


CIRCULATE  
TO:

SERVICE MGR.

PARTS MGR.

MECHANICS

Place in Your  
"Service Bulletins  
Binder"

## GASOLINE/OIL RECOMMENDATIONS - ALL MERCURY SNOWMOBILES

(Attach Bulletin Reference Sticker to Page 1-6 of Your Snowmobile Service Manual.)

**IMPORTANT:** Supersedes all information previously published on gasoline/oil recommendations: Service Manual, Operation and Maintenance Manuals, Snowmobile Service Bulletins and "Fuel Warning Tags - Posters".

### Fan Cooled and Free-Air Models

Recommended Oil(s)	Fan Cooled		Free-Air	
	Ratio (1)	Gasoline (2)	Ratio	Gasoline (3)
Quicksilver Snowmobile	50:1	Regular	20:1	100/130 AvGas
Quicksilver Formula 25	50:1	Leaded	20:1	
Quicksilver Formula 50D	50:1	Minimum 86	20:1	
Quicksilver Formula 50	50:1	Average Octane	20:1	
BIA/TC-W Rated	40:1	(80 Motor Octane)	20:1	

- (1) Ratio of 25:1 is required for the first (one) tank-full during engine "Break-In" period and/or for "Severe Service" operation. Refer to "Operation and Maintenance Manual" for "Severe Service" definition.
- (2) For 1975 Model 440 T/T (Below CHASSIS Serial No. 4210250), use PREMIUM, UNLESS ignition timing is retarded from .095" BTDC to .080" BTDC.
- (3) For Racing, use 100/130 AvGas and retard ignition timing from .100" BTDC to .080" BTDC. For Trail Ride, use PREMIUM and retard ignition timing from .100" BTDC to .060" BTDC.

### Liquid Cooled Models

Recommended Oil(s)	Liquid Cooled	
	Ratio	Gasoline
Quicksilver Formula 50	20:1	100/130 AvGas
Quicksilver Snowmobile Oil	16:1	
Quicksilver Formula 50D	16:1	
BIA/TC-W Rated	16:1	

**IMPORTANT:** Some 1976 S/T "Operation and Maintenance Manuals (C-90-74530)" recommended Quicksilver Snowmobile Oil, Quicksilver Formula 50D and BIA/TC-W Oils (all prediluted) at a 20:1 ratio. Use of these prediluted oils, ONLY, at a 16:1 ratio are permissible. CHANGE any of these Manuals to the above recommendation (16:1 ratio).



# SERVICE BULLETIN

# MERCURY SNOWMOBILES

Number: 76-12

Date : 12/15/75

CIRCULATE  
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MECHANICS

Place in Your  
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- A. Balancer Installation - 1976 Model 340 S/T and 440 S/T Snowmobiles
- B. Drive Clutch Weights - All 1976 Model 340 S/T
- C. Drive Clutch Weights - All 1976 Model 440 S/T
- D. Lower Cowl and Snow Flap Fasteners - All 1976 Model 250-340-440 Sno-Twisters

## A. BALANCER INSTALLATION - 1976 Model 340 S/T and 440 S/T Snowmobiles

*(Attach Bulletin Reference Sticker on Section 2C Index Page of Your Snowmobile Service Manual.)*

For ALL 1976 Model 340 S/T (CHASSIS Serial No. 4495560 and Above)

For ONLY 1976 Model 440 S/T (CHASSIS Serial No. 4349537 and Below)

**IMPORTANT:** ALL 1976 Model 250 S/T already are equipped with the balancer.

ALL 1976 Mercury Sno-Twister Snowmobiles MUST BE equipped with a balancer (steel disc .156" [3.96mm] thick by 5.250" [13.34cm] diameter) between the rewind starter cup and lower pulley. The balancer (D-75961) stabilizes the crankshaft and prevents excessive vibration of the drive clutch, thereby improving the life of drive clutch components.

IMMEDIATELY notify owners of the above specified Sno-Twister Snowmobiles that this balancer MUST BE INSTALLED (installation instructions following).

**IMPORTANT:** A simple visual inspection via the water pump belt channel in the bell housing can verify whether-or-not the balancer has been installed.

Order the required quantity of balancers and 4 screws for each balancer from your parts distribution source. Credit for the balancers, screws and 0.3 hrs. labor per snowmobile will be issued upon receipt of a completed warranty claim. One warranty claim (listing individual CHASSIS Serial Nos.) may be used to cover service to all snowmobiles.

C-75961	Balancer (1 per Snowmobile)
C-10-75967	Screws (4 per Balancer)

## INSTALLATION INSTRUCTIONS

1. Remove rewind starter assembly.
2. Remove 4 screws which secure rewind starter cup and lower pulley to rotor. RETAIN the 4 lockwashers from the screws and discard the screws.
3. Install balancer between lower pulley and starter rewind cup.

**IMPORTANT:** Failure to use the 4 lockwashers on the 4 NEW retaining screws will result in damage to the rotor and could alter ignition timing.

- a. Place MACHINED side of balancer against lower pulley (toward engine).
- b. Install lockwashers (retained in Step 2) on 4 NEW screws, apply Loctite Type "A" (C-92-32609) to threads of screws and reinstall starter rewind cup with screws.
4. Reinstall rewind starter assembly.

(OVER)



## B. DRIVE CLUTCH WEIGHTS - ALL 1976 Model 340 S/T

*(Attach Bulletin Reference Sticker on Section 2C Index Page of Your Snowmobile Service Manual.)*

ALL 1976 Model 340 S/T Snowmobiles MUST BE equipped with #135 weights (D-71737) in the drive clutch assembly (6 weights per clutch). Some 340 S/T Snowmobiles (CHASSIS Serial No. 4495867 and Below) were shipped from the factory with #106 weights in the drive clutch, and these ARE NOT LEGAL for "Stock II" class racing. To remedy, IMMEDIATELY notify owners of 1976 Model 340 S/T Snowmobiles to check the drive clutch for correct #135 weights.

### INSPECTION PROCEDURE

1. Part No. stamped into perimeter of drive clutch cover, as follows:

**INCORRECT: XXXX 088**

**CORRECT : XXXX ~~088~~ or XXXX ~~089~~**  
**088                      088**

2. OR, visual inspection of the Part No. on the weights thru vent holes in drive clutch cover, as follows:

**INCORRECT: XXXX 106 (Color - Red)**

**CORRECT : XXXX 135 (Color - Black)**

**IMPORTANT:** If the weights are incorrect and must be replaced, REMOVE the drive clutch assembly from the engine before attempting clutch disassembly. Removal and/or installation of the drive clutch cover works best -- with the aid of an arbor press.

Credit for the weights and 0.5 hrs. labor per snowmobile will be issued upon receipt of a completed warranty claim. One claim (listing individual CHASSIS Serial Nos.) may be used to cover service to all snowmobiles.

**D-71737**

**Weight - #135 (6 per Clutch Required)**

## C. DRIVE CLUTCH WEIGHTS - ALL 1976 Model 440 S/T

*(Attach Bulletin Reference Sticker on Section 2C Index Page of Your Snowmobile Service Manual.)*

ALL 1976 Model 440 S/T Snowmobiles MUST BE equipped with #106 weights (D-71717) in the drive clutch assembly (6 weights per clutch). Some 440 S/T Snowmobiles (CHASSIS Serial No. 4349543 and Below) were shipped from the factory with #123 weights in the drive clutch, and these ARE NOT LEGAL for "Stock III" class racing. To remedy, IMMEDIATELY notify owners of 1976 Model 440 S/T Snowmobiles to check the drive clutch for correct #106 weights.

### INSPECTION PROCEDURE

1. Part No. stamped into perimeter of drive clutch cover, as follows:

**INCORRECT: XXXX 089**

**CORRECT : XXXX ~~089~~**  
**089**

2. OR, visual inspection of the Part No. on the weights thru vent holes in drive clutch cover, as follows:

**INCORRECT: XXXX 123 (Color - Yellow)**

**CORRECT : XXXX 106 (Color - Red)**

**IMPORTANT:** If the weights are incorrect and must be replaced, REMOVE the drive clutch assembly from the engine before attempting clutch disassembly. Removal and/or installation of the drive clutch cover works best -- with the aid of an arbor press.

Credit for the weights and 0.5 hrs. labor per snowmobile will be issued upon receipt of a completed warranty claim. One claim (listing individual CHASSIS Serial Nos.) may be used to cover service to all snowmobiles.

D-71717

Weight - #106 (6 per Clutch Required)

**D. LOWER COWL and SNOW FLAP FASTENERS - ALL 1976 Model 250-340-440 Sno-Twister Snowmobiles**

*(Attach Bulletin Reference Sticker on Section 2F Index Page of Your Snowmobile Service Manual.)*

**LOWER COWL**

To be sure that the lower cowl remains securely fastened to the front crossmember, we recommend that the 6 aluminum rivets, which secure the cowl to the front crossmember (silver colored, 5/8" diameter head - 3 located inside lower cowl in a line on each side of crossmember), be replaced with STEEL rivets (Mercury Part No. C-17-76047) or an equivalent steel rivet (3/16" [4.8mm] diameter shank x 5/8" [15.9mm] diameter head with 3/8" [9.5mm] to 1/2" [12.7mm] grip range).

**SNOW FLAP**

Check the rivets which secure the snow flap and mounting strip to the chassis. To prevent the rivet from pulling out thru the snow flap, make sure that the "clinch" end of the rivet (inside the tunnel) has a "backing" washer on each rivet (Mercury Part No. C-12-21273) or an equivalent washer (13/64" [5.16mm] I.D. x 1/2" [12.7mm] O.D. x 1/16" [1.59mm] thick).

If the rivets are not equipped with these backing washers, remove and install new rivets (C-17-64817 or equivalent) with the backing washers.





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## MERCURY SNOWMOBILES with ARCTIC DRIVE CLUTCH Internal Drive Clutch Component Information

### "Stock" Drive Clutch Component Chart

MODEL NAME	1975 340 S/T	1975 440 S/T	1976 340 T/T	1976 440 T/T	1976 250 S/T	1976 340 S/T	1976 440 S/T
CHASSIS Serial No.	Below 4207500	Below 4206250	Below 4347125	Above 4347124	Below 4495560	Above 4495559	Above 4349324
MERCURY PART NO.	D-52-71571	D-52-71572	D-52-74255	D-52-74256	D-52-75098	D-52-75099	D-52-75100
LAST 3 DIGITS of NO. STAMPED ON OUTSIDE of DRIVE CLUTCH COVER	061	062	077	080	081	088	089
DRIVE CLUTCH SPRING							
Color	Blue	Blue	Blue	Blue	Green	Green	Green
No. of Turns	3.9	3.9	3.9	3.9	5.0	5.0	5.0
Mercury Part No.	C-24-71517	C-24-71517	C-24-71517	C-24-71517	C-24-74992	C-24-74992	C-24-74992
DRIVE CLUTCH WEIGHTS							
Color	Red	Black	Red	Yellow	Red	Black (2)	Red
No. Stamped on Weights	0146-106	0146-105	0146-106	0146-286	0146-106	0146-135 (2)	0146-106
Gram Weight	5.958g	7.858g	5.958g	8.800g	5.958g	4.479g	5.958g
Outside Diameter	0.530"	0.598"	0.530"	0.629"	0.530"	0.471"	0.530"
Mercury Part No.	D-71717	D-71716	D-71717	D-74125	D-71717	D-71737 (2)	D-71717
DRIVE CLUTCH RAMPS							
No. Stamped on Ramps	None	None	292	293	None	None	None
Drawing of Ramp Profile	Figure 1 (1)	Figure 1 (1)	Figure 3	Figure 4	Figure 5	Figure 6	Figure 6
Mercury Part No.	D-71496 (1)	D-71496 (1)	D-74123	D-74124	D-75908	D-75177	D-75177

(1) Optional Clutch Ramps (D-74857A1, Figure 2) are available for trail riding.

(2) A few 1976 Model 340 S/T snowmobiles were shipped from the factory with INCORRECT drive clutch weights. Weights stamped 0146-135 (D-71737) MUST BE INSTALLED in these clutches.

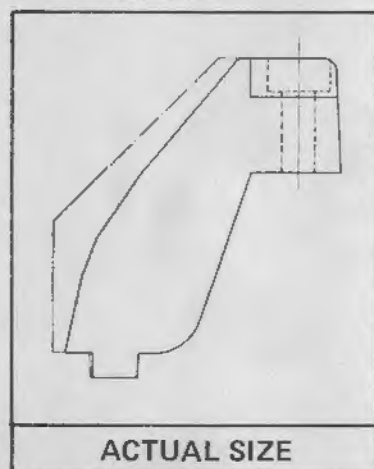


Figure 1. D-71496 Drive Clutch Ramp Profile (1975 340 S/T & 440 S/T)

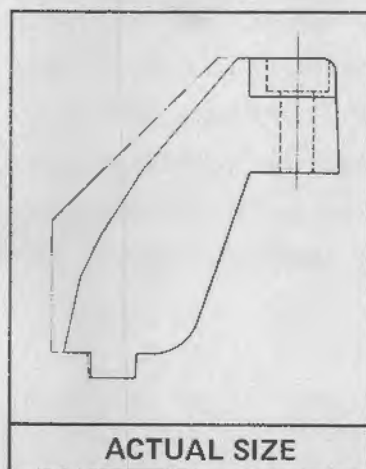


Figure 2. D-74857A1 Drive Clutch Ramp Profile (Trail Ramp for 1975 340 S/T & 440 S/T)

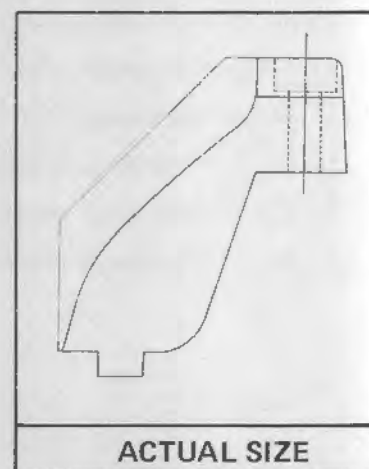


Figure 3. D-74123 Drive Clutch Ramp Profile (1976 340 T/T)

(OVER)



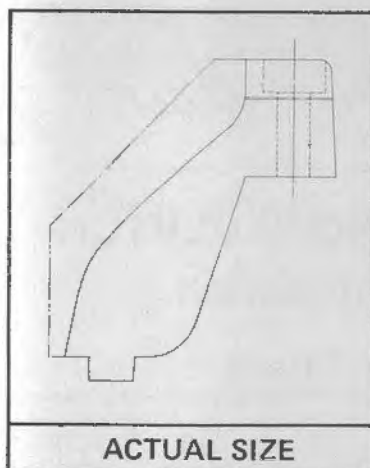


Figure 4. D-74124 Drive Clutch Ramp Profile (1976 440 T/T)

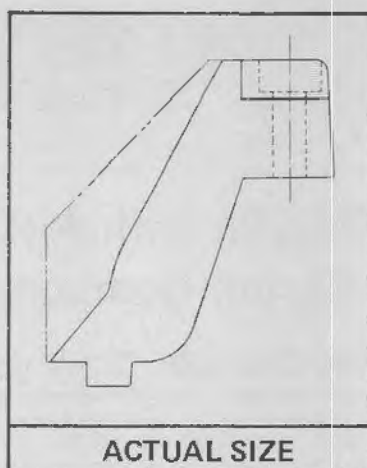


Figure 5. D-75908 Drive Clutch Ramp Profile (1976 250 S/T)

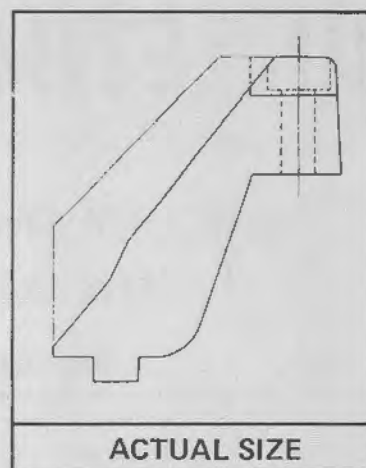


Figure 6. D-75177 Drive Clutch Ramp Profile (1976 340 S/T & 440 S/T)

## Drive Clutch Accessories

MODEL NAME	1975 340 S/T	1975 440 S/T	1976 340 T/T	1976 440 T/T	1976 250 S/T	1976 340 S/T	1976 440 S/T
Drive Clutch Elevation Kit	D-71712A1	D-71712A1	D-74124A1	D-71716A1	D-71712A2	D-71712A2	D-71712A2
Drive Clutch Modification Kit	D-71711A1	D-71711A1	N.A.	N.A.	D-71711A2	D-71711A2	D-71711A2
Drive Clutch Trail Ride Kit	D-74857A1	D-74857A1	N.A.	N.A.	N.A.	N.A.	N.A.

N.A. - Not Available

## Drive Clutch Weight Chart

Full Throttle Engine RPM	Gram Weight		No. Stamped on Weight		Color of Weight	Outside Diameter of Weight	Part No.	
<div>↑ Increase Engine RPM</div> <div>↓ Decrease Engine RPM</div>	Light <div>↑</div> <div>↓</div>	3.058g	0146-108	(1) (2)	Yellow	0.406"	D-71731	(1) (2)
		3.725g	0146-175	(1) (2) (4)	Red	0.437"	D-71735	(1) (2) (4)
		4.479g	0146-135	(1) (2) (3) (4) (6)	Black	0.471"	D-71737	(1) (2) (3) (4) (6)
		4.958g	0146-107	(3) (4) (6)	White	0.491"	D-71736	(3) (4) (6)
		5.958g	0146-106	(3) (4)	Red	0.530"	D-71717	(3) (4)
		6.992g	0146-123	(1) (2) (5)	Yellow	0.568"	D-71734	(1) (2) (5)
		7.858g	0146-105	(5)	Black	0.598"	D-71716	(5)
	Heavy	8.800g	0146-286	(2)	Yellow	0.629"	D-74125	(2)

- (1) Six of these weights are included in Drive Clutch Modification Kit (D-71711A1).
- (2) Six of these weights are included in Drive Clutch Modification Kit (D-71711A2).
- (3) Six of these weights are included in Drive Clutch Elevation Kit (D-71712A1).
- (4) Six of these weights are included in Drive Clutch Elevation Kit (D-71712A2).
- (5) Six of these weights are included in Drive Clutch Elevation Kit (D-71716A1).
- (6) Six of these weights are included in Drive Clutch Elevation Kit (D-74124A1).



(Flash 'Inside' Info for Mercury Snowmobile Dealers to Z-i-p to Their Sno-Twister Customers) 11/16/73

### INTRODUCTION

It's official! After months of spinning on hay and straw, or on just plain grass, the snowmobile season - on good old Alaskan snow - has opened with a resounding "Margin for Mercury". Eager sponsor of the kick-off race meeting on Nov. 3rd and 4th was Brandt's Lodge . . . and, if you're real quick in geography, you'll find it 160 miles northeast of Anchorage. Give or take a couple of months, that can be real mean blizzard territory. Ignoring all impending hazards, however, were local drivers who had "WIN" written all over their Sno-Twisters.

The Sno-Twisters leaped to the front and stayed there to win all three heats in their 400 class, plus the final around the oval, all on Saturday. Then Sunday the crew came right back to grab first place honors in cross-country.

So, here's the bonus! We, of course, are happy to share the secrets of success so that you, too, can make the run for the roses. The following procedures were used in setting-up the champion Sno-Twisters at Brandt's Lodge:

### ENGINE

1. Check timing @3000 RPM .100"  $\pm$  .005" BTDC.
2. Adjust idle slow enough to allow clutch to reset. (Too high idle speed will cause partial engagement and belt drag, resulting in a slower start off the line.)
3. Check for proper jetting.

The following jet sizes will serve as a guide, however, a proper plug check is the only way to get spot-on for racing. A Champion N55G plug is easier to read and is suitable for racing. (After 100 yd. full throttle speed run, the correct fuel/air mixture will cause plug electrode to have a light chocolate brown color - must never appear whitish/grey.)

#### BELOW 2000' ELEVATION

Temperature	Jet Size
Above 30°	290 to 300
0 - 30°	320 to 330
Below 0°	330 to 360

#### 2000' to 4000' ELEVATION

Subtract 10 from the jet sizes listed on left.

If your Mercury dealer doesn't have jets, try any dealer stocking Mikuni carburetor parts. If all else fails, a #53 drill (.059 dia.) corresponds to a 320 jet, and a 1/16 drill (.0625 dia.) corresponds to a 340 jet.

Move jet needle to richer position by one notch; i.e. the retaining clip should be moved to the fourth (4) notch from the top of the jet needle.

### DRIVE SHEAVE

1. Inspect clutch and lube per instructions in the Owners "Operation and Maintenance Manual" (C-90-68019).
2. Check engagement RPM and adjust if necessary.
3. Use an accurate tachometer to check engagement speed. (USSA says 4000 RPM max.)

(OVER)

## DRIVEN SHEAVE

1. Check alignment per the manual.
2. Set spring preload at 2 full cams.
3. **USE A NEW BELT.**
4. Adjust belt tension per the manual.

