



Volume 2 issue 3

Circle Masters Flying Club

Wisconsin's control line club March 2021



Announcements

Joe Nall Fly in canceled for 2021, It was announced as on for this year,

Toledo RC show is back! Yes it was announced that 2019 was the last year is back for April 9-11 2021. Not sure who is running this as the Toledo club is not. May be smaller swap meet.

<https://toledorcswapmeet.com/>

Inside This Issue

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Editor's Notes



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Title Pic- Courtesy of Michael Athony Schmidt 2020 nats picture. Mike has crazy skills at the building table, circle and with a camera.

Media

Plan Something different 1/2a stunter

Picture The P47 was a big airplane, see how much

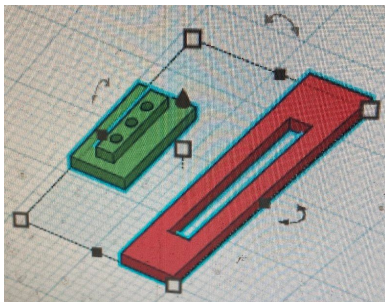
Short take

Building and Flying Where does your bell crank need to position? A funny on worn out engines, and a great article on mixing your own fuel.

3d printing.

I got a 3d printer for christmas and it has been a welcome distraction this winter.

I used it to print several things for my airplanes and shop fixtures and tools. Including this starter end with a milwaukee battery clip on it. I also drew and printed a leadout slider. Stay tuned for a longer article.



Club Information

Web site www.circlemasters.com

Dues \$20.00

Flying Location Sussex Village Park, Sussex. Wisconsin

Meeting First Saturday of the month 1pm

Location Summer (May- Oct) at the field

Location Winter Sussex Library

Comments to circlemastersflyclub@gmail.com

Club Events

June 5th meeting has been pushed out one week to **June 12th.**

August 7th date. It is now on **August 14th.**

Club Contest August 9

Herman Lee's 1/2 lite stunter



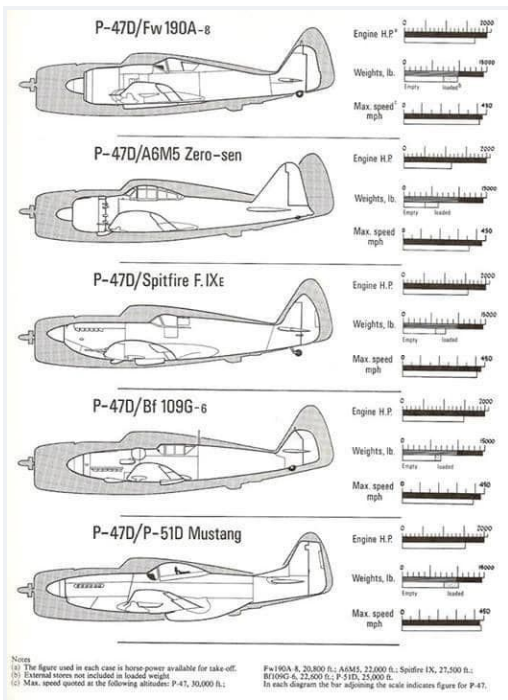
<https://www.aeromaniacs.com/public/pdf/Half%20Lite%20Stunter%20Building%20Instructions.pdf>

Humor

With all the snow recently this seems fitting

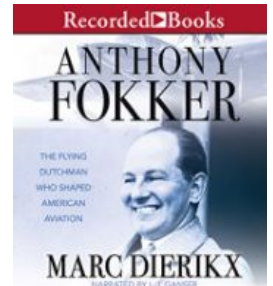


How Big was a P47?



Anthony Fokker:

The Flying Dutchman Who Shaped American Aviation tells the larger-than-life true story of maverick pilot and aircraft manufacturer Anthony Fokker. Fokker came from an affluent Dutch family and developed a gift for tinkering with mechanics. Despite not receiving a traditional education, he stumbled his way into aviation as a young stunt pilot in Germany in 1910. He survived a series of spectacular airplane crashes and rose to fame within a few years. A combination of industrial espionage, luck, and deception then propelled him to become Germany's leading aircraft manufacturer during World War I, making him a multimillionaire by his mid-20s.



CIRCLE MASTERS FLYING CLUB MEETING MINUTES for February 2021:

The February meeting of the Circle Masters Flying Club was held February 06, 2021, on-line and in person at Mike's place. The starting time was 13:05, and there appeared to be about 11 members present.

