

130, 160, 165, 175, 180, and 185 Lawn Tractors

TECHNICAL MANUAL

**John Deere
Lawn & Grounds Care Division**

TM1351 (Apr-88)

Introduction

FOREWORD

This manual is written for an experienced technician. Essential tools required in performing certain service work are identified in this manual and are recommended for use.

Live with safety: Read the safety messages in the introduction of this manual and the cautions presented throughout the text of the manual.



This is the safety-alert symbol. When you see this symbol on the machine or in this manual, be alert to the potential for personal injury.

Technical manuals are divided in two parts: repair and diagnostics. Repair sections tell how to repair the components. Diagnostic sections help you identify the majority of routine failures quickly.

Information is organized in groups for the various components requiring service instruction. At the beginning of each group are summary listings of all applicable essential tools, service equipment and tools, other materials needed to do the job, service parts kits, specifications, wear tolerances, and torque values.

Binders, binder labels, and tab sets can be ordered by John Deere dealers direct from the John Deere Distribution Service Center.

This manual is part of a total product support program.

FOS MANUALS—REFERENCE

TECHNICAL MANUALS—MACHINE SERVICE

COMPONENT MANUALS—COMPONENT SERVICE

Fundamentals of Service (FOS) Manuals cover basic theory of operation, fundamentals of troubleshooting, general maintenance, and basic type of failures and their causes. FOS Manuals are for training new personnel and for reference by experienced technicians.

Technical Manuals are concise guides for specific machines. Technical manuals are on-the-job guides containing only the vital information needed for diagnosis, analysis, testing, and repair.

Component Technical Manuals are concise service guides for specific components. Component technical manuals are written as stand-alone manuals covering multiple machine applications.

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All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

TM1351-19-18APR90

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INDX

TO JOHN DEERE DEALERS

FILING INSTRUCTIONS

TM-1351 (APR-88)
130, 160, 165, 175, 180, and 185 Lawn Tractors

Discard TM-1351 dated (Feb-87) and replace with this manual dated (Apr-88).

New information added to this manual includes:

- All repair specifications moved to Section 10, Group 10
- All test and adjustments specifications moved to Section 210, Group 01
- Sunstrand hydrostatic transmission repair and adjustment.
- Kanzaki differential repair
- Engine symptom/problem diagnostic charts in Section 220, Group 10
- New wiring schematic for new ground system.

The following service information bulletins apply to the 130, 160, 165, 175, 180 and 185 tractors:

TY87-70-6	M87-12-6
TY87-70-1	M87-12-5
M87-12-11	M87-12-4
M87-12-10	M87-12-3
M87-12-9	M87-12-2
M87-12-8	M87-12-1

MX,DEALER -19-07JUN89

Section 10 General Information

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Peerless Differential Oil 10-25-2

Kanzaki Differential Oil 10-25-3

Eaton Hydrostatic Transmission Oil 10-25-3

Substrand Hydrostatic Transmission Oil 10-25-3

General Purpose grease 10-25-4

Group 30—Serial Numbers

Product Identification Numbers 10-30-1

Engine Serial Number 10-30-1

RECOGNIZE SAFETY INFORMATION

This is the safety-alert symbol. When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.

Follow recommended precautions and safe operating practices.



O53,ALERT -19-16JUN87

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-UN-07DEC88
T81389

UNDERSTAND SIGNAL WORDS

A signal word—DANGER, WARNING, or CAUTION—is used with the safety-alert symbol. DANGER identifies the most serious hazards.

Safety signs with signal word DANGER or WARNING are typically near specific hazards.

General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this manual.



O53,SIGNAL -19-07OCT85

-19-30SEP88
TS187

HANDLE FUEL SAFELY—AVOID FIRES

Handle fuel with care: it is highly flammable. Do not refuel the machine while smoking or when near open flame or sparks.

Always stop engine before refueling machine. Fill fuel tank outdoors.

Prevent fires by keeping machine clean of accumulated trash, grease, and debris. Always clean up spilled fuel.

