SPICER (DANA) IFS FRONT DRIVE AXLE

Ford

NOTE — *FRONT AXLE USAGE — The Spicer (Dana) models 44-IFS, 44-IFS-HD & 50-IFS are used as front axles only. The 44-IFS is used on vehicles with front coil springs. The 44-IFS-HD and 50-IFS axles are used on vehicles with leaf springs.*

NOTE — *For removal and installation instructions, see appropriate articles on Locking Hubs and 4-Wheel Drive Steering Knuckles in this Section.*

DESCRIPTION

The Independent Front Suspension (IFS) front axle is of the integral carrier-housing, hypoid-gear type, with the centerline of the drive pinion mounted above the centerline of the ring gear. The drive pinion bearing preload, and side bearing preload are all set or adjusted by shims. Other than the components required for front wheel drive units, drive pinion depth and some torque specifications, service and overhaul procedures for all axle models are the same.

AXLE RATIO & IDENTIFICATION

All Spicer (Dana) drive axles have an integral carrier with a removable rear cover plate. The cover plate has a unique shape that allows positive identification of Spicer (Dana) drive axles on any vehicle. See *Fig. 1*. A metal tag, stamped with the gear ratio and part number is secured to the housing by one of the carrier bolts. If the axle is equipped with limited slip differential, the axle I.D. tag will have the letters LS following the part numbers. The axle model can be determined by measuring the diameter of the ring gear. See the following chart. To determined the drive axle ratio, *refer to Drive Axle Ratio Identification in this Section.*

Model Identification By Ring Gear Diameter

Application	Model
8.50" Ring Gear	Model 44
9.25" Ring Gear	Model 50

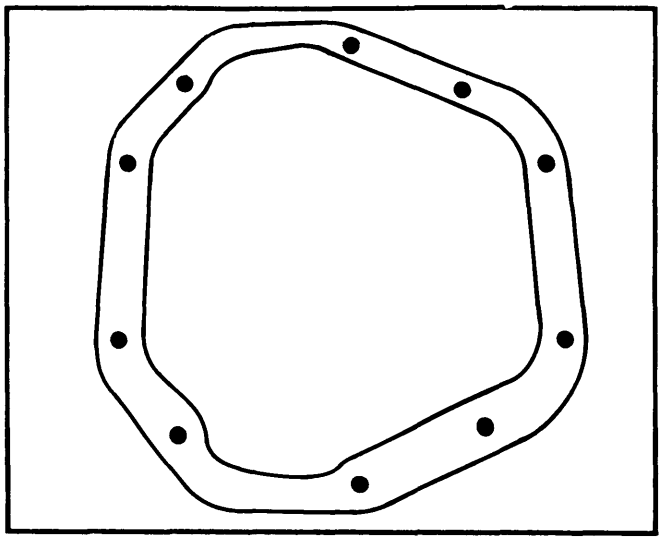

Fig. 1 Spicer (Dana) Housing Cover Gasket for Identification Purposes

REMOVAL & INSTALLATION

AXLE SHAFTS & BEARINGS

Removal — 1) Raise vehicle and support with safety stands. If equipped with locking hubs, *see removal and installation instructions on Locking Hubs and 4-Wheel Drive Steering Knuckles in appropriate articles in this Section.* Remove wheel and brake caliper assembly. Remove hub dust cover and snap ring. Remove drive gear and pressure spring. Remove wheel bearing lock nut, lock ring, and adjusting nut, using front wheel bearing spanner (T59T-1197-B for F150/250 and Bronco, or T78T-1197-A for F350).

2) Remove hub and disc assembly. Remove spindle retaining nuts. Then carefully remove spindle from knuckle studs and axle shaft. It may be necessary to tap spindle with a rawhide or plastic hammer to break it loose. Remove spindle, splash shield, and axle shaft assembly. Remove stub shaft and slip yoke assembly by removing 3 bolts attaching retainer plate to carrier housing.

3) Place axle shaft in a vise, and drill a 1/4" hole in housing retainer ring to a depth 3/4 the rings thickness. With a chisel placed across hole, strike sharply with a hammer to remove retaining ring. Replace bearing retaining ring upon assembly. Press bearing from axle shaft, using special axle bearing removal tools (T80T-4000-M and T80T-4000-L). Remove seal and retainer plate form stub shaft. Discard seal and replace with new seal upon assembly.

