

Fat Bike Hub Spacing and Drivetrain Optimization

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Objective

- **The intention of this “whitepaper” is to address fat bike chainline optimization**
 - This is not meant to be a sales pitch. We love fat biking and we own and ride all the fat bike rear hub spacings out there today so we are just sharing what we have found.
 - For consideration when you read, front ring spacing between rings is 7-8mm and the rear cogs are about 4mm apart on 10/11 spd mtbk cassettes.
 - In our experience and testing +/- 3mm of a perfect chainline provides for the best functioning drivetrain

Summary

| | | Hub Spacing | |
|------------|----|---|--|
| | | 135mm Offset/ 170mm | 190 mm * |
| Drivetrain | 1x | - Ring in middle ring position on std 104 spider or use a DM ring designed for GXP (WTC SDM or other) | - Ring in big ring position on std 104 spider or use BB30 Short Spindle ring for SRAM GXP fat bike crank. - Any long spindle crank (wide q-factor) such as Surly or RF, mount the single ring in the inner position |
| | 2x | - Run stock 2x solutions (SRAM and RaceFace) | - Use a BB30 Short Spindle 2x spider for SRAM (X9 version coming from WTC in January 2014) - Any stock 2x long spindle crankset such as RF or Surly |

* There is no "190mm" standard today, but all extra wide hubs are around 190mm wide (186-191mm currently)

More Details...

History of Hub Spacing

190 mm solutions for your existing fat bike crankset

History Refresher: Different Fat Bike Rear Hub Spacing “Standards”



- 135 mm offset – the original solution used on Surly Bikes (and still being used today)
 - Standard 135 hub but adding 27mm of spindle length (100mm BB - 73mm BB)
 - Optimal chainline 64mm (50mm, the standard mtbk 1x optimal + $\frac{1}{2}$ of 27mm)
- 170 mm – a wider hub that was the first to offer a symmetric rear end to the fat bike world
 - Freewheel has the same 17.5 mm shift as is used on the 135 mm offset
 - Optimal chainline 64mm (50mm, the standard mtbk 1x optimal + $\frac{1}{2}$ of 27mm)
- 190 mm – a wider symmetric hub used on bikes that have frame clearance for 4.8” tires (e.g. Bud, Lou, and Big Fat Larry)
 - Freewheel is now shifted out further yet by ~10mm
 - Optimal chainline is 70-72mm (a little off from the mathematical optimal, but is what we found with testing)

Standard 100mm Spindle Cranksets



- Standard 100mm Spindle cranks are optimized for 170mm and 135-offset rear hubs
- Standard 100mm Spindle cranks are NOT optimized for 190mm and 135-offset rear hubs
 - Most 100mm cranksets do clear the frames of most 190mm rear hub frames. This is good news as converting to 190 does NOT necessarily mean you need a new crankset!
 - The only stock solutions optimized for 190mm rear hub are the RaceFace long spindle crankset and the MWOD from Surly
 - Both solutions result in ~20mm wider q-factors!

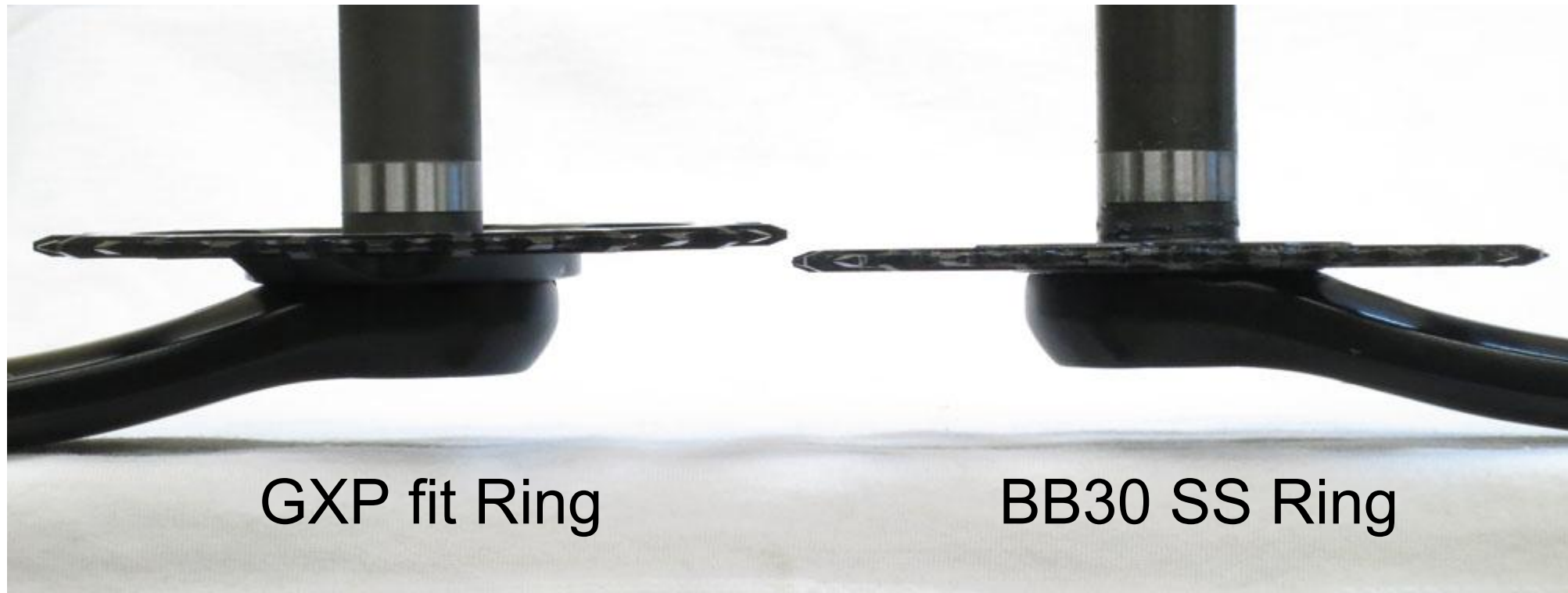
Running a standard 100mm Spindle Crankset on a 190 Rear Hub