## FUEL OIL

Use a 20:1 fuel-oil mix. Only the following oils are known to be satisfactory for SNO-TWISTER:

Mercury Formula 25

Mercury Formula 50

Mercury Formula 50D

Castrol Synthetic High Performance Snowmobile Oil

*NOTE: You may want to clamp or wire the fuel lines at the fuel pump.*

## ICE STUDS and CARBIDES

Carbide wear skags (D-68440) must be installed for racing. The ski holes may need to be drilled out and an oversize washer used above the ski to make the carbide fit properly.

Ice studs (D-68441) must be installed on the track. A good starting point is to install eleven studs on each side, utilizing the holes in the track bars. One or two additional rows of eleven can be added in the center band of the track but should be attached to the rubber only, not thru the bar. Use washers to space the studs up to the 3/8" allowable.

You may prefer to set the steering in the low effort position, since the carbides increase the steering effort considerably. See your "Operation and Maintenance Manual".

## SLIDER/TRACK ADJUSTMENT

The track must be adjusted for proper tension as outlined in your Owners Manual. The track will run smoother if the drive sprockets are lubricated with grease (STP works well). Most of the side load is taken out through the wear plates inside the tunnel, so be sure to lubricate the edge of the track.

As outlined in your Owners Manual, handling (oversteer and understeer) can be adjusted. We found that for best weight transfer, the rear springs should be set soft and the front springs in the 3/4 position. Set yours up and test prior to racing.

## TETHER SWITCH

Disconnect on-off switch wire from #3 stud of terminal block, to prevent accidentally stopping the engine.

Attach a paper clip to the tether switch cord and hook the clip on the throttle cable so that the clip must be pulled free before the tether is disconnected.

Check the tether switch operation. Moisture will cause the points to freeze, resulting in a switch malfunction. Gasoline de-icer will eliminate the moisture.

## COWL

The aluminum hinge rivets should be replaced with large head steel rivets or bolts. The headlight should be removed or taped and the screws secured with silicone sealer.

**\*\*IMPORTANT NOTE: U.S.S.A. has ruled that  
we cannot use the boggie wheel kits for racing.**

# Sno-Twister/Hi-Performance Tipster



No. 75-1 (6/1/74)

## Important Info about Snowmobile Registration and Sno-Twister/Hi-Performance Tipster Mailing List

Mercury Marine is introducing another FREE customer benefit: Owner direct mailing of the new "Sno-Twister/Hi-Performance Tipster", aimed primarily for racing machines.

To get the project in gear, the following "IMPORTANT" Tipster mailing list directive will be included in the "Snowmobile Information" envelope shipped with all Mercury Snowmobiles manufactured after Sept. 1, 1974.

### IMPORTANT

MR. DEALER - Mercury Marine has made an important change to Snowmobile Registration Cards. We've added RACING ☐ to the "Primary Use" section of the card.

We've done this in response to many requests from owners (primarily use their snowmobiles for racing) who wish to receive, from the factory, owner direct mail of latest information in "Sno-Twister/Hi-Performance Tipster" bulletins on racing.

To compile such a customer mailing list via direct computer mailing, it is ESSENTIAL that 1) you fill out all registration cards, 2) you ascertain from the owner the primary use intended and mark the registration card accordingly and 3) you promptly mail all cards to the factory.

We're sure that every racing owner will want to take advantage of this FREE, direct mail service.

Only you can get him on the racing "Tipster" list! If he races, check RACING ☐.

C-90-71050 (5/74)

We'll also advise owners in their "Operation and Maintenance" manual that, if racing is intended, it should be properly checked on the new machine's Registration Card under RACING ☐ so that the customer will be mailed the "Tipster" bulletin.

This "Tipster" sheet will be used exclusively to notify owners of high performance information and time-saving tips.

**IMPORTANT:** The service is intended strictly as an owner benefit. Dealers still will receive an identical mailing at the same time.



Important information regarding the  
the following information is being made:

Notice that the following information is being made:  
The following information is being made:

To the extent in which the following information is being made:  
The following information is being made:

## IMPORTANT

Mr. [Name] is hereby notified that the following information is being made:  
The following information is being made:

To the extent in which the following information is being made:  
The following information is being made:

Notice that the following information is being made:  
The following information is being made:

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The following information is being made:

Notice that the following information is being made:  
The following information is being made:

# Sno-Twister/Hi-Performance Tipster



NOTICE: Sno-Twister/Hi-Performance "Tipsters" are in numerical order, starting with 75-1. If the first copy you receive is (example) 75-3 -- and you desire previous "Tipster" issues (75-1 and 75-2) -- advise Mercury Marine Publications Dept., P.O. Box 1108, Fond du Lac, WI 54935. and give the first number that you received.

No. 75-2 (11/20/74)

## 1975 SNO-TWISTER - (340 S/T - 440 S/T) - COMPETITION SETUP INFORMATION

### POSSESSION

Possession of a Sno-Twister well in advance of the '74-'75 racing season can be a very big assist. It gives the driver ample time to get acquainted with the sled and to properly break it in before entering competition.

### INITIAL SETUP

After receiving a Sno-Twister, you may want to thoroughly check the engine assembly and possibly even disassemble it completely to familiarize yourself with all the parts and to make certain that all components and their assemblies meet with your satisfaction. If so, rebuild the engine with the care and precision that a surgeon would use. It brings results!

- Pay special attention to all nut and bolt torque specifications. Use "Loctite" on all bolts that secure trigger and stator to crankcase.
- When assembling cylinders to crankcase, make sure that the transfer ports are lined up correctly, with no gasket overhang. Make certain that the cylinder head dome is centered directly over the cylinder.
- Check carburetor float levels and adjust high and low speed mixture screws to specifications.
- Reinstall engine assembly, then check torque converter alignment, drive belt tension, drive chain tension, track tension and alignment and adjust to specifications (refer to Owner's Manual).

### BREAK-IN PERIOD

**IMPORTANT:** During break-in period, a slightly rich high speed mixture adjustment is advisable.

Use a good premium gasoline and Merc Snowmobile Oil when mixing gas/oil. Make it a slightly richer mixture for the first few hours of running (until piston rings have seated properly). Run at high RPM for short durations only -- avoid sustained full throttle operation and prolonged operation at a constant throttle setting. Check spark plugs often to ensure that engine is not overheated.

Become familiar with the feel of the sled (clutch engagement, shifting, sound, etc) and its handling characteristics. This is very important for later testing.

### RACE PREPARATION (BASIC)

Cleaning and Inspection: After the break-in period is completed, thoroughly clean the snowmobile. Visually check the engine and chassis for worn or broken parts. Remove cylinder heads and inspect head gaskets, pistons, rings and cylinders for excess wear, cracks, chipped chrome, etc. Repair or replace components as necessary. Check piston fit and ring clearances (end gap and side clearance).

Secure exhaust headers to cylinders, using safety wire or bearing mount type "Loctite" on hex screws.

Check ignition timing (should be .100" BTDC [21½°]).

Check ski alignment (parallel, measuring front and rear of skis). For easier (slower) steering, use the tie rod attaching hole closest to the steering shaft. Try both positions for your preference.

Check track and suspension: Track tension and alignment, suspension cross shafts (wear/bending - lubrication), shock absorbers (dampening/leakage), idler wheels (wear and free bearing movement), slide wear bars and chassis rub strips. Check all nuts and bolts for wear and proper torque. Repair or replace parts as necessary.

Chaincase: Clean and inspect chain, sprockets, jackshaft and bearings.

Check brake assembly (cam, pin and pucks for wear) "free floating" and correctly adjusted.

## **RACE PREPARATION (FINAL)**

Check electrical wiring: Disconnect emergency stop switch (red switch on throttle control) from terminal block (located behind dash). Be sure that ground wire from CD mounting base to engine is secure and in good condition. Red wire from electronic pack connects to PTO side coil; white wire connects to coil on rewind side. Make certain that CD wiring connectors are coupled securely.

Install a "race-proven" ignition safety stop switch (tether switch) to suit rider. Check and adjust carburetion; re-check carburetor float levels. Adjust high speed mixture needles (as outlined in Owner's Manual) to suit conditions (temperature and elevation) that will be encountered. Synchronize throttle slides and adjust idle speed, making sure full throttle operation is attained and throttle cable moves freely. Check all fuel lines and hoses. Be positive that the lines are secure on fittings and not pinched or crimped.

Check exhaust system: Inspect for cracks, broken parts and missing coupler springs. Make certain that system is mounted securely.

Drive sheave (clutch): disassemble and clean. Check fiber bushings in movable and fixed sheaves for wear and/or binding. Check all moving parts for wear and restricted movement. Make sure that ramps are properly seated in movable face. Engagement RPM can be raised by adding spacers on spring or lowered by removing them. No more than four (4) spacers are allowed. When reassembling drive sheave, be sure to match alignment mark on movable sheave with mark on sheave cover and take care not to bind fiber bushing - no lubrication is necessary.

Driven sheave: Disassemble and clean. Check condition of torque bracket wear plates. Replace if necessary. Reassemble and lightly lubricate shaft and wear plates. Adjust return spring preload as required (approximately 2 ramps) to attain maximum recommended RPM at wide open throttle (8250 RPM) - refer to Owner's Manual.

Torque converter alignment: Check and adjust alignment (parallel and offset distance between sheaves). Inspect drive belt for wear, distortion, burn spots and cracking. Check drive belt tension. If in doubt about condition of belt, replace it - refer to Owner's Manual.

Drive chain: Drain and refill chaincase with 3 oz. (3.1 imp. oz.) of automatic transmission fluid (ATF). Check and adjust chain tension to specifications.

Suspension adjustments: Understeer and oversteer can be varied by changing spring tension on front cross shaft. Rear shocks can be adjusted for firm or soft ride, depending upon rider preference. Best weight transfer requires a soft setting at rear - refer to Owner's Manual.



Track/slide suspension alignment: Align track first to slides, then to chassis tunnel.

*NOTE: Because the front control arm always is in compression, it may be necessary to rework the suspension mounting holes slightly and adjust alignment with the suspension bolts loose in order to achieve perfect alignment of the slider suspension inside the chassis tunnel.*

Traction devices: Three types of studs are available from Mercury Marine for various types of racing surfaces and conditions.

D-68441	Merc Stud (22 Pcs. Per Package)
D-71925	Merc Scat Stud (22 Pcs. Per Package)
D-71926	Merc Carbide Stud (22 Pcs. Per Package)

Placement and pattern are strictly rider preference, depending upon rider style and racing surface. The rivet in the outside ends of each track bar can be removed, if absolutely necessary, to place a stud.

Track lubrication: Lubrication of the track can be beneficial by reducing drag between track and sides of tunnel and between drive sprockets and track. (STP lubricant works well.)

Skis/carbide wear skegs: Carbide wear skegs are a MUST for stock racing and are available from Mercury Marine.

D-68440-1	Carbide Skieg (Pair - 10" Carbide Inserts)
D-71334	Carbide Skieg (Pair - 6" Carbide Inserts)

Badly chipped, bent or broken carbide skegs should be replaced immediately. Placement and length of carbide skegs influence handling to a high degree and, again, are mostly rider preference.

Special application: At this time, the following equipment is available from Mercury Marine for special application; i.e., high elevation, cross country racing and modified racing:

D-1393-5872A1	High Elevation Carburetor Kit - 340 S/T
D-1393-5854A1	High Elevation Carburetor Kit - 440 S/T
D-71712A1	High Elevation Drive Sheave Kit - 340 S/T and 440 S/T
D-71711A1	Modified Drive Sheave Kit - 340 S/T and 440 S/T
C-58601A1	Bogie Wheel Kit - 340 S/T and 440 S/T

<u>Driver Sprockets (340 S/T and 440 S/T)</u>		<u>Drive Chain (340 S/T and 440 S/T)</u>	
(1) D-69757-12	12 Tooth	(2) D-71483	78 pitch length
D-68439	13 Tooth		
D-64684	14 Tooth	(2) 78 pitch chain must be used with 16 tooth sprocket.	
D-63318A1	15 Tooth		
D-64131	16 Tooth		

(1) One C-23-69842 spacer must be used with 12 tooth sprocket.

## **CONCLUSION**

The aforementioned steps have touched basically on major aspects of setting up a 1975 Mercury Sno-Twister for competition. Hard work, patience, thoroughness and a strong desire to win can -- and will -- produce a competitive Sno-Twister that will win consistently.

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# MERCURY MARINE - CERTIFIED SNOWMOBILE SPECIFICATIONS

NOTE: All Length Measurements Are in Millimeters, unless Specified Inches (""); All Volume Is in Cubic Centimeters (Conversion Table Below).

MODEL NAME	1974 SNO-TWISTER	1975 340 S/T	1975 440 S/T	1975 440 T/T	1975 340 S/R	1975 440 M/X	1975 440 S/R	1975 Mark II
<b>ENGINE SPECIFICATIONS</b>								
Engine Manufacturer	Kohler	Kohler	Kohler	Kohler	Kohler	Kioritz	Kioritz	Mercury
Engine Model	K400-2RS	K340-2RS	K440-2RS	K440-2RS	K340-2AX	KEC-440/22	KEC-440/22	Mark II
No. of Cylinders	2	2	2	2	2	2	2	2
Engine Displacement	398.2	339.3	429.4	435.8	338.1	437.9	437.9	644
Type of Cooling	F.A.	F.A.	F.A.	Fan	Fan	Fan	Fan	Fan
Bore	65.0	60.0	67.5	68.0	62.0	66.0	66.0	79.37
Stroke	60.0	60.0	60.0	60.0	56.0	64.0	64.0	65.07
Ignition	CD	CD	CD	CD	Mag	Mag	Mag	CD
Min. Compressed Head Gasket Thickness	0.95	1.2	0.7	1.1	1.2	1.1	1.1	N.A.
Min. Compressed Base Gasket Thickness	0.35	0.3	0.3	0.3	0.3	0.3	0.3	N.A.
① Volume of Head to Top of Spark Plug Hole	19.0	14.7	19.0	21.7	17.7	21.4±5%	21.4±5%	28.5
Crankcase Volume	290.0	305.0	305.0	630.0±10%	463.0±10%	931.0±10%	931.0±10%	N.A.
Overall Length of Cylinder	109.0±0.01	109.0±.5	109.0±.5	109.0 ± .1/-2	98.3±.2	115.95±.5	115.95±.5	174.62
Depth - Top of Cylinder to Bottom of Intake Port	90.5	90.0±1.5	95.3±1.5	92.0+.75/-1.0	84.3+.75/-1.0	Reed Valve	Reed Valve	Boost - 53.08
Depth - Top of Cylinder to Top of Exhaust Port	30.0	29.5±1.5	29.0±1.5	33.5+.4/-6	34.43+.4/-6	37.5±1.0	37.5±1.0	39.11
Depth - Top of Cylinder to Top of Transfer Port	47.0	46.25±1.5	46.25±1.5	47.8+.6/-1.2	43.8+.6/-1.2	51.5±1.0	51.5±1.0	50.80
No. of Transfer Ports	4	4	4	4	2	4	4	2
Width of Transfer Ports	32.0/11.7	33.0±1.5/ 12.5±1.0	33.0±1.5/ 13.0±1.0	35.0±1.0/ 13.7±1.0	27.0±1.0	85.0±2.0	85.0±2.0	35.05
Width of Intake Ports	46.0	45.0±1.5	43.0±1.5	48.0±1.0	37.0±1.0	Reed Valve	Reed Valve	Reed Valve
Width of Exhaust Ports	40.0	37.0±1.5	43.0±1.5	42.4+.75	37.0+.75	40.0±1.0	40.0±1.0	47.0
Height of Transfer Ports	13.0	14.0±1.0	14.0±1.0	13.7±1.0	14.0±1.0	13.5±1.0	13.5±1.0	20.32
Height of Intake Ports	29.0	28.5±1.0	30.3±1.0	24.0±.5	22.5±.5	Reed Valve	Reed Valve	Reed Valve
Weight-Piston Assembly Complete	300gr±20gr	240gr±10gr	310gr±10gr	335gr±10%	240gr±10%	307gr±10%	307gr±10%	491.68gr
Overall Height of Piston	71.7	67.5±.55	70.7±.55	71.7±.5	64.1±.5	71.42±.5	71.42±.5	75.41
No. of Rings per Piston	1	1	1	2	2	2	2	3
Ring Type	L-Ring	Dykes Keystone	Dykes Keystone	"L" & Rectangular	"L" & Rectangular	Rectangular	Rectangular	Cast Iron
Ring Thickness	2.0	2.0±.08	2.5±.08	2.0±.08	2.0±.08	1.5±0.1	1.5±0.1	1.57
Crankcase Face to Center of Crankshaft	70.0	70.0±.5	70.0±.5	70.0±.2	58.0±.1	70.23±.2	70.23±.2	1-Piece
Main Bearing Type	Sealed-Ball	Sealed-Ball	Sealed-Ball	Sealed-Ball	Sealed-Ball	Sealed-Ball	Sealed-Ball	Sealed-Ball
Muffler Make	Merc/Donaldson	Mercury	Mercury	Mercury	ACS	Cowl	Cowl	Mercury
DBA Level	82±2	82±2	82±2	82±2	82±2	82±2	82±2	82±2
Head Pipe Length	98.5	117.0±2	167.6±2	"Y"-Manifold	24.5"±.25"	15.25"±.25"	15.25"±.25"	127.0

① Piston @ TDC



NOTICE: Sno-Twister/Hi-Performance "Tipsters" are in numerical order, starting with 75-1. If the first copy you receive is (example) 75-3 -- and you desire previous "Tipster" issues (75-1 and 75-2) -- advise Mercury Marine Publications Dept., P.O. Box 1108, Fond du Lac, WI 54935, and give the first number that you received.

No. 75-3 (11/20/74)

Sno-Twister/Hi-Performance Tipster





<b>CARBURETOR</b>								
Make/Model No.	Mikuni/VM-36	Mikuni/36/34RS	Mikuni/36/44RS	Mikuni/VM-36	Walbro/WDA-50	Walbro/WDA-47	Walbro/WDA-47	Walbro/WRA-3
No. per Engine	2	2	2	2	1	1	1	2
Venturi - Smallest Diameter in Throat	36.0	36.0	36.0	36.0	39.7	39.7	39.7	32.5
Throttle Bore - Largest Dia. Downstream of Butterfly	37.0	36.12	36.12	36.1	41.3	41.3	41.3	38.1
Choke	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>DRIVE CLUTCH</b>								
Make/Model No.	Comet/100C	Arctic Cat/XXXX-061	Arctic Cat/XXXX-062	Salsbury/850	Salsbury/850	Salsbury/850	Mercury	Salsbury/850
Engagement Speed	3800-4000 RPM	② 4000RPM Max.	② 4000 RPM Max.	3300 RPM+10%	3500 RPM+10%	3500 RPM+10%	3400 RPM+10%	3200 RPM+10%
No. of Springs/Color	1/Red	1/Blue	1/Blue	1/Plain	1/Plain	1/Plain	1/Plain	1/Plain
Spring Wire Diameter	4.75	.192"	.192"	4.32	4.32	4.32	4.74	4.3
No. of Coils	4.8	3.9	3.9	5.4+2	5.4+2	5.4+2	5.2+2	5.4+2
Arm/Roller Weight	38.6gr+.5gr	18gr+1.5gr	22gr+1.5gr	50.08gr+.5gr	40.12gr+.5gr	43.86gr+.5gr	65.32gr+.5gr	51.32gr+.5gr
<b>DRIVEN CLUTCH</b>								
Make/Model No.	Comet/90D	Salsbury/152110	Salsbury/152110	Salsbury/850	Salsbury/850	Salsbury/850	Mercury	Salsbury/850
Spring Wire Diameter	4.75	.192"	.192"	4.88	3.96	3.96	5.71	4.3
No. of Coils	6	6.25	6.25	6.25+2	5+2	5+2	6+2	7+2
Ramp Angle	45°	41°	41°	35°	32°	32°	40°	32°
<b>CHASSIS/SUSPENSION</b>								
Chassis Model	66769	70729	70729	72006	66602/70238	68345	69869	66011
Suspension	Slide Rail	Slide Rail	Slide Rail	Slide Rail	Slide Rail	Bogie Wheel	Slide Rail	Swing Frame
Chassis Length	1880+6.3	2235+6	2235+6	2235+6	2209.8+6	2247+6	2247+6	2521
Ski Length	1000±6.3	952.5+3	952.5+3	952.5+3	1008.4+3	1008.4+3	1008.4+3	993.78
Ski Width	117+3.1	117.6+1.5	117.6+1.5	117.6+1.5	136.6+1.5	136.6+1.5	136.6+1.5	152.4
<b>TRACK</b>								
Make	Goodyear	Goodyear	Goodyear	Goodyear	Goodyear	Goodyear	Goodyear	Mercury
Material	Rubber/Steel Bars	Rubber/Steel Bars	Rubber/Steel Bars	Rubber/Steel Bars	Rubber/Grouser	Rubber	Rubber/Grouser	Rubber
Width	381+3.2	381.0+3/-1.5	381.0+3/-1.5	381.0+3/-1.5	387.35	387.35	387.35	431.8
Length - O.D.	2820	2816.4+12.5	2816.4+12.5	2816.4+12.5	3072.4	3009.9	3072.4	3327.4
Track Drive Sprocket Teeth	9	9	9	9	8	8	8	8
<b>CHAINCASE</b>								
Standard Drive Sprocket No. of Teeth	15	14	15	17	15	17	18	16
Standard Driven Sprocket No. of Teeth	34	34	34	34	36	36	28	36
Optional Drive Sprockets No. of Teeth	13-14-16	12-13-15-16-17	12-13-14-16-17	12-13-14-15-16-18	12-13-14-16-17-18	12-13-14-15-16-18	12-13-14-15-16-17	12-13-14-15-17-18
Optional Driven Sprockets No. of Teeth	N.A.	N.A.	N.A.	28-36-38-40	28-34-38-40	28-34-38-40	34-36-38-40	28-34-38-40
Snowmobile Weight (Pounds)	360+10	365	365	365	350	390	380	500

**METRIC CONVERSION:** 1mm (millimeter) = 0.0394" (inch); 1 gr (gram) = 0.04 oz.;

1cc (cubic centimeter) = 0.06 cu.in.; 1 lb. (pound) = 0.4536kg (kilogram)

N.A. = Not Applicable

② 0-4 Spacers (.06 Thick) to Achieve 4000 RPM Max.

