OPERATOR'S MANUAL

M110
15

INCLUDING: INSTALLATION & MAINTENANCE

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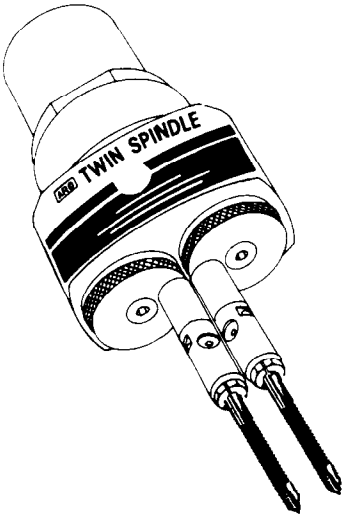
Form: 3124-2

DUAL SPINDLE ATTACHMENT MODEL 47908

FOR USE WITH ARO® SERIES 5 ELECTRA-FEED™ DRILL

IMPORTANT: READ THIS MANUAL CAREFULLY BEFORE INSTALLING, OPERATING OR SERVICING THIS EQUIPMENT.



CENTER DISTANCES:
3/4" TO 3-3/4"
(19.0 TO 95.0 mm)

TAP CAPACITY UP TO:
5/16" (8 mm)

TO ATTACH TO TOOL

REMOVE SCREW Y194-16 SECURING DRILL CHUCK TO SPINDLE AND REMOVE DRILL CHUCK. REMOVE LOCKNUT 46971 FROM PISTON ASSEMBLY. ASSEMBLE DRIVING DOG 47757-301 TO SPINDLE AND SECURE WITH SCREW Y99-478 SUPPLIED WITH ADAPTER ASSEMBLY 47907.
THREAD ADAPTER 47757-311 TO PISTON ASSEMBLY ALIGNING KEY SLOT OF DRIVE GEAR 47757-317 WITH KEY IN DRIVING DOG 47757-301. TIGHTEN SECURELY.
ASSEMBLE DUAL SPINDLE ATTACHMENT 47768 TO ADAPTER ASSEMBLY 47907. IMPORTANT – ALTERNATELY TIGHTEN ADJUSTMENT SCREWS 46036 APPROXIMATELY 1/2 TURN AT A TIME TO PREVENT DAMAGING THE UNIT.

RECOMMENDED METHOD FOR HOLDING TAPS IN SPINDLES

TO PROPERLY HOLD TAP BIT IN COLLET AND REDUCE THE CHANCE OF SLIPPAGE, INSERT BIT INTO SPINDLE WITH SQUARE END OF TAP SHANK INTO LOCKING INSERT (WHERE APPLICABLE – SMALLER CAPACITY DUAL SPINDLES DO NOT HAVE AN INSERT, ONLY SET SCREWS). TIGHTEN COLLET FIRMLY, THEN TIGHTEN SET SCREWS.
NOTE: DO NOT OVERTIGHTEN COLLET. INTENT OF SET SCREWS IS ONLY TO KEEP BIT FROM TURNING COLLETS.

LUBRICATION

OIL RESERVOIRS CAN BE REPLENISHED THRU EITHER SOCKET HEAD SET SCREW (45984) LOCATED ON OPPOSITE SIDES OF THE BODY. THE FELT TYPE OIL RESERVOIRS (46053) SHOULD BE SATURATED WITH A GOOD MULTIGRADE 10W/30 OIL AT APPROXIMATELY EVERY 160 HOURS OF USE. USE ONLY MULTIGRADE 10W/30. DO NOT USE GREASE.

