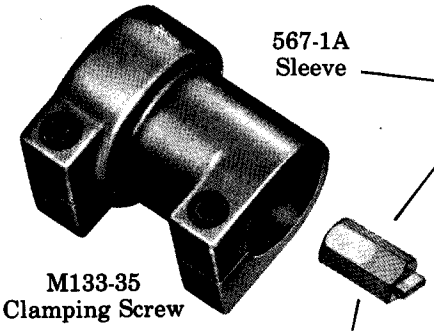
COMPONENT PARTS OF KS-21 SAW UNIT



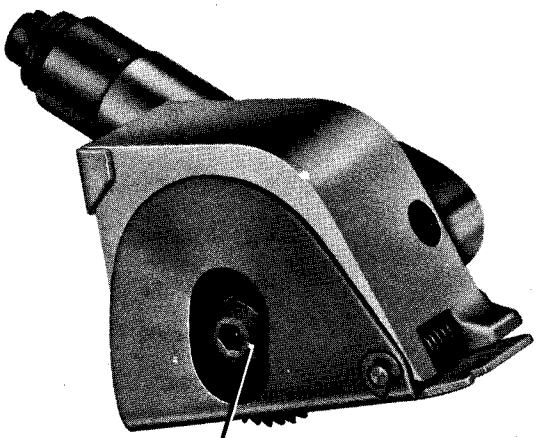
M133-36
Clamping Screw

567-1A
Sleeve

Connecting Sleeves and Safety Shear Couplers differ in dimensions to meet the threaded gear reduction case specifications of the various makes of portable electric and pneumatic drills.

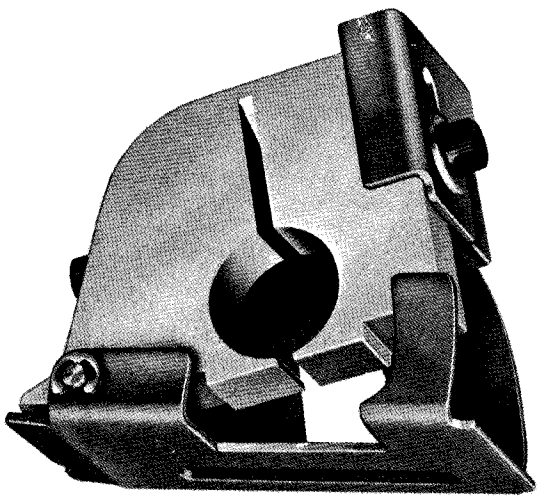
M133-35
Clamping Screw

170-25
Coupler



KS-21
Saw
Unit

133-7
Spindle
Bolt



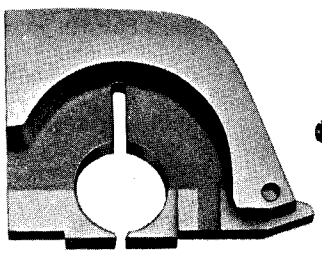
268-10
KS-21H

149-6

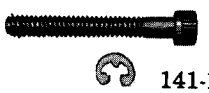
133-28

165-1

164-5

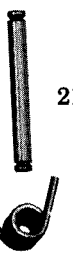


156-8



133-27

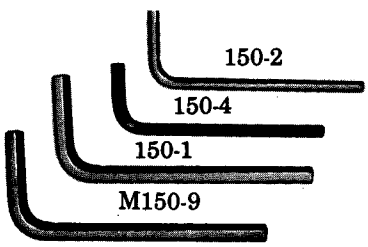
141-11



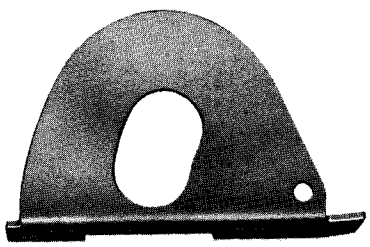
210-2

191-12

141-11



150-2
150-4
150-1
M150-9



160-10

PART NO.	DESCRIPTION
133-3	Clamping Screw
133-28	Depth Stop Screw
133-27	Clamping Screw
141-11	Retaining Ring
149-6	Spindle Wrench
150-1	3/16" Socket Key

PART NO.	DESCRIPTION
150-2	1/8" Socket Key
150-4	5/32" Socket Key
M150-9	4MM Socket Key
156-8	Saw Body
160-10	Saw Guard
164-5	Depth Stop

PART NO.	DESCRIPTION
165-1	Spacer Washer
170-25	Safety Shear Coupler
191-12	Coil Spring
210-2	Guard Pin
268-10	Guard Assembly
567-1A	Connecting Sleeve