CAUTION — *Do not strike axle shaft to free it. And do not use heat from any source to remove retaining ring.*

NOTE — *If old bearing is to be reused and is still installed on axle shaft, lubricate it as follows: Push bearing retainer and seal toward flange end to shaft, being careful that seal does not come off machined part of shaft. Fill cavity between seal and bearing with grease. Wrap masking tape around seal and bearing to retain grease. With masking tape in place, pull seal up toward bearing, forcing grease into bearing. If grease does not appear at small end of rollers, repeat procedure.*

Installation — 1) Inspect retainer plate and stub shaft for nicks or burrs. Replace if necessary. Install retainer plate and new seal on shaft. Coat oil seal with grease. Place bearing on

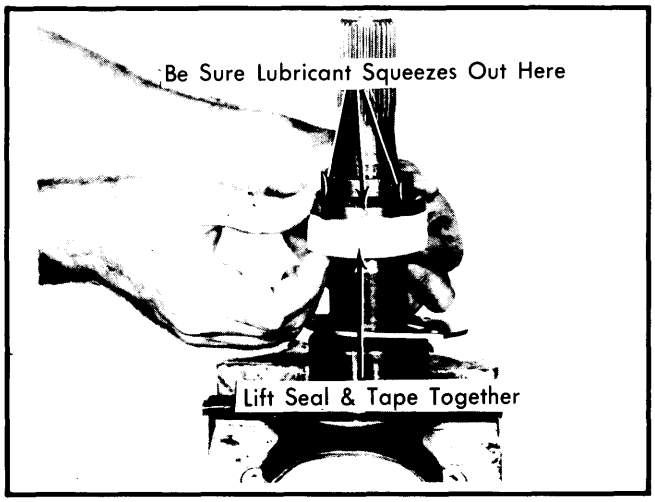

Fig. 2 Lubricating Bearing Installed on Axle Shaft

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shaft. Use axle bearing replacer (T80T-4000-N) and pinion bearing cone remove (T71P-4621-B) to press bearing onto shaft. A .0015" feeler gauge should not fit between bearing seat and bearing.

2) Install stub shaft in carrier, and install 3 retainer bolts. Tighten to 40 ft. lbs. Install right-hand axle shaft assembly into slip yoke. Note blind spline on axle shaft assembly. Install splash shield and spindle, using new nuts. Tighten to 55 ft. lbs. Install hub and disc assembly. Install caliper and wheel assembly.

PINION YOKE & SEAL

NOTE – *Pinion seal can be serviced with axle assembly installed in vehicle.*

Removal – 1) Disconnect drive shaft, and scribe a line down pinion shaft, yoke and nut. Remove nut and yoke using suitable tools.

CAUTION – *Do not hammer yoke off. Damage to pinion gear, ring gear and bearing could result.*

2) Pry seal from bore, using care not to damage machined surfaces.

Installation – Lubricate cavity between seal lips with high melting point lubricant. Install seal into bore, making sure it bottoms against shoulder. Place flange on shaft and draw it down with pinion nut. Tighten pinion nut to specifications. Install drive shaft.

CAUTION – *Failure to tighten pinion nut to full specifications will result in flange or pinion shaft failure.*

AXLE ASSEMBLY

Removal & Installation – Raise vehicle on hoist, supporting axle assembly to take weight off springs. Disconnect drive shaft at pinion flange and tie out of way. Remove hub and disc assemblies. Disconnect vent tube (if equipped), and disconnect shock absorber at axle brackets. Disconnect springs and remove axle. Reverse procedures to complete installation.

OVERHAUL

DISASSEMBLY

NOTE – *Axle housing does not need to be removed to overhaul assembly. However, it is suggested that the entire axle unit be removed from the vehicle and held tight in a stand or rack.*

1) Remove housing cover, and mark differential bearing caps for alignment reference. Loosen bearing cap bolts and install axle housing spreader tool (D-113) with holding clamps. Mount dial indicator on axle housing to measure amount of spread.

CAUTION – *Do not spread housing more than .020". Premanent damage to housing could result.*

2) Remove dial indicator after housing has been spread. Remove bearing cap bolts. Note the matched numbers or letters stamped on the cap and carrier. These letters must be matched upon assembly. Carefully pry differential assembly out of housing. Remove spreader tool immediately so that housing does not take set. Mount differential in vise and using brass drift and hammer, remove ring gear. Remove pinion mate lockpin with small punch. Remove pinion mate shaft and thrust block. Rotate pinion gears until gears are aligned with case opening. Remove gears and thrust washers.

