LUBRICATION MANUAL

- **PURCHASE SPECIFICATIONS**
- **APPROVED PRODUCTS**

FOR USE IN ALL MACHINES MANUFACTURED BY THE CINCINNATI MILLING MACHINE CO.

Publication No. M-2258-1

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO, U. S. A.

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These lubricants have been extensively tested and found to meet the rigid specification requirements for their various applications as established by our laboratory and engineering department.

All products included in this book have passed strict laboratory and field tests.

The list of suppliers and their approved products will provide a comprehensive national, and in many cases, international coverage.

THE CINCINNATI MILLING MACHINE CO.

CINCINNATI 9, OHIO U. S. A.

SPECIFICATION

P-35

Gear Lubricants.

Purchase Specifications

This specification covers a very heavy bodied oil with or without 5% acidless tallow to be used on worm and wheel drives, and slow running gears which are not tightly sealed.

CHEMICAL AND PHYSICAL PROPERTIES:

Viscosity (SUS at 100°F)	(ASTM D 445)	2000 to 2500
Viscosity Index	(ASTM D 567)	80 Min.
Color	(ASTM D 155)	8 Max.
Flash (O.C.)	(ASTM D 92)	500°F Min.
Fire (O.C.)	(ASTM D 92)	575°F Min.

Results After Heat Test

Loss on Evaporation	1.5% Max.
Precipitate or Sludge	None
Condition of Steel Rod	Satisfactory
Condition of Copper Rod	Slightly Discolored

FILLER:

The oil shall not contain grit, sediment, acid, alkali, soap, resin, excessive moisture, or similar contaminants.

HEAT TEST PROCEDURE:

Place clean polished pieces of copper and steel rods (0.25" dia. x 3.0") in a 100 cc Griffin beaker containing a weighed amount of oil sample, about 35 to 40 grams. Put beaker and contents in an electric drying oven for 24 hours, maintaining a temperature of 210° to 220°F.

METHOD OF TEST:

The latest ASTM Standards are followed in making all tests with the exception of the heat test. This test is made to determine the evaporation loss, precipitate or sludge formation, and the effect of the oil on steel and copper.

FIELD TEST REQUIREMENTS:

This lubricant must have all of the general qualities and properties required to insure its satisfactory performance as a machine tool worm and wheel drive lubricant or other established application when it is applied at a semi-annual frequency and used under conditions consistent with normal machine tool practice.

SPECIFICATION

P-35

Approved Products

SUPPLIER	PRODUCT NAME
American Oil Co. (Standard Oil Co.— Div. of American Oil Co.)	American Worm Gear Oil
British-American Oil Co., Ltd.	British Cylinder Oil "M"
Canfield Oil Co.	Cancyl B-140
Cities Service Oil Co.	Optimus No. 6
Esso Standard	Cylesso T-140
Gulf Oil Corp.	Gulf Senate 158F
Humble Oil & Refining Co.	Cylesstic T-140
Midwest Oil Co.	Ace-Lube 95 WA
Pennzoil Co., The (Penn.)	Pennzoil Cylinder Oil No. 2
Shell Oil Co.	Valvata J-78
Socony-Mobil Oil Co.	600-W Oil
Standard Oil Co. (Ohio)	Sohicyl B-140
Sun Oil Co.	Sunvis 150
Texaco Inc.	Pinnacle Cylinder Oil
Tidewater Assoc., Oil Co.	Tycol Atwater 83

Purchase Specifications, concluded.

MARKING:

All shipments shall be made in clean, sealed containers clearly marked with the purchase order number, name of the lubricant, and grade identification number.

REJECTION:

All material which does not meet these specifications will be subject to rejection.

SPECIFICATION

P-38

Light Hydraulic Oil.

Purchase Specifications

Supersedes: P-36, P-39 and P-56.

This specification covers a high quality rust and oxidation inhibited oil to be used in hydraulic pump units.

CHEMICAL AND PHYSICAL PROPERTIES:

A.P.I. Gravity at 60°F	(ASTM D 287)	30 to 33
Viscosity (SUS at 100°F)	(ASTM D 445)	145 to 160
Viscosity Index	(ASTM D 567)	90 Min.
Color	(ASTM D 155)	2.0 Max.
Flash (O.C.)	(ASTM D 92)	370°F Min.
Fire (O.C.)	(ASTM D 92)	420°F Min.
Neutralization No. (Mg. KOH per Gm. Oil)	(ASTM D 664)	0.2 Max.
Pour Point	(ASTM D 97)	20°F Max.
Rust Test	(ASTM D 665-Proc."A")	Pass
Oxidation Test	(ASTM D 943)	1000 Hrs. Min.

Results After Heat Test

Loss on Evaporation		0.3% Max.
Color	(ASTM D 155)	2 Max. Increase
Neutralization No	(ASTM D 664)	0.03 Max. Increase
Precipitate or Sludge		None
Condition of Steel Rod		Satisfactory
Condition of Copper Rod		Slight Discoloration

HEAT TEST PROCEDURE:

Place clean polished pieces of copper and steel rods (0.25" dia. x 3.0") in a 100 cc Griffin beaker containing a weighed amount of oil sample, about 35 to 40 grams. Put beaker and contents in an electric drying oven for 72 hours, maintaining a temperature of 210° to 220°F.