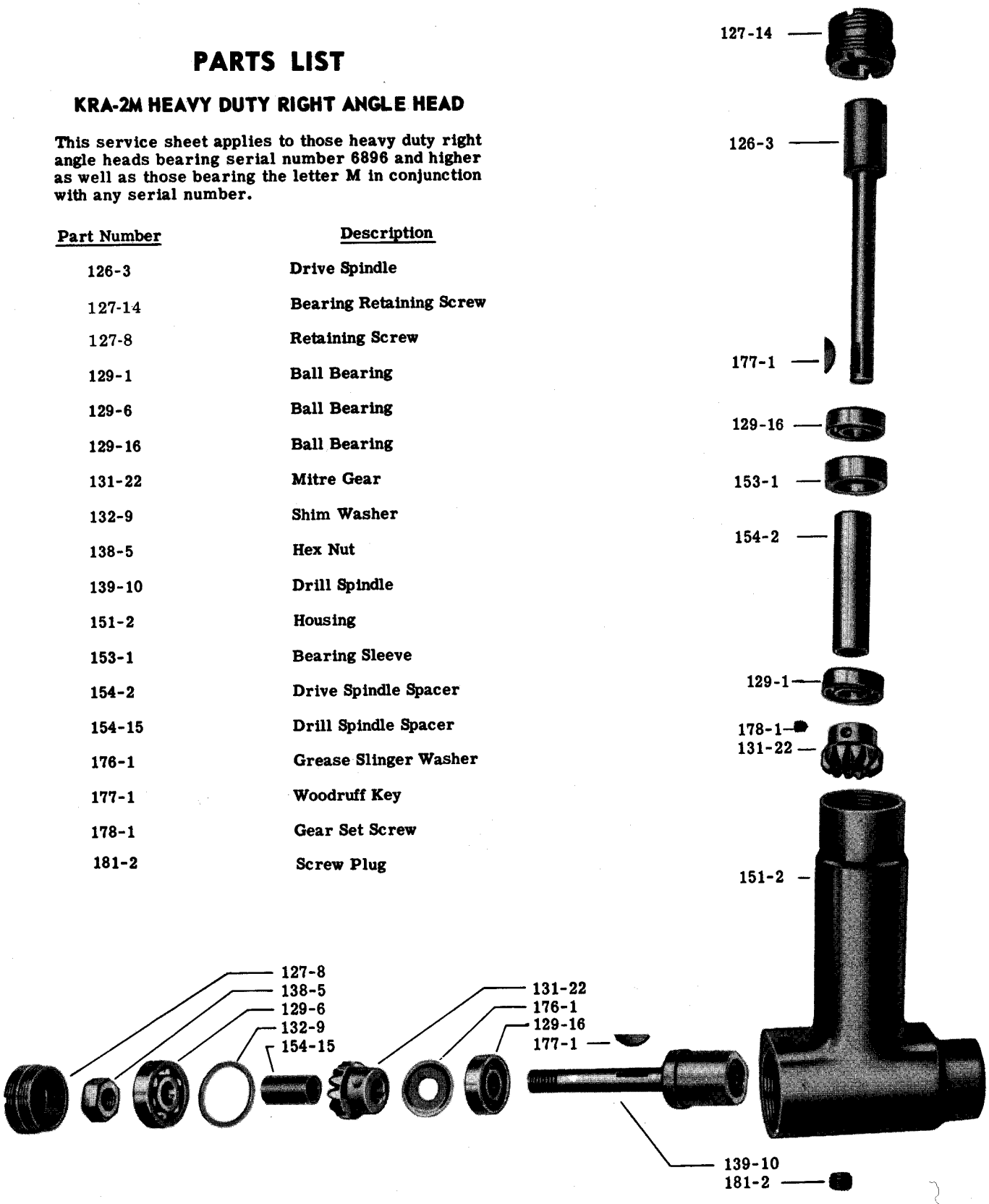
THE KETT TOOL CO. 5055 Madison Road CINCINNATI, OHIO 45227
TEL. (513) 271-0333

PARTS LIST

KRA-2M HEAVY DUTY RIGHT ANGLE HEAD

This service sheet applies to those heavy duty right angle heads bearing serial number 6896 and higher as well as those bearing the letter M in conjunction with any serial number.

Part Number	Description
126-3	Drive Spindle
127-14	Bearing Retaining Screw
127-8	Retaining Screw
129-1	Ball Bearing
129-6	Ball Bearing
129-16	Ball Bearing
131-22	Mitre Gear
132-9	Shim Washer
138-5	Hex Nut
139-10	Drill Spindle
151-2	Housing
153-1	Bearing Sleeve
154-2	Drive Spindle Spacer
154-15	Drill Spindle Spacer
176-1	Grease Slinger Washer
177-1	Woodruff Key
178-1	Gear Set Screw
181-2	Screw Plug



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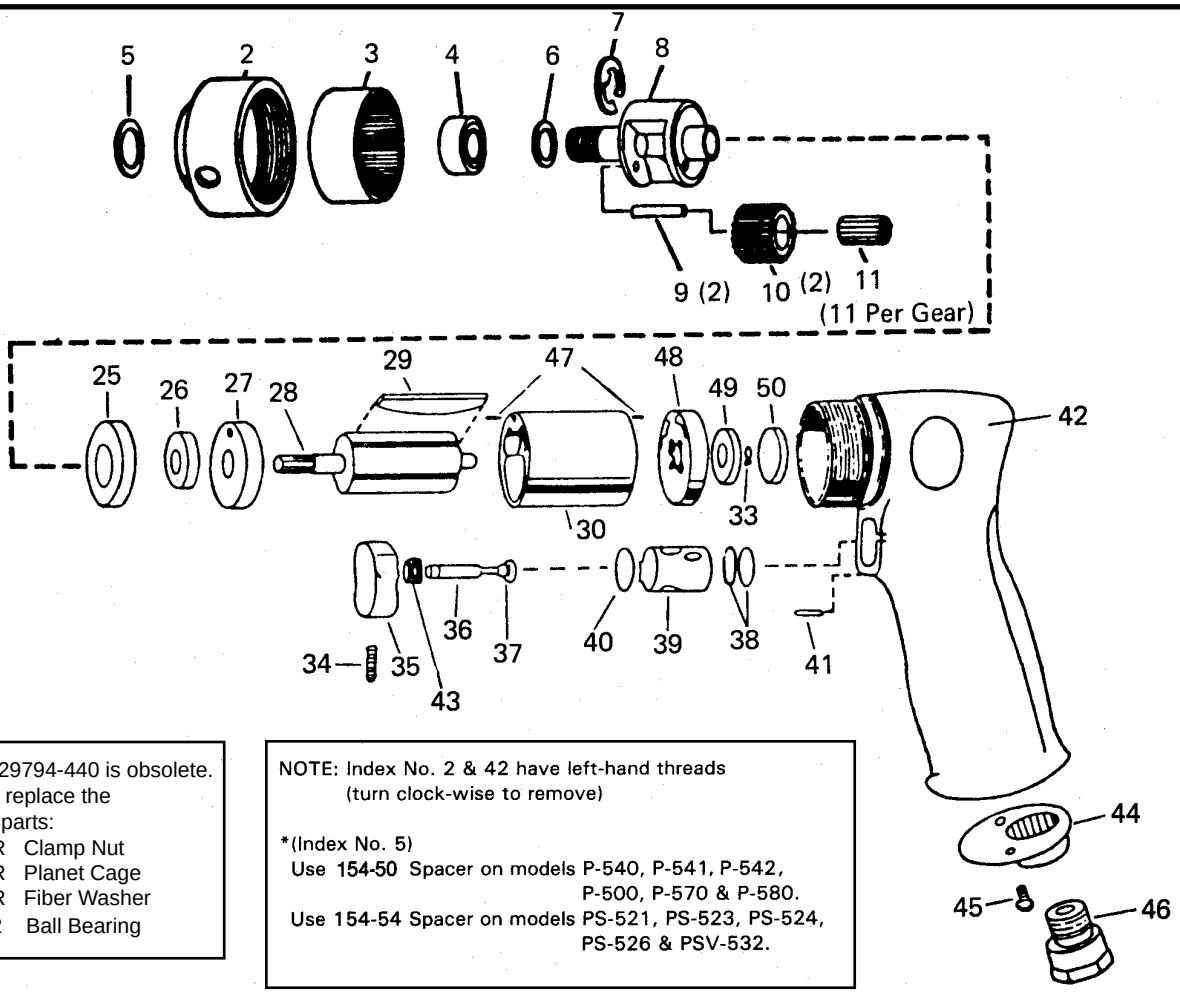
THE KETT TOOL COMPANY 5055 Madison Road Cincinnati, Ohio 45227-1494 Phone 513-271-0333 Fax 513-271-5318