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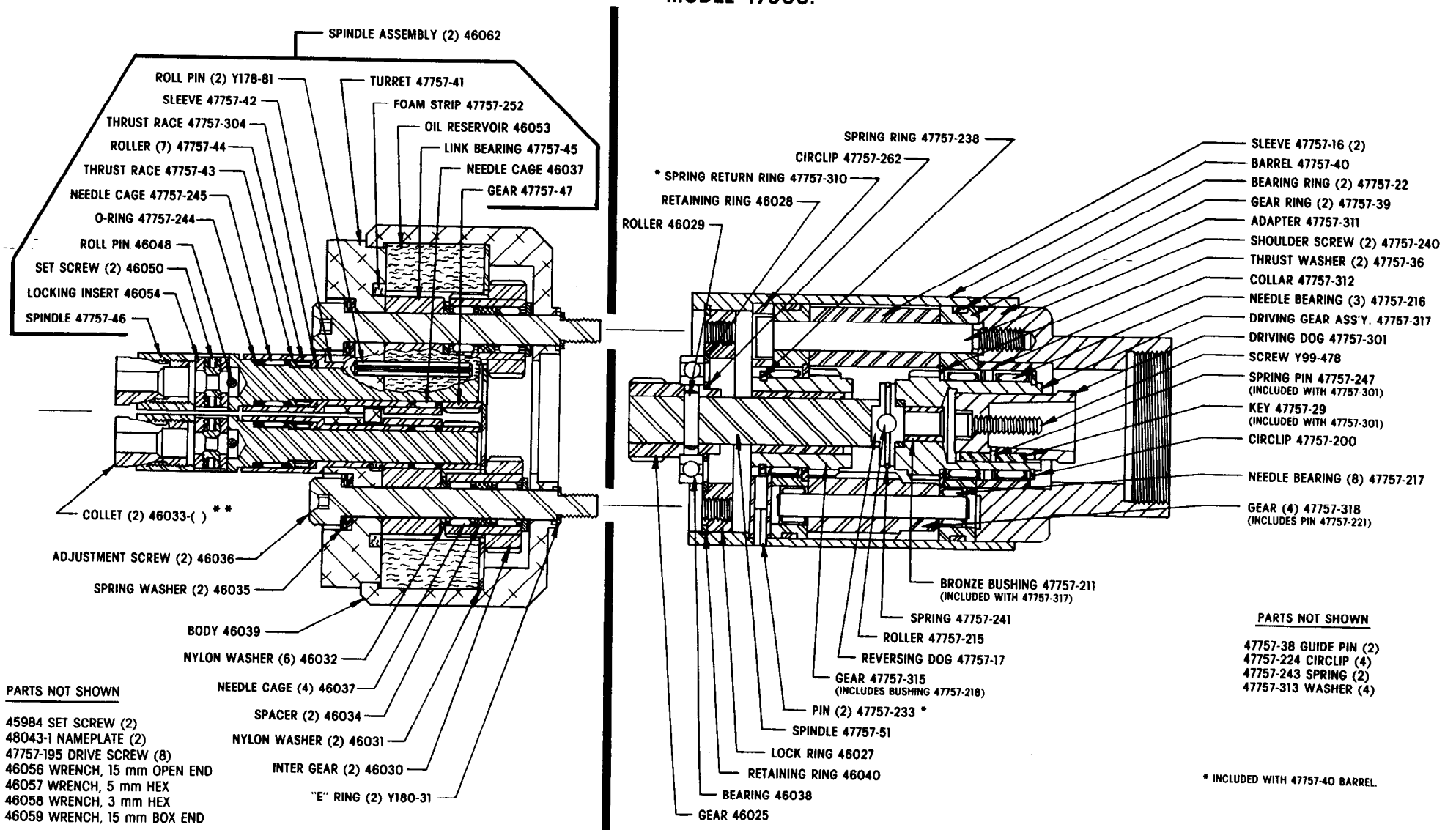
DUAL SPINDLE ATTACHMENT
MODEL 47908.



PARTS NOT SHOWN

45984 SET SCREW (2)
48043-1 NAMEPLATE (2)
47757-195 DRIVE SCREW (8)
46056 WRENCH, 15 mm OPEN END
46057 WRENCH, 5 mm HEX
46058 WRENCH, 3 mm HEX
46059 WRENCH, 15 mm BOX END

PARTS ON THIS SIDE OF HEAVY LINE ARE INCLUDED IN DUAL SPINDLE HEAD ASSEMBLY 47768.