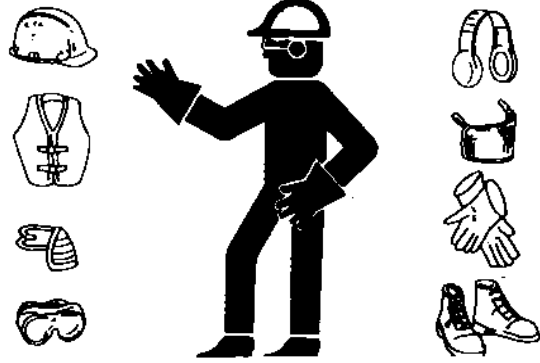


O53,FIRE1 -19-23APR87

-UN-23AUG88
TS202

WEAR PROTECTIVE CLOTHING

Wear close fitting clothing and safety equipment appropriate to the job.



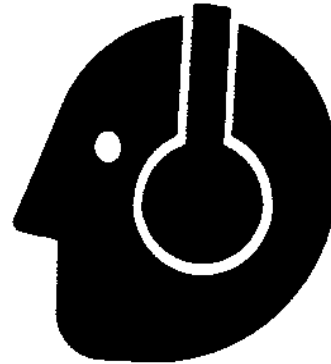
O53,WEAR2 -19-23APR87

TS206 -UN-23AUG88

PROTECT AGAINST NOISE

Prolonged exposure to loud noise can cause impairment or loss of hearing.

Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.



O53,NOISE -19-23APR87

TS207 -UN-23AUG88

PRACTICE SAFE MAINTENANCE

Understand service procedure before doing work. Keep area clean and dry.

Never lubricate or service machine while it is moving. Keep hands, feet, and clothing from power-driven parts. Disengage all power and operate controls to relieve pressure. Lower equipment to the ground. Stop the engine. Remove the key. Allow machine to cool.

Securely support any machine elements that must be raised for service work.

Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.

Disconnect battery ground cable (-) before making adjustments on electrical systems or welding on machine.



O53,SERV -19-21DEC87

TS218 -UN-23AUG88

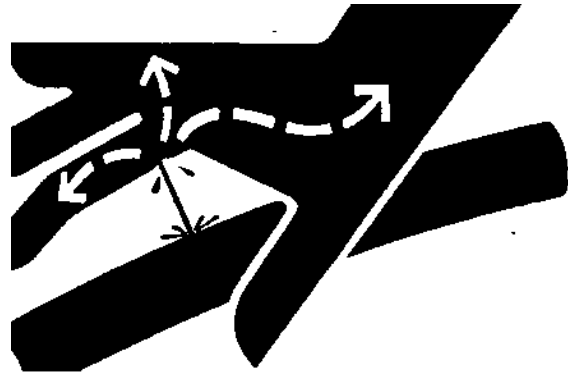
AVOID HIGH-PRESSURE FLUIDS

Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury may call the Deere & Company Medical Department in Moline, Illinois, or other knowledgeable medical source.



O53,FLUID -19-01DEC88

X9811 -UN-23AUG88

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REPAIR SPECIFICATIONS

SECTION 20—Engine

Item	Specification
PTO Mounting Cap Screw Torque	56 N·m (45 lb-ft)

SECTION 40—Electric PTO Clutch

Item	Specification
PTO Clutch Clearance	0.41 mm (0.016 in.)

