liggend is rechts iets langer, naar voren kantelend rechtop komend, wordt links iets langer, advies; fysio bezoek voor bekken/onderrug check	
<b>IT BAND:</b>	NEUTRAAL	NEUTRAAL

LEGS CONTINUED	LEFT	RIGHT
1/3 KNEE BEND HIP:	INSTABIEL	STABIEL
1/3 KNEE BEND KNEE:	VALGUS, GEMIDDELD	NEUTRAAL
1/3 KNEE BEND FOOT:	INSTABIEL	INSTABIEL
QUAD:		
HIP FLEXOR:		
Q-ANGLE:	GEMIDDELD	

UPPER BODY
FORWARD SPINAL FLEXION: GEEN BEPERKINGEN
SPINAL ALIGNMENT: NEUTRAAL
SPINAL CURVE: NEUTRAAL
SHOULDER ROM: VOLLEDIGE ROM, SYMMETRISCH
SCAPULAR POSITION:
CERVICAL FLEXION ROM: VOLLEDIGE ROM
CERVICAL EXTENSION ROM: VOLLEDIGE ROM
CORE STABILITY: STABIEL
LEVEL PELVIS: LINKS HOOG, MILD

MORE UPPER BODY	LEFT	RIGHT
PASSIVE HIP ROTATION ROM:	VOLLEDIGE ROM	BEPERKT NAAR BUITEN
ACTIVE HIP ROTATION ROM:		
SHOULDER ROTATION ROM:		
CERVICAL ROTATION ROM:		

THIS BIKE FIT PERFORMED USING THE **RETÜL** SYSTEM

# ZIN REPORT: FINAL BIKE POSITION

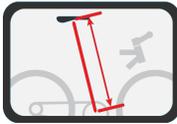
2017, XL - Specialized , Epic (MTB)

Notes:

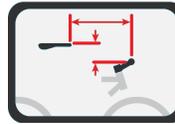
## COMPONENTS

STEM	SPACER STACK	CRANK LENGTH	PEDALS	SADDLE	BARS	SHOES
6 ° x 90mm	4mm	175mm	Shimano SPD	Phenom 143	Specialized Flatbar	Sidi SD15

## MEASUREMENTS & ANGLES



Saddle Height: 840mm  
BB to center of saddle profile



Handlebar Reach: 626mm  
tip of saddle horiz to bar top

Handlebar Drop: -98mm  
cen of saddle profile to bar top grip, - denotes bar below saddle



Saddle Setback: -78mm  
BB horiz to front tip of saddle grip, - denotes saddle behind BB



Grip Reach: 594mm  
tip of saddle horiz to center of grip

Grip Drop: -84mm  
cen of saddle to top center of grip, - denotes grip lower



Saddle Angle: -1 °  
angle of saddle to horizon grip, - denotes nose down



Bar Rise: 14mm  
top of bar vertical to top center of grip



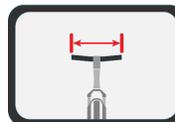
Eff. Seat Tube Angle: 76 °  
BB to center of saddle profile



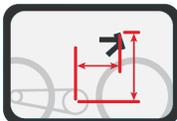
Bar Sweep Angle: 6 °  
top view bend angle of bar center to grip center



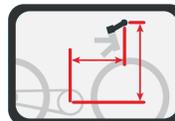
Grip Width: 597mm  
grip center to center



Bar Width: 609mm  
grip end to end



Frame Stack: 634mm  
Frame Reach: 474mm  
BB to center of headtube top



Handlebar Stack: 700mm  
Handlebar Reach: 548mm  
BB to center of bar

# BILATERAL FIT REPORT: EIND POSITIE

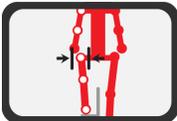
Specialized , Epic

Power: Error2 Watts

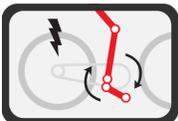
Left Notes: -

Right Notes:

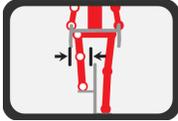
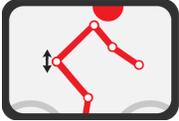
## BODY GEOMETRY STEPS 1-4