** NOTE: COLLETS ARE NOT FURNISHED WITH DUAL SPINDLE ATTACHMENT — — COLLETS MUST BE ORDERED SEPARATELY.

PARTS NOT SHOWN

47757-38 GUIDE PIN (2)
47757-224 CIRCLIP (4)
47757-243 SPRING (2)
47757-313 WASHER (4)

* INCLUDED WITH 47757-40 BARREL.

PARTS ON THIS SIDE OF HEAVY LINE ARE INCLUDED IN TAPPING ADAPTER ASSEMBLY 47907.

DISASSEMBLY

The Dual Spindle Attachment can be serviced without removing the complete assembly from tool. Using 5 mm hex wrench supplied with unit, loosen both Adjusting Screws (46036)—IMPORTANT: Alternately unthread Adjusting Screws approximately 1/2 turn at a time or unthread screws simultaneously to prevent damaging the unit and remove dual spindle unit from tool.

Push back on head of Adjusting Screw (46036) to compress Spring Washer (46035) and expose "E" Ring (Y180-31) out of counterbore of Body and remove "E" Ring. Rotate Spindle Turret and at the same time pull back slightly on Turret to locate alignment of Spindle with notch in Body (46039) and remove Spindle Assembly from Body. To remove Gear (46030) from Body, remove Oil Reservoir (46053) and Nylon Washer (46031)—bend washer slightly to remove. Needle Cage (46037), Spacer (46034) and Washer (46032) are loose parts and will drop out. DO NOT disassemble Spindle (46062) unless it is necessary to replace a part.

To disassemble Spindle Assembly (46062): Using a flat bottom type punch or similar tool and an arbor press, remove Gear (47757-47) from Spindle (47757-46). Remove Spindle from the Sleeve carefully because the seven (7) Rollers (47757-44) are loose parts and will drop out. NOTE: Thrust Race (47757-43) is press fit on Spindle. Cut off O-Ring (47757-244) and using a "C" type washer that properly fits spindle, press Thrust Race and Needle Cage off Spindle. If Link Bearing (47757-45) and Sleeve (47757-42) are removed from Turret, it will be necessary to remove the Foam Strip (47757-252) first. Lift one end of Foam Strip and pull so it slides through notch under Link Bearing. Using a proper size punch and arbor press, remove Link Bearing. Press Sleeve through remaining distance in Turret.

To disasemble Adapter Assembly (47907): Remove the Adapter Assembly from the drilling unit (tool). Remove Retaining Rings (46028) and (46040) and remove Lock Ring (46027). Remove two (2) Circlips (47757-224) from the two (2) Guide Pins (47757-38). Pull off Barrel (47757-40). Remove Circlip (47757-262). Push Bearing (46038) back on spindle exposing Roller (46029) and Remove Roller, Gear (46025) and Bearing (46038). Remove Shoulder Screws (47757-240) to disassemble the remaining adapter parts. Remove Circlip (47757-200) to remove the Driving Gear (47757-317) and Gear Ring (47757-39). With the Driving Gear and Thrust Washer (47757-36) removed the Needle Bearings are then pressed out to separate the Adapter (47757-56) and the Gear Ring (47757-39).

REASSEMBLY

Pack bearings and coat gears with a good grade of bearing grease when assembling. Saturate Oil Reservoirs with a good multigrade 10W/30 oil.

Assembling Spindle (46062): Press Sleeve (47757-42) into Turret. IMPORTANT — SLOT IN THE SLEEVE MUST BE ALIGNED WITH THE NOTCH IN THE BACK FACE OF TURRET. Push the Foam Strip (47757-252) into the notch in Turret with the widest side across the notch. The center of the strip should be under the sleeve and the two ends should meet at the point opposite the sleeve. Press the Link Bearing on Sleeve keeping the 10 mm hole in the Link Bearing in accurate alignment with the 10 mm hole in the Turret. Slide O-Ring (47757-244) and Needle Cage (47757-245) on Spindle. Slide Thrust Race (47757-43) on Spindle and press to location diameter up to shoulder adjacent to Bearing (47757-245). Be certain Thrust Race is pressed on and squarely seated or premature failure of the bearing may occur. Assemble Thrust Race (47757-304) and slide Spindle into Sleeve leaving approximately a 1/2" gap between end of Sleeve and Thrust Race and assemble the seven (7) Rollers to Spindle. Be certain there are seven rollers. Lubricate Rollers and bearings using a good grade of bearing grease and slide Spindle on into Sleeve. Assemble Needle Cage (46037) to Spindle and press Gear (47757-47) on Spindle leaving an end play of .001/.002".