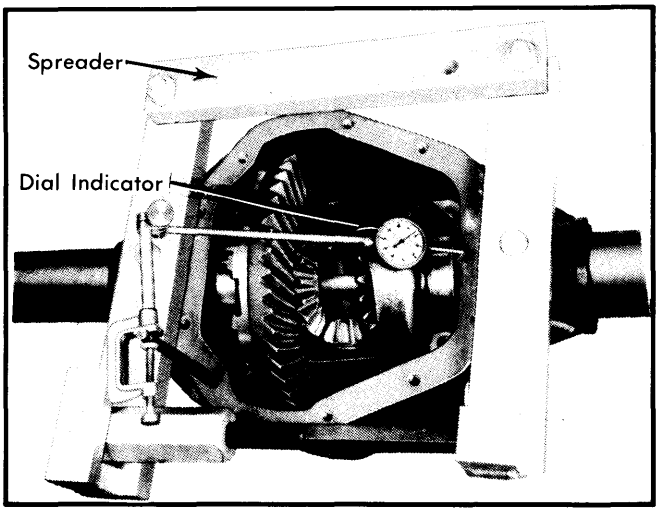

Fig. 3 Spreading Carrier Housing

3) Remove pinion nut. With suitable puller, remove pinion yoke. Using soft-faced hammer, drive pinion shaft out of housing.

NOTE – *Pinion bearing adjusting shims may remain on pinion shaft, stick to bearing, or fall loose. Collect them and save for reassembly.*

4) From pinion shaft bore, remove oil seal and bearing cone. A baffle or oil slinger may also be present. Record the order in which they were removed so that they may be installed correctly. Discard seal. Remove inner bearing cone, and press pinion bearing off shaft.

5) Using a suitable puller, remove side bearings from differential case. During removal of side bearings, shims between bearings and case may be mutilated. If so, shims must be individually measured and their thicknesses recorded, so that new shim packs can be secured.

REASSEMBLY & ADJUSTMENT

Case Assembly – 1) Place differential case in holding fixture or vise. Lubricate side and pinion gears and all thrust washers and install in case. Rotate side gears until holes in pinion gears and washers line up with holes in case. Install spacer block (if equipped) and differential pinion shaft. If old thrust washers are used, check for preload of side gears. Clearance between side gears and case should be .000-.006". If not, shims can be installed (at least one on each side) or new thrust washers used. Install lock pin, and peen over hole to retain pin. Inspect ring gear and case for burrs and nicks. Install ring gear and tighten bolt evenly.

2) Install differential side bearings. Assemble case in housing WITHOUT shims. Install bearings caps, and tighten bolts just enough to seat bearing cups. Mount dial indicator to read at back of differential flange. Measure and record amount of

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side play of differential case by moving back and forth with a screwdriver. The measurement will be used later to determined proper shim pack dimension. Remove case from housing.

