

LEVEL 2 OVERHAUL CHECKLIST (for bikes with rim brakes)

*Not all steps apply to all bikes. Italicized items unavailable at lower job levels.
Torques are minimum recommended in absence of manufacturer specifications.*

Check-off items done to specification. Mark items with “NA” when not applicable, or “X” when problems could not be repaired and/or are in need of further attention.

EXISTING CONDITIONS

- Derailleurs operated and performance evaluated.
- Brakes operated and performance evaluated.
- Stem height *and handlebar position* marked or recorded.
- Handlebar add-on or extension positions recorded.*
- Control-lever positions recorded.
- Seat height, *fore/aft position, and angle* recorded.

DISASSEMBLY, CLEANING, AND INSPECTION

- Wheels removed.
 - Tires inspected for damage and wear, then removed.
 - Rear cogs or freewheel removed.
 - Freewheel or cassette cleaned in solvent.
 - Freewheel or cassette inspected for wear and damage.
 - Hubs disassembled (cleaned, including freehub body).
 - Hubs and axles sets inspected for wear and damage.
 - Rims and spokes thoroughly cleaned.
 - Rims inspected for damage.
 - Pedals removed, *disassembled, and cleaned.*
 - Pedals inspected for worn and damaged parts.
 - Crank arms removed, cleaned and inspected.
 - Chainrings removed, cleaned, and inspected for wear.
 - Bottom bracket disassembled and cleaned.
 - Bottom-bracket cartridge (or cups and spindle) inspected.
 - Chain removed and cleaned.
 - Chain inspected for wear and damage.
 - Brake cables removed and inspected for rust, frays, and kinks in the inner wire and housing.
 - Brake levers inspected for damage.
 - Brake calipers removed, *disassembled,* and cleaned.
 - Brake caliper inspected for damage.
 - Brake pads checked for wear.
 - Derailleur cables removed and inspected for rust, frays, and kinks in the inner wires and housing.
 - Rear derailleur removed, disassembled and cleaned.
 - Rear derailleur inspected for damage and worn pulleys.
 - Front derailleur removed, cleaned, and inspected.
 - Stem removed from fork.
 - Stem and *handlebar-binder* bolts removed and cleaned.
 - Handlebar extensions or add-ons removed and inspected, and bolts removed and cleaned.*
 - Handlebars and stem inspected for damage.
 - Headset disassembled and cleaned.
 - Headset parts inspected for wear, damage, and looseness in frame and on fork.
 - Fork inspected for damage.
 - Seat post removed and cleaned.
 - Seat binder removed, cleaned, and inspected.*
 - Frame thoroughly cleaned.
 - Frame checked for damage and cracks.
- ## FRAME PREP, ASSEMBLY, and BEARING ADJUSTMENT
- Stem *and handlebar binder* bolts greased and installed.
 - Handlebar extension/add-on bolts greased and installed.*
 - Brake-caliper threads, pivots, and springs lubricated and *calipers* assembled.
 - Adjustable brake pivots adjusted for no play or binding.
 - Brake-pivot nuts and/or bolts checked for security.

- Rear derailleur threads, pivots, and springs lubricated and pivots assembled.
- Rear-derailleur pulley wheels lubricated and installed.
- Seat tube honed if necessary.
- Seat binder lubricated and installed.*
- Seat post and seat tube greased.
- Seat post installed to original depth or minimum-insertion point, whichever is lower.
- Seat-post retention mechanism secured.
- Seat checked for proper alignment and security (non-integral clamp 130in-lbs, single-bolt-integral clamp 120in-lbs, double-bolt-integral clamp 85in-lbs).
- Fork alignment checked and fixed (as materials allow).*
- Fork dropouts aligned (as materials allow).
- Frame rear triangle aligned for proper width and center (as materials allow).*
- Rear swing-arm/linkage pivots secured.
- Rear dropouts aligned (as materials allow).
- Frame and fork polished or waxed.*
- Hubs assembled with worn parts replaced (where possible), fresh grease, and new bearings (parts addtl.).
- Rims trued laterally to .5mm tolerance or better.
- Rims trued radially to .5mm tolerance or better.
- Wheel dish corrected to .5mm tolerance or better.
- Spokes tensioned to 90-120 kgf right-side average (rim and spoke condition allowing).
- Spoke tensions set to $\pm 10\text{kgf}$ of average for each side.*
- Wheels stressed until true is stabilized.
- Hubs adjusted to have no free play secured in bike, but with free play when QR is loosened 45°.
- All hub locknuts secured to 120in-lbs.
- Freewheel or cassette lubricated and installed (cassette lockring secured to 355in-lbs).
- Tires installed, inflated, and inspected for proper seating.
- Bottom-bracket fixed cup (or cartridge) installed with Loctite 242 and secured to 300in-lbs.
- Bottom-bracket assembled with worn parts replaced, fresh grease, and new ball bearings (parts addtl.).
- Bottom-bracket adjusted to minimal drag and no free play, and lockring (or cartridge-retaining ring) secured to 300in-lbs (Loctite 242 on cartridge-retaining ring).
- Chainrings installed to right crank arm.
- Chainring bolts secured to 50in-lbs.
- Crank-arm bolts greased and arms secured:
Square taper – 335in-lbs (Race Face 420 in-lbs)
Spline fit (Octalink & ISIS) – 420in-lbs
Split-hole (such as Hollowtech II) binder bolts – 110in-lbs
- Threaded dustcaps lubed and gently secured.
OR One-key-release washers greased, cap threads prepped with Loctite 242, and caps gently secured.
- Pedals re-assembled with damaged parts replaced, fresh grease, and new ball bearings (parts addtl.).*
- Pedal bearings adjusted to minimal drag and no free play.
- Pedal threads greased and pedals secured to 300in-lbs.
- Headset assembled with loose parts secured, worn parts replaced, fresh grease and new bearings (parts addtl.).