PARTS LIST FOR PNEUMATIC POWER UNITS

253-38 (SERIAL NUMBER 2001 TO 9600)

253-57 (SERIAL NUMBER 9601 & HIGHER)



**Part #729794-440 is obsolete. To repair, replace the following parts:
729799-R Clamp Nut
729794-R Planet Cage
729797-R Fiber Washer
49423-02 Ball Bearing

NOTE: Index No. 2 & 42 have left-hand threads (turn clock-wise to remove)

*(Index No. 5)
Use 154-50 Spacer on models P-540, P-541, P-542, P-500, P-570 & P-580.
Use 154-54 Spacer on models PS-521, PS-523, PS-524, PS-526 & PSV-532.

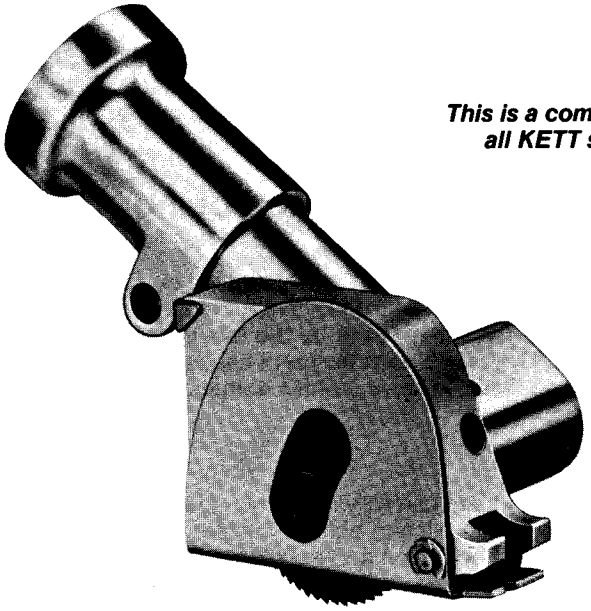
INDEX NO.	PART NO.	DESCRIPTION	REQ'D TOOL
2	729799-R	Clamp Nut (253-57)	1
	729799-440	Clamp Nut (253-38)	1
3	729798	Internal Gear	1
4	49423-02	Ball Bearing (253-57)	1
	1008854	Ball Bearing (253-38)	1
5	154-*	Spacer	1
6	729797-R	Fiber Washer (253-57)	1
	729797	Fiber Washer (253-38)	1
7	729208	Ret. Ring (used only on 253-38)	1
8	729794-R	Planet Cage (253-57)	1
	729794-440	Planet cage (253-38) oblsolete**	1
9	729796-440	Planet Pin	2
10	729795	Planet Gear (incl. 729808 Needle Rollers)	2
11	729808	Needle Rollers (see 729795 Planet Gear)	22
25	1008212	Ball Bearing	1
26	1001532	Ball Bearing	1
27	729793	Front Plate	1
28	729792	Rotor	1

INDEX NO.	PART NO.	DESCRIPTION	REQ'D TOOL
29	729709	Rotor Blade	4
30	729708	Cy linder	1
33	1012831	Retaining Ring	1
34	731928	Set Screw	1
35	731929	Trigger	1
36	731926	Valve Stem	1
37	729591	O-ring	1
38	729091	O-ring	2
39	731927	Valve Bushing	1
40	729263	O-ring	1
41	731930	Pin	1
42	731923-440	Motor Housing	1
43	731925	Valve Spring	1
44	731922	Housing End Cap	1
45	731921	Screw	2
46	731920	Air Inlet	1
47	729707	Dowel Pin	2
48	729791	Rear Plate	1
49	729012	Ball Bearing	1
50	729178	Bearing Seal	1

Operation & Maintenance of KETT Portable Power Panel Cutting Saws

KETT Panel Cutting Saws are available in models that range in cutting capacity from ¼" up to a full 1" depth of cut. Blades for this selection of Saw Models start at 1¼" and go thru to 3⅜" in diameter. The KETT Saws and Blades are designed for many uses such as cutting mild steel 16 gage and lighter, hard tempered aluminum and brass up to ⅛", soft aluminum up to 3/16", FRP plastics and plastic laminates up to ⅝". Plywood, particle board, pressed board and similar soft rigid materials can be worked with ease. KETT Saws are especially effective on metal laminated sandwich type wall paneling as Alliance Wall, Color Wall, Mirawal, Porc-Lin Ply, Chalkboard and similar products.

KETT Saws like any good tools are well made and will give satisfactory service when used with care and given occasional preventive maintenance. Bear in mind the proper KETT Saws when used with factory recommended blades are suitable for cutting cold rolled sheet steel up to 16 gage. We do not recommend the saws for stainless steel nor titanium. To exceed this rated capacity invites excessive blade wear and breakage and damage to the motor by overtaxing the tool. See the application recommendations on the KETT Saw Blade price sheet and by all means **Read and heed the safety rules which accompany each tool.**



This is a composite of all KETT saw units

Adjustments

Before making any adjustments to the saw be certain it is disconnected from the power source.