# Sno-Twister/Hi-Performance Tipster



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No. 75-4 (11/22/74)

## Driven Shaft Pillow Block - 1975 340 S/T, 440 S/T and 440 T/T Models

We have received a few reports that the driven shaft pillow block (D-71007) has developed a small crack (as shown in Figure 1) because of the torque load and stress to which the block is subjected. Thus far, complete breakage has not occurred.

At this time, and only as a temporary measure, we recommend construction and installation of a support brace (as shown in Figure 2) to reinforce the block.

A new, stronger pillow block with a support brace is in process and will be available soon for no-charge replacement. As soon as parts are available, details will follow in a later bulletin.

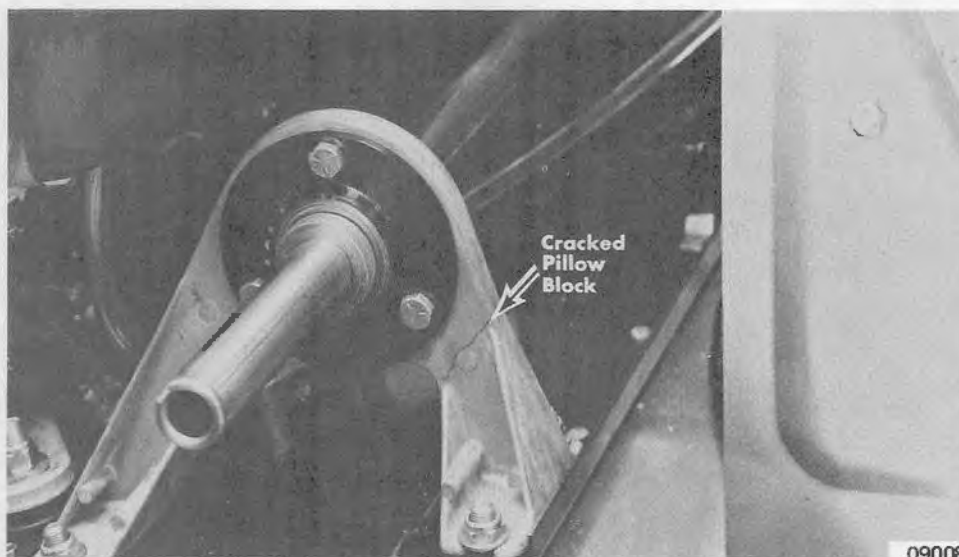


Figure 1.  
Cracked  
Pillow  
Block

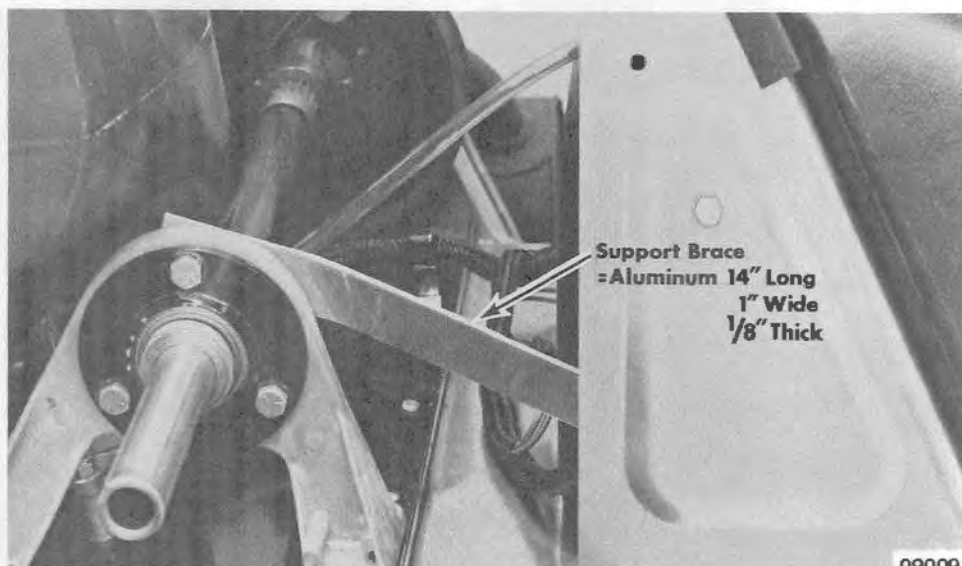


Figure 2.  
Support  
Brace  
Installed





# Sno-Twister/Hi-Performance Tipster



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No. 75-5 (11/22/74)

## 1974-75 "Race Proven" Set-Up Tips

It's official - On the weekend of November 2nd & 3rd, 1974, in Alaska, Mercury Sno-Twister Snowmobiles kicked off the 1974-75 snowmobile racing season with resounding victories in Stock II and Stock III classes. Here are some set-up tips that helped pull it off.

**IMPORTANT:** These set-up tips and specifications are intended for use under race conditions ONLY!

### ENGINE and CARBURETION

1. Check ignition timing ( $.100'' \pm .005''$  BTDC at 3000 RPM).
2. Make sure that idle RPM is set low enough to permit drive clutch to reset (disengage from belt). Idle RPM too high causes belt drag, resulting in a slower start off the line.
3. Set the low speed mixture needles (air pilot screws) on both the 340 S/T and 440 S/T at 2 turns open from seat.
4. Set carburetor jet needles as follows:
  - 340 S/T - "E" ring in 2nd notch from top.
  - 440 S/T - "E" ring in 1st (top notch).
5. Use the chart and graph in the Owners "Operation and Maintenance" Manual as a guide to determine approximate setting of high speed mixture needles. However, **POSITIVELY** determine final setting by "reading" spark plug color after making a few 100 yd. WOT runs (refer to Owners Manual for procedure).

### TORQUE CONVERTER

1. Set driven sheave spring preload at 2 full cams [30-32 lbs. (13.6-14.5kg)] . Check for 8250 RPM at WOT and readjust if necessary.

*NOTE: To assist future adjustments and/or repairs, remove burrs from torque bracket ID to achieve a "slip fit" on the steel shaft of the fixed sheave. A light film of grease on the shaft also helps.*

2. Clean and inspect drive clutch as outlined in Owners Manual.
3. Check and adjust drive belt tension as outlined in Owners Manual.
4. Check clutch engagement RPM and adjust if necessary.

**IMPORTANT:** Use a dependable and accurate service tachometer to check RPM. Don't rely strictly on your snowmobile tachometer. (USSA rules specify 4000 RPM maximum engagement.)

## TRACK/SUSPENSION

1. Adjust track tension and alignment as outlined in Owners Manual.
2. Lubricate drive sprockets and both edges of track for smoother running with less drag (STP works well).
3. For best results of weight transfer, set spring preload on rear shocks soft and set tension on front suspension springs as test results on a particular track may dictate.
4. Check tightness of all fasteners regularly before each race, particularly bolts that secure the ski pivot (saddle) to the leaf spring assembly and bolts which secure the ski assembly to the spindle.

## TETHER SWITCH

Obtain and install a "race proven" Safety Tether Switch. Type of switch and mounting location are strictly driver preference. (Safety Tether Switch IS NOT available from Mercury Marine.)

**IMPORTANT:** To prevent accidentally stopping the engine during a race, we suggest disconnecting the emergency stop switch (red), located on the throttle control. (Remove orange wire from No. 1 position on terminal block.)

## TRACTION DEVICES

1. Carbide insert wear skag (Mercury Marine Part No. D-68440-1) on the skis are a MUST for racing.
2. The following "stud" patterns are typical of installations that performed very well on "hard pack" and ice.

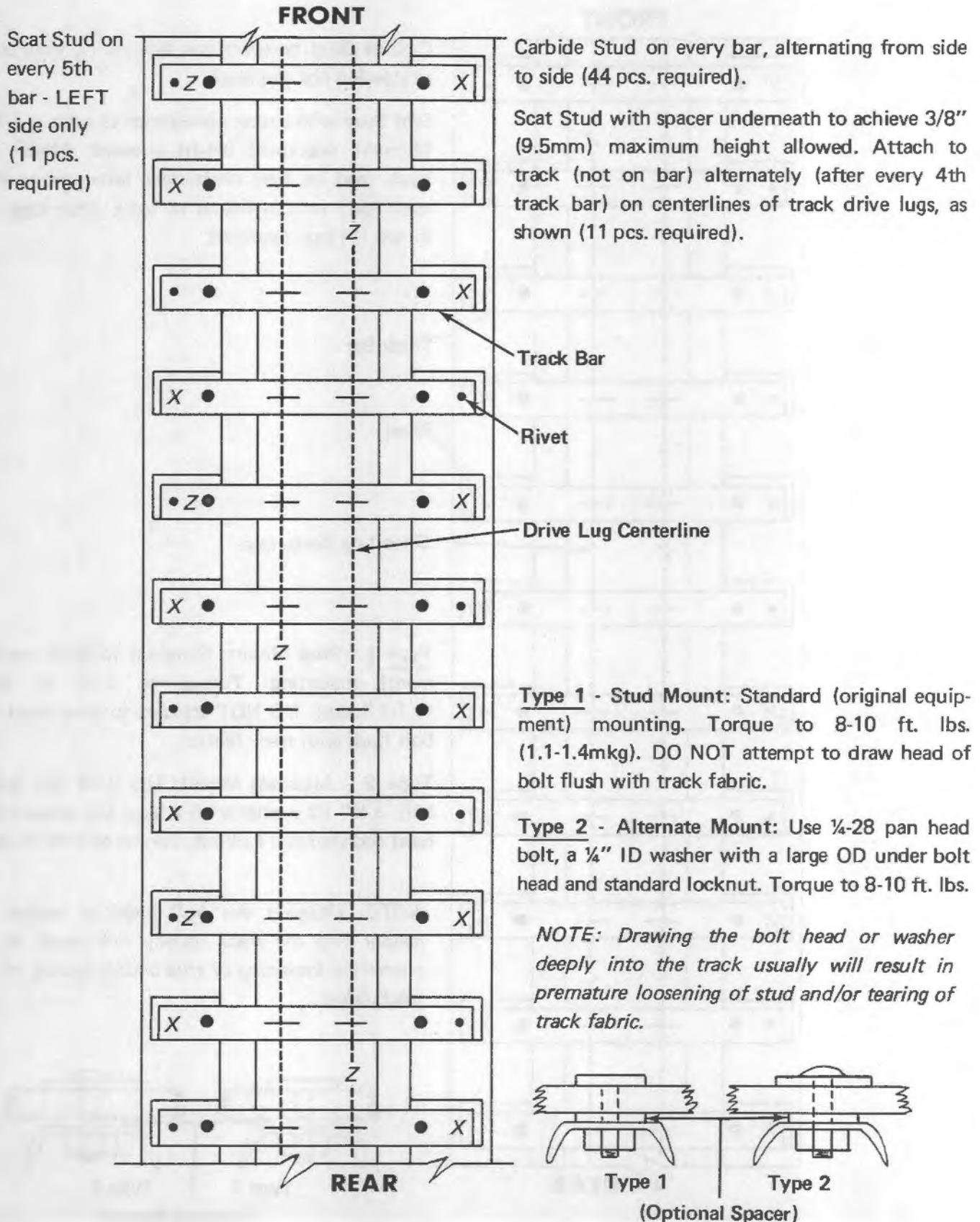
**NOTE:** Patterns shown are viewed from the bottom of the track, rear to front.

# 440 S/T

## KEY

X = Merc Carbide Stud (Part No. D-71926 - 22 pcs. in pkg.) (Super Stud)

Z = Merc Scat Stud (Part No. D-71925 - 22 pcs. in pkg.) (Kangaroo - 1 3/4" x 3/4" - 5/8" bite)



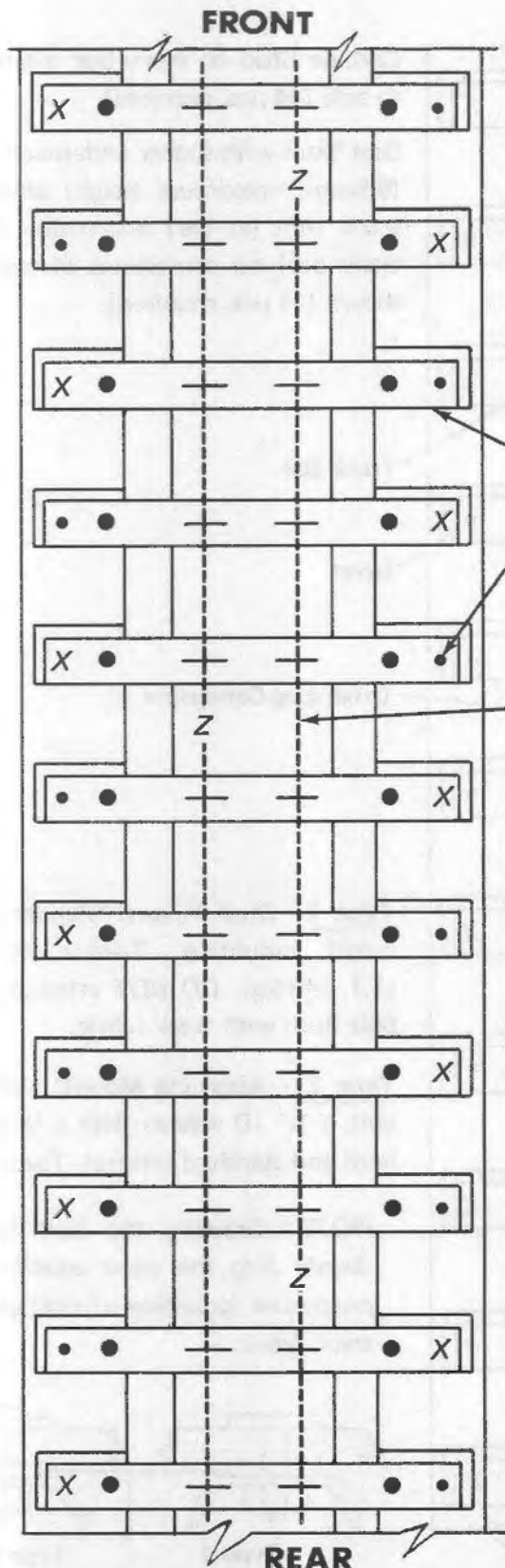


## 340 S/T

### KEY

X = Merc Carbide Stud (Part No. D-71926 - 22 pcs. in pkg.) (Super Stud)

Z = Merc Scat Stud (Part No. D-71925 - 22 pcs. in pkg.) (Kangaroo - 1 1/4" x 3/4" - 5/8" bite)



Carbide Stud on every bar, alternating from side to side (44 pcs. required).

Scat Stud with spacer underneath to achieve 3/8" (9.5mm) maximum height allowed. Attach to track (not on bar) alternately (after every 4th track bar) on centerlines of track drive lugs, as shown (11 pcs. required).

Track Bar

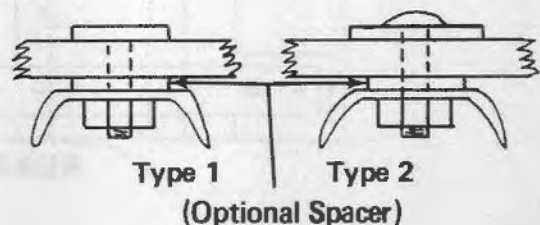
Rivet

Drive Lug Centerline

**Type 1 - Stud Mount:** Standard (original equipment) mounting. Torque to 8-10 ft. lbs. (1.1-1.4mkg). DO NOT attempt to draw head of bolt flush with track fabric.

**Type 2 - Alternate Mount:** Use 1/4-28 pan head bolt, a 1/4" ID washer with a large OD under bolt head and standard locknut. Torque to 8-10 ft. lbs.

**NOTE:** Drawing the bolt head or washer deeply into the track usually will result in premature loosening of stud and/or tearing of track fabric.





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No. 75-6 (11/22/74)

## 340 S/T MODIFICATION INSTRUCTIONS

**IMPORTANT:** Modification of exhaust system and/or engine **VOIDS** your **WARRANTY**. Modification instructions are intended solely for race applications.

**CAUTION:** Modify engine, exhaust system and carburetion **EXACTLY** as instructed, following. **ANY DEVIATION** from **SPECIFIED DIMENSIONS** or **MODIFICATION** of **PARTS NOT MENTIONED** WILL **DECREASE** PERFORMANCE and could result in severe engine damage.

### Modifying 340 S/T from "Stock" to "Modified-Stock" CYLINDER

#### A. Exhaust Port

Enlarge exhaust port of cylinder as follows:

1. Raise top edge of exhaust port to a point 1.120" (28.45mm) below top surface of cylinder. (Figure 1) **DO NOT** change bottom edge of exhaust port.
2. Increase the chordal width of exhaust port to 1.460" (37.08mm). (Figure 1)

*NOTE: Chordal width (Figure 1) is straight line distance between side edges of port (not following curvature of cylinder wall).*

3. Enlarge radius of 4 exhaust port corners to 0.20" (5.1mm). (Figure 1)
4. After grinding exhaust port, chamfer all sharp edges.

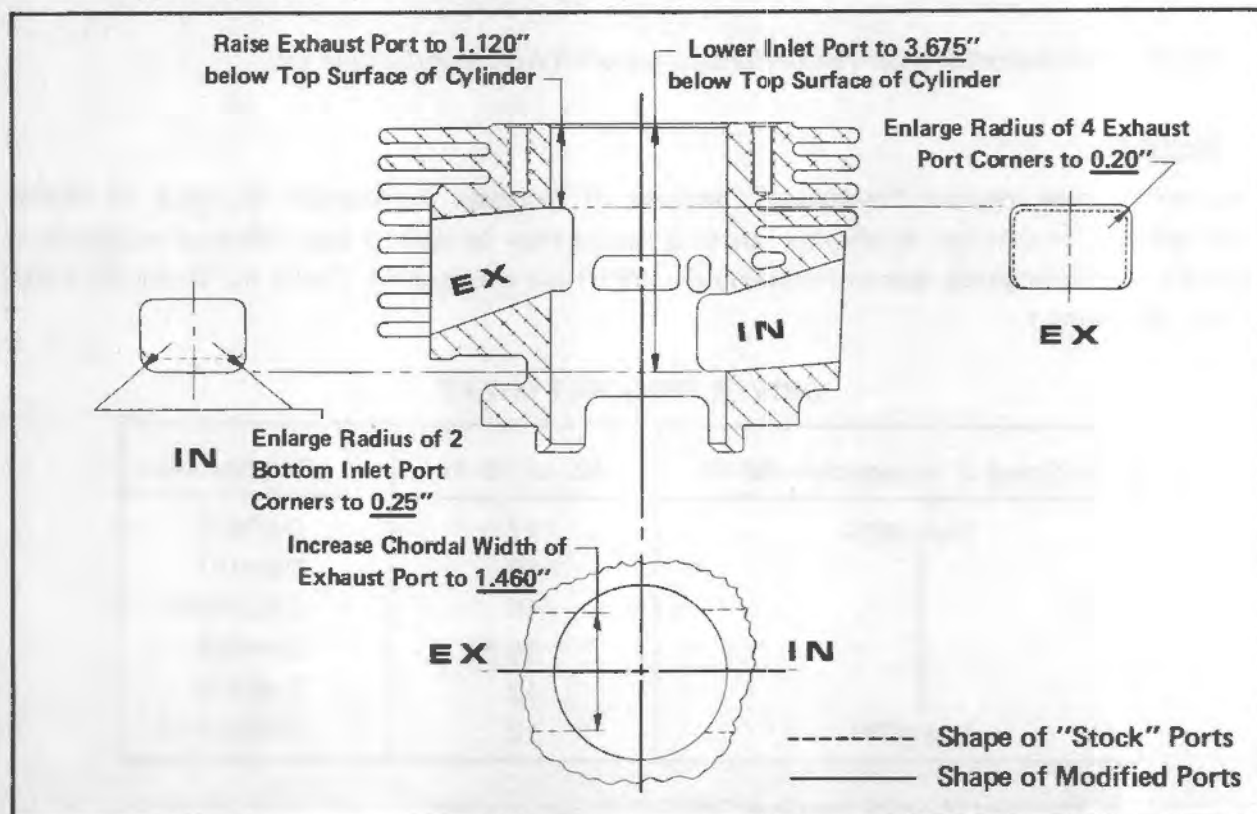


Figure 1. 340 S/T "Modified-Stock" and "Super-Modified" Cylinder Dimensions

## B. Inlet Port

Enlarge inlet port of cylinder as follows:

1. Lower bottom edge of inlet port to a point 3.675" (93.35mm) below top surface of cylinder. (Figure 1) DO NOT change top edge or chordal width of inlet port.
2. Enlarge radius of 2 bottom inlet port corners to 0.25" (6.35mm). (Figure 1)
3. After grinding inlet port, chamfer all sharp edges.