Insert a dummy Adjusting Screw (46036) (or a shaft of same dia.) thru Adapter side of Body to maintain alignment of parts to be assembled into Body and assemble Nylon Washer (46032) to dummy screw. Assemble one Needle Cage (46037), Spacer (46034) and Needle Cage (46037) into Gear (46030) and assemble Gear to the dummy screw. Assemble Nylon Washer (46031) into Body — Bend Washer slightly to insert into Body and assemble Oil Reservoir (46053) into Body.

Assemble Spring Washer (46035) and Nylon Washer (46032) to Adjusting Screw (46036) and assemble adjusting Screw to Spindle Assembly.

Assemble another Nylon Washer (46032) to Adjusting Screw. Assemble the Spindle Assembly into Body while holding Adjusting Screw in alignment with dummy screw to maintain parts alignment and using Adjusting Screw to push the dummy screw out of Body. NOTE: Align Spindle Assembly with notch in Body to assemble. After assembling Spindle to Body, depress head of Adjusting Screw and assemble "E" Ring to Screw securing Screw to Body.

Assembling Adapter (47907): Press Needle Bearings (47757-217) into Gear Rings (47757-39) flush with face. Press Needle Bearings (47757-216) into Gear Rings in the following manner. Place Thrust Washer (47757-36) on the bed of the press, cover the Thrust Washer with the counterbore of the Gear Ring (47757-39) and press bearing into bore. This procedure will ensure correct positioning of the Needle Bearing. Press Needle Bearing (47757-216) into Adapter (47757-56) flush with counter bored face. Align the two (2) Shoulder Screw holes of Gear Ring (47757-39) with the tapped holes in the Adapter (47757-56) using one (1) Shoulder Screw and press the projecting portion of the Needle Bearing into the Adapter using the press against the Thrust Washer (47757-36).

Lightly grease all Needle Bearings with a good grade of bearing grease and remove excess grease from Needle Berings (47757-217) as this can affect the performance of the Adapter Assembly by blocking breather channels. Press Bronze Bushing (47757-211) into Driving Gear (47757-317) and Bronze Bushing (47757-218) into Reversing Gear (47757-315). The Bushings should be pressed flush with the back face of the dogs and should not obstruct the engagement of the dogs. DO NOT GREASE BRONZE BUSHINGS. Check that Tapping Spindle (47757-51) slides freely into bushings. Fit Thrust Washer (47757-36) and Driving Gear (47757-317) to Gear Ring/Adapter Assembly and assemble Circlip (47757-200). Fit Thrust Washer (47757-36) and Reversing Gear (47757-315) into the remaining Gear Ring (47757-39) and assemble Spring Ring (47757-238). Be sure gears rotate freely. Slide Reversing Dog (47757-17) onto Spindle (47757-51) and assemble Roller (47757-215) through Reversing Dog and Spindle. Assemble Spring (47757-241) over Dog and Roller securing Roller. Position gap in Spring away from end of Roller. Assemble Circlip (47757-224) to the groove 1/2" from end of Guide Pin (47757-38). Slide on Washer (47757-313), Spring (47757-243) and second Washer (47757-313). Slide end of Guide Pin through Gear Ring/Reversing Gear Assembly compressing Spring and assemble Circlip (47757-224) to groove of Pin.