	L	R		L	R
	-	Ankle Angle at Bottom 87 °		-	Knee Angle Flexion 110 °
				-	Knee Angle Extension 39 °
	-	Knee Forward of Spindle -26mm		-	Hip Vertical Travel 36mm
	-	Hip Lateral Travel 9mm		-	Foot Rotation Mean -11 °
	-	Cadence Average 76			

## BODY GEOMETRY STEPS 5-8

	L	R		L	R
	-	Shoulder Angle to Elbow 76 °		-	Back Angle 52 °
	-	Shoulder Angle to Wrist 79 °			
	-	Hip Angle Closed 71 °		-	Elbow Angle 170 °
	-	Forearm Angle -46 °		-	Cadence Average 76

## BODY GEOMETRY STEPS 9-14

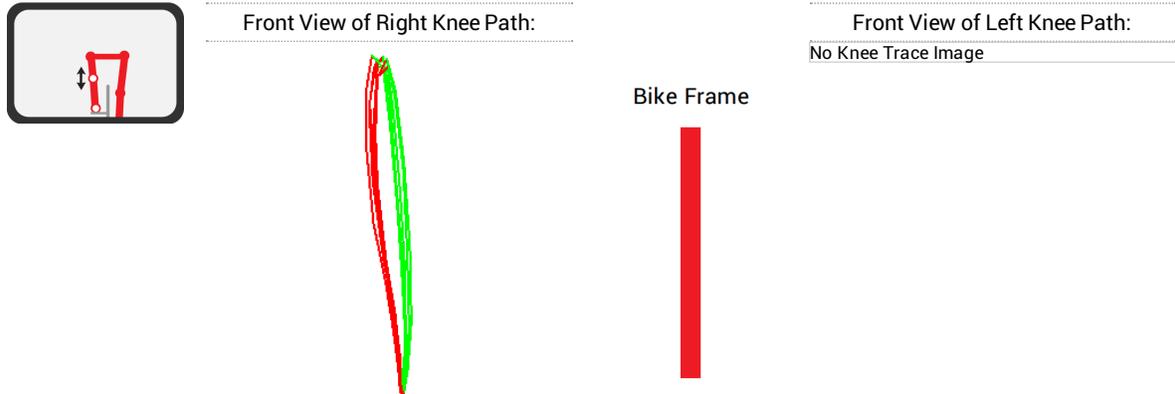
	L	R		L	R
	-	Knee Lateral Travel 31mm		-	Hip Vertical Travel 36mm
	-	Hip Lateral Travel 9mm		-	Hip to Foot Lateral Offset 10mm
	-	Knee to Foot Lateral Offset 27mm		-	Knee Travel Tilt 4°
	-	Foot Rotation Mean -11°		-	Cadence Average 76

## WORKLOAD

	L	R
	-	Cadence Mean 76
	-	Cadence Maximum 91

## MARKER PATH

Note: Marker paths viewed from the front will be on the opposite side of the report. The paths representing the right side of the body will be shown on the left and vice versa.





# BICYCLE MEASUREMENT DEFINITIONS

KEY	DESCRIPTION/DEFINITION	KEY	DESCRIPTION/DEFINITION
<b>Common Bike Definitions (used on all reports)</b>			
	<p><b>Frame Stack and Reach</b> The horizontal and vertical distance from the center of the bottom bracket to the center of the top of the headtube.</p>		<p><b>Handlebar Stack &amp; Reach</b> The horizontal and vertical distance from the center of the bottom bracket to the center of the handlebar.</p>
	<p><b>Handlebar Reach</b> The horizontal distance from the front tip of the saddle to the center of the handlebar.</p>		<p><b>Effective Seat Tube Angle</b> The angle between horizontal and the saddle height axis defined in saddle height.</p>
	<p><b>Handlebar Drop</b> The vertical distance from the center point of the saddle profile to the top of the handlebar. A negative value signifies the handlebar being lower than the saddle.</p>		<p><b>Saddle Height</b> The distance from the center of the bottom bracket to the horizontal midpoint of the saddle profile.</p>
	<p><b>Saddle Setback</b> The horizontal distance from the front tip of the saddle to the center of the bottom bracket. A negative value signifies the saddle being rearward of the bottom bracket.</p>		<p><b>Saddle Angle</b> The angle between horizontal and the line tangent to the top of the saddle. A negative value signifies the nose of the saddle being lower than the rear of the saddle.</p>
<b>Road Bike Definitions (used on road reports)</b>			
	<p><b>BB to Grip Reach</b> The horizontal distance from the center of the bottom bracket to the trough of the grip.</p>		<p><b>Grip Reach</b> The horizontal distance from the front tip of the saddle to the trough of the grip.</p>
	<p><b>Grip Drop</b> The vertical distance from the center point of the saddle profile to the trough of the grip. A negative value signifies the grip being lower than the saddle.</p>		<p><b>Grip Angle</b> The angle between horizontal and the flat segment of the grip. A positive value signifies the front of the grip being higher than the rear.</p>
	<p><b>Bar Reach</b> The horizontal distance from the top of the handlebar to the rearmost point of the grip.</p>		