METHOD OF TEST:

The latest ASTM Standards are followed in making all tests with the exception of the heat test. This test is made to determine the evaporation loss, change in color and neutralization number, precipitate or sludge formation and the effect of the oil on steel and copper.

FIELD TEST REQUIREMENTS:

This lubricant must have all of the general qualities and properties required to insure its satisfactory performance as a machine tool lubricant and hydraulic medium, when it is applied at a semi-annual frequency and used under conditions consistent with good machine tool practice.

Approved Products

SUPPLIER	PRODUCT NAME
American Oil Co. (Standard Oil Co.— Div. of American Oil Co.)	American Industrial Oil No. 15
British-American Oil Co., Ltd.	Britex R & O Oil 44
Canfield Oil Co.	Canvis 43
Cities Service Oil Co.	Pacemaker No. 1
Cities Service Oil Co.	Pacemaker No. 150-T
Crescent Oil Co., Inc.	Clingolene SP-150
D-X Sunray Oil Co.	DX-Cherokee Oil "L" (R & O)
Fiske Refining Co.	Lubriplate Hydraulic Oil HO-OC
Gulf Oil Corp.	Gulf Harmony 44 & Gulfcrest 44
Humble Oil & Refining Co.	Nuto 42
Midwest Oil Co.	Ace-Lube Light
Pennzoil Co., The (Calif.)	Zoil Hydraulic Oil Light
Pennzoil Co., The (Penn.)	Turbine Oil Light
Pure Oil Co.	Puropale RX Light
Purfina S.A.	Purfina Hydran 125/31
Henry E. Sanson and Sons, Inc.	No-Gum Hydraulic Oil Light "H"
Shell Oil Co.	Tellus 27*
Socony-Mobil Oil Co.	D.T.E. Light
Standard Oil Co. (Calif.)	Chevron OC Turbine Oil 9
Standard Oil Co. (Ohio)	Sohivis 43
Sun Oil Co.	Sunvis 916
Texaco Inc.	Regal Oil "A" (R & O)
Tidewater Assoc. Oil Co.	Tycol Aturbrio 50
Valvoline Oil Co.	Turbine Oil No. 1

**Does not meet specification limits for viscosity. Shell Oil Co. refinery viscosity range is 150-170 SUS at 100°F, with a typical value of 153-159 SUS at 100°F. (Page 4).*

Purchase Specifications, concluded.

MARKING:

All shipments shall be made in clean, sealed containers clearly marked with the purchase order number, name of the lubricant, and grade identification number.

REJECTION:

All material which does not meet these specifications will be subject to rejection.

SPECIFICATION

P-45

Light Spindle Oil.

Purchase Specifications

Supersedes: P-46.

This specification covers a high quality rust and oxidation inhibited oil to be used in grinder spindle bearings.

CHEMICAL AND PHYSICAL PROPERTIES:

A.P.I. Gravity at 60°F	(ASTM D 287)	28.5 to 32.5
Viscosity (SUS at 100°F)	(ASTM D 445)	100 to 115
Viscosity Index	(ASTM D 567)	90 Min.
Color	(ASTM D 155)	2 Max.
Flash (O.C.)	(ASTM D 92)	360°F Min.
Fire (O.C.)	(ASTM D 92)	410°F Min.
Neutralization No. (Mg. KOH per Gm Oil)	(ASTM D 664)	0.15 Max.
Rust Test	(ASTM D 665)	Pass
Oxidation Test	(ASTM D 943)	1000 Hrs. Min.

Results After Heat Test

Loss on Evaporation		0.3% Max.
Color	(ASTM D 155)	2 Max. Increase
Neutralization No.	(ASTM D 664)	0.03 Max.
Precipitate or Sludge		None
Condition of Steel Rod		Satisfactory
Condition of Copper Rod		Slight Discoloration

HEAT TEST PROCEDURE:

Place clean polished pieces of copper and steel rods (0.25" dia. x 3.0") in a 100 cc Griffin beaker containing a weighed amount of oil sample, about 35 to 40 grams. Put beaker and contents in an electric drying oven for 72 hours, maintaining a temperature of 210° to 220°F.

METHOD OF TEST:

The latest ASTM Standards are followed in making all tests with the exception of the heat test. This test is made to determine the evaporation loss, change in color and neutralization number, precipitate or sludge formation and the effect of the oil on steel and copper.

FIELD TEST REQUIREMENTS:

This lubricant must have all of the general qualities and properties required to insure its satisfactory performance as a spindle lubricant when used under conditions consistent with good machine tool practice.

SPECIFICATION

P-45

Approved Products

SUPPLIER	PRODUCT NAME
American Oil Co. (Standard Oil Co.— Div. of American Oil Co.)	American Spindle Oil C
Canfield Oil Co.	Canspin 100
Cities Service Oil Co.	Pacemaker No. 0
Esso Standard	Spinesso 38
Gulf Oil Corp.	Gulf Harmony 41
Humble Oil & Refining Co.	Spinesstic 38
Midwest Oil Co.	Ace-Lube-0
Shell Oil Co.	Tellus 23*
Socony-Mobil Oil Co.	Velocite 10
Standard Oil Co. (Ohio)	Sohispin 100
Sun Oil Co.	Sunvis 11
Tidewater Assoc. Oil Co.	Tycol Alweave 4

**Does not meet specification limits for viscosity. Shell Oil Co. refinery viscosity range is 110-130 SUS at 100°F with a typical value of 127 SUS at 100°F. (Page 6).*

Purchase Specifications, concluded.