SECTION 50—Power Train

Item	Specification
Powered Wheels	
Wheel Hub-to-Axle Housing Clearance	0.25—1.02 mm (0.010—0.040 in.)
Traction Drive Clutch	
Belt Clearance	94 mm (3.70 in.)
Belt Guide Clearance	5 mm (0.20 in.)
5-Speed Transaxle	
Needle Bearings	
Output Pinion and Input Shaft Depth	3.43—3.81 mm (0.135—0.150 in.)
Transaxle Cover Cap Screw Torque	12 N·m (100 lb-in.)
Hydrostatic Transmission	
Eaton	
Dump Valve Shaft Torque	3 N·m (30 lb-in.)
Body-to-Cover Cap Screw Torque	20 N·m (180 lb-in.)
Oil Reservoir Torque	14 N·m (124 lb-in.)
Control Arm Clearance	0.70—2.50 mm (0.028—0.098 in.)
Control Lever Spring Length	42 mm (1.700 in.)
Sundstrand	
Center Section-to-Transmission Cap Screw Torque	17 N·m (150 lb-in.)
Drain Plug Torque	15 N·m (130 lb-in.)
Transmission Oil Capacity	850 cc (28.7 fl oz)
Hydrostatic Differential	
Peerless	
Ring Gear Cap Screw Torque	10 N·m (88 lb-in.)
Differential Cover Cap Screw Torque	11 N·m (97 lb-in.)
Differential Carrier-to-Case Thrust Surface Maximum Wear	1.02 mm (0.040 in.)

M21,1010S,A1 -19-13MAY88

SECTION 50—Power Train (cont'd)

Item	Specification
Hydrostatic Differential (cont'd)	
Kanzaki	
Idle Gear I.D.	21.01—21.03 mm (0.827—0.828 in.)
Idler Shaft O.D.	16.99—17.00 mm (0.668—0.669 in.)
Cam Lever Shaft O.D.	19.97—20.03 mm (0.786—0.788 in.)
Cam Lever Shaft Bore I.D. (Cover)	20.10—20.20 mm (0.791—0.795 in.)
Cam Lever Shaft Bore I.D. (Housing)	20.05—20.08 mm (0.789—0.790 in.)
Actuator Thickness (Includes Ball)	9.10—9.30 mm (0.358—0.366 in.)
Disc Thickness	1.90—2.10 mm (0.075—0.083 in.)
Plate Thickness	2.40—2.60 mm (0.094—0.102 in.)
Axle Housing (Needle Bearing) O.D.	24.98—25.00 mm (0.983—0.984 in.)
Counter Gear I.D.	20.01—20.03 mm (0.788—0.789 in.)
Pinion Drive O.D.	20.00—20.02 mm (0.787—0.788 in.)
Pinion Shaft O.D.	13.97—13.98 mm (0.549—0.550 in.)
Pinion Gear I.D.	14.03—14.05 mm (0.552—0.553 in.)
Differential Case (Axle End) I.D.	20.08—20.10 mm (0.790—0.791 in.)
Ring Gear Cap Screw Torque	26 N·m (230 lb-in.)
Bearing Retainer Tapping Bolts	
New Case Torque	29 N·m (22 lb-ft)
Used Case Torque	25 N·m (221 lb-in.)
Axle Tapping Bolts	
New Case Torque	29 N·m (22 lb-ft)
Used Case Torque	25 N·m (221 lb-in.)
Ring Gear-to-Pinion Drive Gear Backlash	0.15—0.30 mm (0.006—0.012 in.)
Cam Lever Shaft Tapping Bolt	
New Case Torque	29 N·m (22 lb-ft)
Used Case Torque	25 N·m (221 lb-in.)
Case Cover Tapping Bolts	
New Case Torque	29 N·m (22 lb-ft)
Used Case Torque	25 N·m (221 lb-in.)
Drain Plug Torque	15 N·m (130 lb-in.)

SECTION 60—Steering and Brakes

Item	Specification
Brake Disk Gap Clearance	0.50 mm (0.020 in.)