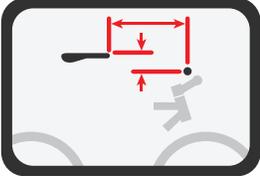
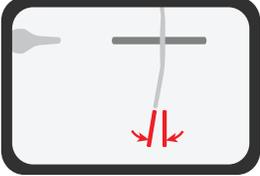
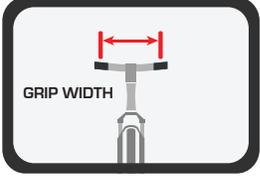
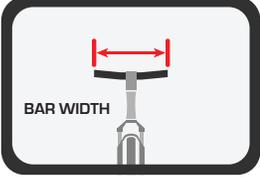
# BICYCLE MEASUREMENT DEFINITIONS

KEY	DESCRIPTION/DEFINITION	KEY	DESCRIPTION/DEFINITION
<p>GRIP WIDTH</p>	<p><b>Grip Width</b> The 3D distance between the midpoints of the grip contours if both grips traced. Otherwise, two times the distance perpendicular from the plane of the bike to the midpoint of the single traced grip contour.</p>		
<b>Tri Bike Definitions (used on tri/tt reports)</b>			
	<p><b>Arm Pad Stack BB</b> The vertical distance from the center of the bottom bracket to the top of the arm pad.</p>		<p><b>Arm Pad Reach BB</b> The horizontal distance from the center of the bottom bracket to the back of the arm pad.</p>
	<p><b>BB to Grip Reach</b> The horizontal distance from the center of the bottom bracket to the frontmost point of the grip.</p>		<p><b>Arm Pad Reach</b> The horizontal distance from the front tip of the saddle to the back of the arm pad.</p>
	<p><b>Grip Reach</b> The horizontal distance from the front tip of the saddle to the frontmost point of the grip.</p>		<p><b>Arm Pad Drop</b> The vertical distance from the center point of the saddle profile to the top of the arm pad. A negative value signifies the arm pad being lower than the saddle.</p>
	<p><b>Grip Drop</b> The vertical distance from the center point of the saddle profile to the frontmost point of the grip. A negative value signifies the grip being lower than the saddle.</p>		<p><b>Grip Angle</b> The angle between horizontal and the best fit line to the traced grip contour. A positive value signifies the front of the grip being higher than the rear.</p>
	<p><b>Arm Pad to Grip Reach</b> The horizontal distance from the back of the arm pad to the frontmost point of the grip.</p>	<p>ARMPAD WIDTH</p>	<p><b>Arm Pad Width</b> The 3D distance between the midpoints of the arm pad contours if both arm pads traced. Otherwise, two times the distance perpendicular from the plane of the bike to the midpoint of the single traced arm pad contour.</p>
<p>GRIP WIDTH</p>	<p><b>Grip Width</b> The 3D distance between the midpoints of the grip contours if both grips traced. Otherwise, two times the distance perpendicular from the plane of the bike to the midpoint of the single traced grip contour.</p>		