To adjust the angle of the saw body on the Geared Right Angle Head loosen the socket head clamping screw in the saw body and turn saw body to desired position, being careful to keep the saw blade centered in the slot and in line with the vee sight of the saw guard, then tighten the clamping screw.

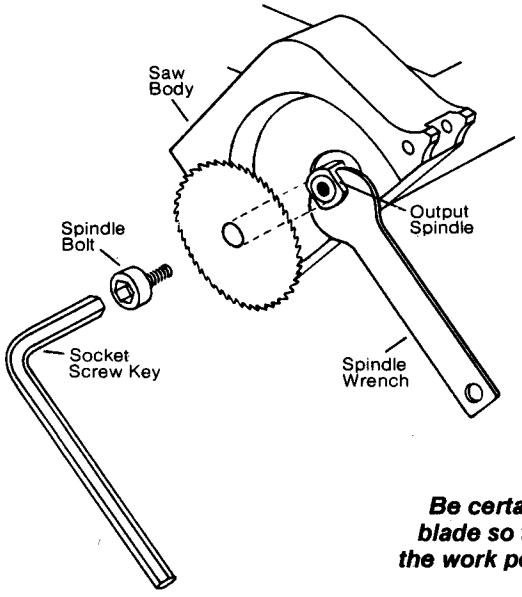
To adjust the angle of the Saw Unit in relation to the motor, loosen the socket head clamping screw in the sleeve, twist saw unit to desired position, being careful to keep it at the same depth in sleeve, so as not to disengage coupler then tighten the clamping screw.

To adjust for cutting depth, loosen the depth stop screw (or a knurled thumb nut that could be in its place) on rear of saw body, raise or lower depth stop as necessary until blade is properly exposed to desired penetration, then tighten. Ordinarily the saw should be extended approximately 1/16" to ⅛" more than the thickness of the material being cut. When cutting through a panel supported by ribs or other understructure that should be unmolested, extend blade to the same distance as the measured thickness of the material being cut.

Replacing Blades

To replace blade on the KETT Saw insert open end spindle wrench behind the blade and span the flats on the output spindle. Insert the socket key into the hex socket of the spindle bolt, loosen and remove both bolt and blade.

You will note the blade, which has a 7/16" bore, slips over the spindle and seats itself against the shoulder. This design provides for more concentricity resulting in smoother, faster and more accurate cutting. Slip the blade over the spindle, seat it against the shoulder, replace the spindle bolt and pull up tight. The smaller diameter blade with the ¼" bore fits over the threaded shank of the spindle bolt and seats itself against the face of the output spindle.



Be certain to insert the blade so the teeth enter the work pointing forward

Precaution Before Replacing Blades

Be certain there is no oil or grease or any particles of any kind on the face of the spindle, on the shoulder of the spindle or on either side of the blade. Be certain to wipe clean all these parts. Failure to follow this precaution will result in the blade slipping or standing stationary on the spindle when the saw is in operation.

Care of the Motor

Motors are packed with lubricant to give 300 hours service. At the end of this period the gear case and the armature bearings should be checked and more grease added if necessary. A good grade of gear grease is recommended.

A hot motor is a sign of trouble. It can easily lead to a burnt out armature. **Stop the tool and determine the cause.** Overheating is due to overloading beyond capacity; low voltage, due to faulty connections or the use of extensions of light wire gage (the extension itself will tend to overheat), poor ventilation thru motor case; or bad brushes. **It is good practice to check brushes every two weeks. Chipped brushes or brushes shorter than ⅜" should be replaced.**

The tool is equipped with an approved three conductor cord and three prong grounding type plug to fit the proper grounding type 120VAC receptacle. This green ground wire connection on the cord and at the plug is there for your own safety. **Please use it.** It is especially important that the tool be grounded when there is the slightest trace of dampness present. **Precaution! Always check the line voltage before plugging in your saw.**

These instructions exclude **DOUBLE INSULATED TOOLS** when referring to brush length and three wire conductor.

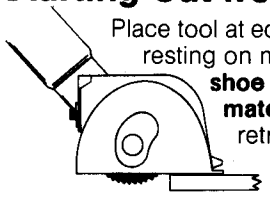
Care of the KETT Saw

A light, compact unit such as the KETT Saw necessarily has small gears and shafts. Extremely rugged for its size, the KETT Saw is more than adequate for normal use. However, as with all fine tools, care is essential for long life and best performance. Skillful operation depends on a certain amount of practice, easily acquired, but very important. The saw spindle and gears should be lubricated after every 25 to 30 hours use. Injecting a light cup grease into the grease opening covered by screw plug #181-2. Two ounce tubes are available from stock. Specify 264-1 two ounce tube Non-Fluid Oil. **MAKE A VISUAL CHECK FOR DAMAGE BEFORE OPERATING TO BE CERTAIN SAW IS SAFE TO USE.**

Cutting with the KETT Saw

Feed Blade into material gradually to avoid sudden strain. When blade starts cutting, it is better to "crowd" the rate of feed to attain a steady cutting speed rather than to hold back. Where conditions permit, blade life can be extended through the use of a lubricant such as cutting oil, wax, tallow, or a grease stick. It is recommended to practice cutting with the KETT Saw on scrap material until knack of using tool is acquired.

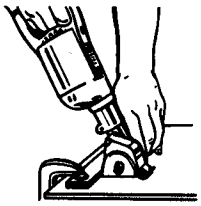
Starting Cut from Edge of Material



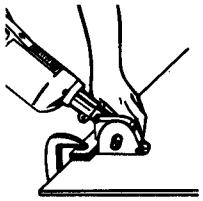
Place tool at edge of material with front of shoe only resting on material. **Make sure tool is held with shoe flat and level with surface of material.** The guard should be in its retracted position to expose the blade. Point tool in direction of cut lining up scribed line in vee sight on saw guard. Squeeze the trigger switch and set the blade in motion. Slowly push tool forward until blade starts to cut, gradually increasing pressure until blade is cutting full depth. Then increase pressure until tool moves forward at a uniform rate depending on material being cut. Do not jerk or thrust tool. **DO NOT REMOVE SAW GUARD, BE CERTAIN THAT SAW GUARD IS FIRMLY IN PLACE BEFORE STARTING.**

Starting Plunge Cut in Center of Sheet

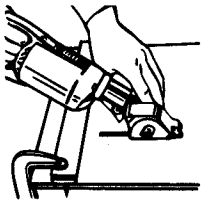
CAUTION: Use a sharp blade.