MARKING:

All shipments shall be made in clean, sealed containers clearly marked with the purchase order number, name of the lubricant, and grade identification number.

REJECTION:

All material which does not meet these specifications will be subject to rejection.

SPECIFICATION

P-47

Medium-Heavy Way Oil.

Purchase Specifications

Supersedes: P-52.

This specification covers a compounded medium-heavy oil for machine tool slideways. A non-corrosive additive is to be used to provide anti stick-slip characteristics. A tacky additive is used to provide the required adhesive properties.

CHEMICAL AND PHYSICAL PROPERTIES:

A.P.I. Gravity (at 60°F)	(ASTM D 287)	18 to 27
Viscosity (SUS at 100°F)	(ASTM D 445)	300 to 350
Color	(ASTM D 155)	8 Max.
Flash (O.C.)	(ASTM D 92)	330°F Min.
Fire (O.C.)	(ASTM D 92)	360°F Min.
*Neutralization No. (Mg. KOH per Gm. Oil)	(ASTM D 664)	1.7 Max.
Pour Point	(ASTM D 97)	15°F Max.

Results After Heat Test

Loss on Evaporation	1.0% Max.
Precipitate or Sludge	None
Condition of Steel Rod	Satisfactory
Condition of Copper Rod	Light Brown Stain

*This value subject to negotiation with individual supplier.

STICK-SLIP TEST:

This oil must pass the CMMCo. stick-slip test, i.e., the ratio of the coefficients of static friction to kinetic friction must not exceed .90.

HEAT TEST PROCEDURE:

Place clean polished pieces of copper and steel rods (0.25" dia. x 3.0") in a 100 cc Griffin beaker containing a weighed amount of oil sample, about 35 to 40 grams. Put beaker and contents in an electric drying oven for 24 hours, maintaining a temperature of 210° to 220°F.

METHOD OF TEST:

The latest ASTM Standards are followed in making all tests with the exception of the heat and stick-slip tests. The heat test is made to determine the evaporation loss, precipitate or sludge formation and the effect of the oil on steel and copper.

FIELD TEST REQUIREMENTS:

This lubricant must have all of the general qualities and properties required to insure its satisfactory performance as a machine tool slideway lubricant when it is applied at a quarterly frequency and used under conditions consistent with good machine tool practice.

SPECIFICATION

P-47

Approved Products

SUPPLIER	PRODUCT NAME
American Oil Co. (Standard Oil Co.— Div. of American Oil Co.)	American Way Oil No. 31 F.T.
Canfield Oil Co.	Canway 50
Cities Service Oil Co.	Slide Rite No. 2
Gulf Oil Corp.	Gulfway 52
Humble Oil & Refining Co.	Febis K-53
Petrofina, S.A.	Fina Artac EP 37
Shell Oil Co.	Tonna 33
Socony-Mobil Oil Co.	Vactra No. 2
Standard Oil Co. (Ohio)	Sohiway 50
Sun Oil Co.	Sunoco Way Lubricant
Texaco Inc.	Way Lubricant D

Purchase Specifications, concluded.

MARKING:

All shipments shall be made in clean, sealed containers clearly marked with the purchase order number, name of the lubricant, and grade identification number.

REJECTION:

All material which does not meet these specifications will be subject to rejection.

SPECIFICATION

P-50

Heavy Way Oil.

Purchase Specifications

Supersedes: P-41.

This specification covers a compounded heavy oil for machine tool slideways. A non-corrosive additive is to be used to provide anti stick-slip characteristics. A tacky additive is used to provide the required adhesive properties.

CHEMICAL AND PHYSICAL PROPERTIES:

A.P.I. Gravity (at 60°F)	(ASTM D 287)	18 to 27
Viscosity (SUS at 100°F)	(ASTM D 445)	850 to 950
Color	(ASTM D 155)	8 Max.
Flash (O.C.)	(ASTM D 92)	350°F Min
Fire (O.C.)	(ASTM D 92)	410°F Min.
*Neutralization No. (Mg. KOH per Gm. Oil)	(ASTM D 664)	1.7 Max.

Results After Heat Test

Loss on Evaporation	1.0% Max.
Precipitate or Sludge	None
Condition of Steel Rod	Satisfactory
Condition of Copper Rod	Light Brown Stain

*This value subject to negotiation with individual supplier.

STICK-SLIP TEST:

This oil must pass the CMMCo. stick-slip test, i.e., the ratio of the coefficients of static friction to kinetic friction must not exceed .90.

HEAT TEST PROCEDURE:

Place clean polished pieces of copper and steel rods (0.25" dia. x 3.0") in a 100 cc Griffin beaker containing a weighed amount of oil sample, about 35 to 40 grams. Put beaker and contents in an electric drying oven for 24 hours maintaining a temperature of 210° to 220°F.

METHOD OF TEST:

The latest ASTM Standards are followed in making all tests with the exception of the heat and stick-slip tests. The heat test is made to determine the evaporation loss, precipitate or sludge formation and the effect of the oil on steel and copper.

FIELD TEST REQUIREMENTS:

This lubricant must have all of the general qualities and properties required to insure satisfactory performance as a machine tool slideway lubricant, when it is applied at a quarterly frequency and used under conditions of good machine tool practice.