# BICYCLE MEASUREMENT DEFINITIONS

KEY	DESCRIPTION/DEFINITION	KEY	DESCRIPTION/DEFINITION
<b>Mountain Bike Definitions (used on mountain reports)</b>			
	<p><b>Grip Reach</b> The horizontal distance from the front tip of the saddle to the midpoint of the grip contour.</p> <p><b>Grip Drop</b> The vertical distance from the center point of the saddle profile to the midpoint of the grip contour. A negative value signifies the grip being lower than the saddle.</p>		<p><b>Bar Rise</b> The vertical distance from the top of the handlebar to the midpoint of the grip contour.</p>
	<p><b>Bar Sweep Angle</b> The top view angle between the handlebar clamp axis and the line from the center of the handlebar to the midpoint of the grip contour.</p>	 <p>GRIP WIDTH</p>	<p><b>Grip Width</b> The 3D distance between the midpoints of the grip contours if both grips traced. Otherwise, two times the distance perpendicular from the plane of the bike to the midpoint of the single traced grip contour.</p>
 <p>BAR WIDTH</p>	<p><b>Bar Width</b> The 3D distance between the widest endpoints of the grip contours if both grips traced. Otherwise, two times the distance perpendicular from the plane of the bike to the widest endpoint of the single traced grip contour.</p>		





# CYCLIST MEASUREMENT DEFINITIONS

## Stroke Intelligence/Averaging

A process developed by Retul to isolate each pedal stroke within a capture period and average our measurements across those pedal strokes. All lower limb measurements have stroke intelligence while our upper limb and torso measurements represent averages of the entire capture period.

## Vantage 3D Motion Capture

The Vantage system uses a technique called Motion Capture to record the dynamic movements of riders through digitization of anatomical markers. The Vantage 3D Motion Capture System is the world's only cycling-specific, 3D motion capture system featuring real-time data. The 3D generated body angles, alignments and movements patterns are considered the gold standard of accuracy in sports science as well as other fields such as video gaming, film, and clinical medicine.

KEY	DESCRIPTION/DEFINITION	KEY	DESCRIPTION/DEFINITION
	<b>Ankle Minimum</b> Maximum dorsiflexion at any point in the pedal stroke defined by the knee-ankle line and the heel-foot-line.		<b>Ankle Range</b> The difference between ankle maximum and ankle minimum.
	<b>Ankle Maximum</b> Maximum plantarflexion at any point in the pedal stroke defined by the knee-ankle line and the heel-foot-line.		<b>Ankle Angle at Front</b> The ankle angle at the front of the pedal stroke (90 degrees).
	<b>Ankle Angle at Top</b> The ankle angle at the top of the pedal stroke (0 degrees).		<b>Ankle Angle at Rear</b> The ankle angle at the rear of the pedal stroke (270 degrees).
	<b>Ankle Angle at Bottom</b> The ankle angle at the bottom of the pedal stroke (180 degrees).		<b>Knee Angle Range</b> The difference between knee angle flexion and knee angle extension.
	<b>Maximum Knee Flexion</b> Maximum flexion of the knee joint at any point in the pedal stroke defined by the hip-knee line and the knee-ankle line		<b>Back Angle</b> The angle of the back relative to the horizon defined by the hip and shoulder marker
	<b>Maximum Knee Extension</b> Maximum extension of the knee joint at any point in the pedal stroke defined by the hip-knee line and the knee-ankle line		<b>Elbow Angle</b> The angle of the elbow joint defined by the shoulder, elbow, and wrist marker
	<b>Hip Angle Closed</b> The most closed angle of the hip joint defined by the knee, hip and shoulder marker.		
	<b>Hip Angle Open</b> The most open angle of the hip joint defined by the knee, hip and shoulder marker.		
	<b>Hip Angle Range</b> The difference between hip angle open and closed.		
	<b>Shoulder Angle to Wrist</b> The angle of the shoulder joint defined by the hip, shoulder, and wrist markers.		
	<b>Shoulder Angle to Elbow</b> The angle of the shoulder joint defined by the hip, shoulder, and elbow markers.		





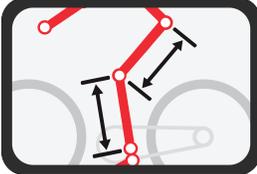
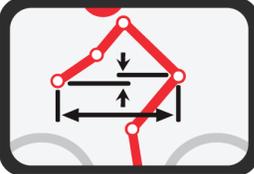
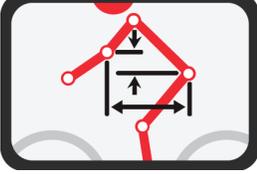
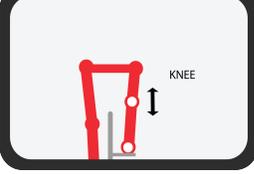
# CYCLIST MEASUREMENT DEFINITIONS