REPORTS & ANNOUNCEMENTS:

Some members said they didn't receive an email copy of the membership roster. I will resend.

Treasurers Report: A new checking account is setup.

OLD BUSINESS:

Jason met with the Sussex Parks board on January 19th. Our circle center pole receptacle installation was approved.

Mike was able to secure our August 8th contest date at Mukwonago High School.

NEW BUSINESS:

The AMA insurance and club charter fees were sent in for 2021.

The first Saturday in June is being looked at for a fun-fly at Mukwonago High School.

The Sussex Steam Show will probably happen, so plan on it. There was a discussion on putting on an airshow for this event.

The weeds will be taken care of this spring.

WEB SITE BUSINESS: no report

OTHER BUSINESS:

The meeting ended at 13:38.

SHOW & TELL:

John Strobel showed his Dmeco Sport Wing, which he **has built** from plans. It is a cool-looking forward-swept wing design by Hal Debolt.

Jason showed his modified Sig Akromaster for electric power, with throttle control and added flaps. The elevator hinges are bubble gum flavored dental floss. He mentioned that his very first airplane was a Carl Goldberg Stunt Man 23. (The Sig Akromaster does look a little like a larger version of the Stunt Man 23.)

Gene showed his 14-inch full house Are/See electric powered biplane wings and fuselage. It is covered with Microlite.

Joe is rebuilding his dad's 1955 Veco Brave which last flew in 1972. He is also finishing up a Veco Smoothie.

John Schram

Secretary

You Know Your Engine is Worn Out If

by Divot McSlow

--The prop wobbles enough to hit the needle valve and bend it.

--You hear a “whoosh, whoosh, whoosh” sound from the exhaust port on just one flip.

--When you finally get all the carbon buildup off of the outside, you can see the inside.

--All the head bolts are “free-wheeling” after you seat them.

--You used hybrid ceramic bearings because they are insane*, but when you pulled the backplate off the engine to find out why it doesn't feel right, you find all this sand in there.

--Your Fox Stunt was working pretty hard trying to make your lap times on that 50-ounce Nobler, so you took the varnish out of it by running a half-gallon of synthetic fuel through it.

--The new lapped piston you bought still falls right thru the liner.

--It has two “apparent TDC Positions” of the crank.

--Your Fox stunt crank broke and spun out the front end of the case—and now there are what looks like threads inside the bearing journal.

--It's the third time you've stuck the piston in the oven to “grow it” and your heirloom still has no compression.

--Your primer bottle contains a 5:1 mix of castor to glow fuel.

--You feel the bumpity-bump at TDC and when you take a look at the rod you find the holes are the shape of aviator glasses.

--It gave you trouble hand starting it a while back, and now you can't quite understand why the electric starter battery keeps dying during a flying session.

--The ABN liner has funny brass-colored patches. Oddly, the piston has a lot of matching vertical stripes.

--Your Cox Black Widow starts to feel a little loose, so you pull it apart to reset the rod—but the rod is already peeking out the top of the piston.

--It was already worn out when you took it out of the defective returns bin at the factory sale. But it *was* a good price.

--When five different guys flip it as hard as they can, and get one “pop.” Just the one....

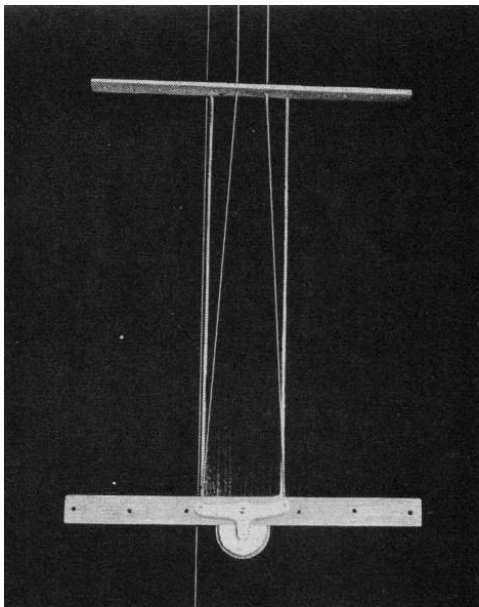
-- If your engine hits the ground and scatters some large pieces across the pavement—but you know a guy that sells parts on ebay and you have Paypal--then it is totally **not** worn out.