Position—The tool is held in upright position while you bring the blade into perfect starting alignment. The guard only is against the panel — the blade cannot accidentally mar the surface.



Plunge—The handle is lowered pushing the blade into the panel exactly where you want it — starting the cut. The back stop shown prevents any tendency of backward movement when plunging.



Saw with Ease—The guard rides smoothly over the panel surface as you continue cutting your pattern. When the cut is finished, the guard automatically drops down to cover the blade.

Continuing the Cut

Make sure the shoe stays flat against material being cut. If not kept flat, blade may fail to penetrate or may be pinched and broken. The shoe is designed to keep chips from getting under and marring the work. If the saw guard does seem to mar the surface of the material being cut, this can be overcome by either running the cut on the reverse side of the material or by covering the section to be cut with a pressure sensitive tape, then running the saw over and cutting thru the tape.

Stopping the Cut and Removing the Saw

Bring the saw up to the ending point of the cut, hold firmly, shut off power and let it coast to a full stop. Then lift the saw from the cut. **Never back up the tool in the cut with the power on. This is the most frequent cause of broken blades and can result in more serious damage to the tool.**

Guarantee

Each tool has been carefully inspected and tested before shipping. Before attempting to put tool into service it is imperative to read the operation and maintenance manual as well as the safety rules.

Our obligation assumed under this guarantee is limited to making repairs to any tools or any parts of our manufacture returned to our factory at our option, transportation prepaid, which prove to our satisfaction upon examination to have been defective and have not been misused, abused or carelessly handled.

We reserve the right to decline responsibility where repairs have been made or attempted by others.

This guarantee does not apply to expendable parts such as saw blades, shear cutters, safety shear couplers, brushes, and auger bits.

No other guarantee, written or verbal, is authorized by us.

Important: You must fill out and mail Registry Card or Guarantee is Void

THE KETT TOOL COMPANY

5055 Madison Road
Cincinnati, Ohio 45227
(513) 271-0333

K89-905 Printed in U.S.A.

PNEUMATIC TOOLS

KETT TOOL COMPANY

SAFETY, OPERATION AND MAINTENANCE

IMPORTANT SAFETY INSTRUCTIONS

Read all instructions.
Save these instructions.

For all pneumatic tools:
When servicing, use only identical replacement parts.

SPECIFIC SAFETY RULES

Keep Work Area Clean
Cluttered areas and benches invite accidents. Keep work area well lit.

Keep Children Away
All visitors should be kept away from work area.

Store Idle Tools
When not in use, tools should be stored in dry, high or locked-up place out of reach of children.

Don't Force Tool
It will do the job better and safer at the rate for which it was designed.

Use Right Tool
Don't force a small tool to do the job of a heavy duty tool. Don't use tool for on purpose not intended, for example-don't use a circular saw for cutting tree limbs or logs.

Dress Properly
Do not wear loose clothing or jewelry. They can be caught in moving parts. Rubber gloves and footwear are recommended when working out doors. Wear protective hair covering to contain long hair.

Use Safety Glasses
Use safety equipment. Always wear eye protecion.

Secure Work
Use clamps or vise to hold work. It's safer than using your hand and it frees both hands to operate tool.

Don't Overreach.
Keep proper footing and balance at all times.

Maintain Tools with Care
Keep tools sharp and clean for best and safest performance. Follow instructions for lubricating and changing blades. Keep handles dry, clean, and be free from oil and grease.

Disconnect Tools
When not in use; before servicing; when changing blades, etc.

Remove Adjusting keys and Wrenches
Form a habit of checking to see that keys and adjusting wrenches are removed from tool before turning it on.

Avoid Accidental Starting
Don't carry plugged-in tool with finger on switch. Be sure switch is OFF when plugging in. Use of any accessory with this power unit might increase the hazard. The tool should be used only for the purpose for which it is designed.

Stay Alert
Watch what you are doing, use common sense when operating a power tool. Do not use tool while tired or under the influence of drugs, alcohol or medication.

Check Damaged Parts
Before further use of the tool, a guard or other part that is damaged should be carefully checked to determine that it will operate properly and perform its intended function. Check for alignment if moving parts, binding or moving parts, breakage of parts, mounting, and any other conditions that may affect its operation. A guard or other part that is damaged should be properly repaired or replaced by an authorized service center unless otherwise indicated elsewhere in this instruction manual. Have defective switches replaced by authorized service center. Do not use tool if switch does not turn it on or off. **DO NOT OPERATE** power tools in explosive atmospheres such as in the presence of flammable liquids, gases, or dust.

Read all instruction.
Save these instructions.

Operating Instructions

Panel Saws
Be sure the work piece is securely held unless it will remain secure do to its own weight or bulk. Grasp the tool with both hands, one around the handle where the trigger switch is located, the other around the neck or sleeve which holds the cutting head in position. Before starting the motor place the shoe of the foot at the edge of the material to be cut.

Make certain the saw guard is set to depress to the desired depth. Be sure the shoe is flat or level and ready to make full contact with the surface to be cut. The scribed line to be cut should appear in the vee type gunsight on the saw guard.

Squeeze the trigger switch and set the blade in motion. Slowly push the saw forward until the blade makes contact and starts to cut. Gradually increase pressure, until blade is cutting at full capacity at a uniform speed without the feel of being forced or slowing to a stall. Keep the blade perpendicular to the cut and the feed at a constant speed. Do not jerk or suddenly thrust tool in cut and do not rock tool from side to side, so as to bind blade in the cut. When the blade starts cutting, it is more desirable to “crowd” rate of feed to attain efficient cutting speed, rather than to hold back and permit the blade to “dwell” in the cut.

Shut off the power the moment the saw has completed the cut through the sheet. If the cut is to be ended within the boundary of the sheet, bring the saw up to the end of the cut, hold firmly, shut off power and let it coast to a full stop. Then lift the saw from the cut. NEVER BACK UP THE SAW IN THE CUT WITH THE POWER ON AND THE BLADE IN MOTION. This is the most frequent cause of broken blades and can result in more serious damage to the tool.