SPECIFICATION

P-50

Approved Products

SUPPLIER	PRODUCT NAME
American Oil Co. (Standard Oil Co.— Div. of American Oil Co.)	American Way Oil No. 95
Canfield Oil Co.	Canway 90
Cities Service Oil Co.	Slide Rite No. 3
Gulf Oil Corp.	Gulfway 75
Humble Oil & Refining Co.	Febis K-73
Petrofina, S.A.	Fina Artac EP 53
Shell Oil Co.	Tonna 72
Socony-Mobil Oil Co.	Vactra No. 4
Standard Oil Co. (Ohio)	Sohiway 90
Sun Oil Co.	Sunoco Way Lubricant 90
Texaco Inc.	Way Lubricant "G"

Purchase Specifications, concluded.

MARKING:

All shipments shall be made in clean, sealed containers clearly marked with the purchase order number, name of the lubricant, and grade identification number.

REJECTION:

All material which does not meet these specifications will be subject to rejection.

SPECIFICATION

P-53

Combination Hydraulic and Way Lubricant.

Purchase Specifications

This specification covers a good quality light oil to be used in a central system for lubricating hydraulic pump units and slideways. This lubricant shall contain a non-corrosive additive that will provide anti stick-slip characteristics.

CHEMICAL AND PHYSICAL PROPERTIES:

A.P.I. Gravity (at 60°F)	(ASTM D 287)	20 to 30
Viscosity (SUS at 100°F)	(ASTM D 445)	155 to 165
Flash (O.C.)	(ASTM D 92)	315°F Min.
Fire (O.C.)	(ASTM D 92)	355°F Min.
Neutralization No. (Mg. KOH per Gm. Oil)	(ASTM D 664)	0.6 Max.
Pour Point	(ASTM D 97)	15°F Max.

Results After Heat Test

Loss on Evaporation	0.5% Max.
Precipitate or Sludge	None
Condition of Steel Rod	Satisfactory
Condition of Copper Rod	Slight Discoloration

STICK-SLIP TEST:

This oil must pass the CMMCo. stick-slip test, i.e., the ratio of the coefficients of static friction to kinetic friction must not exceed .95.

HEAT TEST PROCEDURE:

Place clean polished pieces of copper and steel rods (0.25" dia. x 3.0") in a 100 cc Griffin beaker containing a weighed amount of oil sample, about 35 to 40 grams. Put beaker and contents in an electric drying oven for 24 hours maintaining a temperature of 210° to 220°F.

METHOD OF TEST:

The latest ASTM Standards are followed in making all tests with the exception of the heat and stick-slip tests. The heat test is made to determine the evaporation loss, precipitate or sludge formation and the effect of the oil on steel and copper.

FIELD TEST REQUIREMENTS:

This lubricant must have all of the general qualities and properties required to insure its satisfactory performance as a combination hydraulic and way lubricant for machine tools when it is applied at semi-annual frequency and used under conditions consistent with good machine tool practice.

SPECIFICATION

P-53

Approved Products

SUPPLIER	PRODUCT NAME
American Oil Co. (Standard Oil Co.— Div. of American Oil Co.)	American Way Oil No. 15-H
Cities Service Oil Co.	Slide Rite No. 1
Petrofina, S.A.	Fina Hydran Cin 31
Pure Oil Co.	Blend 53-217
Shell Oil Co.	Tonna No. 27
Socony-Mobil Oil Co.	Vactra No. 1
Sun Oil Co.	Lubeway Oil 150

Purchase Specifications, concluded.

MARKING:

All shipments shall be made in clean, sealed containers clearly marked with the purchase order number, name of the lubricant, and grade identification number.

REJECTION:

All material which does not meet these specifications will be subject to rejection.

SPECIFICATION

P-54

Medium-Heavy Hydraulic Oil.

Purchase Specifications

Supersedes: P-52.

This specification covers a good quality rust and oxidation inhibited oil for use in hydraulic systems and general lubricating service.

CHEMICAL AND PHYSICAL PROPERTIES:

A.P.I. Gravity at 60°F	(ASTM D 287)	29 to 31
Viscosity (SUS at 100°F)	(ASTM D 445)	300 to 320
Viscosity Index	(ASTM D 567)	90 Min.
Color	(ASTM D 155)	3.0 Max.
Flash (O.C.)	(ASTM D 92)	385°F Min.
Fire (O.C.)	(ASTM D 92)	425°F Min.
Neutralization No. (Mg. KOH per Gm. Oil)	(ASTM D 664)	0.2 Max.
Rust Test	(ASTM D 665-Proc. "A")	Pass
Oxidation Test	(ASTM D 943)	1000 Hrs. Min.

Results After Heat Test

Loss on Evaporation		0.5% Max.
Color	(ASTM D 155)	2 Max. Increase
Neutralization No.	(ASTM D 664)	0.03 Max. Increase
Precipitate or Sludge		None
Condition of Steel Rod		Satisfactory
Condition of Copper Rod		Slight Discoloration

HEAT TEST PROCEDURE:

Place clean polished pieces of copper and steel rods (0.25" dia. x 3.0") in a 100 cc Griffin beaker containing a weighed amount of oil sample, about 35 to 40 grams. Put beaker and contents in an electric drying oven for 72 hours maintaining a temperature of 210° to 220°F.

METHOD OF TEST:

The latest ASTM Standards are followed in making all tests with the exception of the heat test. This test is made to determine the evaporation loss, change in color and neutralization number, precipitate or sludge formation and the effect of the oil on steel and copper.