## EXHAUST SYSTEM

Modification of "stock" exhaust system is not permitted for "modified-stock" competition.

## CARBURETION

Adjust high speed mixtures (adjust mixture needles and/or replace fixed high speed jets) to attain "normal" coloration of spark plugs.

**CAUTION:** When in doubt about high speed mixture adjustment, ALWAYS select a "richer" setting. Carburetors, which are adjusted too "lean", will cause severe internal engine damage.

## DRIVE SYSTEM

### A. Maximum Engine RPM

A "modified-stock" 340 S/T will deliver maximum power when operated at 8,750 to 9,000 RPM. Modify and adjust torque converter to increase full throttle engine RPM to this speed.

### B. Drive Sheave (Clutch)

Install Drive Sheave Modification Kit (D-71711A1). Modify profile of drive sheave ramps to attain correct full throttle engine RPM (as recommended in preceding paragraph) and desired shift pattern.

*NOTE: Clutch modification instructions are supplied with modification kit.*

### C. Sprockets

Snowmobile may require "re-gearing" because of increased horsepower (a result of engine modification). Installation of another driver sprocket may be desired (depending upon operating conditions) to change top speed of snowmobile (MPH) and acceleration. (Refer to "Driver Sprocket Chart", following.)

**DRIVER SPROCKET CHART**

Top Speed of Snowmobile (MPH)	No. of Teeth	Part Number
<div style="text-align: center;">High MPH ↑ ↓ Low MPH</div>	17	D-63573
	16	D-64131
	15	D-63318A1
	14 ■	D-64684
	13	D-68439
	12	D-69757-12

■ Standard (factory installed) 340 S/T driver sprocket



# Modifying 340 S/T from "Stock" to "Super-Modified"

## ENGINE

### A. Cylinder

1. Exhaust Port - Enlarge cylinder exhaust port as outlined in "Modifying 340 S/T from 'Stock' to 'Modified-Stock'", preceding.
2. Inlet Port - Enlarge cylinder inlet port as outlined in "Modifying 340 S/T from 'Stock' to 'Modified-Stock'", preceding.

### B. Ignition Timing

Retard ignition timing (full advance) from 0.100" BTDC to 0.080" BTDC (2.54mm to 2.03mm).

## EXHAUST SYSTEM

### A. Exhaust Pipe Center Section

1. Cut 4.5" (11.43cm) from center section of each exhaust pipe. (Figure 2)
2. Before re-welding exhaust pipes, position pipes in snowmobile and rotate sections to attain best fit.
3. Weld sections of exhaust pipes together. Be sure that welds are smooth and do not restrict exhaust.

### B. Exhaust Pipe Stinger

1. Cut production stinger from each exhaust pipe.

*NOTE: Converging cone of exhaust pipes may have to be cut back slightly, so that inside diameter (ID) of cones are enlarged to 1" (25.4mm) (same ID as replacement stinger).*

2. Weld modified stingers [1" ID x 0.040" thick (approximately) x 10.5" long (25.4mm x 1.02mm x 26.67cm) - Figure 2] to converging cones. Be sure that welds are smooth and do not restrict exhaust.

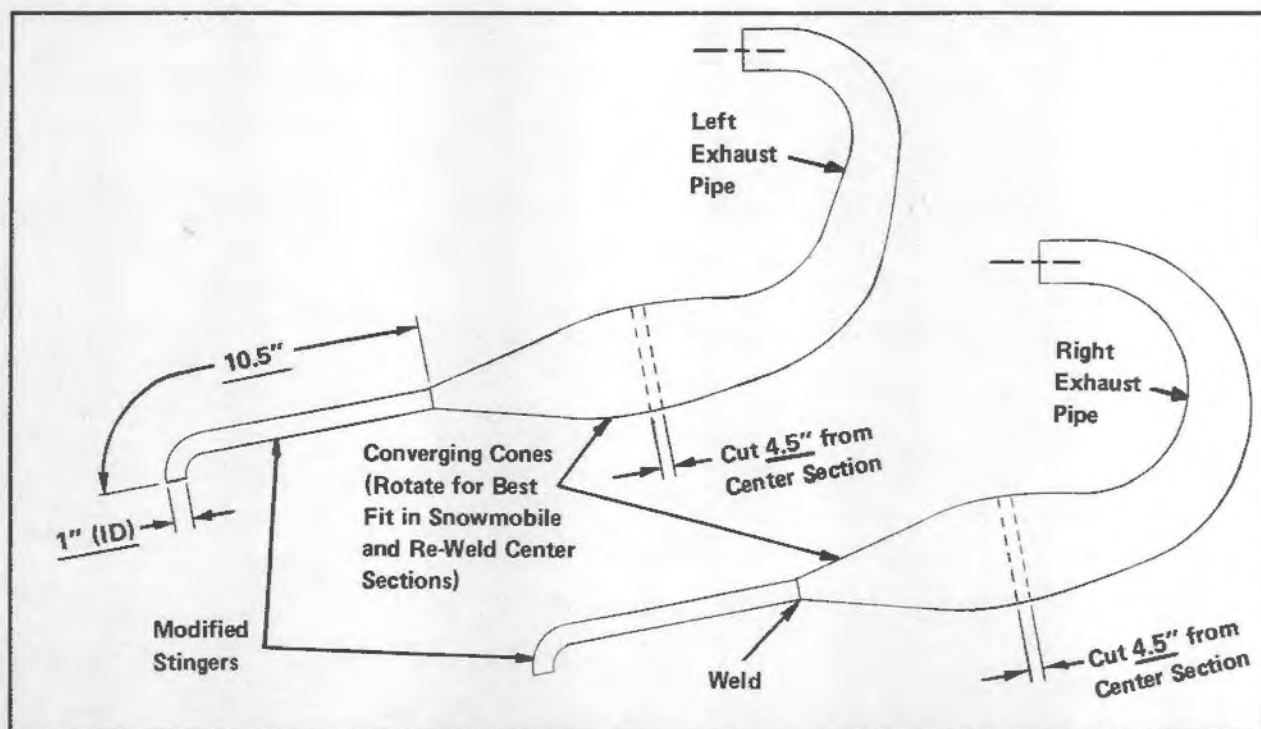


Figure 2. 340 S/T "Super-Modified" Exhaust Pipes

## CARBURETION

Adjust high speed mixtures (adjust mixture needles and/or replace fixed high speed jets) to achieve "normal" coloration of spark plugs.

**CAUTION:** When in doubt about high speed mixture adjustment, **ALWAYS** select a "richer" setting. Carburetors, which are adjusted too "lean", will cause severe internal engine damage.

## DRIVE SYSTEM

### A. Maximum Engine RPM

A "super-modified" 340 S/T will deliver maximum power when operated at 9,750 to 10,000 RPM. Modify and adjust torque converter to increase full throttle engine RPM to this speed.

### B. Drive Sheave (Clutch)

Install Drive Sheave Modification Kit (D-71711A1). Modify profile of drive sheave ramps to attain correct full throttle engine RPM (as recommended in preceding paragraph) and desired shift pattern.

*NOTE: Clutch modification instructions are supplied with modification kit.*

### C. Sprockets

Snowmobile may require "re-gearing" because of increased horsepower (a result of engine and exhaust modification). Installation of another driver sprocket may be desired (depending upon operating conditions) to change top speed of snowmobile (MPH) and acceleration. (Refer to "Driver Sprocket Chart", preceding.)





NOTICE: Sno-Twister/Hi-Performance "Tipsters" are in numerical order, starting with 75-1. If the first copy you receive is (example) 75-3 -- and you desire previous "Tipster" issues (75-1 and 75-2) -- advise Mercury Marine Publications Dept., P.O. Box 1108, Fond du Lac, WI 54935. and give the first number that you received.

No. 75-7 (11/22/74)

## 440 S/T MODIFICATION INSTRUCTIONS

**IMPORTANT:** Modification of exhaust system and/or engine **VOIDS** your **WARRANTY**.  
Modification instructions are intended solely for race applications.

**CAUTION:** Modify engine, exhaust system and carburetion **EXACTLY** as instructed, following. **ANY DEVIATION** from **SPECIFIED DIMENSIONS** or **MODIFICATION** of **PARTS NOT MENTIONED** WILL **DECREASE PERFORMANCE** and could result in severe engine damage.

### Modifying 440 S/T from "Stock" to "Modified-Stock"

#### ENGINE

##### A. Cylinder

1. Exhaust Port - Enlarge cylinder exhaust port as follows:
  - a. Raise top edge of exhaust port to a point 1.120" (28.45mm) below top surface of cylinder. (Figure 1) **DO NOT** change bottom edge of exhaust port.
  - b. Increase chordal width of exhaust port to 1.690" (42.93mm). (Figure 1)

**NOTE:** Chordal width (Figure 1) is straight line distance between side edges of port (not following curvature of cylinder wall).

- c. Enlarge radius of 4 exhaust port corners to 0.20" (5.08mm). (Figure 1)
- d. After grinding exhaust port, chamfer all sharp edges.

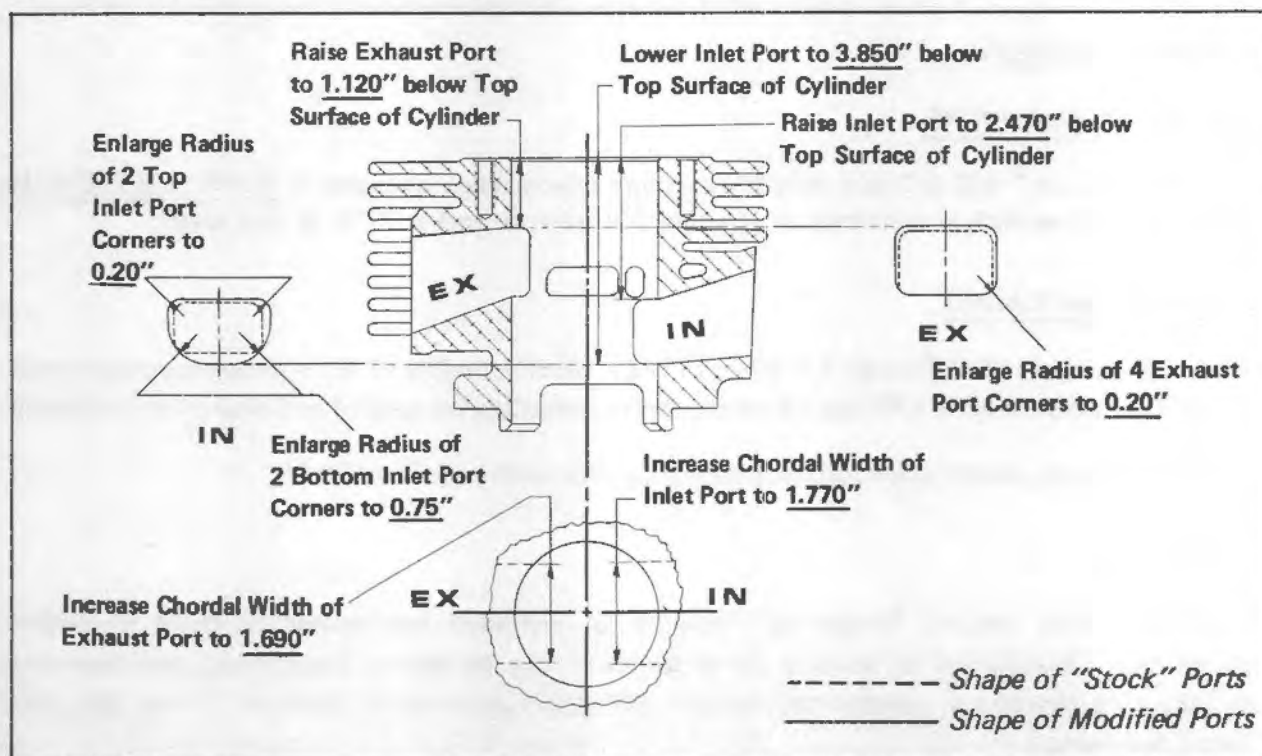


Figure 1. 440 S/T "Modified-Stock" and "Super-Modified" Cylinder Dimensions



## 2. Inlet Port - Enlarge cylinder inlet port as follows:

- Lower bottom edge of inlet port to a point 3.850" (97.79mm) below top surface of cylinder. (Figure 1)
- Raise top edge of inlet port to a point 2.470" (62.74mm) below top surface of cylinder. (Figure 1)
- Increase chordal width of inlet port to 1.770" (44.96mm). (Figure 1)
- Enlarge radius of 2 bottom inlet port corners to 0.75" (19.05mm). (Figure 1)
- Enlarge radius of 2 top inlet port corners to 0.20" (5.08mm). (Figure 1)
- After grinding inlet port, chamfer all sharp edges.

## B. Piston

Remove 0.080" (2.03mm) from inlet side of piston skirt. (Figure 2) After cutting piston skirt, remove all sharp edges from skirt.

*NOTE: Inlet side of piston is side opposite exhaust mark on piston dome.*

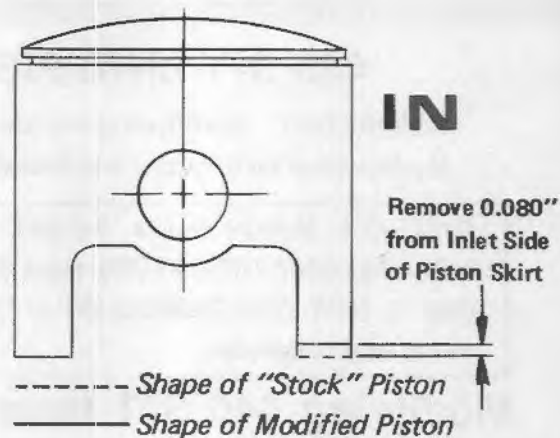


Figure 2. 440 S/T "Modified-Stock" and "Super-Modified" Piston

## EXHAUST SYSTEM

Modification of "stock" exhaust system is not permitted for "modified-stock" competition.

## CARBURETION

Adjust high speed mixtures (adjust mixture needles and/or replace fixed high speed jets) to obtain "normal" coloration of spark plugs.

**CAUTION:** When in doubt about high speed mixture adjustment, ALWAYS select a "richer" setting. Carburetors, which are adjusted too "lean", will cause severe internal engine damage.

## DRIVE SYSTEM

### A. Maximum Engine RPM

A "modified-stock" 440 S/T will deliver maximum power when operated at 8,500 to 8,750 RPM. Modify and adjust torque converter to increase full throttle engine RPM to this speed.

### B. Drive Sheave (Clutch)

Install Drive Sheave Modification Kit (D-71711A1). Modify profile of drive sheave ramps to attain correct full throttle engine RPM (as recommended in preceding paragraph) and desired shift pattern.

*NOTE: Clutch modification instructions are supplied with modification kit.*

### C. Sprockets

Snowmobile may require "re-gearing" because of increased horsepower (a result of engine modification). Installation of another driver sprocket may be desired (depending upon operating conditions) to change top speed of snowmobile (MPH) and acceleration. (Refer to "Driver Sprocket Chart", following.)

## DRIVER SPROCKET CHART

Top Speed of Snowmobile (MPH)	Number of Teeth	Part Number
High MPH ↑ ↓ Low MPH	17	D-63573
	16	D-64131
	15 ▲	D-63318A1
	14	D-64684
	13	D-68439
	12	D-69757-12

▲ Standard (factory installed) 440 S/T driver sprocket

## Modifying 440 S/T from "Stock" to "Super-Modified" ENGINE

### A. Cylinder

1. Exhaust Port - Enlarge cylinder exhaust port (Figure 1) as outlined in "Modifying 440 S/T from 'Stock' to 'Modified-Stock' ", preceding.
2. Inlet Port - Enlarge cylinder inlet port (Figure 1) as outlined in "Modifying 440 S/T from 'Stock' to 'Modified-Stock' ", preceding.

### B. Piston

Modify piston (Figure 2) as outlined in "Modifying 440 S/T from 'Stock' to 'Modified-Stock' ", preceding.

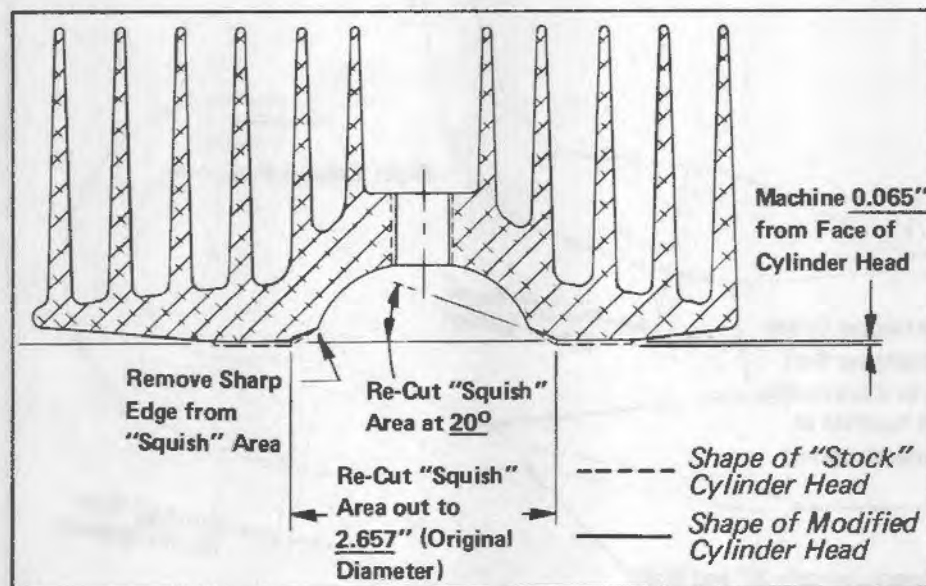


Figure 3. 440 S/T "Super-Modified" Cylinder Head

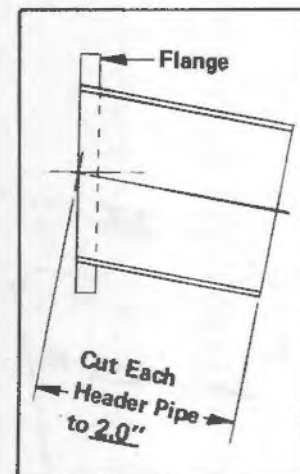


Figure 4.  
440 S/T "Super-Modified" Exhaust Header Pipe

### C. Cylinder Head

1. Machine 0.065" (1.65mm) from face of cylinder head. (Figure 3)
2. Re-cut cylinder head "squish" area at 20° and out to original diameter [2.657" (64.49mm)]. (Figure 3)
3. Remove all sharp edges from edge of "squish" area. (Figure 3)
4. Volume of modified cylinder head (measured on flat plate) should be 23.8cc.

### D. Ignition Timing

Retard ignition timing (full advance) from 0.100" (2.54mm) BTDC to 0.080" (2.03mm) BTDC.

## EXHAUST SYSTEM

### A. Exhaust Header Pipe

Cut each header pipe down to 2.0" (50.8mm) including flange. (Figure 4)

*NOTE: Re-weld spring attaching washers to flange of header pipes.*

### B. Exhaust Pipe Center Section

1. Cut 1.0" (25.4mm) from center section of each exhaust pipe. (Figure 5)
2. Before re-welding exhaust pipes, position pipes in snowmobile and rotate sections to obtain best fit.