- Why is this important?
 - 190 mm rear hub fat bikes are becoming more common and may become the de-facto standard
 - The q-factor on fat bikes is already wide and making it wider is not an ideal solution for most riders knees and hips!
- As noted, the ideal chainline on a 190mm rear hub is 170-172mm or about 6-8mm further outboard than on a standard 100mm crankset. The following solutions get the drivetrain within +/-3mm of the “perfect chainline”
 - 1x drivetrains:
 - For SRAM, use a BB30 short spindle single ring (chainline ~170): <http://www.wolftoothcycling.com/products/direct-mount-for-sram-bb30-cranks-1>
 - On a triple crankset, mount the single ring in the BIG ring position (chainline ~172)
 - 2x drivetrains:
 - For SRAM - Replace the stock spindle with a BB30 short spindle 2x spider (coming from WTC in January 2014)
 - For other 2x systems - there is no solution for standard 100 mm spindle cranksets

Picture of Chainline Difference for SDM

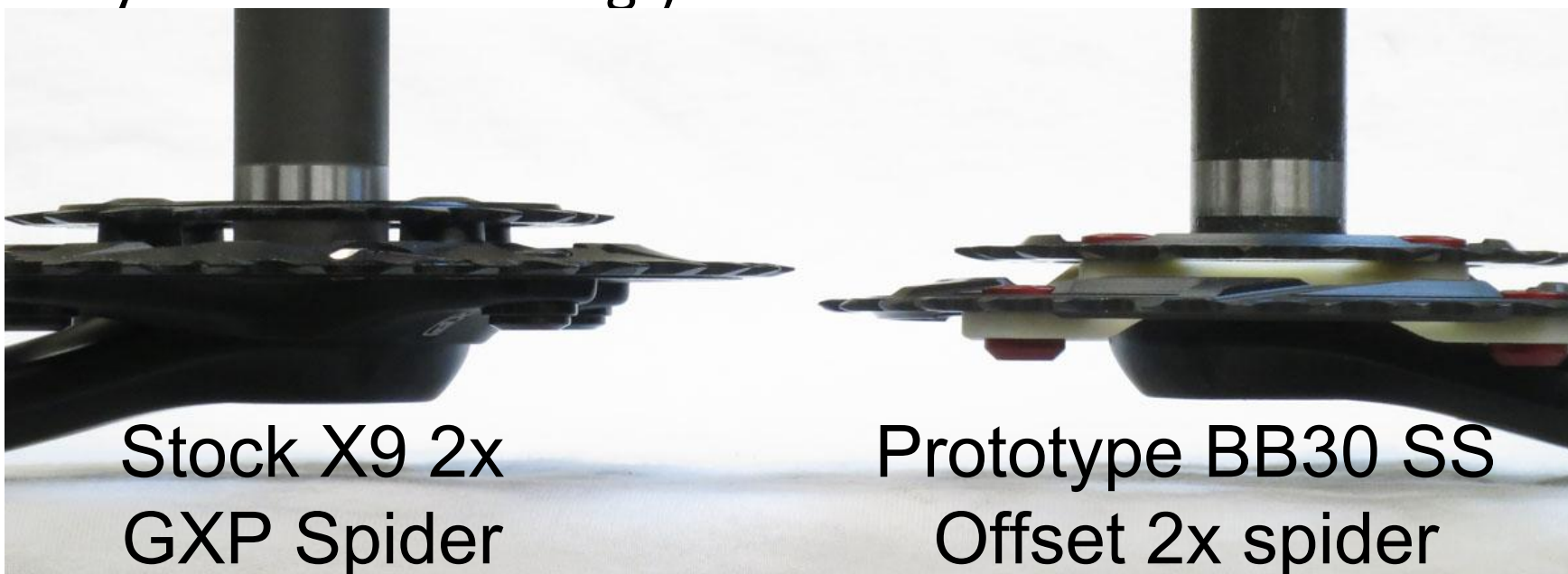
- Here are X9 cranks lined up with an SDM (SRAM Direct Mount) for GXP on the left and a SDM for Short Spindle BB30 on the right
- Note that the BB30 SS pushes the chainline out 6mm, which makes a good chainline when using an X9 or XX1 crankset on a 190 rear hub bike



Picture of Chainline Difference for 2x Spiders



- Here are X9 cranks lined up with a stock GXP 2x spider on the left and a Short Spindle BB30 2x spider (coming from WTC in February) on the right
- Note that the BB30 SS pushes the chainline out 6mm, which makes a good chainline when using an X9 crankset on a 190 rear hub bike (you can actually use the small ring!)



Stock X9 2x
GXP Spider

Prototype BB30 SS
Offset 2x spider

Other Links to Fat Bike Chainline and Tire Clearance

- Some other very useful references:
 - Salsa and tire clearance: http://salsacycles.com/culture/tech_talk_understanding_drivetrain_rear_tire_capacity
 - RF Fat Bike Crankset clearance: <http://www.raceface.com/comp/pdf/FATBIKE-CRANK-CLEARANCES.pdf>