Place Adapter (47757-311)/Gear Ring Assembly on working surface with Gear Ring "up" and fit Inter Gears (47757-318) into bearings. Adjacent and diametrically opposite Gears should be reversed. Place end of Spindle (47757-51) into Driving Gear Bushing (47757-211). Take Bearing Ring /Guide Pin Assembly and align bearing with Inter Gears (47757-318) and push together. Slide Sleeve (47757-16) between Gear Rings and assemble Shoulder Screws (47757-240) and tighten subassembly. Remove retaining Circlips and check if gears rotate freely. Grease the Reversing Dog cavity. Be sure the groove around the Gear Ring is free from dirt and fit the brass Bearing Ring (47757-22). The Bearing Rings should be opened up just enough to pass over Gear Ring.

continued on page 4.

Slide Barrel over assembly so Guide Pins and screw heads project through Spring Return Ring (47757-310). Barrel should be a slide fit. A tight fit will affect the performance of the Tapping Adapter Assembly. Using a screwdriver, lever the Guide Pins through Spring Return Ring and assemble Circlips (47757-224) to Guide Pin groove.

Assemble Bearing (46038) to Gear (46025) leaving cross hole exposed. Slide Circlip (47757-262) and Gear on Spindle aligning cross holes of Gear and Spindle and secure Gear to Spindle with Roller (46029). Slide Bearing (46038) over Gear securing Roller. Assemble Circlip (47757-262) to Gear. Assemble Lock Ring (46027) into Barrel and secure with Retaining Rings (46028) and (46040).

NOTE: When assembling Dual Spindle Attachment to Adapter assembly, alternately thread Adjusting Screws (46036) approximately 1/2 turn at a time to prevent damaging the unit.

SPINDLE ADJUSTMENT

FOR SIMPLE SPINDLE ADJUSTMENT THE "X" "X" AND "Y" "Y" AXIS OF THE COMPONENT SHOWN IN FIG. 1 SHOULD COINCIDE WITH THE "X" "X" AND"Y" "Y" AXIS OF THE DRILL HEAD AND DRILLING UNIT AS SHOWN IN FIG. 2. THE SPINDLES SHOULD THEN BE ADJUSTED IN THE MANNER SHOWN IN FIGS. 3 AND 4.

IMPORTANT –
IF THE PROCEDURE IS NOT FOLLOWED AND BOTH SPINDLES ARE MOVED OUT TO ONE SIDE OF THE HEAD, ANY SUBSEQUENT SPINDLE ADJUSTMENT WILL RESULT IN THE NECESSITY OF HAVING TO RE-ADJUST THE RELATIONSHIP BETWEEN THE DRILLING UNIT AND THE COMPONENT.

FIG. 2 SHOWS THE TWIN SPINDLE HEAD WITH THE SPINDLES SET TO THE MINIMUM CENTERS.

TO ADJUST THE SPINDLES AS SHOWN IN FIG. 3 LOOSEN BOTH SCREWS "A" AND ROTATE BOTH TURRETS IN THE DIRECTION INDICATED BY THE ARROWS TO THE APPROXIMATE CENTERS THAT ARE REQUIRED.

ROTATE THE COMPLETE DRILL HEAD ASSEMBLY TO BRING BOTH SPINDLES TO THE REQUIRED "Y" "Y" AXIS AS SHOWN IN FIG. 4. FINALLY ADJUST SPINDLE CENTERS ON AXIS "Y" "Y" TO SUIT GAUGE OR DRILL BUSHINGS AND TIGHTEN SCREWS "A" SECURELY.