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- Quill-stem shaft, wedge, and bolt greased, then installed to original depth of insertion (or minimum insert mark, whichever is lower), aligned perpendicular to fork, and secured to 170in-lbs (steel bolts only).
OR Threadless-stem bolts greased and installed, stem and top cap installed, and stem aligned perpendicular to fork.
 - Headset adjusted to loosest setting with no free play.
 - Threaded-headset locknut secured to 300in-lbs
OR Threadless-stem-binder bolts secured to 50in-lbs (double bolts) or 120in-lbs (single bolt).
 - Handlebars inspected for damage *and installed to original (unless unacceptable) alignment.*
 - Handlebar-binder bolts *greased, installed*, then secured (8mm bolts: 180in-lbs, 7mm bolts: 155in-lbs, 6mm bolts 120in-lbs, side-by-side binder bolts: 60in-lbs each).
 - Handlebar add-ons *installed, aligned* and secured.
 - Brake-pivot studs (if any) greased, Loctite 242 applied to mounting threads (except nylock nuts or bolts), & calipers mounted (70in-lbs for sidepulls, 25in-lbs for others).
 - Brake levers set to original alignment (unless unacceptable) and secured (cast clamp: 35in-lbs, strap clamp: 60in-lbs).
 - Brake-lever pivots, cable-anchor pivots and cable adjusters lubricated.
 - New or existing brake housings sized. (Lever to frame piece: as short as possible to allow full normal fork rotation. All others: as short as possible without abrupt bends at ends, or interference with caliper motion.)
 - Brake-housing ends finished with filing and end caps, wherever end caps fit (parts addtl.).
 - Wheels mounted in proper alignment and security (front axle nuts 180in-lbs, rear axle nuts 240in-lbs.
OR Q.R. skewers set so force is required through out the last 90° of closure and base of lever ends up parallel to dropout.
 - Derailleur hanger aligned to less than 4mm tool-to-rim gap at all points.
 - Rear derailleur installed and secured to 70in-lbs.
 - Front-derailleur pivots lubricated.
 - Front derailleur set so bottom of outer cage plate clears outer chainring teeth by 1-3mm.
 - Front derailleur rotated so outer cage plate is parallel to line of chain in outermost gear combination.
 - Front derailleur secured to 35in-lbs.
- BRAKE AND DERAILLEUR ADJUSTMENTS**
- Brake-pad height set so top edge of pad is even with top edge of rim's braking surface (except U-brake and outer-pivot arm of dual pivot: set so bottom edge of pad is even with bottom edge of rim's braking surface).
 - Brake pads set tangent (parallel) to rim.
 - Brake-pad toe set to .5-1.5mm if needed to reduce squeal.
 - Brake cables lubricated where they pass through housing.
 - Brake cables routed correctly (no interference with other cables, or unnecessary bends) and cable-pinch mechanisms secured to 50in-lbs.
 - Brake-cable system stress tested by pulling brake lever firmly a minimum of ten times.
- Brake-pad clearance set to 1-2mm per side (looser if cable release is difficult, or tighter if lever clears grip/bar by less than 25mm when pads first contact rim).
 - Brake pads centered to less than .5mm difference.
 - Brake cables trimmed, soldered, and capped.
 - Rim braking surfaces cleaned of lubricants.
 - New or existing derailleur housings sized and ends finished with end cap. (From controls to frame: sized as short as possible to allow full normal fork rotation. To rear derailleur: sized such that with derailleur body parallel to chain stay, housing enters adjusting barrel in a straight line.)
 - New or existing derailleur cables lubricated where they pass through housings.
 - Derailleur cables routed so they do not interfere with any other cables, and pinch mechanisms secured to 35in-lbs.
 - Derailleur cables pre-stressed.
 - Wobbling chainwheels aligned to less than .5mm wobble.
 - Chain lubricated, sized to longest acceptable length in small/small gear combination, and installed.
 - Chain inspected for tight links, protruding rivets, and too-short symptoms in big/big gear combination.
 - Rear-derailleur limit screws set to tightest settings that allow shift to largest and smallest sprockets (with no excess noise).
 - Rear-derailleur cable tension set to tightest setting that allows indexing without out-shift hesitation or post-shift chain-to-cog rubs.
 - Front-derailleur outer-limit screw set to hold .5-1.0mm clearance between the chain and outer cage (with chain on outer/outer gear combination).
 - Front-derailleur outer-limit screw set to hold .5-4.0mm clearance between the chain and inner cage (with chain on inner/inner gear combination).
 - Front-derailleur overshift checked in all gear combinations.
 - Front-derailleur cable tension set to create .0-.5mm clearance between inner cage and chain (chain on innermost rear cog and next-to-outermost chainring), with no audible rubs in any gear combination.
 - Accessories checked for mounting security and interference with moving parts or safety hazards.
- TEST RIDE AND INSPECTIONS**
- Handlebar and add-ons load-tested (30lb side load and 150lbs down load - tested at furthest point from headset).
 - Seat nose load tested (50lbs side load and 75lbs down load).
 - Brakes checked for stopping power and squeal.
 - Bicycle checked for tracking problems.
 - Derailleurs checked for performance and overshift.
 - Chain and freewheel cogs checked for skipping under load.
 - Bicycle checked for unusual noises.
- MECHANIC'S SIGNATURE _____
- DATE _____