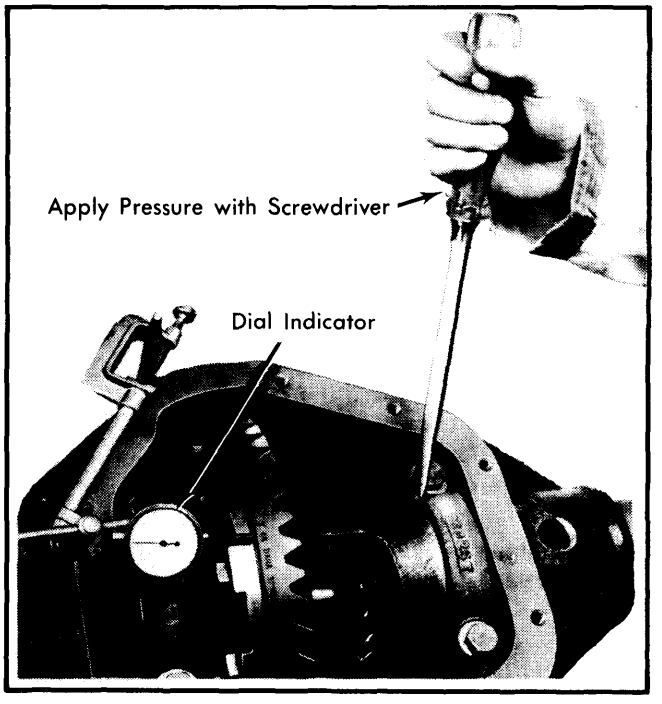

Fig. 4 Measuring Differential End Play With a Dial Indicator

Pinion Depth & Bearing Preload – **1)** Pinion is adjusted by shims placed between inner bearing cup and housing, and by shims placed between pinion shaft shoulder and outer bearing. Shims behind inner bearing cup adjust position of pinion in relation to ring gear. Shims behind outer bearing adjust pinion inner and outer bearing preload.

2) If old pinion and ring gear assembly are used, proceed as follows: Install original shims and inner bearing cup. Install outer bearing cup. Press bearing cone onto pinion shaft and install shaft into housing. Install outer bearing cone, companion flange, and nut. Do not install outer shims or seal at this time. Tighten nut to obtain bearing preload of 10-30 ft. lbs. Use a suitable gauge to measure distance from ring gear center to machined button on end of pinion gear. Add or subtract shims from under inner bearing cup to obtain nominal dimension listed in specifications.

3) If new pinion and ring gear assembly are to be installed, proceed as follows: Determine pinion depth adjustment figure of old and new pinions and find shim adjustment figure from chart. Adjust original shim pack accordingly and proceed as in step 2.

NOTE – *An oil slinger (between the inner bearing cone and pinion) and a baffle (between the inner bearing cup and carrier) have been added to the front axle assemblies.*

4) Remove pinion gear, rear bearing cup, and starter shim. Install pinion depth shim of correct thickness in housing bearing cup bore. Reinstall rear bearing cup. Install pinion bearing, oil slinger, yoke, washer, and old pinion nut. Tighten nut to specified torque, while rotating pinion shaft. Position housing so that pinion shaft is in vertical position, pointing up. With INCH lb. torque wrench, rotate shaft through several revolutions to measure rotating torque.

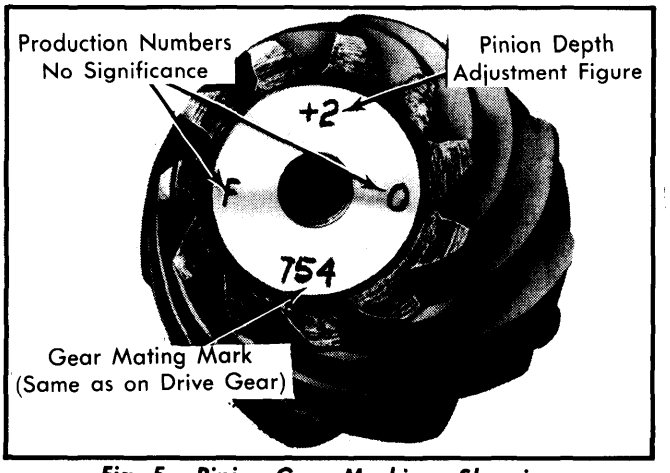

Fig. 5 Pinion Gear Markings Showing Depth Adjustment Figure

NOTE – *Ignore torque needed to start shaft rotating.*

5) Check measurement against pinion bearing preload in specifications. To decrease preload, add shims; to increase preload, subtract shims. After adjustment is made, install oil seal and recheck pinion depth.

6) Check seals in front axle housing bores. If condition is questionable, replace using suitable installer tool.

NOTE – *When installing front axle shafts be sure that these seals are not dislodged.*

Side Bearing Preload – **1)** With pinion installed in housing and depth and preload adjustments properly made, install differential case into housing. Set dial indicator so that it reads at back of ring gear. Leave bearing cap bolts loose enough to allow movement of case.

2) Insert screwdriver between bearing cap and housing at opposite end from ring gear. Jam case toward ring gear side and, with force still applied to case, set dial indicator to zero. Jam case the other way making sure that ring gear and pinion gears mesh, and record reading, repeat several times until readings are the same.

3) This reading is the amount of shims that will go between case and bearing on ring gear side. Remove indicator and differential case from the carrier. Remove master bearing from differential case. Install these shims.