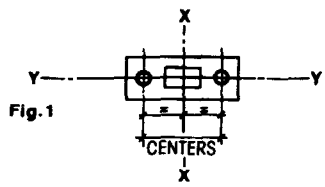


Fig.1

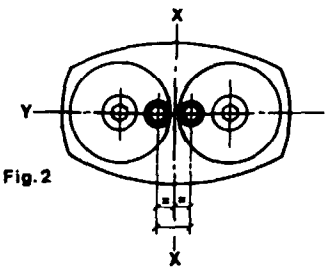


Fig.2

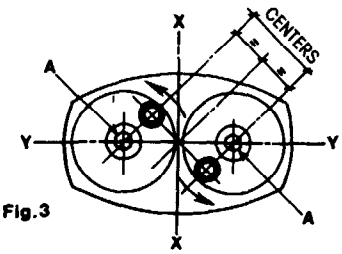


Fig.3

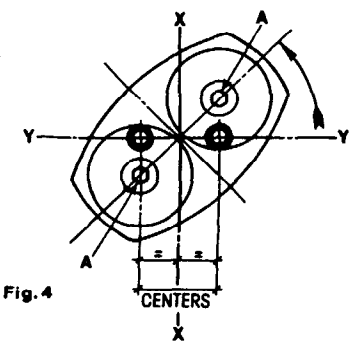


Fig.4

TAP CHART 46033-( ) COLLETS

PART NO.	TAP RANGE (METRIC)	
46033-17	No. 0 – No. 6	(M 1.6 – M 3.5)
46033-24	No. 8	(M 4)
46033-31	No. 10	(M 4.5 – M 5)
46033-37	No. 12	—
46033-46	1/4"	(M 6)
46033-62	5/16"	(M 7 – M 8)

PART NO.	BORE DIA. (REF.)	ACCEPTS DRILL SIZES INCH	NO.	mm
46033-1	.079	5/64	47	2.0
46033-2	.083		45	2.1
46033-3	.087		44	2.2
46033-4	.091		43	2.3
46033-5	.094	3/32	42	2.4
46033-6	.098		40	2.5
46033-7	.102		38	2.6
46033-8	.106		36	2.7
46033-9	.110	7/64	35	2.8
46033-10	.114		33	2.9
46033-11	.118		32	3.0
46033-12	.122		31	3.1
46033-13	.126	1/8	—	3.2
46033-14	.130		30	3.3
46033-15	.134		29	3.4
46033-16	.138		—	3.5
46033-17	.142	9/64	28	3.6
46033-18	.146		26	3.7
46033-19	.150		25	3.8
46033-20	.154		23	3.9
46033-21	.157	5/32	22	4.0
46033-22	.161		20	4.1
46033-23	.165		19	4.2
46033-24	.169		18	4.3
46033-25	.173	11/64	17	4.4
46033-26	.177		16	4.5
46033-27	.181		14	4.6
46033-28	.185		13	4.7
46033-29	.189	3/16	12	4.8
46033-30	.193		10	4.9
46033-31	.197		9	5.0
46033-32	.201		7	5.1
46033-33	.205	13/64	5	5.2
46033-34	.209		4	5.3
46033-35	.213		3	5.4
46033-36	.216		—	5.5
46033-37	.220	7/32	2	5.6
46033-38	.224		—	5.7
46033-39	.228		1	5.8
46033-40	.232		—	5.9
46033-41	.236	15/64	A	6.0
46033-42	.240		B	6.1
46033-43	.244		C	6.2
46033-44	.248		D	6.3
46033-45	.252	1/4	E	6.4
46033-46	.256		F	6.5
46033-47	.260		G	6.6
46033-48	.264	17/64	—	6.7
46033-49	.268		H	6.8
46033-50	.272		I	6.9
46033-51	.276		J	7.0
46033-52	.280	9/32	K	7.1
46033-53	.283		—	7.2
46033-54	.287		—	7.3
46033-55	.291		L	7.4
46033-56	.295		M	7.5
46033-57	.299	19/64	—	7.6
46033-58	.303		N	7.7
46033-59	.307		—	7.8
46033-60	.311	5/16	—	7.9
46033-61	.315		O	8.0
46033-62	.319		—	8.1
46033-63	.323		P	8.2
46033-64	.327	21/64	—	8.3
46033-65	.331		Q	8.4
46033-66	.335		—	8.5
46033-67	.339		R	8.6
46033-68	.342	11/32	—	8.7
46033-69	.346		—	8.8
46033-70	.350		S	8.9
46033-71	.354		—	9.0
46033-72	.358	23/64	T	9.1
46033-73	.362		—	9.2
46033-74	.366		—	9.3
46033-75	.370		U	9.4
46033-76	.375	3/8	—	9.5