For plunge cutting, that is, starting a cut within the perimeter or boundaries of a sheet, see the explicitly detailed instructions in the operation and service manual.

Where conditions permit, blade life can be extended and cutting efficiency improved through the use of a lubricant such as a grease stick, wax or tallow, or even cutting oil. It is recommended to practice cutting with the KETT Saw on scrap material until a knack of using the tool is acquired.

Power Shears
Please read carefully all safety rules and operating instructions. The Model P-500 and P-2060 shears are recommended for CR sheet steel up to 18 gauge, the P-542 and P-2042 to 16 gauge, the P-540 and P-2040 to 14 gauge. Secure work piece. To start cut, place side knives of shear slightly on the top side of the edge of the work piece to steady the tool and ready it for the cut. Depress the trigger and guide shear into the work. Do not force it. Avoid double thicknesses of material which exceeds the recommended capacity. For cutting within the perimeter of the work piece drill a 1/2” diameter starting hole and follow instructions above. If resistance to tool develops or cutting becomes difficult, discontinue cutting and check the following: lubrication; thickness of material; sharpness fo blades.

Scissor Shears
Read safety rules carefully and observe all precautions. The KETT Scissor Shear is recommended for woven wood slat type shades; carpeting and carpet underlay or padding; Linoleum; vinyl and rubber flooring tile; soft, pliable plastic sheeting up to 1/8” thickness; and many other similar sheet like materials.

The shear head can be rotated a full 360 degrees on the power unit making it possible to position it to cut in close quarters. This feature also serves to set the oscillating blade to a preferred position either to the top or the bottom of the shear unit.

If resistance to tool develops or cutting becomes difficult, discontinue cutting and check the following: lubrication; thickness of material, sharpness of cutting blades. Blades can be sharpened.

The Model P-541 Scissor Shear is recommmended for steel siding and other light gauge metals. Secure the work piece. To start the cut, place knives of shear slightly on the side of the work piece to steady the tool and ready it for the cut. Depress the trigger and guide shear into the work. Simply depress the trigger to adjust the speed to suit the material being cut. Do no force it.

Power NIbbler
Please read carefully all safety rules and operating instructions.
The PN-1020 Nibbler is recommended for CR sheet steel up to 18 gauge and the PN-2020 up to 14 gauge. Secure the work piece. To start cut, place die opening of nilbbler slightly onto the edge of the work piece to steady the tool and ready it for the cut. Depress the trigger switch on the drive motor and guide the nibbler into the work. Don’t force it. Avoid double thickness of material which exceeds the 18 and 14 gauge recommended capacity. For cutting within the perimeter of the work piece, drill a 5/8” diameter starting hole and follow instructions above. If resistance to tool develops or cutting becomes difficult, discontinue cutting and check the following: lubrication; chip clogging; thickness of material; sharpness of

MAINTENANCE

When servicing, use only identical replacement parts. Tool may be cleaned and lubricated by the user, but any other servicing, including the changing of carbon brushes, should be performed by the manufacturer or any authorized representative or service station.

Loss of power or erratic action

If resistance to tool developes or cutting becomes difficult, discontinue cutting and check the following: lubrication; thickness of material; sharpness of cutting blades; air pressure.

Check for low air pressure or air line restriction, also reduced compressor output or excessive drain on air lines.

Dirt and gum deposits in tool may cause loss of power and may be removed by flushing tool with a rust inhibitive oil.

For maximum efficiency, 90 psi of clean, dry air should be supplied at the tool during operation. The use of one horsepower or larger compressor connected to an air tank of at least 40 gallons capacity is recommended.

Pipe and fittings between compressor and air hose outlets should be 1/2” pipe size (5/8” ID). Aie hose should be at least 3/8” ID.

Lubrication

Lubricate the air motor daily with a good grade of air motor oil. Use a continuous airline oiler with filter.

Right Angle Drill & Saw Heads

Saw and drill head gears should be lubricated after 25 to 30 hours use. Inject a light cup grease into the grease opening covered by screw 181-2 in the bottom of the geared right angle transmission head. Specify 264-1 tube grease for lubrication.

Adherence to these maintenance instructions will greatly increase the life of your saw, so it will give you long and satisfactory service.

Shear Heads

Once every three months, depending upon usage, remove the shear head from the power unit following the instructions given on the service sheet under the heading “Disassembly - To remove the shear head assembly from the drive motor”. Put a few drops of heavy oil on the Eccentric Bearing Assembly, so that it saturates the needle bearing. Grease is even better if it can be forced or pressed into the beedle bearing.

Nibbler Head

When servicing use only identical replacement parts. Once every three months, depending upon usage, remove the nibbler head from the power unit by loosening the clamping screw (M133-16) and pull the head with a twisting action. Lubricate the bearing surface of the exxentric nut (41-24-1) with a good grade of bearing grease. Place nibbler head back onto motor. Tighten clamping screw snugly to lock head assembly in place.

All Angle Head

To lubricate teh 360 degreee All Angle Head, first seperate the two halves of the head by removing the socket head swivel stud out of the swivel stud nut. With the two halves separated, fill the drive spindle side until level with 264-1 Tube Grease.

Be sure to replace the copper shim between the two halves of the head. After the two halves are tightly clamped together, remove the excess grease. The tool is again ready for use.

KETT TOOL COMPANY

The Kett Tool Company
5055 Madison Road
Cincinnati, Ohio 45247
(513)271-0333
fax (513)271-5318
www.kett-tool.com
info@kett-tool.com

K13-413

Safety Data Sheet

According to OSHA HCS 2012 (29 CFR 1910.1200)

Section 1: Identification — KETT TOOL part no. 264-6

Product Identifier: **Megaflow® AW Hydraulic Oil**

Other means of identification: Megaflow® AW Hydraulic Oil 22, 32, 46, 68, 100, 150, 220, 320
Megaflow® AW Ultra-Clean Hydraulic Oil 32, 46, 68, 100

SDS Number: **814637**

Intended Use: Hydraulic Fluid

Uses Advised Against: All others

Emergency Health and Safety Number: Chemtrec: 800-424-9300 (24 Hours)

Manufacturer:
Phillips 66 Lubricants
P.O. Box 4428
Houston, TX 77210

SDS Information:
Phone: 800-762-0942
Email: SDS@P66.com
URL: www.Phillips66.com

Customer Service:
U.S.: 1-800-822-6457 or International: +1-83-2486-3363
Technical Information: 1-877-445-9198

Section 2: Hazards Identification

Classified Hazards
This material is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29CFR 1910.1200.