*NOTE: Spring hooks will require repositioning on exhaust pipes to give sufficient spring tension. Left exhaust pipe (PTO side) must be heated and CAREFULLY bent to fit around engine rewind housing. Bend left exhaust pipe in area of first bend (just after header pipe - Figure 5).*

3. Weld sections of exhaust pipes together. Be sure that welds are smooth and do not restrict exhaust.

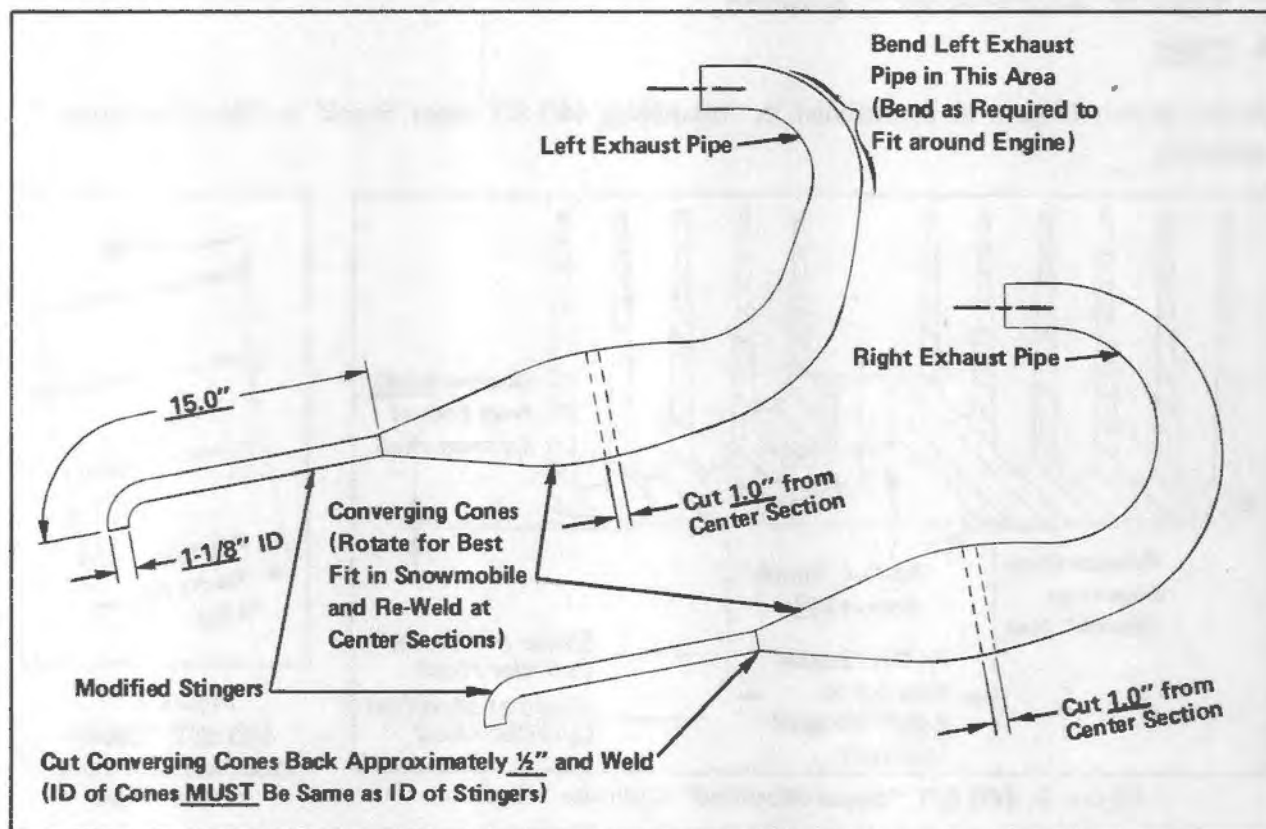


Figure 5. 440 S/T "Super-Modified" Exhaust Pipes

### C. Exhaust Pipe Stingers

1. Cut production stinger from each exhaust pipe.
2. Cut approximately 1/2" (12.7mm) from end of each converging cone so that inside diameter (ID) of cones is enlarged to 1-1/8" (28.58mm) (same ID as replacement stinger). (Figure 5)
3. Weld modified stingers [1-1/8\" ID x 0.040\" thick (approximately) x 15\" long (28.58mm x 1.02mm x 38.1cm) - Figure 5] to converging cones. Be sure that welds are smooth and do not restrict exhaust.



## CARBURETION

### A. Carburetors

Replace "stock" carburetors (Mikuni VM 36) with Mikuni VM 38 carburetors (38mm). Carburetors are available thru Mercury Marine (see "Ordering Information", following).

### B. High Speed Mixture

1. Fixed high speed jets in the range of No. 400 to No. 480 (depending upon conditions of operation) will be required in VM 38 carburetors. Fixed high speed jets are available thru Mercury Marine (see "Ordering Information", following).
2. Adjust high speed mixtures (adjust mixture needles and/or replace fixed high speed jets) to attain "normal" coloration of spark plugs.

**CAUTION:** When in doubt about high speed mixture adjustment, ALWAYS select a "richer" setting. Carburetors, which are adjusted too "lean", will cause severe internal engine damage.

### C. Ordering Information

To obtain ordering information on modified carburetors (Mikuni VM 38) and fixed high speed jets (No. 400 to No. 480), contact:

*Mercury Marine  
Hi-Performance Products Department  
20 Wisconsin Street  
Oshkosh, Wisconsin 54901  
  
Attention: Snowmobile Division  
  
Telephone: (414) 231-9180*

## DRIVE SYSTEM

### A. Maximum Engine RPM

A "super-modified" 440 S/T will deliver maximum power when operated at 9,500 to 9,750 RPM. Modify and adjust torque converter to increase full throttle engine RPM to this speed.

### B. Drive Sheave (Clutch)

Install Drive Sheave Modification Kit (D-71711A1). Modify profile of drive sheave ramps to obtain correct full throttle engine RPM (as recommended in preceding paragraph) and desired shift pattern.

*NOTE: Clutch modification instructions are supplied with modification kit.*

### C. Sprockets

Snowmobile may require "re-gearing" because of increased horsepower (a result of engine and exhaust modification). Installation of another driver sprocket may be desired (depending upon operating conditions) to change top speed of snowmobile (MPH) and acceleration. (Refer to "Driver Sprocket Chart", preceding.)

## CARBURETION

### A. Description

Positive "lean" carburetors (Venturi) are used on all models. The carburetor is located in the engine compartment, and is accessible from the front of the vehicle.

### B. High Speed Mixture

1. High speed jet is the jet of air, 450 to 500 lbs. per sq. in. (operation) will be reduced to 25 lbs. per sq. in. when the engine is idling.
2. Mixture (lean) jet is the jet of air, 450 to 500 lbs. per sq. in. (operation) will be reduced to 25 lbs. per sq. in. when the engine is idling.

NOTE: When in doubt, always use the "lean" mixture. A "lean" mixture will cause the engine to run "lean", and cause a loss of power.

### C. Operating Information

To obtain optimum performance, the carburetor should be adjusted to the following specifications:

- 1. High Speed Jet: 450 to 500 lbs. per sq. in.
- 2. Mixture (lean) Jet: 25 lbs. per sq. in.
- 3. Idle Jet: 25 lbs. per sq. in.
- 4. Idle Mixture: 25 lbs. per sq. in.
- 5. Idle Jet: 25 lbs. per sq. in.
- 6. Idle Mixture: 25 lbs. per sq. in.

## DRIVE SYSTEM

### A. Maximum Engine RPM

A "super motor" 540 BT will deliver maximum power when operating at 5,400 to 5,600 RPM. It is recommended that the engine be kept at this RPM.

### B. Drive Shaft (Clutch)

Use the Drive Shaft (Clutch) for all models. The Drive Shaft (Clutch) is located in the engine compartment, and is accessible from the front of the vehicle.

NOTE: A clutch mechanism is used to engage and disengage the drive shaft.

### C. Shifter

Shifter may require "re-gearing" during the service life of the vehicle. Re-gearing is the process of changing the gear ratios of the transmission. This is done by changing the gear ratios of the transmission. The gear ratios are changed by changing the gear ratios of the transmission. The gear ratios are changed by changing the gear ratios of the transmission.



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No. 75-8 (12/6/74)

## TRACK "STUD" INSTALLATION

1975 Models 340 S/T, 440 S/T and 440 T/T

(Chassis Serial No. 4205000 and Above)

On some snowmobiles, wear strips (D-70727) in the chassis tunnel will require repositioning if installation of track studs is desired. Make certain that the FRONT END of both wear strips extend 4" (10.16cm) forward of FRONT wear strip attaching hole in chassis. Failure to observe this dimension exactly may result in damage to the chassis tunnel with track studs installed.

If wear strips are not correctly positioned, reposition as follows:

1. Remove seat cushion, fuel tank and slide suspension.
2. Drill out 14 rivets, which attach wear strips to chassis, and remove wear strips.
3. Reposition each wear strip so that the front end extends 4" forward of front wear strip attaching hole in chassis. Using wear strip as a guide, drill 13/64" (5.16mm) holes thru chassis (7 for each wear strip).
4. Install fuel tank and seat cushion.
5. Attach wear strips with 14 rivets (C-17-71790).
6. Install slide suspension and readjust track tension and alignment.

1. The first step in the design of a drive sheave is to determine the required diameter. This is done by dividing the pitch diameter of the gear by the number of teeth. The result is the pitch diameter of the sheave.

# 340 2-T and 4-T 2-T DRIVE SHEAVE Suggested Dimensions for SUPER-MODIF

As a result of factory testing, the following dimensions are suggested for the 340 2-T and 4-T 2-T drive sheaves. These dimensions are based on the assumption that the sheave will be used with a 340 2-T or 4-T 2-T gear. The dimensions are given in inches.

The dimensions are given in inches. The dimensions are given in inches. The dimensions are given in inches. The dimensions are given in inches. The dimensions are given in inches.







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2. Drill out 14 rivets, which attach wear strips to chassis, and remove wear strips.
3. Reposition each wear strip so that the front end extends 4" forward of front wear strip attaching hole in chassis. Using wear strip as a guide, drill 13/64" (5.16mm) holes thru chassis (7 for each wear strip).
4. Install fuel tank and seat cushion.
5. Attach wear strips with 14 rivets (C-17-71790).
6. Install slide suspension and readjust track tension and alignment.



# Sno-Twister/Hi-Performance Tipster



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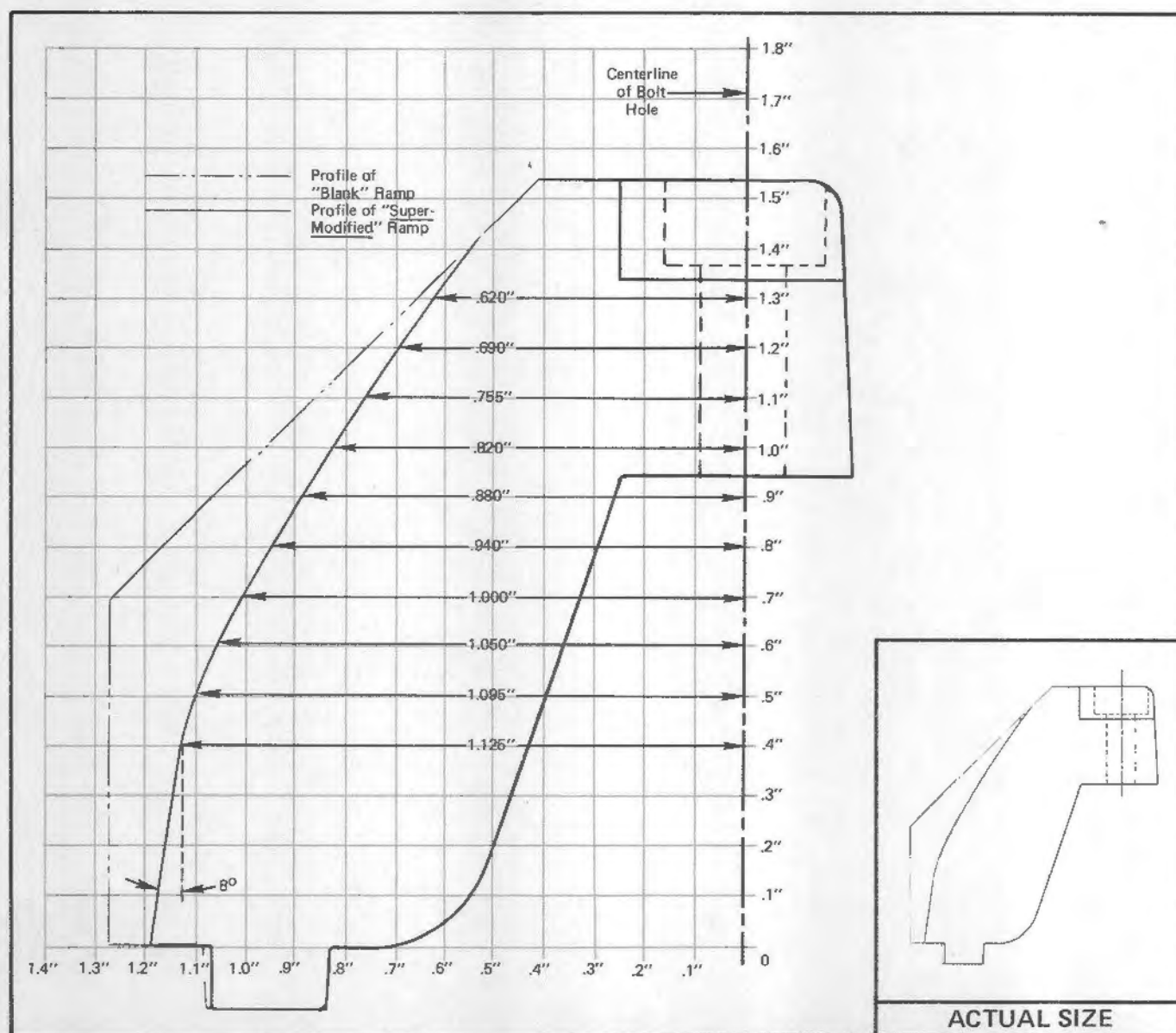


No. 75-9 (12/18/74)

## 340 S/T and 440 S/T DRIVE SHEAVE RAMPS Suggested Dimensions for "SUPER-MODIFIED" Ramps

As a result of factory testing, Mercury has designed a drive sheave ramp profile suitable for 340 S/T and 440 S/T "Super-Modified" Snowmobiles (see drawing below). This ramp profile is intended to be used with green compression spring and optional weights (0146-135 for 340 S/T and 0146-123 for 440 S/T).

Green compression spring, an assortment of weights, a set of "blank" ramps (hardened) and an instruction sheet are included in Drive Sheave Modification Kit (D-71711A1).



Suggested Dimensions for 340 S/T and 440 S/T "Super-Modified" Drive Sheave Ramps





# Sno-Twister/Hi-Performance Tipster



NOTICE: Sno-Twister/Hi-Performance "Tipsters" for 1976 are in numerical order, starting with 76-1. If the first copy you receive is (example) 76-3 -- and you desire previous "Tipster" issues (76-1 and 76-2) -- advise Mercury Marine Publications Dept., P.O. Box 1108, Fond du Lac, WI 54935 and give the first number that you received.

No. 76-1 (11/26/75)

## MERCURY MARINE - CERTIFIED SNOWMOBILE SPECIFICATIONS

MODEL NAME	1976 340 T/T	1976 440 T/T	1976 250 S/T	1976 340 S/T	1976 440 S/T
<b>ENGINE SPECIFICATIONS</b>					
Engine Manufacturer	Kohler	Kohler	Kohler	Kohler	Kohler
Engine Model	K340-2AS	K440-2AS	250 RLC	340 RLC	440 RLC
No. of Cylinders	2	2	2	2	2
Engine Displacement	339.3cc	435.8cc	250cc	339.3cc	435.8cc
Horsepower	40 @ 7000 RPM	50 @ 7000 RPM	N.A.	N.A.	N.A.
Type of Cooling	Axial Fan	Axial Fan	Liquid	Liquid	Liquid
Bore	60.0mm	68.0mm	51.5mm	60.0mm	68.0mm
Stroke	60.0mm	60.0mm	60.0mm	60.0mm	60.0mm
Ignition	Wico CD	Wico CD	Thunderbolt CD	Thunderbolt CD	Thunderbolt CD
Min. Compressed Head Gasket Thickness	0.7mm	0.7mm	0.7mm	0.7mm	0.7mm
Min. Compressed Base Gasket Thickness	0.3mm	0.3mm	0.2mm	0.3mm	0.3mm
① Volume of Head to Top of Spark Plug Hole - Vertical	12.7cc	21.7cc	10.5cc	14.2cc	16.5cc
Head Volume w/Spark Plug - on a Flat Plate	18.5 ± 1.0cc	26.5 ± 1.0cc	10.7 ± 0.8cc	17.5 ± 0.8cc	23.5 ± 1.0cc
Crankcase Volume	310.0cc	310.0cc	305.0cc	305.0cc	305.0cc
Overall Length of Cylinder	109.0 ± 0.5mm	109.0 ± 0.5mm	109.0 ± 0.5mm	109.0 ± 0.5mm	109.0 ± 0.5mm
Cylinder Bore Material	Chrome Plated Alum.	Chrome Plated Alum.	Chrome Plated Alum.	Chrome Plated Alum.	Chrome Plated Alum.
Depth - Top of Cylinder to Bottom of Intake Port	92.5 ± 1.0mm	92.5 ± 1.0mm	93.9 ± 1.0mm	92.5 ± 1.0mm	96.0 ± 1.0mm
Depth - Top of Cylinder to Top of Exhaust Port	33.0 ± 1.2mm	33.0 ± 1.2mm	28.7 ± 1.2mm	29.5 ± 1.2mm	28.6 ± 1.2mm
Depth - Top of Cylinder to Top of Transfer Port(s)	47.3 ± 1.2mm	47.3 ± 1.2mm	46.5 ± 1.2mm	46.5 ± 1.2mm	46.5 ± 1.2mm
Width of Transfer Ports	34.2 ± 1.0/14.1 ± 1.0mm	33.8 ± 1.0/12.8 ± 1.0mm	27.7 ± 1.0/10.7 ± 1.0mm	32.3 ± 1.0/12.5 ± 1.0mm	32.1 ± 1.0/15.2 ± 1.0mm
Width of Intake Ports	42.0 ± 0.8mm	48.0 ± 0.8mm	40.0 ± 0.8mm	44.0 ± 0.8mm	42.0 ± 0.8mm
Height of Exhaust Port/Including Chamfer	27.0 ± 1.2mm	27.0 ± 1.2mm	31.2 ± 1.2mm	30.5 ± 1.2mm	31.0 ± 1.2mm
Height of Exhaust Port/Excluding Chamfer	26.5 ± 0.7mm	26.5 ± 0.7mm	30.7 ± 0.7mm	30.0 ± 0.7mm	30.5 ± 0.7mm
Width of Exhaust Port/Top (Wide Part)	42.0 ± 0.5mm	42.0 ± 0.5mm	32.0 ± 0.5mm	42.0 ± 0.5mm	42.0 ± 0.5mm
Width of Exhaust Port/Bottom (Narrow Part)	N.A.	N.A.	28.0 ± 0.5mm	35.0 ± 0.5mm	35.0 ± 0.5mm
Height of Transfer Ports	12.7 ± 1.0mm	12.7 ± 1.0mm	13.5 ± 1.0mm	13.5 ± 1.0mm	13.5 ± 1.0mm
Height of Intake Port/Including Chamfer	24.5 ± 0.9mm	24.5 ± 0.9mm	30.9 ± 0.9mm	30.5 ± 0.9mm	34.0 ± 0.9mm
Height of Intake Port/Excluding Chamfer	24.0 ± 0.7mm	24.0 ± 0.7mm	30.4 ± 0.7mm	30.0 ± 0.7mm	33.5 ± 0.7mm
Weight - Piston Assembly Complete	240.2g ± 10%	335g ± 10%	198.0 ± 10.0g	240.0 ± 10.0g	309.0 ± 10.0g
Overall Height of Piston (thru Center)	70.5 ± 0.8mm	71.7 ± 0.8mm	68.7 ± 0.8mm	67.15 ± 0.8mm	70.7 ± 0.8mm
Height of Piston/Exhaust Side	65.0 ± 0.8mm	65.0 ± 0.8mm	65.0 ± 0.8mm	62.0 ± 0.8mm	64.0 ± 0.8mm
Height of Piston/Intake Side	63.0 ± 0.8mm	65.0 ± 0.8mm	63.0 ± 0.8mm	60.0 ± 0.8mm	62.0 ± 0.8mm
No. of Rings per Piston	2	2	1	1	1
Ring Type	"L" and Rectangular	"L" and Rectangular	"L" - Keystone	"L" - Keystone	"L" - Keystone
Ring Thickness	1.995mm	"L"/2.515-Rect./1.995mm	1.995mm	1.995mm	2.515mm
Ring Width(s)	2.7/2.4mm	3.0/2.7mm	2.12mm	2.6mm	3.0mm
Crankcase Face to Center of Crankshaft	70.0 ± 0.5mm	70.0 ± 0.5mm	70.0 ± 0.5mm	70.0 ± 0.5mm	70.0 ± 0.5mm
DBA Level	78 ± 2	78 ± 2	78 ± 2	78 ± 2	78 ± 2
Head Pipe Length	② 4.0" ± 0.192"	② 4.0" ± 0.192"	③ 1.5" ± 0.192"	③ 1.5" ± 0.192"	③ 1.5" ± 0.192"
Head Pipe Inside Diameter	1.563" ± 0.025"	1.563" ± 0.025"	1.5" ± 0.02"	1.625" ± 0.02"	1.625" ± 0.02"

① Piston @ TDC

② Y-Pipe Manifold with Single Expansion Chamber and Muffler Assembly

③ Twin Expansion Chambers Discharging into Single Muffler

N.A. = Not Applicable

NOTE: See Bottom of Page 2

for Metric/U.S. Conversion

(OVER)