SECTION 80—Miscellaneous

Item	Specification
Mower Spindle	
Maximum Mower Spindle Rolling Torque	0.07 N·m (0.60 lb-in.)
Spindle Mounting Bolt Torque	25 N·m (221 lb-in.)
Mower Blade Cap Screw Torque	75 N·m (55 lb-ft)
Mower Drive Sheave Nut Torque	125 N·m (92 lb-ft)

TRACTOR SPECIFICATIONS

ENGINE

Manufacture	KAWASAKI
Engine Model Number	
130	FC290V
160/165	FB460V
175	FC420V
180/185	FC540V
Horsepower	
130	9
160/165	12.5
175	14
180/185	17
Cylinders	One
Cycle	Four
Speeds	
Full throttle, no load	3350 ± 100 rpm
Slow idle, no load	1400 ± 100 rpm
Spark Plug Type	
130	Champion RN11YC
160/165	Champion RCJ8 NGK-BMR4A
175	Champion RN11YC
180/185	Champion RN11YC
Spark Plug Gap	
130, 175, 180/185	0.70—0.80 mm (0.028—0.031 in.)
160/165	0.60—0.70 mm (0.024—0.028 in.)

ELECTRICAL SYSTEM

Battery, John Deere (TY6109)	12 Volt
255 amp cold cranking capacity capacity at 25 amp	
Alternator Charging Capacity	
130	13 Amp
160/165	13 Amp
175	13 Amp
180/185	15 Amp
Ignition	Solid State

CAPACITIES

Fuel Tank	8.3 L (2.2 gal)
Engine Oil, Without Filter	
130	1.1 L (2.3 pt)
160/165	1.4 L (3 pt)
175	1.3 L (2.7 pt)
180/185	1.6 L (3.4 pt)
Engine Oil, With Filter	
160/165	1.6 L (3.4 pt)
175	1.7 L (3.6 pt)
180/185	2.0 L (4.2 pt)
Transaxle	
130/160/180	1.1 L (2.3 pt)
Hydrostatic Transmission	
165/175/185	0.7 L (1.5 pt)
Differential	
165/175/185	0.7 L (1.5 pt)

TRAVEL SPEEDS AT 3300 RPM

First Gear-Transaxle	
130/160/180	2.2 km/h (1.4 mph)
180 w/46 in. Mower	2.4 km/h (1.5 mph)
Second Gear	
130/160/180	3.5 km/h (2.2 mph)
180 w/46 in. Mower	3.8 km/h (2.4 mph)
Third Gear	
130/160/180	5.3 km/h (3.3 mph)
180 w/46 in. Mower	5.6 km/h (3.5 mph)
Fourth Gear	
130/160/180	6.7 km/h (4.2 mph)
180 w/46 in. Mower	7.2 km/h (4.5 mph)
Fifth Gear	
130/160/180	7.8 km/h (4.9 mph)
180 w/46 in. Mower	8.5 km/h (5.3 mph)
Hydrostatic Transmission	
Forward	0-8 km/h (0-5 mph)
Reverse	0-4 km/h (0-2.5 mph)

APPROXIMATE WEIGHT

130	184 kg (405 lb)
160	202 kg (445 lb)
165 and 175	213 kg (470 lb)
180 with 30 in. Mower	220 kg (485 lb)
180 with 46 in. Mower	236 kg (520 lb)
180 with 38 in. Mower	231 kg (510 lb)

M21,1010S,A3 -19-16MAY88

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MOWER SPECIFICATIONS

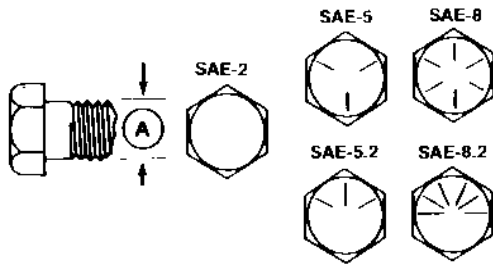
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Item	30-Inch	38-Inch	46-Inch
Type	Rotary	Rotary	Rotary
Cutting Blades	One	Two	Three
Blade Length	762 mm (30 in.)	496 mm (19.50 in.)	407 mm (16 in.)
Cutting Width	762 mm (30 in.)	965 mm (38 in.)	1170 mm (46 in.)
Cutting Height	25.40—102 mm (1.00—4.00 in.)	25.40—102 mm (1.00—4.00 in.)	38.10 102 mm (1.50—4.00 in.)