FIELD TEST REQUIREMENTS:

This lubricant must have all of the general qualities and properties required to insure its satisfactory performance as a machine tool lubricant and hydraulic medium when applied at a semi-annual frequency and used under conditions consistent with good machine tool practice.

SPECIFICATION

P-54

Approved Products

SUPPLIER	PRODUCT NAME
American Oil Co. (Standard Oil Co.— Div. of American Oil Co.)	American Industrial Oil No. 31
British-American Oil Co., Ltd.	Britex R & O 55
Canfield Oil Co.	Canvis 52
Cities Service Oil Co.	Pacemaker No. 3
Cities Service Oil Co.	Pacemaker No. 300-T
Crescent Oil Co. Inc.	Clingolene SP-300
D-X Sunray Oil Co.	DX-Cherokee Oil "H" (R & O)
Gulf Oil Corp.	Gulf Harmony 53
Humble Oil & Refining Co.	Nuto 50
Midwest Oil Co.	Ace-Lube Heavy Medium
Pennzoil Co., The (Calif.)	Zoil Hydraulic Oil Heavy
Pennzoil Co , The (Penn.)	Turbine Oil Heavy-Medium
Pure Oil Co.	Puropale RX Heavy-Medium
Pure Oil Co.	Puroturbine, Heavy-Medium
Henry E. Sanson and Sons, Inc.	No-Gum Hydraulic Oil 20-H
Shell Oil Co.	Tellus 33
Socony-Mobil Oil Co.	D.T.E. Heavy-Medium
Standard Oil Co. (Calif.)	Chevron O.C. Turbine Oil 15
Standard Oil Co. (Ohio)	Sohivis 52
Sun Oil Co.	Sunvis 931
Texaco Inc.	Regal Oil PC (R & O)
Tidewater Assoc. Oil Co.	Tycol Aturbrio 60

Purchase Specifications, concluded.

MARKING:

All shipments shall be made in clean, sealed containers clearly marked with the purchase order number, name of the lubricant, and grade identification number.

REJECTION:

All material which does not meet these specifications will be subject to rejection.

SPECIFICATION

P-55

Medium General Purpose Oil.

Purchase Specifications

Supersedes: P-31.

This specification covers a good quality rust and oxidation inhibited oil to be used for both hydraulic and lubricating service such as gear boxes, one-shot systems, oil cups and general shop use.

CHEMICAL AND PHYSICAL PROPERTIES:

A.P.I. Gravity (at 60°F)	(ASTM D 287)	28 to 31.5
Viscosity (SUS at 100°F)	(ASTM D 445)	200 to 220
Viscosity Index	(ASTM D 567)	90 Min.
Color	(ASTM D 155)	3.0 Max.
Flash (O.C.)	(ASTM D 92)	385°F Min.
Fire (O.C.)	(ASTM D 92)	425°F Min.
Neutralization No. (Mg. KOH per Gm. Oil)	(ASTM D 664)	0.20 Max.
Rust Test	(ASTM D 665-Proc. "A")	Pass
Oxidation Test	(ASTM D 943)	1000 Hrs. Min.

Results After Heat Test

Loss on Evaporation		0.5% Max.
Color	(ASTM D 155)	2 Max. Increase
Neutralization No.	(ASTM D 664)	0.03 Max. Increase
Precipitate or Sludge		None
Condition of Steel Rod		Satisfactory
Condition of Copper Rod		Slight Discoloration

HEAT TEST PROCEDURE:

Place clean polished pieces of copper and steel rods (0.25" dia. x 3.0") in a 100 cc Griffin beaker containing a weighed amount of oil sample, about 35 to 40 grams. Put beaker and contents in an electric drying oven for 72 hours maintaining a temperature of 210° to 220°F.

METHOD OF TEST:

The latest ASTM Standards are followed in making all tests with the exception of the heat test. This test is made to determine the evaporation loss, change in color and neutralization number, precipitate or sludge formation and the effect of the oil on steel and copper.

FIELD TEST REQUIREMENTS:

This lubricant must have all of the general qualities and properties required to insure its satisfactory performance as a general purpose machine tool lubricant and hydraulic fluid when it is applied at a semi-annual frequency and used under conditions consistent with good machine tool practice.

SPECIFICATION

P-55

Approved Products

SUPPLIER	PRODUCT NAME
American Oil Co. (Standard Oil Co.— Div. of American Oil Co.)	American Industrial Oil No. 21
British American Oil Co., Ltd.	Britex R & O 48
Canfield Oil Co.	Canvis 47
Cities Service Oil Co.	Pacemaker No. 2
Cities Service Oil Co.	Pacemaker No. 200-T
D-X Sunray Oil Co.	DX-Cherokee Oil "M" (R & O)
Esso Standard	Teresso 47
Gulf Oil Corp.	Gulf Harmony 47
Humble Oil & Refining Co.	Teresstic 47
Midwest Oil Company	Ace-Lube Medium
Pennzoil Co., The (Calif.)	Zoil Hydraulic Oil Medium
Pennzoil Co., The (Penn.)	Pennzoil Turbine Oil Medium
Pure Oil Co.	Puropale RX Medium
Shell Oil Co.	Tellus 29*
Socony-Mobil Oil Co.	D.T.E. Medium
Standard Oil Co. (Calif.)	Chevron O.C. Turbine Oil 11
Standard Oil Co. (Ohio)	Sohivis 47
Sun Oil Co.	Sunvis 921
Texaco Inc.	Regal Oil "B" (R & O)
Tidewater Assoc. Oil Co.	Tycol Aturbrio 58

**Does not meet specification limits for viscosity. Shell Oil Co. refinery viscosity range is 225-245 SUS at 100°F with a typical value of 235 SUS at 100°F.* *(Page 16).*

Purchase Specifications, concluded.