Other Hazards
None Known

Label Elements

No classified hazards

Section 3: Composition / Information on Ingredients

Chemical Name	CASRN	Concentration[1]
Distillates, petroleum, hydrotreated heavy paraffinic	64742-54-7	<100
Residual oils, petroleum, solvent-dewaxed	64742-62-7	<90
Non-Hazardous Materials	VARIOUS	<5

[1] All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Section 4: First Aid Measures

Eye Contact: If irritation or redness develops from exposure, flush eyes with clean water. If symptoms persist, seek medical attention.

Skin Contact: Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops and persists, seek medical attention. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician. (see Note to Physician)

Inhalation (Breathing): First aid is not normally required. If breathing difficulties develop, move victim away from source of exposure and into fresh air in a position comfortable for breathing. Seek immediate medical attention.

Ingestion (Swallowing): First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

Most important symptoms and effects, both acute and delayed: Inhalation of oil mists or vapors generated at elevated temperatures may cause respiratory irritation. Accidental ingestion can result in minor irritation of the digestive tract, nausea and diarrhea. Dry skin and possible irritation with repeated or prolonged exposure.

Notes to Physician: Acute aspirations of large amounts of oil-laden material may produce a serious aspiration pneumonia. Patients who aspirate these oils should be followed for the development of long-term sequelae. Inhalation exposure to oil mists below current workplace exposure limits is unlikely to cause pulmonary abnormalities. When using high-pressure equipment, injection of product under the skin can occur. In this case, the casualty should be sent immediately to the hospital. Do not wait for symptoms to develop. High-pressure hydrocarbon injection injuries may produce substantial necrosis of underlying tissue despite an innocuous appearing external wound. These injuries often require extensive emergency surgical debridement and all injuries should be evaluated by a specialist in order to assess the extent of injury. Early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

Section 5: Fire-Fighting Measures

NFPA 704 Hazard Class

Health: 0 **Flammability:** 1 **Instability:** 0

0 (Minimal)
1 (Slight)
2 (Moderate)
3 (Serious)
4 (Severe)

Extinguishing Media: Dry chemical, carbon dioxide, foam, or water spray is recommended. Water or foam may cause frothing of materials heated above 212°F / 100°C. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

Specific hazards arising from the chemical

Unusual Fire & Explosion Hazards: This material may burn, but will not ignite readily. If container is not properly cooled, it can rupture in the heat of a fire.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Oxides of sulfur, nitrogen or phosphorus may also be formed.

Special protective actions for firefighters: For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

Section 6: Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: This material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard. Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).

Methods and material for containment and cleaning up: Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water remove with appropriate methods (e.g. skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken. See Section 13 for information on appropriate disposal.

Section 7: Handling and Storage

Precautions for safe handling: Keep away from flames and hot surfaces. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8). Spills will produce very slippery surfaces. High pressure injection of hydrocarbon fuels, hydraulic oils or greases under the skin may have serious consequences even though no symptoms or injury may be apparent. This can happen accidentally when using high pressure equipment such as high pressure grease guns, fuel injection apparatus or from pinhole leaks in tubing of high pressure hydraulic oil equipment.

Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes.

Conditions for safe storage: Storage temperatures above 113°F may lead to thermal decomposition, resulting in the generation of hydrogen sulfide and other sulfur containing gases. Use and store this material in cool, dry, well-ventilated area away from heat and all sources of ignition. Keep container(s) tightly closed and properly labeled. Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Section 8: Exposure Controls / Personal Protection

Chemical Name	ACGIH	OSHA	Other
Distillates, petroleum, hydrotreated heavy paraffinic	TWA: 5mg/m^3 STEL: 10 mg/m^3 as Oil Mist, if Generated	TWA: 5mg/m^3 as Oil Mist, if Generated	---
Residual oils, petroleum, solvent-dewaxed	TWA: 5mg/m^3 STEL: 10 mg/m^3 as Oil Mist, if Generated	TWA: 5mg/m^3 as Oil Mist, if Generated	---

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Eye/Face Protection: The use of eye/face protection is not normally required; however, good industrial hygiene practice suggests the use of eye protection that meets or exceeds ANSI Z.87.1 whenever working with chemicals.

Skin/Hand Protection: The use of skin protection is not normally required; however, good industrial hygiene practice suggests the use of gloves or other appropriate skin protection whenever working with chemicals. Suggested protective materials: Nitrile

Respiratory Protection: Where there is potential for airborne exposure above the exposure limit a NIOSH certified air purifying respirator equipped with R or P95 filters may be used.

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use. Air purifying respirators provide limited protection and cannot be used in atmospheres that exceed the maximum use concentration (as directed by regulation or the manufacturer's instructions), in oxygen deficient (less than 19.5 percent oxygen) situations, or under conditions that are immediately dangerous to life and health (IDLH).

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

Section 9: Physical and Chemical Properties

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance: Amber, Transparent
Physical Form: Liquid
Odor: Petroleum
Odor Threshold: No data
pH: Not applicable
Vapor Density (air=1): >1
Upper Explosive Limits (vol % in air): No data
Lower Explosive Limits (vol % in air): No data
Evaporation Rate (nBuAc=1): No data
Particle Size: N/A
Percent Volatile: No data
Flammability (solid, gas): May Ignite
Solubility in Water: Negligible

Flash Point: > 302 °F / > 150 °C
Test Method: Pensky-Martens Closed Cup (PMCC), ASTM D93, EPA 1010
Initial Boiling Point/Range: No data
Vapor Pressure: <1 mm Hg
Partition Coefficient (n-octanol/water) (Kow): No data
Melting/Freezing Point: No data
Auto-ignition Temperature: No data
Decomposition Temperature: No data
Specific Gravity (water=1): 0.85-0.89 @ 60ºF (15.6ºC)
Bulk Density: 7.08-7.41 lbs/gal
Viscosity: 4.0 - 25 cSt @ 100°C; 21 - 345 cSt @ 40°C
Pour Point: < 10 °F / < -12 °C

Section 10: Stability and Reactivity

Reactivity: Not chemically reactive.