--On the other hand, if your engine hits the pavement and just kind of *brushes* it—but you have some skill *selling* things on ebay--then it is also not worn out.

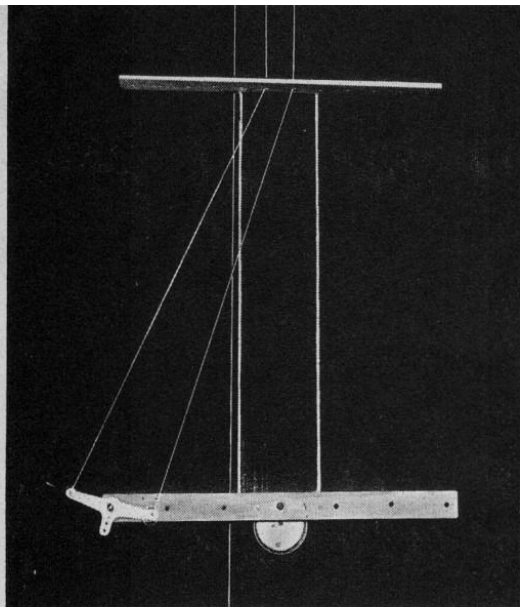
Bellcrank position doesn't matter, Leadout position does

This is an experiment that "Wild Bil" Neztband in in the 1960s. It is a mockup of a hanging airplane to show the the relationship between bellcrank position, leadout position and center of gravity Many people think the bell crank location is important with respect to the center of gravity of the wing.

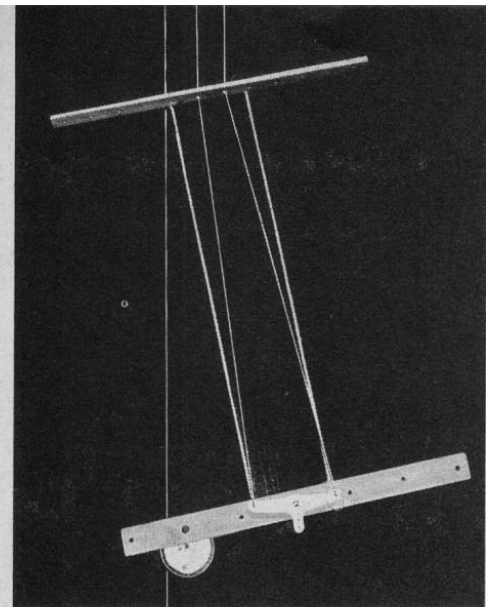
Look closely at the picture of s simulated wing. There is a bell crank, leadout guide and a lead weight simulating the mass of the airplane at its center of gravity. The "airplane" is hanging by its leadouts and bellcrank. Notice the fixture always hangs on a line that passes through the leadout guide to the center of gravity. The bellcrank position (for and aft) does not matter.



Bill's CG/Bellcrank test device with 1-lb wt., BC centered below leadouts.



Pic 2: Same as Pic # 1 except BC is left 6"; still sq. with plumb line.



Pic 3: CG moved to left, device now at yawing angle, CG lined up with leadouts.

Making your own 2 Stroke glow fuel Fuel Blending 101 - By Paul Gibeault

Some people in rural areas are on occasion finding themselves without suitable fuel. As somebody who has blended his own C/L & R/C championship fuels for many years, here are some ideas on to how to blend your own custom glow fuel and never again be caught short. Homemade fuel is an especially useful tool to use as a "Reference Standard" if you suspect trouble when using your usual commercial fuel or when trying a different fuel brand.



Your first task is to obtain the fuel **ingredients**.

Oils: I use two types of oils. Straight (first pressing) castor oil is most easily available from your local SIG dealer. The best of which is called "**Benol**" as is sold by Klotz. Benol is pure castor oil with a film strengthener additive. Although not technically legal for FAI use, it is a bit **better** than straight castor. Some bike & go-cart shops also stock castor oil under the names of Bakers AA, Blendzall and others. Any castor oil sold for Internal Combustion (IC) engine use is suitable for our purposes. The negative of using drugstore bought (USP) castor oil

is that it is not de-gummed & although it will work, tends to cause a **rapid buildup of carbon varnish** inside the engine. This means you will need to do regular de-varnishing of your piston, cylinder & head which is a hassle most of us are better off avoiding.