MARKING:

All shipments shall be made in clean, sealed containers clearly marked with the purchase order number, name of the lubricant, and grade identification number.

REJECTION:

All material which does not meet these specifications will be subject to rejection.

SPECIFICATION

P-57

Heavy Hydraulic or General Purpose Oil.

Purchase Specifications

This specification covers a premium quality rust and oxidation inhibited oil. This lubricant is to be used where the hydraulic or general application requires a product having extremely good stability.

CHEMICAL AND PHYSICAL PROPERTIES:

A.P.I. Gravity (at 60°F)	(ASTM D 287)	27 to 30
Viscosity (SUS at 100°F)	(ASTM D 445)	600 to 800
Viscosity Index	(ASTM D 567)	90 Min.
Color	(ASTM D 155)	5 Max.
Flash (O.C.)	(ASTM D 92)	430°F Min.
Fire (O.C.)	(ASTM D 92)	475°F Min.
Neutralization No (Mg. KOH per Gm. Oil)	(ASTM D 664)	0.2 Max.
Pour Point	(ASTM D 97)	25°F Max.
Rust Test	(ASTM D 665 Proc. "A")	Pass
Oxidation Test	(ASTM D 943)	1000 Hrs. Min.

Results After Heat Test

Loss on Evaporation		0.5% Max.
Color	(ASTM D 155-45)	2 Max. Increase
Neutralization No.	(ASTM D 664-54)	0.03 Max. Increase
Precipitate or Sludge		None
Condition of Steel Rod		Satisfactory
Condition of Copper Rod		Slight Discoloration

HEAT TEST PROCEDURE:

Place clean polished pieces of copper and steel rods (0.25" dia. x 3.0") in a 100 cc Griffin beaker containing a weighed amount of oil sample, about 35 to 40 grams. Put beaker and contents in an electric drying oven for 72 hours maintaining a temperature of 210° to 220°F.

METHOD OF TEST:

The latest ASTM Standards are followed in making all tests with the exception of the heat test. This test is made to determine the evaporation loss, change in color, neutralization number, precipitate or sludge formation and the effect of the oil on steel and copper.

FIELD TEST REQUIREMENTS:

This lubricant must have all of the general qualities and properties required to insure its satisfactory performance as a machine tool lubricant and hydraulic medium when it is applied at a semi-annual frequency and used under conditions consistent with good machine tool practice.

SPECIFICATION

P-57

Approved Products

SUPPLIER	PRODUCT NAME
American Oil Co. (Standard Oil Co.— Div. of American Oil Co.)	American Industrial Oil No. 75
British-American Oil Co., Ltd.	Britex R & O 77
Canfield Oil Co.	Canvis 78
Cities Service Oil Co.	Pacemaker No. 6
Crescent Oil Co., Inc.	Clingolene SP-650
Esso Standard	Teresso 80
Gulf Oil Corp.	Gulf Harmony 76
Humble Oil & Refining Co.	Teresstic 80
Midwest Oil Co.	Ace-Lube CC
Pure Oil Co.	Puropale RX Special Heavy
Shell Oil Co.	Tellus 69
Socony-Mobil Oil Co.	D.T.E. Extra Heavy
Standard Oil Co. (Ohio)	Sohivis 78
Sun Oil Co.	Sunvis 975
Texaco Inc.	Regal Oil F (R & O)
Tidewater Assoc. Oil Co.	Tycol Aturbrio 71

Purchase Specifications, concluded.

MARKING:

All shipments shall be made in clean, sealed containers clearly marked with the purchase order number, name of the lubricant, and grade identification number.

REJECTION:

All material which does not meet these specifications will be subject to rejection.

SPECIFICATION

P-59

Heavy E. P. Gear Lubricant.

Purchase Specifications

This specification covers a good quality, heavy, lead naphthenate compounded extreme pressure oil. This lubricant is to be used in worm gear drives and other applications where an extreme pressure product is required.

CHEMICAL AND PHYSICAL PROPERTIES:

A.P.I. Gravity (at 60°F)	(ASTM D 287)	16 to 26
Viscosity (SUS at 100°F)	(ASTM D 445)	900 to 1500
Flash (O.C.)	(ASTM D 92)	360°F Min.
Fire (O.C.)	(ASTM D 92)	410°F Min.
Pour Point	(ASTM D 97)	15°F
Neutralization No. (Mg. KOH per Gm. of Oil)	(ASTM D 664)	3.0 Max.
Timken Rating (lbs. loading)		40 Min.

Results After Heat Test

Loss on Evaporation	1.0% Max.
Precipitate or Sludge	None
Condition of Steel Rod	Satisfactory
Condition of Copper Rod	Light Brown Discoloration Max.

HEAT TEST PROCEDURE:

Place clean polished pieces of copper and steel rods (0.25" dia. x 3.0") in a 100 cc Griffin beaker containing a weighed amount of oil sample, about 35 to 40 grams. Put beaker and contents in an electric drying oven for 24 hours, maintaining a temperature of 210° to 220°F.