4) From the figure originally recorded under Case Assembly, subtract amount of shims just installed on case. Add .015" for bearing preload and install new shim pack on end of case opposite ring gear.

Example: +.070" (Original Recorded Sideplay)
−.032" (Sideplay With Pinion Installed)
=.038" (Amount Left From Original Sideplay)
+.015" (Additional Amount For Bearing Preload)
=.053" (Amount Installed Opposite of Ring Gear)

5) Install spreader to housing, spread housing and install differential case.

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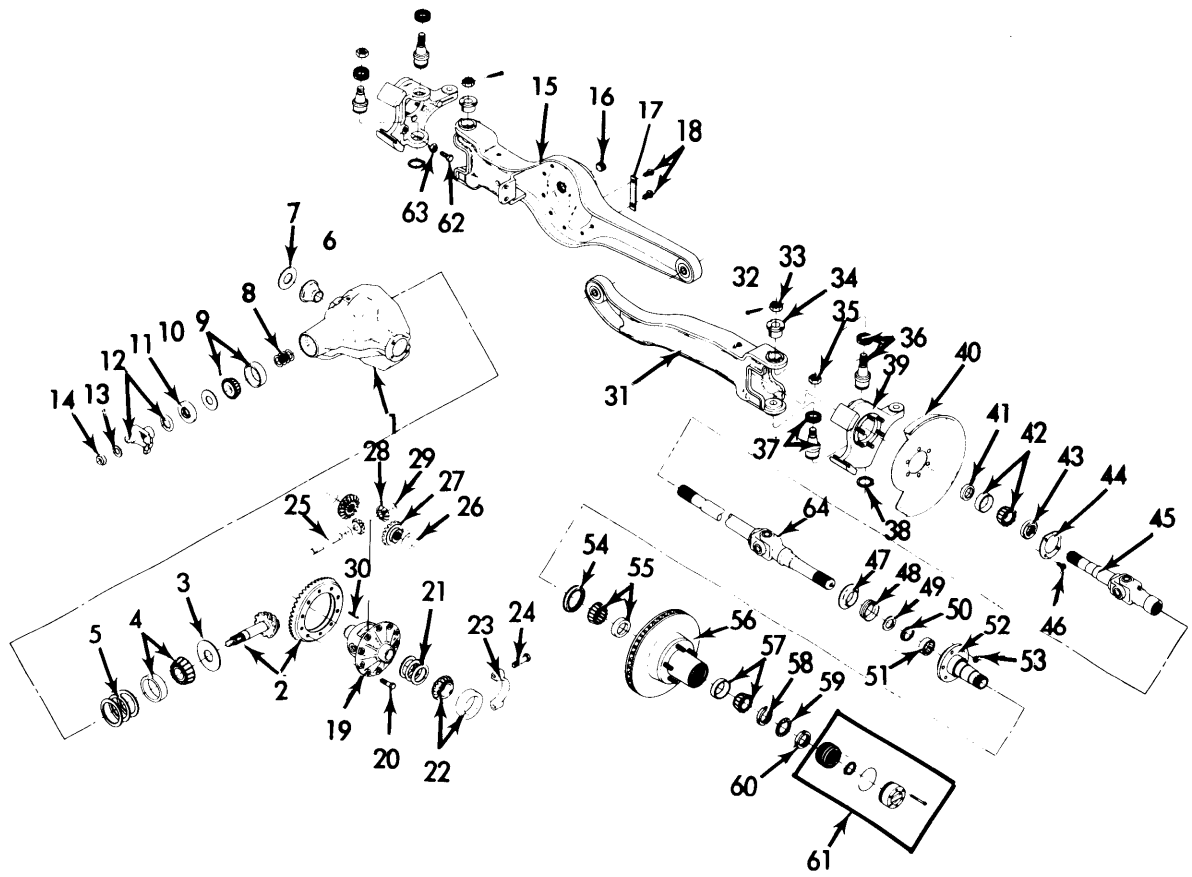