MODEL NAME	1976 340 T/T	1976 440 T/T	1976 250 S/T	1976 340 S/T	1976 440 S/T
<b>CARBURETOR</b>					
Make/Model No.	Mikuni/VM32-91	Mikuni/VM36-34	Mikuni/VM34	Mikuni/VM 36	Mikuni/VM38
No. per Engine	2	2	2	2	2
Venturi - Smallest Diameter in Throat	32.0mm	36.0mm	34.0mm	36.0mm	37.5mm
Throttle Bore - Largest Dia. Downstream of Butterfly	33.0mm	37.0mm	34.5mm	37.0mm	38.0mm
Choke	Yes	Yes	Yes	Yes	Yes
<b>DRIVE CLUTCH</b>					
Make/Model No.	Arctic XXXX - 077	Arctic XXXX - 080	Arctic XXXX - 081	Arctic XXXX - 088	Arctic XXXX - 089
Engagement Speed	3200 RPM $\pm$ 200	3200 RPM $\pm$ 200	4000 RPM	4000 RPM	4000 RPM
No. of Springs/Color	1/Blue	1/Blue	1/Green	1/Green	1/Green
Spring Wire Diameter	.192" $\pm$ .005"	.192" $\pm$ .005"	.192" $\pm$ .005"	.192" $\pm$ .005"	.192" $\pm$ .005"
Drive Clutch Spring - Free Length	2.49" $\pm$ .12"	2.49" $\pm$ .12"	4.375" $\pm$ .250"	4.375" $\pm$ .250"	4.375" $\pm$ .250"
No. of Turns	3.9	3.9	5	5	5
Drive Clutch Spring - Outside Diameter	2.31" $\pm$ .040"	2.31" $\pm$ .040"	2.375" $\pm$ .040"	2.375" $\pm$ .040"	2.375" $\pm$ .040"
Arm/Roller Weight	27.8 $\pm$ 2.0g	33.9 $\pm$ 2.0g	28.34 $\pm$ 2.0g	25.38 $\pm$ 2.0g	28.34 $\pm$ 2.0g
Drive Clutch - Roller Diameter	.470" $\pm$ .010"	.470" $\pm$ .010"	.470" $\pm$ .010"	.470" $\pm$ .010"	.470" $\pm$ .010"
<b>DRIVEN CLUTCH</b>					
Make/Model No.	Arctic XXXX - 015	Arctic XXXX - 015	Arctic XXXX - 015	Arctic XXXX - 015	Arctic XXXX - 015
Quantity/Driven Clutch Spring(s)	1	1	1	1	1
Spring Wire Diameter	.156" $\pm$ .005"	.156" $\pm$ .005"	.156" $\pm$ .005"	.156" $\pm$ .005"	.156" $\pm$ .005"
No. of Turns	5	5	5	5	5
Driven Clutch Spring - Free Length	5.00" $\pm$ .250"	5.00" $\pm$ .250"	5.00" $\pm$ .250"	5.00" $\pm$ .250"	5.00" $\pm$ .250"
Ramp Angle	30° $\pm$ 2°	30° $\pm$ 2°	30° $\pm$ 2°	30° $\pm$ 2°	30° $\pm$ 2°
<b>CHASSIS/SUSPENSION</b>					
Chassis Model	74001	74001	74558	74558	74558
Suspension	Slide Rail	Slide Rail	Slide Rail	Slide Rail	Slide Rail
Overall Vehicle Length	99.44" $\pm$ .500"	99.44" $\pm$ .500"	89.875" $\pm$ .250"	89.875" $\pm$ .250"	89.875" $\pm$ .250"
Chassis Length	88.00 $\pm$ .250"	88.00" $\pm$ .250"	82.875" $\pm$ .250"	82.875" $\pm$ .250"	82.875" $\pm$ .250"
Ski Length	37.50" $\pm$ .125"	37.500" $\pm$ .125"	33.500" $\pm$ .250"	33.500" $\pm$ .250"	33.500" $\pm$ .250"
Overall Vehicle Width	39.500" $\pm$ .250"	39.500" $\pm$ .250"	39.250" $\pm$ .250"	39.250" $\pm$ .250"	39.250" $\pm$ .250"
Ski Width	4.62" $\pm$ .060"	4.62" $\pm$ .060"	4.06" $\pm$ .06"	4.06" $\pm$ .06"	4.06" $\pm$ .06"
Center Distance between Skis	35.00" $\pm$ .125"	35.00" $\pm$ .125"	35.00" $\pm$ .125"	35.00" $\pm$ .125"	35.00" $\pm$ .125"
<b>TRACK</b>					
Material	Rubber/Steel Bars	Rubber/Steel Bars	Rubber/Grouser	Rubber/Grouser	Rubber/Grouser
Width	15.00" $\pm$ .125"	15.00" $\pm$ .125"	15.00" $\pm$ .125"	15.00" $\pm$ .125"	15.00" $\pm$ .125"
Pitch Length	110.88"	110.88"	102.00"	102.00"	102.00"
Track Drive Sprocket Teeth	9	9	12	12	12
Idler Diameter	7.625"	7.625"	7.625"	7.625"	7.625"
<b>CHAINCASE</b>					
Standard Drive Sprocket No. of Teeth	17	18	14	15	16
Standard Driven Sprocket No. of Teeth	34	34	34	34	34
Optional Drive Sprockets No. of Teeth	12-13-14-15-16-18	12-13-14-15-16-17	12-13-15-16-17-18	12-13-14-16-17-18	12-13-14-15-17-18
Optional Driven Sprockets No. of Teeth	28-36	28-36	28-36	28-36	28-36
Drive Chain/Rows	2	2	2	2	2
<b>WEIGHT</b>					
Overall (Less Gas)	365 $\pm$ 15 lbs.	365 $\pm$ 15 lbs.	330 $\pm$ 10 lbs.	330 $\pm$ 10 lbs.	330 $\pm$ 10 lbs.

**METRIC/U.S. CONVERSION:** 1mm (millimeter) = 0.0394" (inch); 1" = 25.4mm; 1 g (gram) = 0.04oz.;  
1cc (cubic centimeter) = 0.06 cu. in.; 1 lb. (pound) = 0.4536kg (kilogram)



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No. 76-2 (11/26/75)

## SET-UP INFORMATION

### "Stock" - 1976 Model 250-340-440 S/T Snowmobiles

#### IGNITION TIMING

Standard ignition timing for each model (as specified in the S/T "Operation and Maintenance Manual") MUST BE ADHERED TO. Advancing ignition timing beyond the recommended specification will gain absolutely nothing and could cause serious engine damage.

#### SPARK PLUGS

Standard spark plugs (Champion QN-19V) MUST BE USED FOR RACING. Champion N-55G plugs (which are easier to "read") may be used to determine correct carburetor "jetting" ONLY.

#### CYLINDER HEAD - "SQUISH" CHAMBER CLEARANCE

A MINIMUM of .030" (0.76mm) clearance must be maintained between cylinder head and piston dome [heads torqued to 225 in. lbs. (259kg-cm) after engine warmup to a minimum of 110° F (43° C)]. When re-using head gaskets, check "squish" chamber clearance as follows:

1. Place a piece of L-shaped, soft, wire solder through the spark plug hole to the cylinder wall.
2. Rotate engine over TDC.
3. Remove and measure flattened section of wire solder.

#### COOLING SYSTEM

- When installing cylinder heads, a thin film of GE Silicone Sealer should be used on both sides of the cylinder head gaskets.
- If coolant leakage should occur at cylinder head mounting studs, clean the mounting hardware and apply GE Silicone Sealer to the stud threads and bosses on the cylinder heads.
- In extreme cold temperatures, it may be necessary to "tape off" a portion of the radiator to maintain the recommended engine operating temperature [above 110° F (43° C) MINIMUM].
- Frequently check and tighten all hose clamps.



## CARBURETORS

### 440 S/T

Engine idle = 3000 RPM

Calibration = No change from standard settings

### 340 S/T

Engine idle = 3000 RPM

Calibration = No change from standard settings

### 250 S/T

Engine idle = 3000 RPM

Calibration = **CHANGE** jet needle E-rings from 2nd groove from top to 4th groove from top.

## TORQUE SPECIFICATIONS

Torque Specs	250 S/T	340 S/T & 440 S/T
Cylinder block . . . . .	185 in. lbs.	225 in. lbs.
Crankcase halves (only) . . . . .	155 in. lbs.	155 in. lbs.
Cylinder head . . . . .	225 in. lbs.	225 in. lbs.
Rotor nut . . . . .	90 ft. lbs.	90 ft. lbs.
Screws to water pump cover . . . . .	95 in. lbs.	95 in. lbs.
Retractable starter . . . . .	85 in. lbs.	85 in. lbs.
Drain plug . . . . .	95 in. lbs.	95 in. lbs.
Exhaust flange . . . . .	85 in. lbs.	85 in. lbs.
Spark plug . . . . .	18 ft. lbs.	18 ft. lbs.

(1 in. lb. = 1.15kg-cm; 1 ft. lb. = .14mkg)

## THROTTLE CABLES

Occasionally lubricate throttle cable core wires with WD40 or LPS lubricant.

1. Lubricate from ends of cables around core wires, and/or
2. Drill a 1/16" (1.6mm) hole in top end of cable junction block and lubricate through the hole.

## CLUTCHING

To obtain and maintain ultimate snowmobile performance, proper clutch operation is a "must" in maintaining peak engine operating RPM.

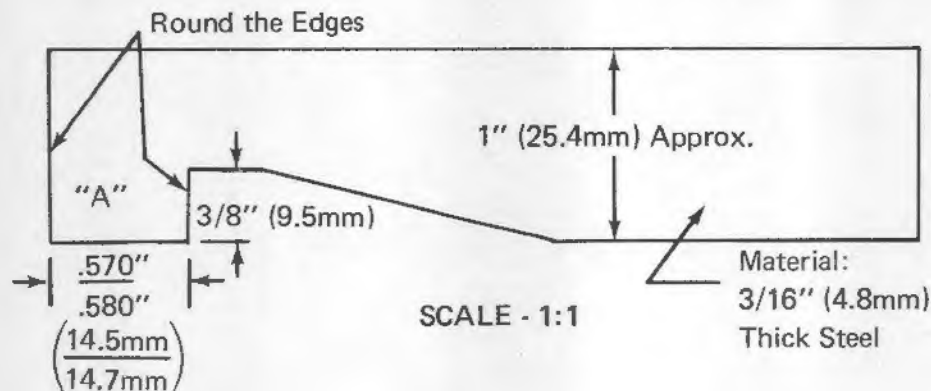
1. Use drive belt D-57-74294 (identified by white patch on belt cover).
2. 250 S/T - adjust driven sheave spring preload to achieve 9200 to 9500 engine RPM at W.O.T. acceleration.
3. 340 S/T - 440 S/T - adjust driven sheave spring preload to achieve 9250 to 9500 engine RPM at W.O.T. acceleration.
4. Frequently disassemble, clean and inspect drive clutch assembly - once every race day is recommended.

**IMPORTANT:** To prevent scarring or chipping the inside diameter of the cover bushing, **TAKE PARTICULAR CARE** to keep cover "SQUARE" on shaft (prevent cocking and binding), as cover is removed and/or installed. This task is made somewhat easier if the complete drive clutch is removed from the engine before disassembly.



During each inspection, be certain to inspect the bushings in all of the roller assemblies. Failure to recognize and replace roller assemblies with worn bushings will lead to premature ramp destruction.

*NOTE: Construction and use of the simple tool (sketched below) is an unbelievable time-saver (not to mention an aid to your sanity) when removing and installing the roller assemblies.*



*Insert Tang "A"  
between Roller Arm  
and Twist Tool  
to Spread Arms.*

## SKI ASSEMBLIES

1. Check both leaf springs to make certain that they move freely in the plastic slides. If necessary, grind or file the sides of the spring, as required.
2. Check the "curl" of the leaf spring (top forward end) to make sure that the "curl" does not hit the shock absorber when the spring is collapsed. If necessary, grind or file end of spring "curl", as required.

## CARBIDE SKEGS

Starting with Standard Carbide Skegs D-74783-1 (ten, 1" carbide segments; numbered 1-thru-10, front to rear) -

1. Move carbide segment Nos. 1 and No. 2 behind No. 3. Move No. 4 carbide segment behind No. 10.
2. Depending upon conditions and individual preference, you also may want to add two more 1" carbide segments; one behind No. 3 and one behind No. 10 [4" and 8" (10cm and 20cm) carbide skag].

## SUSPENSION ADJUSTMENTS

Initial suspension settings should be:

1. Front arm in upper chassis hole and middle hole on the suspension.
2. Set the springs quite stiff.

Weight transfer effect can be increased by increasing the angle of the front arm (lower hole in the suspension).

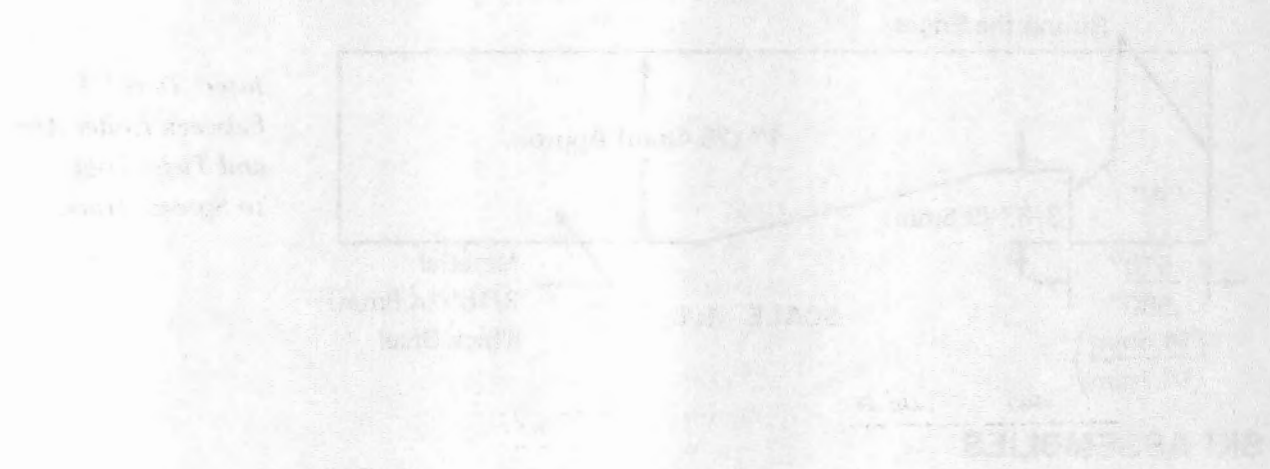
Weight transfer effect can be decreased by decreasing the angle of the front arm (lower hole in chassis or upper hole in suspension).

*NOTE: Less weight transfer effect results in more ski pressure while accelerating.*

## TRACK "STUDDING"

Handling on hard ice appears best when track is studded generously with carbide studs on the outer track bands and scat studs (or "claws") scattered across the center track band.

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No. 76-3 (R1-12/1/75)

## 250 S/T MODIFICATION INSTRUCTIONS

**IMPORTANT:** Modification of exhaust system and/or engine **VOIDS** your **WARRANTY**. Modification instructions are intended solely for race applications.

**CAUTION:** Modify engine, exhaust system and carburetion **EXACTLY** as instructed, following. **ANY DEVIATION** from **SPECIFIED DIMENSIONS** or **MODIFICATION** of **PARTS NOT MENTIONED** WILL **DECREASE** PERFORMANCE and could result in severe engine damage.

### Modifying 250 S/T from "Stock" to "Modified-Stock" and "Super-Modified"

#### ENGINE

##### A. Cylinders

1. Exhaust Port - Enlarge exhaust port of each cylinder as follows:
  - a. Raise top edge of exhaust port to a point 1.100" (27.94mm) below top surface of cylinder. (Figure 1) **DO NOT** change bottom edge of exhaust port.
  - b. Square off side edges of exhaust port (down to a point directly opposite top of transfer ports) while increasing chordal width of port to 1.438" (36.00mm). (Figure 1) Cut a 0.50" (12.70mm) radius in side edges of exhaust port (at a point directly opposite top of transfer ports) and continue side edges of port over to bottom edge of port, as shown in Figure 1.

*NOTE: Chordal width (Figure 1) is straight line distance between side edges of port (not following curvature of cylinder wall).*
  - c. Change radius of 2 top exhaust port corners to 0.20" (5.08mm). (Figure 1)
  - d. After grinding exhaust port, make a 0.060" (1.52mm) chamfer to top edge of exhaust port. (Figure 1) **DO NOT** chamfer side edges or bottom edge of port.
  - e. Remove sharp edges from exhaust port by lightly rounding cylinder bore edges of port with fine emery cloth.

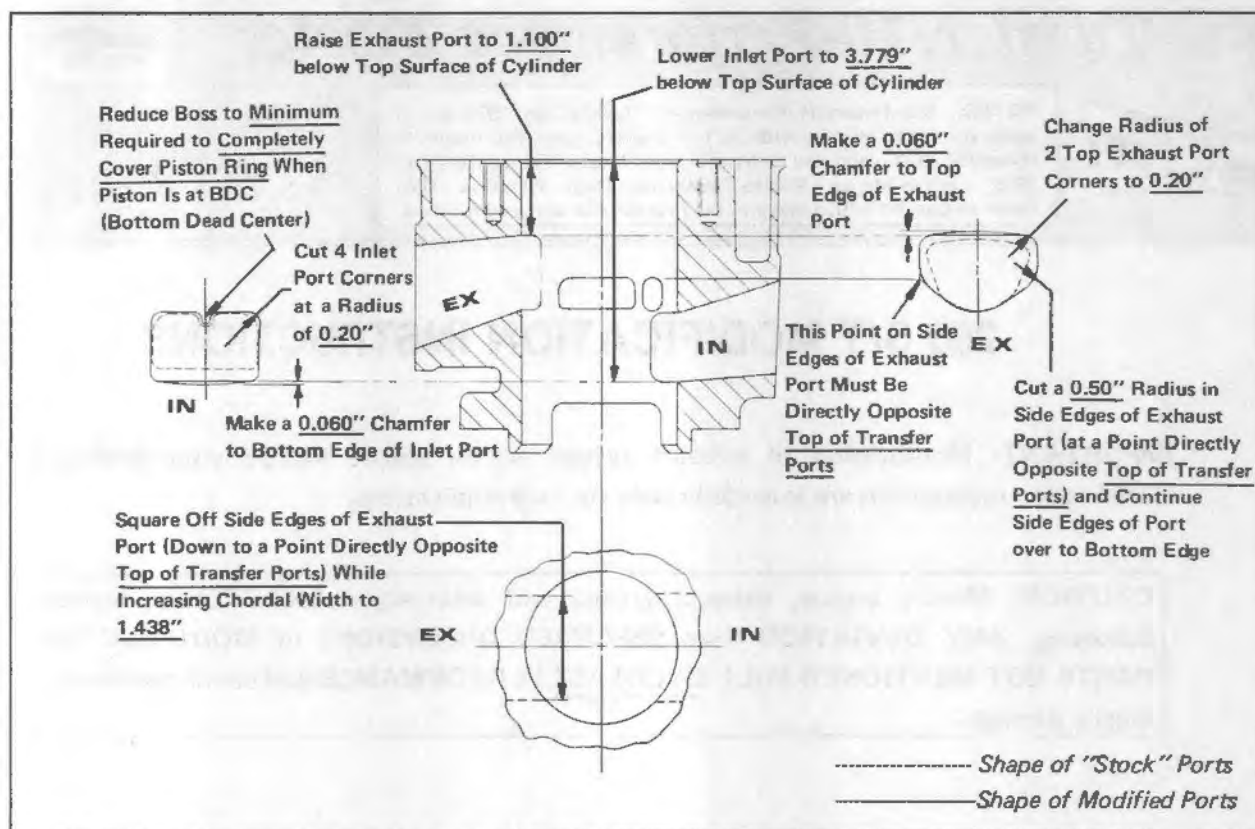


Figure 1. 250 S/T "Modified-Stock" Cylinder Dimensions

2. Inlet Port - Enlarge inlet port of each cylinder as follows:

- Lower bottom edge of inlet port to a point 3.779" (95.99mm) below top surface of cylinder. (Figure 1) DO NOT change top edge or chordal width of inlet port.
- Cut 4 inlet port corners at a radius of 0.20" (5.08mm). (Figure 1)
- Reduce boss at top edge of inlet port to a minimum. (Figure 1) Boss must be large enough to completely cover piston ring when piston is at BDC (bottom dead center).
- After grinding inlet port, make a 0.060" (1.52mm) chamfer to bottom edge of inlet port. (Figure 1) DO NOT chamfer side edges or top edge of port.
- Remove sharp edges from inlet port by lightly rounding cylinder bore edges of port with fine emery cloth.

**IMPORTANT:** DO NOT POLISH transfer passages.

**B. Ignition Timing**

Retard ignition timing to 16.0° BTDC @ 3000 RPM

**IMPORTANT:** Ignition timing will retard slightly as engine RPM increases (a normal characteristic of this ignition system). For this reason, the timing specification of 16° is applicable ONLY at 3000 RPM and is equivalent to 13° BTDC @ 9250 RPM.