METHOD OF TEST:

The latest ASTM Standards are followed in making all tests with the exception of the heat test. This test is made to determine the evaporation loss, precipitate or sludge formation, and the effect of the oil on steel and copper.

FIELD TEST REQUIREMENTS:

This lubricant must have all of the general qualities and properties to insure its satisfactory performance as a machine tool worm gear lubricant when it is applied at a semi-annual frequency and used under conditions consistent with good machine tool practice.

SPECIFICATION

Approved Products

P-59

SUPPLIER	PRODUCT NAME
Canfield Oil Co.	Factolube 3
Cities Service Oil Co.	Trojan Compound L-2
Gulf Oil Corp.	Gulf E.P. Lubricant 95
Humble Oil & Refining Co.	Pen-O-Led E.P. 3
Pure Oil Co.	Poco PB No. 8
Shell Oil Co.	Macoma 72
Socony-Mobil Oil Co.	Compound DD
Standard Oil Co. (Ohio)	Factolube 3
Sun Oil Co.	Sunep 70
Texaco Inc.	Meropa Lubricant No. 3

Purchase Specifications, concluded.

MARKING:

All shipments shall be made in clean, sealed containers clearly marked with the purchase order number, name of the lubricant, and grade identification number.

REJECTION:

All material which does not meet these specifications will be subject to rejection.

SPECIFICATION

P-62

Very Light Spindle Lubricant.

Purchase Specifications

This specification covers a very light, high quality, rust and oxidation inhibited oil. This lubricant is to be used for high speed, light load applications or where heat due to fluid friction causes an undesirable increase in temperature when a more viscous spindle oil is used.

CHEMICAL AND PHYSICAL PROPERTIES:

A.P.I. Gravity (at 60°F)	(ASTM D 287)	26 to 36
Viscosity (SUS at 100°F)	(ASTM D 445)	50 to 65
Color	(ASTM D 155)	3 Max.
Flash (O.C.)	(ASTM D 92)	Min. 275°F
Fire (O.C.)	(ASTM D 92)	Min. 300°F
Neutralization No. (Mg. KOH per Gm. Oil)	(ASTM D 664)	0.15 Max.
Rust Test	(ASTM D 665)	Pass
Oxidation Test	(ASTM D 943)	1000 Hrs. Min.

Results After Heat Test

Loss on Evaporation		1.5% Max.
Color	(ASTM D 155)	2 Max. Increase
Neutralization No.	(ASTM D 664)	0.03 Max. Increase
Precipitate or Sludge		None
Condition of Steel Rod		Satisfactory
Condition of Copper Rod		Slight Discoloration

HEAT TEST PROCEDURE:

Place clean polished pieces of copper and steel rods (0.25" dia. x 3.0") in a 100 cc Griffin beaker containing a weighed amount of oil sample, about 35 to 40 grams. Put beaker and contents in an electric drying oven for 72 hours, maintaining a temperature of 210° to 220°F.

METHOD OF TEST:

The latest ASTM Standards are followed in making all tests with the exception of the heat test. This test is made to determine the evaporation loss, change in color and neutralization number, precipitate or sludge formation and the effect of the oil on steel and copper.

FIELD TEST REQUIREMENTS:

This lubricant must have all of the general qualities and properties required to insure its satisfactory performance as a spindle bearing lubricant when used under conditions consistent with good machine tool practice.

SPECIFICATION

P-62

Approved Products

SUPPLIER	PRODUCT NAME
American Oil Co. (Standard Oil Co.— Div. of American Oil Co.)	American Spindle Oil "A"
British-American Oil Co., Ltd.	Britex R & O 34
Canfield Oil Co.	Canspin 60
Esso Standard	Spinesso 34
Humble Oil & Refining Co.	Spinesstic 34
Socony-Mobil Oil Co.	Velocite Oil 6
Standard Oil Co. (Ohio)	Sohispin 60
Texaco Inc.	Spintex Oil 60

Purchase Specifications, concluded.

MARKING:

All shipments shall be made in clean, sealed containers clearly marked with the purchase order number, name of the lubricant, and grade identification number.

REJECTION:

All material which does not meet these specifications will be subject to rejection.

SPECIFICATION

P-63

Medium E. P. Gear Lubricant.

Purchase Specifications

This specification covers a good quality, medium, lead naphthenate compounded extreme pressure oil. This lubricant is to be used on elevating screws, worm drive units and other applications where an extreme pressure free flow back lubricant is needed.

This lubricant has excellent water repellent characteristics. It should be used as a slideway lubricant for bearings exposed to water washing action that do not operate under conditions that require the use of a product that contains anti stick-slip characteristics.

CHEMICAL AND PHYSICAL PROPERTIES:

A.P.I. Gravity (at 60°F)	(ASTM D 287)	18.0 to 23.0
Viscosity (SUS at 100°F)	(ASTM D 445)	300 to 360
Flash (O.C.)	(ASTM D 92)	340°F Min.
Fire (O.C.)	(ASTM D 92)	400°F Min.
Pour Point	(ASTM D 97)	10°F Max.
Neutralization No. (Mg. KOH per Gm. Oil)	(ASTM D 664)	3.0 Max.
Timken Rating (lbs. loading)		40 Min.