KEY	DESCRIPTION/DEFINITION	KEY	DESCRIPTION/DEFINITION
	<p><b>Forearm Angle</b> The angle of the forearm relative to the horizon defined by the elbow and wrist markers. A positive number indicates the wrist is higher than the elbow</p>		<p><b>Knee Forward of Foot</b> The fore/aft offset of the knee marker relative to the foot marker captured at the forward part of the pedal stroke (3 o'clock or 90 degrees down). A negative number indicates a knee that is aft of neutral.</p>
	<p><b>Knee Forward of Spindle</b> The fore/aft offset of the knee marker relative to the pedal spindle at 3 o'clock in the pedal stroke (90 degrees in the downstroke).</p>		<p><b>Knee Varus/Valgus (prior KFLO)</b> The lateral offset between the knee and foot markers. A negative number indicates the knee is in valgus. A positive number indicates the knee is in varus.</p>
	<p><b>Hip to Foot Lateral Offset</b> The lateral offset between the hip and foot marker. A negative number indicates the hip is outside the foot. A positive number indicates that the hip is inside the foot.</p>		<p><b>Shoulder to Wrist Lateral Offset</b> The lateral offset between the shoulder and wrist markers. A negative number indicates the wrist is inside the shoulder (TT bike). A positive number indicates the wrist is outside the shoulder (MTB).</p>
	<p><b>Foot from Level Mean</b> The angle of the foot relative to the horizon defined by the heel and forefoot marker</p>		<p><b>Foot Rotation Minimum</b> The minimum rotational angle of the foot relative to the bike plane defined by the heel and forefoot marker. A negative number indicates that the foot is externally rotated (heel closer to the bike than the forefoot). A positive number indicates the foot is internally rotated (forefoot closer to the bike than the heel).</p>
	<p><b>Foot Rotation Maximum</b> The maximum rotational angle of the foot relative to the bike plane defined by the heel and forefoot marker. A negative number indicates that the foot is externally rotated (heel closer to the bike than the forefoot). A positive number indicates the foot is internally rotated (forefoot closer to the bike than the heel).</p>		<p><b>Foot Rotation Mean</b> The average rotational angle of the foot relative to the bike plane defined by the heel and foot marker. A negative number indicates that the foot is externally rotated (heel closer to the bike than the forefoot). A positive number indicates that the foot is internally rotated (forefoot closer to the bike than the heel).</p>
	<p><b>Knee Travel Tilt</b> The frontal plane angle of the tracing created by the moving knee marker with respect to vertical. A positive number indicates a knee that tracks away from the bike in the upstroke. A negative number represents a knee that tracks towards the bike in the upstroke. See the front view of the knee path for visual representation of this measurement.</p>		<p><b>Knee Lateral Travel</b> The magnitude of the lateral movement of the knee</p>
	<p><b>Hip Vertical Travel</b> The magnitude of the vertical movement of the hip</p>		<p><b>Hip Lateral Travel</b> The magnitude of the lateral movement of the hip</p>





# CYCLIST MEASUREMENT DEFINITIONS

KEY	DESCRIPTION/DEFINITION	KEY	DESCRIPTION/DEFINITION
	<p><b>Thigh Length</b> The length of the hip/knee segment</p> <p><b>Shin Length</b> The length of the knee/ankle segment</p>		<p><b>Hip to Wrist Vertical</b> The vertical offset of the wrist relative to the hip marker</p> <p><b>Hip to Wrist Horizontal</b> The horizontal offset of the wrist relative to the hip marker</p>
	<p><b>Hip to Elbow Vertical</b> The vertical offset of the elbow relative to the hip marker.</p> <p><b>Hip to Elbow Horizontal</b> The horizontal offset of the elbow relative to the hip marker</p>		<p><b>Front View of Knee Path</b> Knee tracking measurement; green is downstroke; red is upstroke. The blue cone represents +/- 3 degrees on the knee travel tilt angle.</p>
	<p><b>Power Output</b> The average and maximum calculated power or user input power during the recording time.</p> <p><b>Speed</b> The average and maximum calculated rear wheel speed during the recording time.</p> <p><b>Cadence</b> The average and maximum calculated number of strokes per minute defined by the foot of every body measurement index.</p>		