## EXHAUST SYSTEM

*NOTE: When removing parts (muffler, air intake box, etc) from snowmobile, keep in mind that you are making the machine lighter. A certain amount of weight may have to be retained to meet weight limit.*



Replace "stock" exhaust system with modified exhaust pipes (available thru Mercury Marine). To obtain ordering information on modified pipes, contact:

Mercury Marine  
Hi-Performance Products Department  
20 Wisconsin Street  
Oshkosh, Wisconsin 54901  
Attention: Snowmobile Division  
Telephone: (414) 231-9180

## CARBURETION

1. Remove carburetor air intake box from snowmobile.
2. Remove large air funnel from each carburetor.

*NOTE: When removing parts (muffler, air intake box, etc) from snowmobile, keep in mind that you are making the machine lighter. A certain amount of weight may have to be retained to meet minimum weight limit.*

3. Check synchronization of carburetor throttle valves and readjust as necessary.

**CAUTION:** When in doubt about a carburetor adjustment, ALWAYS select a "richer" setting. Carburetors, which are adjusted too "lean", will cause severe internal engine damage.

4. Check carburetor adjustments (idle speed, low speed mixture, jet needles and fixed high speed jets). Adjust high speed mixture (replace fixed high speed jets) to achieve "normal" coloration of spark plugs.

*NOTE: Use fixed high speed jets which are 1 to 2 jet sizes larger (richer) than those required for a "stock" 250 S/T.*

## DRIVE SYSTEM

### A. Maximum Engine RPM

A "modified-stock" and "super-modified" 250 S/T will deliver maximum power when operated at 9,900 RPM ("running on" to 10,200 RPM). Modify and adjust torque converter to increase full throttle engine RPM to this speed.

### B. Drive Sheave (Clutch)



Install Drive Sheave Modification Kit (D-71711A2). Modify profile of drive sheave ramps to obtain correct full throttle engine RPM (as recommended in preceding paragraph) and desired shift pattern.

*NOTE: Clutch modification instructions are supplied with modification kit.*

### C. Sprockets

Snowmobile may require "re-gearing" because of increased horsepower (a result of engine and exhaust modification). Installation of another driver sprocket may be desired (depending upon operating conditions) to change top speed of snowmobile (MPH) and acceleration. (Refer to "Driver Sprocket Chart", following.)

### DRIVER SPROCKET CHART

Top Speed of Snowmobile (MPH)	No. of Teeth	Part Number
<div style="text-align: center;">           High MPH                Low MPH         </div>	18	D-69757A18
	17	D-69757A17
	16	D-69757A16
	15	D-69757A15
	14 ■	D-69757A14 ■
	13	D-69757A13
	12	D-69757A12

■ Standard (factory installed) 250 S/T driver sprocket

### BREAK-IN PROCEDURE

After modifying an S/T Snowmobile and prior to racing, the engine should be "run in" at part throttle (50% to 75% power) for one hour. Operate engine at 110°F to 170°F (coolant temperature) for "Break-In" and all operation thereafter.



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No. 76-4 (12/1/75)

## 340 S/T MODIFICATION INSTRUCTIONS

**IMPORTANT:** Modification of exhaust system and/or engine **VOIDS** your **WARRANTY**. Modification instructions are intended solely for race applications.

**CAUTION:** Modify engine, exhaust system and carburetion **EXACTLY** as instructed, following. **ANY DEVIATION** from **SPECIFIED DIMENSIONS** or **MODIFICATION** of **PARTS NOT MENTIONED** WILL **DECREASE** PERFORMANCE and could result in severe engine damage.

### Modifying 340 S/T from "Stock" to "Modified-Stock"

#### CYLINDERS

##### A. Exhaust Port

Enlarge exhaust port of each cylinder as follows:

1. Raise top edge of exhaust port to a point 1.100" (27.94mm) below top surface of cylinder. (Figure 1) **DO NOT** change bottom edge of exhaust port.
2. Square off side edges of exhaust port while maintaining a chordal width of 1.654" (42.00mm). (Figure 1)

*NOTE: Chordal width (Figure 1) is straight line distance between side edges of port (not following curvature of cylinder wall).*

3. Change radius of 2 top exhaust port corners to 0.20" (5.08mm). (Figure 1)
4. Enlarge radius of 2 bottom exhaust port corners to 0.50" (12.70mm). (Figure 1)
5. After grinding exhaust port, make a 0.060" (1.52mm) chamfer to top and bottom edges of exhaust port. (Figure 1) **DO NOT** chamfer side edges of exhaust port.
6. Remove sharp edges from exhaust port by lightly rounding cylinder bore edges of port with fine emery cloth.

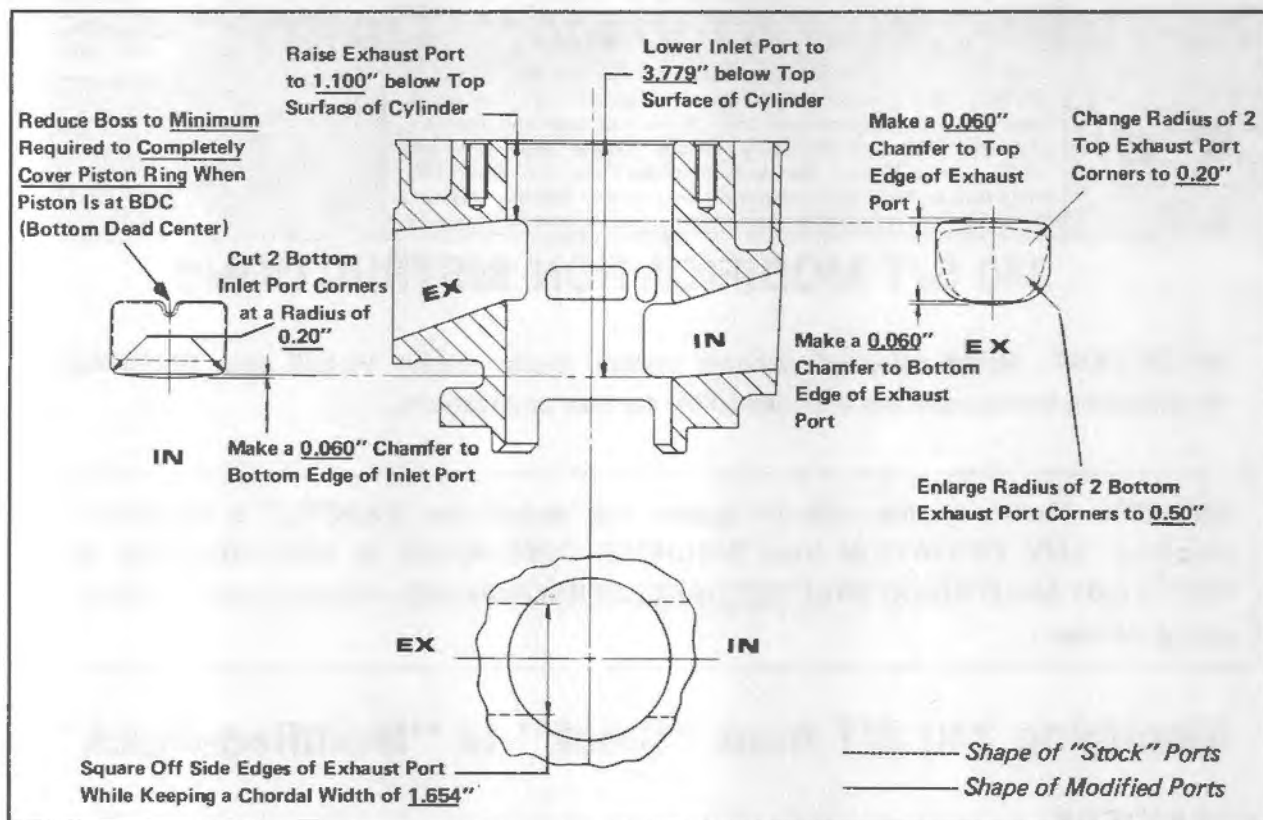


Figure 1. 340 S/T "Modified-Stock" Cylinder Dimensions

#### B. Inlet Port

Enlarge inlet port of each cylinder as follows:

1. Lower bottom edge of inlet port to a point 3.779" (95.99mm) below top surface of cylinder. (Figure 1) DO NOT change top edge or chordal width of inlet port.
2. Cut 2 bottom inlet port corners at a radius of 0.20" (5.08mm). (Figure 1)
3. Reduce boss at top edge of inlet port to a minimum. (Figure 1) Boss must be large enough to completely cover piston ring when piston is at BDC (bottom dead center).
4. After grinding inlet port, make a 0.060" (1.52mm) chamfer to bottom edge of inlet port. (Figure 1) DO NOT chamfer side edges or top edge of inlet port.
5. Remove sharp edges from inlet port by lightly rounding cylinder bore edges of port with fine emery cloth.

**IMPORTANT: DO NOT POLISH transfer passages.**

### EXHAUST SYSTEM

*NOTE: When removing parts (muffler, air intake box, etc) from snowmobile, keep in mind that you are making the machine lighter. A certain amount of weight may have to be retained to meet minimum weight limit.*

Remove muffler assembly from snowmobile and modify "stock" exhaust system as follows:

#### A. Exhaust Pipe Diverging Cones

1. Cut 0.75" (19.05mm) from diverging cone of each exhaust pipe directly behind header joint. (Figure 2)
2. Weld header joint to diverging cone of each exhaust pipe. Be sure that welds are smooth and do not restrict exhaust.
3. Reposition spring hooks on exhaust pipes to give sufficient spring tension.



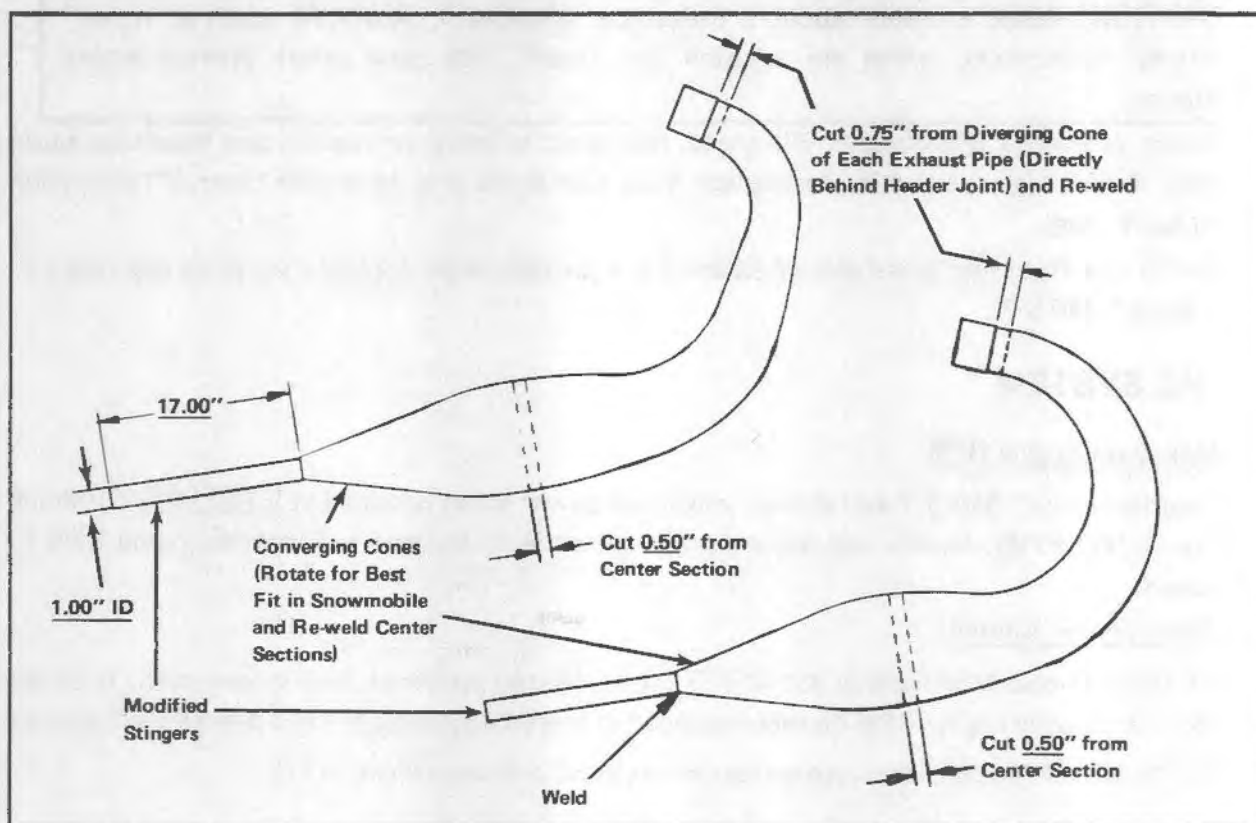


Figure 2. 340 S/T "Modified-Stock" Exhaust Pipes

#### B. Exhaust Pipe Center Sections

1. Cut 0.50" (12.70mm) from center section (at widest part) of each exhaust pipe. (Figure 2)
2. Before re-welding exhaust pipes, position pipes in snowmobile and rotate sections to obtain best fit.
3. Weld sections of exhaust pipes together. Be sure that welds are smooth and do not restrict exhaust.

#### C. Exhaust Pipe Stingers

1. Cut production stinger from each exhaust pipe.

*NOTE: Converging cone of exhaust pipes may have to be cut back slightly so that inside diameter (ID) of cones is enlarged to 1.00" (25.40mm) (same ID as replacement stinger).*

2. Weld modified stingers [1.00" ID x 0.040" thick (approximately) x 17.00" long (25.40mm x 1.02mm x 43.18cm) - Figure 2] to converging cones. Be sure that welds are smooth and do not restrict exhaust.

### CARBURETION

1. Remove carburetor air intake box from snowmobile.
2. Remove large air funnel from each carburetor.

*NOTE: When removing parts (muffler, air intake box, etc) from snowmobile, keep in mind that you are making the machine lighter. A certain amount of weight may have to be retained to meet minimum weight limit.*

3. Check synchronization of carburetor throttle valves and readjust as necessary.

**CAUTION:** When in doubt about a carburetor adjustment, ALWAYS select a "richer" setting. Carburetors, which are adjusted too "lean", will cause severe internal engine damage.

4. Check carburetor adjustments (idle speed, low speed mixture, jet needles and fixed high speed jets). Adjust high speed mixture (replace fixed high speed jets) to achieve "normal" coloration of spark plugs.

*NOTE: Use fixed high speed jets which are 3 to 4 jet sizes larger (richer) than those required for a "stock" 340 S/T.*

## DRIVE SYSTEM

### A. Maximum Engine RPM

A "modified-stock" 340 S/T will deliver maximum power when operated at 9,750 RPM ("running on" to 10,000 RPM). Modify and adjust torque converter to increase full throttle engine RPM to this speed.

### B. Drive Sheave (Clutch)

Install Drive Sheave Modification Kit (D-71711A2). Modify profile of drive sheave ramps to obtain correct full throttle engine RPM (as recommended in preceding paragraph) and desired shift pattern.

*NOTE: Clutch modification instructions are supplied with modification kit.*

### C. Sprockets

Snowmobile may require "re-gearing" because of increased horsepower (a result of engine and exhaust modifications). Installation of another driver sprocket may be desired (depending upon operating conditions) to change top speed of snowmobile (MPH) and acceleration. (Refer to "Driver Sprocket Chart", following.)

**DRIVER SPROCKET CHART**

Top Speed of Snowmobile (MPH)	No. of Teeth	Part Number
High MPH	18	D-69757A18
	17	D-69757A17
	16	D-69757A16
	15 ■	D-69757A15 ■
	14	D-69757A14
	13	D-69757A13
Low MPH	12	D-69757A12

■ Standard (factory installed) 340 S/T driver sprocket

## BREAK-IN PROCEDURE

After modifying an S/T Snowmobile and prior to racing, the engine should be "run in" at part throttle (50% to 75% power) for one hour. Operate engine at 110°F to 170°F (coolant temperature) for "Break-In" and all operation thereafter.

## Modifying 340 S/T from "Stock" to "Super-Modified"

A limited number of "Super-Mod Kits" are available thru Mercury Marine. To obtain ordering information on these kits, contact:

Mercury Marine • Hi-Performance Products Department • 20 Wisconsin Street • Oshkosh, Wisconsin 54901 • Attention: Snowmobile Division • Telephone: (414) 231-9180



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No. 76-5 (12/1/75)

## 440 S/T MODIFICATION INSTRUCTIONS

IMPORTANT: Modification of exhaust system and/or engine VOIDS your WARRANTY. Modification instructions are intended solely for race applications.

CAUTION: Modify engine, exhaust system and carburetion EXACTLY as instructed, following. ANY DEVIATION from SPECIFIED DIMENSIONS or MODIFICATION of PARTS NOT MENTIONED WILL DECREASE PERFORMANCE and could result in severe engine damage.

### Modifying 440 S/T from "Stock" to "Modified-Stock"

#### ENGINE

##### A. Cylinders

1. Exhaust Port - Enlarge exhaust port of each cylinder as follows:
  - a. Raise top edge of exhaust port to a point 1.100" (27.94mm) below top surface of cylinder. (Figure 1) DO NOT change bottom edge of exhaust port.
  - b. Increase chordal width of exhaust port to 1.772" (45.00mm). (Figure 1)

*NOTE: Chordal width (Figure 1) is straight line distance between side edges of port (not following curvature of cylinder wall).*

- c. Change radius of 2 top exhaust port corners to 0.13" (3.30mm). (Figure 1)
  - d. Enlarge radius of 2 bottom exhaust port corners to 0.50" (12.70mm). (Figure 1)
  - e. After grinding exhaust port, make a 0.060" (1.52mm) chamfer to top and bottom edges of exhaust port. (Figure 1) DO NOT chamfer side edges of port.
  - f. Remove sharp edges from exhaust port by lightly rounding cylinder bore edges of port with fine emery cloth.

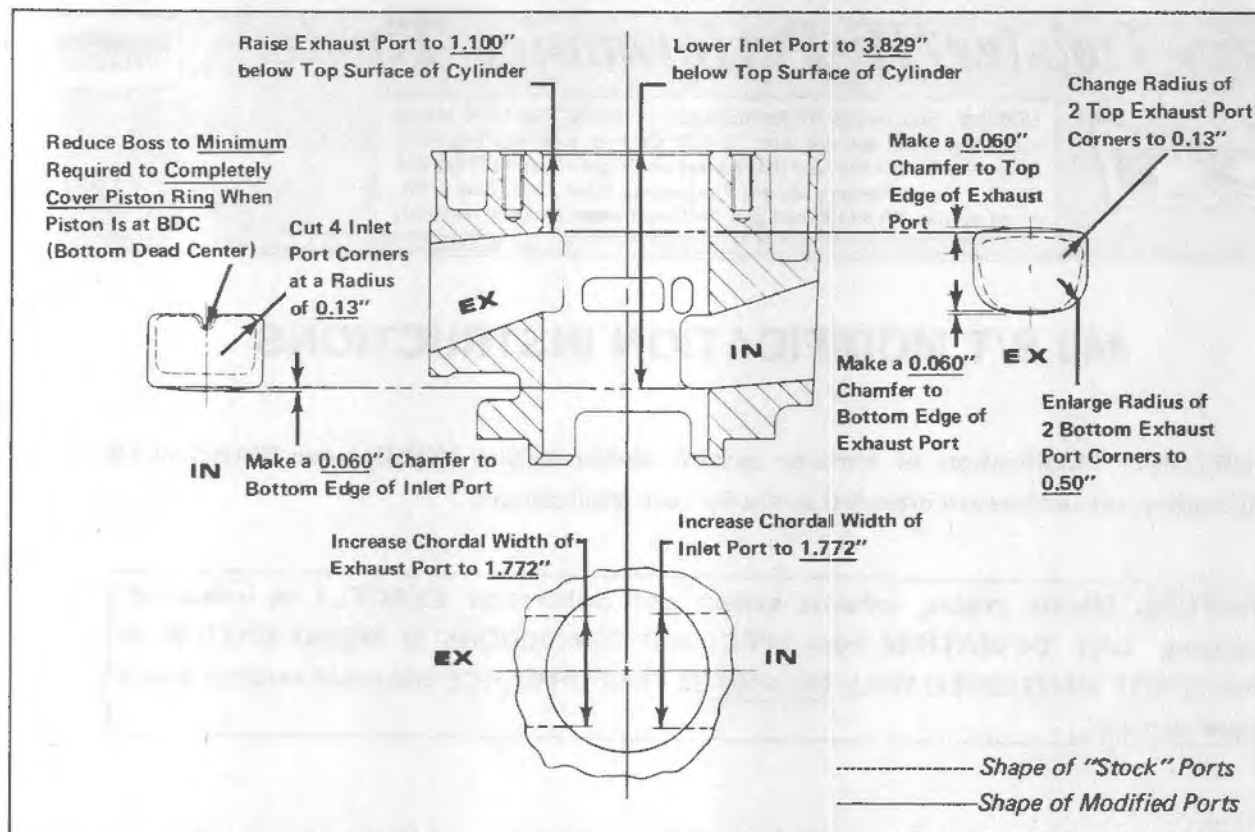


Figure 1. 440 S/T "Modified-Stock" Cylinder Dimensions

2. Inlet Port - Enlarge inlet port of each cylinder as follows:

- Lower bottom edge of inlet port to a point 3.829" (97.26mm) below top surface of cylinder. (Figure 1) DO NOT change top edge of port.
- Increase chordal width of inlet port to 1.772" (45.00mm). (Figure 1)
- Cut 4 inlet port corners at a radius of 0.13" (3.30mm). (Figure 1)
- Reduce boss at top edge of inlet port to a minimum. (Figure 1) Boss must be large enough to completely cover piston ring when piston is at BDC (bottom dead center).
- After grinding inlet port, make a 0.060" (1.52mm) chamfer to bottom edge of inlet port. (Figure 1) DO NOT chamfer side edges or top edge of port.
- Remove sharp edges from inlet port by lightly rounding cylinder bore edges of port with fine emery cloth.