Chemical stability: Stable under normal ambient and anticipated conditions of use.

Possibility of hazardous reactions: Hazardous reactions not anticipated.

Conditions to avoid: Avoid all possible sources of ignition. Extended exposure to high temperatures can cause decomposition.

Incompatible materials: Avoid contact with strong oxidizing agents and strong reducing agents.

Hazardous decomposition products: Not anticipated under normal conditions of use.

Section 11: Toxicological Information

Information on Toxicological Effects of Substance/Mixture

Acute Toxicity	Hazard	Additional Information	LC50/LD50 Data
Inhalation	Unlikely to be harmful		>5 mg/L (mist, estimated)
Dermal	Unlikely to be harmful		> 2 g/kg (estimated)
Oral	Unlikely to be harmful		> 5 g/kg (estimated)

Aspiration Hazard: Not expected to be an aspiration hazard.

Skin Corrosion/Irritation: Not expected to be irritating. Repeated exposure may cause skin dryness or cracking.

Serious Eye Damage/Irritation: Not expected to be irritating.

Skin Sensitization: No information available on the mixture, however none of the components have been classified for skin sensitization (or are below the concentration threshold for classification).

Respiratory Sensitization: No information available.

Specific Target Organ Toxicity (Single Exposure): Not expected to cause organ effects from single exposure.

Specific Target Organ Toxicity (Repeated Exposure): Not expected to cause organ effects from repeated exposure.

Carcinogenicity: No information available on the mixture, however none of the components have been classified for carcinogenicity (or are below the concentration threshold for classification).

Germ Cell Mutagenicity: No information available on the mixture, however none of the components have been classified for germ cell mutagenicity (or are below the concentration threshold for classification).

Reproductive Toxicity: No information available on the mixture, however none of the components have been classified for reproductive toxicity (or are below the concentration threshold for classification).

Information on Toxicological Effects of Components

Lubricant Base Oil (Petroleum)

Carcinogenicity: The petroleum base oils contained in this product have been highly refined by a variety of processes including severe hydrocracking/hydroprocessing to reduce aromatics and improve performance characteristics. All of the oils meet the IP-346 criteria of less than 3 percent PAH's and are not considered carcinogens by NTP, IARC, or OSHA.

Section 12: Ecological Information

GHS Classification:
No classified hazards

Toxicity: All acute aquatic toxicity studies on samples of lubricant base oils show acute toxicity values greater than 100 mg/L for invertebrates, algae and fish. These tests were carried out on water accommodated fractions and the results are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon compositions.

Persistence and Degradability: The hydrocarbons in this material are not readily biodegradable, but since they can be degraded by microorganisms, they are regarded as inherently biodegradable.

Bioaccumulative Potential: Log Kow values measured for the hydrocarbon components of this material are greater than 5.3, and therefore regarded as having the potential to bioaccumulate. In practice, metabolic processes may reduce bioconcentration.

Mobility in Soil: Volatilization to air is not expected to be a significant fate process due to the low vapor pressure of this material. In water, base oils will float and spread over the surface at a rate dependent upon viscosity. There will be significant removal of hydrocarbons from the water by sediment adsorption. In soil and sediment, hydrocarbon components will show low mobility with adsorption to sediments being the predominant physical process. The main fate process is expected to be slow biodegradation of the hydrocarbon constituents in soil and sediment.

Other adverse effects: None anticipated.

Section 13: Disposal Considerations

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations.

This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste and is not believed to exhibit characteristics of hazardous waste. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the MSDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste.

This material under most intended uses would become "Used Oil" due to contamination by physical or chemical impurities. Whenever possible, Recycle used oil in accordance with applicable federal and state or local regulations. Container contents should be completely used and containers should be emptied prior to discard.

Section 14: Transport Information

U.S. Department of Transportation (DOT)

Shipping Description: *Not regulated*
Note: *If shipped by land in a packaging having a capacity of 3,500 gallons or more, the provisions of 49 CFR, Part 130 apply. (Contains oil)*

International Maritime Dangerous Goods (IMDG)

Shipping Description: *Not regulated*
Note: *U.S. DOT compliance requirements may apply. See 49 CFR 171.22, 23 & 25.*

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

International Civil Aviation Org. / International Air Transport Assoc. (ICAO/IATA)

UN/ID #: *Not regulated*
Note: *U.S. DOT compliance requirements may apply. See 49 CFR 171.22, 23 & 24.*

	LTD. QTY	Passenger Aircraft	Cargo Aircraft Only
Packaging Instruction #:	---	---	---
Max. Net Qty. Per Package:	---	---	---

Section 15: Regulatory Information

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):

This material does not contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

CERCLA/SARA - Section 311/312 (Title III Hazard Categories)

Acute Health Hazard: No
Chronic Health Hazard: No
Fire Hazard: No
Pressure Hazard: No
Reactive Hazard: No

CERCLA/SARA - Section 313 and 40 CFR 372:

This material does not contain any chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372.

EPA (CERCLA) Reportable Quantity (in pounds):

This material does not contain any chemicals with CERCLA Reportable Quantities.

California Proposition 65:

This material does not contain any chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm at concentrations that trigger the warning requirements of California Proposition 65.

International Hazard Classification

Canada:

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all the information required by the Regulations.

WHMIS Hazard Class:

none

National Chemical Inventories

All components are either listed on the US TSCA Inventory, or are not regulated under TSCA
All components are either on the DSL, or are exempt from DSL listing requirements.

U.S. Export Control Classification Number: EAR99

Section 16: Other Information

Date of Issue:	Previous Issue Date:	SDS Number:	Status:
21-Aug-2013	16-Aug-2013	814637	FINAL

Revised Sections or Basis for Revision:
Periodic review and update; Regulatory information (Section 15)

Guide to Abbreviations:
ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

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