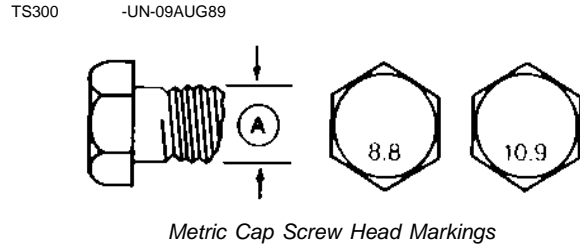
Specifications and design subject to change without notice.

M21,1010S,A4 -19-16MAY88

CAP SCREW TORQUE VALUES



Inch Cap Screw Head Markings



Metric Cap Screw Head Markings

INCH CAP SCREW TORQUE VALUES

Bolt Diameter (A)	Wrench Size	Cap Screw Grade					
		SAE 2		SAE 5		SAE 8	
		N-m	lb-ft	N-m	lb-ft	N-m	lb-ft
1/4"	7/16"	7	(5)	11	(8)	16	(12)
5/16"	1/2"	14	(10)	23	(17)	33	(24)
3/8"	9/16"	24	(18)	41	(30)	54	(40)
7/16"	5/8"	41	(30)	68	(50)	95	(70)
1/2"	3/4"	61	(45)	102	(75)	142	(105)
9/16"	13/16"	88	(65)	142	(105)	203	(150)
5/8"	15/16"	122	(90)	197	(145)	278	(205)
3/4"	1-1/8"	217	(160)	353	(260)	495	(365)
7/8"	1-5/16"	224	(165)	563	(415)	800	(590)
1"	1-1/2"	332	(245)	848	(625)	1193	(880)
1-1/4"	1-7/8"	665	(490)	1492	(1100)	2393	(1765)

CAUTION: Use only metric tools on metric hardware. Other tools may not fit properly. They may slip and cause injury.

DO NOT use these values if a different torque value or tightening procedure is listed for a specific application. Torque values listed are for general use only. Check tightness of cap screws periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

METRIC CAP SCREW TORQUE VALUES

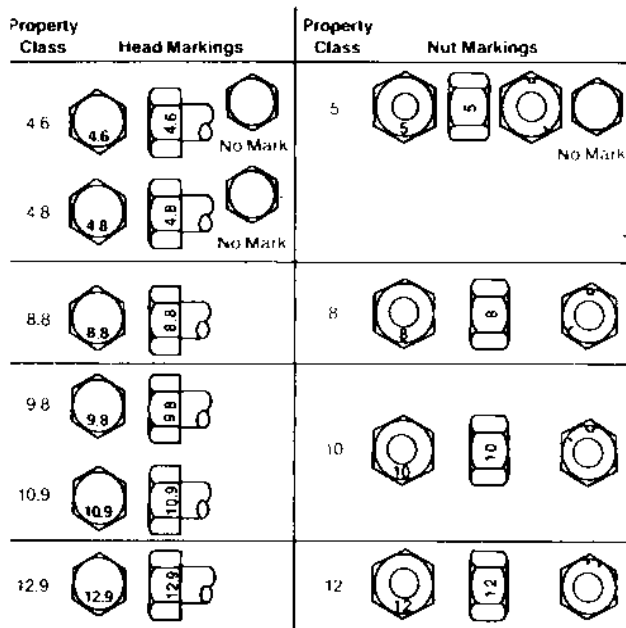
Bolt Diameter (A)	Wrench Size	Markings on Cap Screw Heads			
		8.8		10.9	
		N-m	lb-ft	N-m	lb-ft
5 mm	8 mm	6	(4.5)	9	(6.5)
6 mm	10 mm	10	(7.5)	15	(11)
8 mm	13 mm	25	(18)	35	(26)
10 mm	16 mm	50	(37)	75	(55)
12 mm	18 mm	85	(63)	130	(97)
16 mm	24 mm	215	(159)	315	(232)
20 mm	30 mm	435	(312)	620	(457)
24 mm	36 mm	750	(553)	1070	(789)
30 mm	46 mm	1495	(1103)	2130	(1571)

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

Make sure fastener threads are clean and you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of amount shown in chart. Tighten toothed or serrated-type lock nuts to full torque value.