**IMPORTANT: DO NOT POLISH** transfer passages.

**B. Pistons**

*NOTE: Inlet side of piston is side opposite exhaust mark on piston dome.*

Remove 0.060" (1.52mm) from inlet side of each piston skirt. (Figure 2) After cutting piston skirt, remove sharp edge from skirt by cutting a .005" (.13mm) radius on edge.



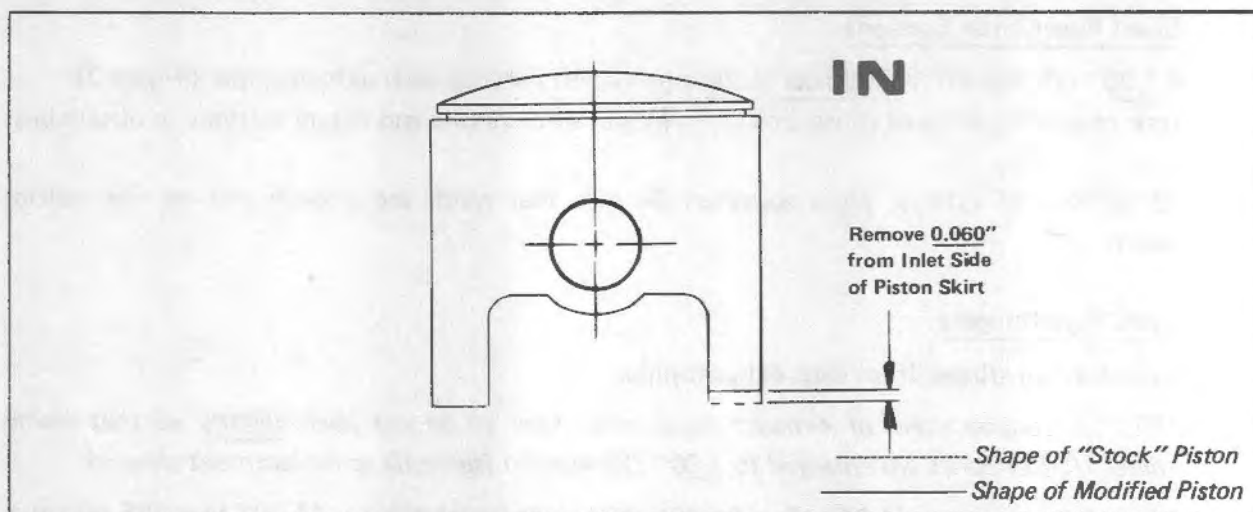


Figure 2. 440 S/T "Modified-Stock" Piston

## EXHAUST SYSTEM

*NOTE: When removing parts (muffler, air intake box, etc) from snowmobile, keep in mind that you are making the machine lighter. A certain amount of weight may have to be retained to meet weight limit.*

Remove muffler assembly from snowmobile and modify "stock" exhaust system as follows:

### A. Exhaust Pipe Diverging Cones

1. Cut 1.00" (25.40mm) from diverging cone of each exhaust pipe, directly behind header joint. (Figure 3)
2. Weld header joint to diverging cone of each exhaust pipe. Be sure that welds are smooth and do not restrict exhaust.
3. Reposition spring hooks on exhaust pipes to give sufficient spring tension.

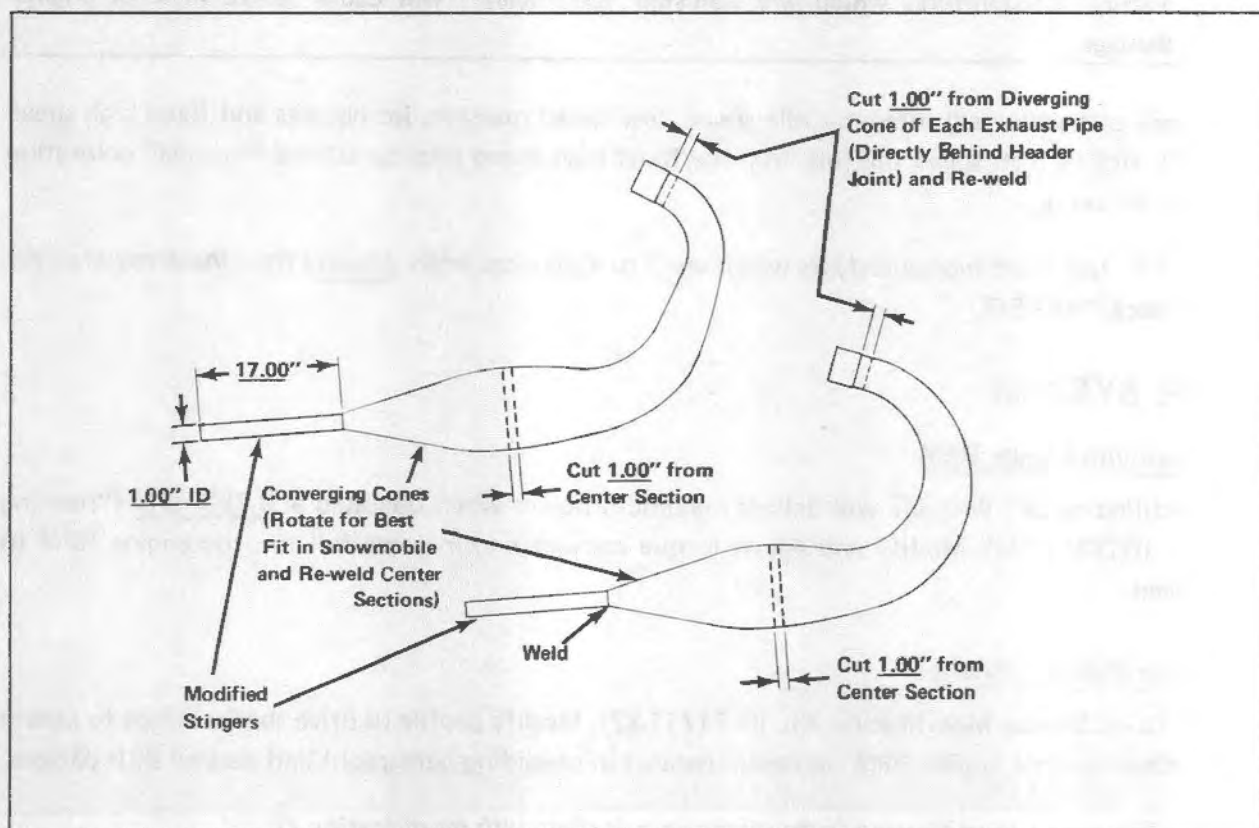


Figure 3. 440 S/T "Modified-Stock" Exhaust Pipes

## B. Exhaust Pipe Center Sections

1. Cut 1.00" (25.40mm) from center section (at widest part) of each exhaust pipe. (Figure 3)
2. Before re-welding exhaust pipes, position pipes in snowmobile and rotate sections to obtain best fit.
3. Weld sections of exhaust pipes together. Be sure that welds are smooth and do not restrict exhaust.

## C. Exhaust Pipe Stingers

1. Cut production stinger from each exhaust pipe.

*NOTE: Converging cone of exhaust pipes may have to be cut back slightly so that inside diameter (ID) of cones are enlarged to 1.00" (25.40mm) (same ID as replacement stinger).*

2. Weld modified stingers [1.00" ID x 0.040" thick (approximately) x 17.00" long (25.40mm x 1.02mm x 43.18cm) - Figure 2] to converging cones. Be sure that welds are smooth and do not restrict exhaust.

## CARBURETION

1. Remove carburetor air intake box from snowmobile.
2. Remove large air funnel from each carburetor.

*NOTE: When removing parts (muffler, air intake box, etc) from snowmobile, keep in mind that you are making the machine lighter. A certain amount of weight may have to be retained to meet minimum weight limit.*

3. Check synchronization of carburetor throttle valves and readjust as necessary.

**CAUTION:** When in doubt about a carburetor adjustment, **ALWAYS** select a "richer" setting. Carburetors, which are adjusted too "lean", will cause severe internal engine damage.

4. Check carburetor adjustments (idle speed, low speed mixture, jet needles and fixed high speed jets). Adjust high speed mixture (replace fixed high speed jets) to achieve "normal" coloration of spark plugs.

*NOTE: Use fixed high speed jets which are 3 to 4 jet sizes larger (richer) than those required for a "stock" 440 S/T.*

## DRIVE SYSTEM

### A. Maximum Engine RPM

A "modified-stock" 440 S/T will deliver maximum power when operated at 9,750 RPM ("running on" to 10,000 RPM). Modify and adjust torque converter to increase full throttle engine RPM to this speed.

### B. Drive Sheave (Clutch)

Install Drive Sheave Modification Kit (D-71711A2). Modify profile of drive sheave ramps to obtain correct full throttle engine RPM (as recommended in preceding paragraph) and desired shift pattern.

*NOTE: Clutch modification instructions are supplied with modification kit.*

### C. Sprockets

Snowmobile may require "re-gearing" because of increased horsepower (a result of engine and exhaust modification). Installation of another driver sprocket may be desired (depending upon operating conditions) to change top speed of snowmobile (MPH) and acceleration. (Refer to "Driver Sprocket Chart", following.)

DRIVER SPROCKET CHART

Top Speed of Snowmobile (MPH)	No. of Teeth	Part Number
<div>High MPH ↑ ↓ Low MPH</div>	18	D-69757A18
	17	D-69757A17
	16 ■	D-69757A16 ■
	15	D-69757A15
	14	D-69757A14
	13	D-69757A13
	12	D-69757A12

■ Standard (factory installed) 440 S/T driver sprocket

### BREAK-IN PROCEDURE

After modifying an S/T Snowmobile and prior to racing, the engine should be "run in" at part throttle (50% to 75% power) for one hour. Operate engine at 110°F to 170°F (coolant temperature) for "Break-In" and all operation thereafter.

### Modifying 440 S/T from "Stock" to "Super-Modified"

A limited number of "Super-Mod Kits" are available thru Mercury Marine. To obtain ordering information for these kits, contact:

*Mercury Marine  
Hi-Performance Products Department  
20 Wisconsin Street  
Oshkosh, Wisconsin 54901*

*Attention: Snowmobile Division  
Telephone: (414) 231-9180*







NOTICE: Sno-Twister/Hi-Performance "Tipsters" for 1976 are in numerical order, starting with 76-1. If the first copy you receive is (example) 76-3 -- and you desire previous "Tipster" issues (76-1 and 76-2) -- advise Mercury Marine Publications Dept., P.O. Box 1108, Fond du Lac, WI 54935 and give the first number that you received.

No. 76-7 (12/30/75)

## 1976 MODELS 250 S/T, 340 S/T and 440 S/T REAR SUSPENSION CONTROL ARM

Mercury Marine has received a few reports of the rear suspension control arm (D-74492A1) failing on 1976 Model Sno-Twisters. The failure is occurring where track guide is welded to the control arm.

Reinforce rear suspension control arm as follows:

- If track guide has NOT BROKEN loose from control arm, securely weld a steel strap (.100"/.125" thick x .50" wide) to track guide and control arm, as shown in Figure 1.
- If track guide HAS BROKEN loose from control arm, replace guide with a piece of steel tube (1.90"/2.00" diameter x .50" wide). Flatten tube to a height of 1.62" and weld securely to control arm, as shown in Figure 2.

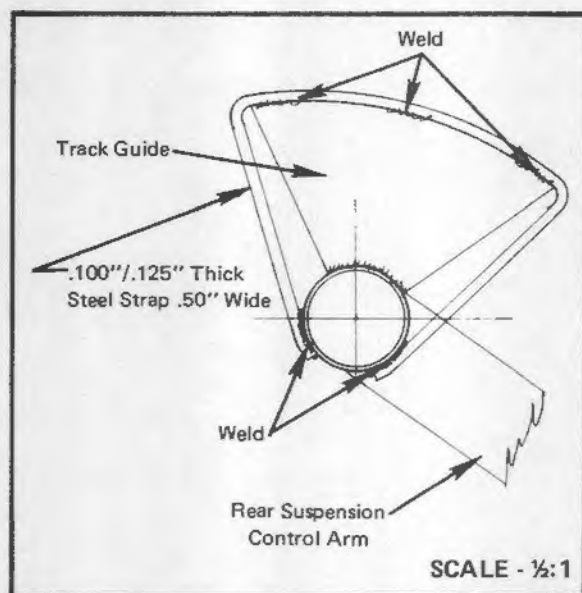


Figure 1. Reinforcing Rear Suspension Control Arm

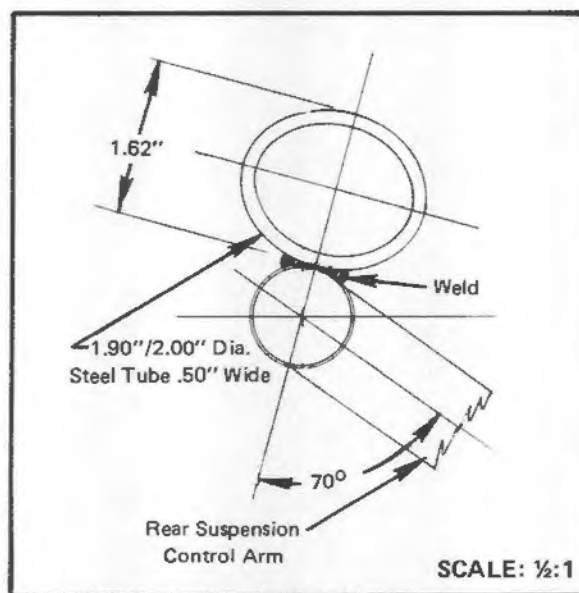


Figure 2. Repairing Rear Suspension Control Arm

1. The first step in the design of a control system is the selection of the system to be controlled. This is usually done by the user of the system, who may have a specific task in mind or may simply want to improve the performance of an existing system. The selection of the system to be controlled is a critical step, as it determines the scope and complexity of the control system.

## REAR SUSPENSION CONTROL ARM

The rear suspension control arm is a critical component of the rear suspension system. It is responsible for maintaining the correct geometry of the rear suspension, which is essential for proper handling and ride quality. The control arm is typically made of steel and is bolted to the rear axle and the chassis. It is also connected to the rear suspension spring. The control arm is designed to absorb road shocks and maintain the correct wheel alignment. It is a critical component of the rear suspension system, and its failure can lead to poor handling and ride quality.



Figure 1. Rear suspension control arm assembly.

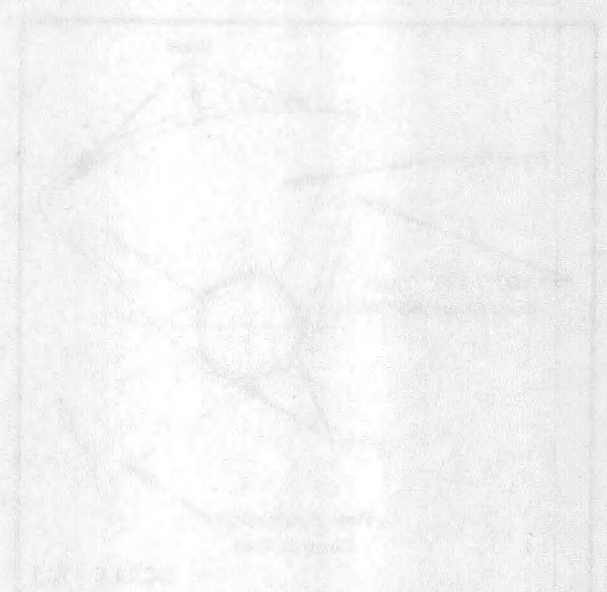


Figure 2. Rear suspension control arm assembly.



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No. 76-8 (1/29/76)

## 1976 MODELS 250 S/T, 340 S/T and 440 S/T (Chassis Serial No. 4349324 and Above) CHASSIS - FRONT CROSSMEMBER

Mercury Marine has received a few reports of the chassis-front crossmember (D-74553A2) failing on 1976 Model Sno-Twister snowmobiles that have been raced. The crossmember failure is occurring just outside of engine mounting tabs (either side).

**WARNING:** Failure of crossmember could result in loss of steering.

ALL CROSSMEMBERS MUST BE INSPECTED and REINFORCED IMMEDIATELY before further operation of snowmobile. Reinforce crossmember as follows:

1. Remove 11 rivets which secure lower bulkhead to crossmember. (Figure 1) If any cracks in crossmember are evident, weld as necessary before installing reinforcing steel strap.
2. Position a reinforcing steel strap [11 gauge (0.1196") cold rolled steel (1.00" x 30.50")] between lower bulkhead and crossmember. (Figure 1)

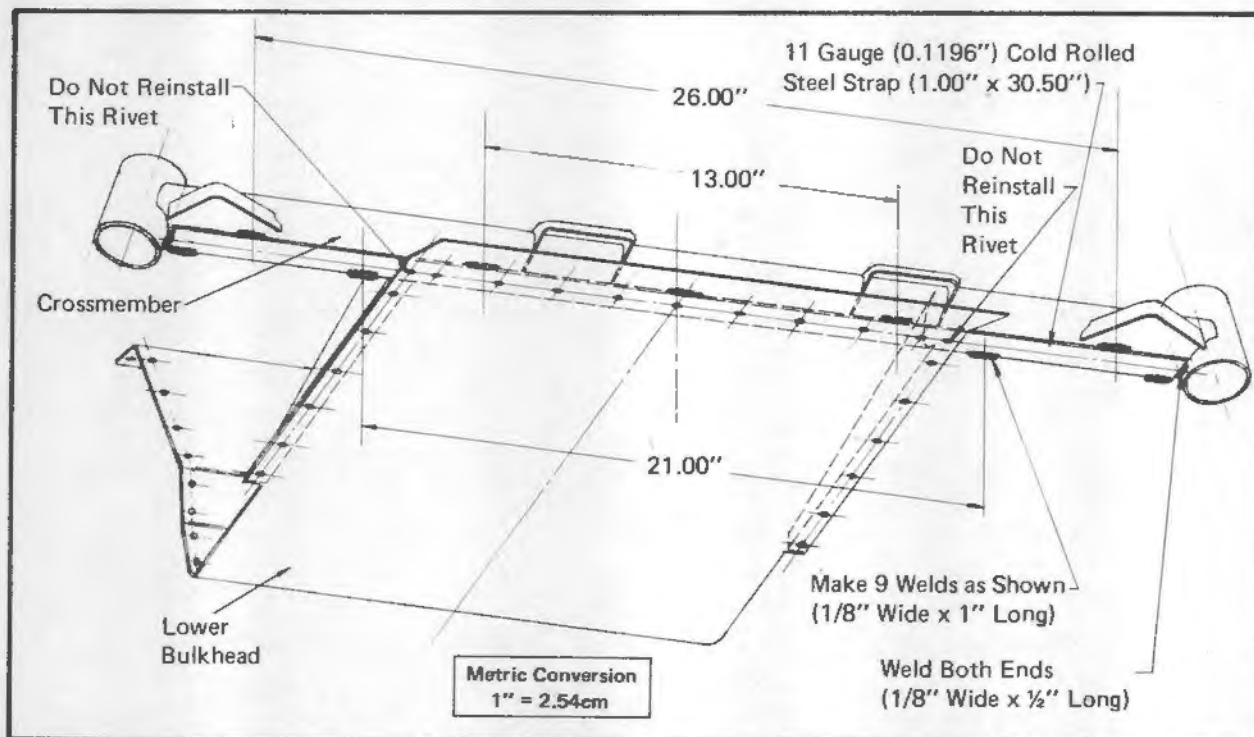


Figure 1. Reinforcing Crossmember (Viewed from Underside)

3. Securely weld steel strap to crossmember ONLY at locations shown in Figure 1.  
**IMPORTANT:** Outer rivets (one each side - Figure 1) will not be reinstalled, therefore, DO NOT drill a rivet hole thru steel strap at these locations.
4. Using rivet holes in lower bulkhead as a guide, drill 9 rivet holes (3/16") thru reinforcing steel strap.
5. Secure lower bulkhead to crossmember with 9 steel rivets (D-17-74671). (Figure 1)

The Mercury Marine "Limited Warranty" is not extended to snowmobiles that are used for racing. Cost of this reinforcement is to be borne by the owner.