Synthetic oil: Is also available from SIG sold under the Klotz label. A note about Klotz who offers several types of oil. We are mainly interested in Klotz Techniplate KL-200 which is their 100% synthetic oil. Super Techniplate is a **blend** with 80% synthetic & 20% castor oil. The full 100% synthetic oil is what I use. Going to the Klotz website can give you more insight into their various oils and oil numbering system. <https://klotzlube.com/>

There are other synthetics available from Union Carbide such as their UCON LB625, as well as several in Europe from Model Technics. The key here to remember is: Ball bearing ABC/AAC engines **need no castor oil**, and all synthetic oil blends run fine and run much cleaner. Any engine with iron pistons, iron piston rings and or plain bearings really do need to use **some** castor oil for engine and bearing longevity. Most of our old C/L engines fall into this category. (Cox, Fox, K&B, Super Tigre & older O.S Max's) It turns out that an **oil blend** of both synthetic & castor oil offers better protection & higher performance than either one individually.

For best performance, the ratio (obtained from the late Bill Wisniewski) is 3->1 synthetic to castor, with a 20% total oil content. Bill once told me that even the all-synthetic oil K&B fuels **still contained 2% castor oil**. Total oil content is a contentious issue in some C/L circles, but I have found that 20% half & half castor synthetic runs very well and will do no engine damage in any of the above mentioned engines.

It is the **regulation standard** in most all classes of

AMA racing and speed. This oil blend (confirmed by a Klotz Technical Rep at the 1999 AMA Nats) has properties superior to either straight castor or straight synthetic oil blends. As well, the oil blended fuels run much cleaner & deposit much less carbon inside the engine, because the synthetic oil acts as a detergent whilst keeping the superior high temperature protection provided by the castor oil. As well the synthetic oil acts as a stabilizer to keep fuels with high percentages of nitro in solution. Win-Win as I see it.

It turns out the very popular and excellent running SIG Champion fuels (and several others) use just this 50-50 castor/synthetic oil blend in their fuels (unless specifically stated otherwise). Some fliers find bumping up the oil content advantageous, but that is mostly because they are looking for a certain kind of a stunt run. 25+% total oil fuels are preferred on very old engines such as the Fox 35 Stunt and Super Tigre 46 stunt engines to yield a nicer 2 -> 4 break type of run in Stunt.

They will also run **more stable** using an all castor fuel or a higher 25% total oil content blended fuel. Fox .35 Stunt engines for example have poor cooling fins and are thermally unstable. Higher oil content fuels often allow their run to become more stable. CD's in the Northwest USA allow 2 fuel types in Sport Racing. One with 20% all castor & one with half & half castor/synthetic. Both work fine & neither causes any engine damage for racing purposes. They do this to satisfy both camps, which is thoughtful of them.

Nitromethane: This appears to be the most expensive ingredient to obtain. Cities that have drag race strips can be a source. Chemical supply houses are another (but more expensive) source. Some fuel manufacturers in the USA (i.e. Excalibur Fuels out of Tucson) will often sell you straight nitro & components, but of course you must make an inquiry (or know somebody there) to go that route. I am lucky to be able to use a network of

model friends who help me with nitro. My last nitro came from a contact in Calgary who supplies the r/c boat racing community with fuel. So, you may have to get creative and make some phone calls.

Methanol: This is the easiest component to source locally. Available easily from chemical supply houses, methanol comes in several grades with various impurities. I recommend a minimum of reagent grade 98.9% pure methanol. Lab grade is the very purest, but much more expensive & not necessary for our purposes. Methanol is also an ingredient available at some racetracks as well. Methanol is hygroscopic (water absorbing) so its storage containers must be very well sealed.

If not, the methanol absorbs moisture from the air and soon becomes watered down and unusable for our purposes. If I am unsure, I use a **Nurnberg's Hydrometer** to read the specific gravity of the chemical. For methanol we are looking for a S.G. of .795 and for nitromethane a S.G. of 1.124 @ 25 degrees C.