METRIC SERIES TORQUE CHART



TS234 -19-19DEC88

CAUTION: Use only metric tools on metric hardware. Other tools may not fit properly. They may slip and cause injury.

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

Check tightness of cap screws periodically. Torque values listed are for general use only. Do not use these values if a different torque value or tightening procedure is listed for a specific application.

Make sure fastener threads are clean and you properly start thread engagement. This will prevent them from failing when tightening.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Tighten cap screws having lock nuts to approximately 50 percent of amount shown in chart.

DIA.	WRENCH SIZE	4.6		4.8		8.8		9.8		10.9		12.9	
		OIL	DRY	OIL	DRY	OIL	DRY	OIL	DRY	OIL	DRY	OIL	DRY
		N-m(lb-ft)	N-m(lb-ft)	N-m(lb-ft)	N-m(lb-ft)	N-m(lb-ft)	N-m(lb-ft)	N-m(lb-in)	N-m(lb-in)	N-m(lb-ft)	N-m(lb-ft)	N-m(lb-ft)	N-m(lb-ft)
M5	8mm	1.5(1)	2.5(1.5)	2.5(1.5)	3.0(2)	4.5(3.5)	6.0(4.5)	5.0(3.5)	7.0(5)	6.5(4.5)	9.0(6.5)	7.5(5.5)	10.0(7.5)
M6	10mm	3.0(2)	4.0(3)	4.0(3)	5.5(4)	7.5(5.5)	10.0(7.5)	8.5(6)	12.0(9)	11.0(8)	15.0(11)	13.0(9.5)	18.0(13)
M8	13mm	7.0(5)	9.5(7)	10.0(7.5)	13.0(10)	18.0(13)	25(18)	21.0(15)	30(22)	25(18)	35(26)	30(22)	45(33)
M10	16mm	14.0(10)	19.0(14)	20.0(15)	25(18)	35(26)	50(37)	40(30)	55(41)	55(41)	75(55)	65(48)	85(63)
M12	18mm	25(18)	35(26)	35(26)	45(33)	65(48)	85(63)	70(52)	100(74)	95(70)	130(97)	110(81)	150(111)
M14	21mm	40(30)	50(37)	55(41)	75(55)	100(74)	140(103)	115(85)	155(114)	150(111)	205(151)	175(129)	240(177)
M16	24mm	60(44)	80(59)	85(63)	115(85)	160(118)	215(159)	180(133)	245(180)	235(173)	315(232)	275(203)	370(273)
M18	27mm	80(59)	110(81)	115(85)	160(118)	225(166)	305(225)			320(236)	435(321)	375(277)	510(376)
M20	30mm	115(85)	160(118)	165(122)	225(166)	320(236)	435(321)			455(356)	620(457)	535(395)	725(535)
M22	33mm	160(118)	215(159)	225(167)	305(225)	435(321)	500(435)			620(457)	840(620)	725(535)	985(726)
M24	36mm	200(148)	275(203)	285(210)	390(288)	555(409)	750(553)			790(583)	1070(789)	925(682)	1255(926)
M27	41mm	295(218)	400(295)	415(306)	565(417)	810(597)	1100(811)			1155(852)	1565(1154)	1350(996)	1835(1353)
M30	46mm	400(295)	545(402)	565(417)	770(568)	1100(811)	1495(1103)			1570(1158)	2130(1571)	1835(1353)	2490(1837)
M33	51mm	545(402)	740(546)	770(568)	1050(774)	1500(1106)	2035(1500)			2135(1575)	2900(2139)	2500(1840)	3390(2500)
M36	55mm	700(516)	950(700)	990(730)	1345(992)	1925(1420)	2610(1925)			2740(2021)	3720(2744)	3205(2364)	4355(3212)

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