1 – Carrier
2 – Drive Gear and Drive Pinion Assembly
3 – Oil Slinger
4 – Inner Pinion Bearing
5 – Pinion Piston Shim
6 – Oil Seal
7 – Dust Slinger
8 – Pinion Bearing Preload Shims
9 – Outer Pinion Bearing
10 – Pinion Oil Seal Slinger
11 – Pinion Oil Seal
12 – End Yoke and Seal
13 – Washer
14 – Pinion Nut
15 – Left-Hand Support Arm
16 – Fill Plug
17 – Axle Identification Tag
18 – Cover Screws
19 – Differential Case
20 – Ring Gear Screws
21 – Differential Bearing Preload and Backlash Shims
22 – Differential Cup and Bearing
23 – Differential Bearing Cap
24 – Differential Bearing Cup Screw
25 – Differential Cross Shaft
26 – Differential Side Gear Thrust Washer
27 – Differential Side Gear
28 – Differential Pinion Mate
29 – Differential Pinion Mate Thrust Washer
30 – Roll Pin
31 – Right Hand Support Arm
32 – Cotter Key
33 – Slotted Nut
34 – Camber Adjuster
35 – Locknut
36 – Upper Socket Assembly
37 – Lower Socket Assembly
38 – Snap Ring
39 – Steering Knuckle
40 – Brake Splash Shield
41 – Bearing Retainer Ring
42 – Unit Bearing
43 – Oil Seal
44 – Retainer Plate
45 – Shaft Assembly and Slip Yoke Assembly
46 – Retainer Plate Screw
47 – Dust Shield
48 – Oil Seal
49 – Wheel Bearing Spindle Spacer
50 – Spindle Grease Seal
51 – Spindle Needle Bearings
52 – Spindle
53 – Spindle Retaining Nut
54 – Hub Grease Seal
55 – Inner Wheel Cup and Bearing
56 – Hub and Rotor
57 – Outer Wheel Cup and Bearing
58 – Inner Wheel Bearing Adjusting Nut
59 – Wheel Bearing Nut Lock Washer
60 – Outer Wheel Bearing Adjusting Nut
61 – Hub Lok Assembly
62 – Steering Stop Bolt
63 – Stop Bolt Nut
64 – Outer Shaft and Joint Assembly

Fig. 6 Exploded View of Spicer (Dana) Model 44-IFS Front Drive Axle

NOTE – *Do not spread housing more than .020". Permanent damage to housing could result.*

6) Remove spreader and install bearing caps. Make sure that caps are in original position. Then tighten caps evenly.

Backlash & Final Assembly – Mount dial indicator to housing, and measure ring gear to pinion gear backlash in 3 places around ring gear. Variation between readings should not exceed .002". Adjust to specifications by moving shims from one side of differential case to the other, or by changing depth of pinion gear. Check tooth contact pattern. *See Tooth Pattern in this Secton.* Install cover and tighten bolts to specifications.

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TIGHTENING SPECIFICATIONS

Application	Ft. Lbs.
Pinion Shaft Flange Nut	210
Differential Side Bearing Cap Bolt	50
Ring Gear-to-Differential Case Bolt	55
Axle Shaft Retainer Bolt	30
Differential Housing Cover Bolt	20

AXLE ASSEMBLY SPECIFICATIONS

Application	Specifications
Axle Shaft End Play	Non-Adjustable
Ring Gear Backlash	.005-.010"
Side Bearing Preload	
New Bearings	20-40 INCH Lbs.
Used Bearings	10-20 INCH Lbs.
Pinion Gear Depth (Normal Dimension)	
Model 44 (8.50" Ring Gear)	2.625"
Model 50 (9.25" Ring Gear)	2.810"

PINION DEPTH SHIM ADJUSTMENT CHART (INCHES)

Old Pinion Marking	New Pinion Marking								
	.4	.3	.2	.1	0	+1	+2	+3	+4
+4	+0.008	+0.007	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0
+3	+0.007	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	+0	−0.001
+2	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0	−0.001	−0.002
+1	+0.005	+0.004	+0.003	+0.002	+0.001	0	−0.001	−0.002	−0.003
0	+0.004	+0.003	+0.002	+0.001	0	−0.001	−0.002	−0.003	−0.004
−1	+0.003	+0.002	+0.001	0	−0.001	−0.002	−0.003	−0.004	−0.005
−2	+0.002	+0.001	0	−0.001	−0.002	−0.003	−0.004	−0.005	−0.006
−3	+0.001	0	−0.001	−0.002	−0.003	−0.004	−0.005	−0.006	−0.007
−4	0	−0.001	−0.002	−0.003	−0.004	−0.005	−0.006	−0.007	−0.008

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