Other chemicals & additives: For special purposes, other components can be added in small amounts, such as Acetone, Ether, and Propylene Oxide. Those additives are used by advanced fuel blenders for specific purposes that are beyond the scope of this general article. 1-2% of Ether (or Di-ethyl

ether) can be added to make for a **quite easy starting** glow fuel for **Winter Flying**. Acetone can be used to extend the flight time of a model that is short on range when the tank size is limited. Propylene Oxide is a power additive that allows nitromethane to liberate more oxygen and is sometimes used in very high-performance Vintage Speed and racing applications. It is a carcinogen, and so must be treated with great care. Prop. Oxide also tends to lose its effectiveness over time and so (like diesel fuel) does not store very well at all.

Mixing Containers: Shown are chemistry graduated cylinders of various sizes. I have achieved consistent results using laboratory graduate measuring cylinders. 250 and 500 ml sizes are my favorite ones.

Glow fuel needs to be mixed preferably at room temperature (20 degrees C) in a **clean area in a well-ventilated room** or preferably outdoors. Rubber gloves are used to prevent any harmful raw fuel chemicals from touching your skin.



It should be noted that the **bottom** of the fluid **meniscus** is what should match the desired line on the

measuring graduate. I normally add the oil first, followed by the alcohol, then the nitro. Once done I seal the top of the graduate with a clean plastic sandwich bag tied on with rubber bands.

I then turn the sealed graduate upside down and shake until the solution is homogeneous. I allow the mixed fuel to settle then look at the solution through a **bright light** to ensure the entire mixture is clear & homogeneous. If it turns a milky color, that's indicative that moisture has somehow gotten into the solution, rendering the batch no good. (Mixing fuel outdoors when it is very humid or raining can cause this to happen). From there, I pour the final mixed fuel solution through a Coleman felt fuel filter or coffee filter paper into its final container.



Properly sealed **metal** containers are the preferred container with which to keep fuel in for long time storage. I have found the ones for acetone or lacquer thinner from *Canadian Tire* to work excellent. Polypropylene plastic containers are a

second choice. In any case they must have **well sealing caps.**



After the new fuel blend is in its container, I lay it down on a clean paper towel for a while and come back to see if there is any dampness which would indicate a leaky cap.



Other interesting applications: If you have a given fuel and wish to change the oil or nitro content, I find going to an online fuel calculator makes it simple. When adding extra nitro, you end up lowering the oil (and less importantly methanol) percentage content in the process. There are several calculators online, but the two listed below work well enough for me.

<http://www.nitrorc.com/default2.asp?Introduction=http://www.nitrorc.com/fuelws>

www.coxengines.com/files/castor.xls

PROBLEM: How do I change my Gallon of SIG Champion 35% nitro fuel (w/ 20% oil) to increase the nitro content to 40% while still keeping my oil at 20%, and still keeping my final mix quantity to less than 128 oz. total, so that it all fits in my regular one gallon container?

According to the figures you just gave us, your current fuel has, **35%** nitro content and **20%** oil content, leaving **45%** methanol.

You have indicated that you wish to increase your nitro content by **5%** to a new total percentage of **40%** and your oil by **0%** to a new total of **20%**

To accomplish this, you will simply need to add **11.3** ounces of nitro and **2.8** ounces of castor/synthetic oil to your **113** ounces of fuel.

When you are done, you should end up with **127.1** ounces (0.99 U.S. gallons) of newly blended, custom fuel.

****Note than to stay within your 1-gallon container restriction, you will first need to withdraw 15 oz. of fuel from your gallon jug. So (1 U.S. Gallon) 128 oz. – 15 oz. of fuel leaves 113 oz. left in the jug, before adding the extra nitro & oil. ****

Be aware that 4 litres are just a bit too much fuel to pour into an American 1-gallon fuel jug, so plan your mix accordingly. I hope this has been of interest

For those who have always wondered what was in the Original Cox “Red Can” Racing Fuel? Below are the Cox factory specification sheets, courtesy of Cox International. I believe “Dow Lube” is equivalent to Klotz 100% synthetic oil.

Local Fuel Additives Milwaukee area

Locally we can get Methanol and Castor or Klotz over the counter from Franklin Cart (go cart shop <https://franklinkart.com/>) in New Berlin. Gas stations near Slinger speedway and Beaver Dam have methanol at the gas pump. Due to all the drag, dirt, and snowmobile methanol and proper oil is easy to get locally.

Nitromethane is another matter. Last Time I checked you could order 5 gallon pails of NitroMethane from VP racing and have it delivered to a VP racing dealer. Nitro is very expensive now. Anyone know a drag racer that runs a nitro car willing to sell a gallon or so?

INGREDIENT	% OF MIX BY VOLUME	SPECIFIC GRAVITY @ 60° F.	SPECIFIC GRAVITY @ % OF MIX	FUEL CHECK - SPECIFIC GRAVITY
METHANOL	65%	.7955	.51707	.8781 = SPECIFIC GRAVITY @ 60° F.
CASTOR OIL	18%	.9635	.17343	.8681/.8881 = ±.01 TOLERANCE
NITRO METHANE	15%	1.1290	.16935	27/31 = CONVERSION TO BAUME SCALE
DOW LUBE XA-1180-6	2%	.9015	.01820	
* NOTE: DOW LUBE SHIPPED TO US UNDER LABEL # KLOTZ # KL-201 #.				.8781 T.

CASTOR OIL 8.0326 LB. PER GAL.
NITRO METHANE 9.487 LB. PER GAL.
OIL/GAL = 5.75 (METHANOL) X 1.28.

MIXING FORMULA		oz./GAL.
ORDER	6000 GAL. METHANOL	83.20
	1661 GAL. CASTOR OIL (15,342 LB.)	23.04
ADD	1389 GAL. NITRO METHANE	19.20
	185 GAL. DOW LUBE	2.56
TOTAL	9230 GAL. FUEL MIX	128.00 _{oz} = 1 GAL.

FLASH POINT 61° F. REF U.S. TESTING CO. REPORT # LA 70216, DTD. 4-12-77.

2780	* RELEASED	4/1/77	KWN
ECO N#	BYM.	DESCRIPTION	DATE BY

REVISIONS

MATERIAL	TOLERANCES UNLESS OTHERWISE NOTED	L. M. COX MFG. CO., INC.	
FINISH	ANGLES ± 1/4" FRACTIONS ± 1/64 IN. DECIMALS	1805 E. WARNER AVE. SANTA ANA, CALIFORNIA	
HEAT TREAT	XX ± XXX ±	TITLE	SCALE
	DRAWN KWN DATE 4-6-77	FLIGHT POWER FUEL	DWG. NO. 50000
	CHECKED DATE	SIZE A	REV. *

INGREDIENT	% OF MIX BY VOLUME	SPECIFIC GRAVITY @ 60° F.	SPECIFIC GRAVITY @ % OF MIX	FUEL CHECK - SPECIFIC GRAVITY
METHANOL	50%	.7955	.39775	.9281 = SPECIFIC GRAVITY @ 60° F.
CASTOR OIL	18%	.9635	.17343	.9181/.1381 = ±.01 TOLERANCE
NITRO METHANE	30%	1.1290	.33870	19/22 = CONVERSION TO BAUME SCALE
* DOW LUBE XA-1180-6	2%	.9015	.01820	
* NOTE: DOW LUBE SHIPPED TO US UNDER LABEL # KLOTZ KL-201 #.				.9281 T.

CASTOR OIL 8.0326 LB. PER GAL.
NITRO METHANE 9.487 LB. PER GAL.

MIXING FORMULA		P	700 GAL. OF #50000 CONTAINS	910 GAL. OF #50000 CONTAINS	ADD TO #50000
START WITH	700 GAL. #50000 FUEL	R	METHANOL 455 GAL.-65%	455 GAL.-50%	0
ADD	38 GAL. CASTOR OIL (305 LB.)	O	CASTOR OIL 126 GAL.-18%	164 GAL.-18%	38 GAL
	168 GAL. NITRO METHANE	O	NITRO METHANE 105 GAL.-15%	273 GAL.-30%	168 GAL
	4 GAL. DOW LUBE	F	DOW LUBE 14 GAL.- 2%	18 GAL.- 2%	4 GAL
TOTAL	910 GAL. FUEL MIX	F	TOTAL 700 GAL.- 100%	910 GAL.- 100%	210 GAL

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FINISH	ANGLES ± 1/4" FRACTIONS ± 1/64 IN. DECIMALS	1805 E. WARNER AVE. SANTA ANA, CALIFORNIA	
HEAT TREAT	XX ± XXX ±	TITLE	SCALE
	DRAWN KWN DATE 4-11-77	RACE POWER FUEL	DWG. NO. 51000
	CHECKED DATE	SIZE A	REV. *