Results After Heat Test

Loss on Evaporation	1.0% Max.
Precipitate or Sludge	None
Condition of Steel Rod	Satisfactory
Condition of Copper Rod	Light Brown Discoloration

HEAT TEST PROCEDURE:

Place clean polished pieces of copper and steel rods (0.25" dia. x 3.0") in a 100 cc Griffin beaker containing a weighed amount of oil sample, about 35 to 40 grams. Put beaker and contents in an electric drying oven for 24 hours, maintaining a temperature of 210° to 220°F.

METHOD OF TEST:

The latest ASTM Standards are followed in making all tests with the exception of the heat test. This test is made to determine the evaporation loss, precipitate or sludge formation, and the effect of the oil on steel and copper.

FIELD TEST REQUIREMENTS:

This lubricant must have all of the general qualities and properties required to insure its satisfactory performance as a machine tool elevating screw and worm gear drive unit lubricant or other established application when it is applied at a semi-annual frequency and used under conditions of good machine tool practice.

SPECIFICATION

P-63

Approved Products

SUPPLIER	PRODUCT NAME
Canfield Oil Co.	Factolube 1
Gulf Oil Corp.	Gulf E.P. Lubricant 55
Humble Oil & Refining Co.	Pen-O-Led E.P. 1
Pure Oil Co.	Poco PB No. 5
Shell Oil Co.	Macoma 33
Socony-Mobil Oil Co.	Compound "AA"
Standard Oil Co. (Ohio)	Factolube 1
Sun Oil Co.	Sunep 50
Texaco Inc.	Meropa Lubricant 1

Purchase Specifications, concluded.

MARKING:

All shipments shall be made in clean, sealed containers clearly marked with the purchase order number, name of the lubricant, and grade identification number.

REJECTION:

All material which does not meet these specifications will be subject to rejection.

SPECIFICATION

P-64

Lithium Base General Purpose Grease.

Purchase Specifications

Supersedes: P-37 and P-43.

This specification covers a premium quality, general purpose, lithium base grease (N.L.G.I. No. 2) for cup service, gear boxes, ball and roller type bearings.

CHEMICAL AND PHYSICAL PROPERTIES:

Penetration (unworked) at 77°F	(ASTM D 217)	265-295 Dec. mm.
Penetration (10,000 strokes) at 77°F.	(ASTM D 217)	15% Max. increase
Dropping Point (°F)	(ASTM D 566)	350 Minimum
Viscosity of Oil (SUS at 100°F)	(ASTM D 445)	500-750
Lithium Soap (12 hydroxy stearate) %		8 Minimum
Water		Traces
Norma Hoffman Bomb Test (lbs. drop per 100 hrs.)		8 Maximum

Results After Heat Test

Condition of Steel Rod	Satisfactory
Condition of Copper Rod	Slight Discoloration

HEAT TEST PROCEDURE:

Place clean polished pieces of copper and steel rods (0.25" dia. x 3.0") in a 100 cc Griffin beaker containing a weighed amount of grease sample (approximately 40 grams). Place beaker and contents in an electric drying oven for 24 hours, maintaining a temperature of 200° to 220°F.

FILLERS:

This grease shall not contain fillers such as resin, resinous oils, soapstone, powdered formica, asbestos, clay, or other types of grit.

METHOD OF TEST:

The latest ASTM Standards are followed in making all tests with the exception of the heat test. This test is made to determine the effect of the grease on steel and copper.

FIELD TEST REQUIREMENTS:

This lubricant must have all the general qualities and properties required to insure its satisfactory performance as a lubricant when used under conditions consistent with good machine tool practice.

SPECIFICATION

P-64

Approved Products

SUPPLIER	PRODUCT NAME
American Oil Co. (Standard Oil Co.— Div. of American Oil Co.)	Amolith Grease No. 2
British-American Oil Co., Ltd.	Duralube Heavy
Canfield Oil Co.	Vari-Lith 2
Cities Service Oil Co.	Trojan H-2
Gulf Oil Corp.	Gulfcrown Grease 2
Midwest Oil Co.	Ace-Lube Lith-HD
N. Y. and N. J. Lubricant Co.	G-60
Pure Oil Co.	Poco H. T. E. P. Grease 2
Shell Oil Co.	Alvania 2
Socony-Mobil Oil Co.	Mobilux 2
Standard Oil Co. (Ohio)	Sohitran 2
Sun Oil Co.	Prestige 42
Texaco Inc.	Multifak 2

Purchase Specifications, concluded.

MARKING:

All shipments shall be made in clean, sealed containers clearly marked with the purchase order number, name of the lubricant, and grade identification number.

REJECTION:

All material which does not meet these specifications will be subject to rejection.

SPECIFICATION

P-65

Extra Light Spindle Oil.

Purchase Specifications

This specification covers a high quality extra light oil to be used in high speed grinder spindle bearings.

CHEMICAL AND PHYSICAL PROPERTIES:

A.P.I. Gravity (at 60°F)	(ASTM D 287)	33 to 45
Viscosity (SUS at 100°F)	(ASTM D 445)	33 to 38
Color	(ASTM D 155)	1 Max.
Flash (O.C.)	(ASTM D 92)	175°F Min.
Fire (O.C.)	(ASTM D 92)	200°F Min.
Neutralization No. (Mg. KOH per Gm. Oil)	(ASTM D 664)	0.15 Max.
Rust Test	(ASTM D 665-Proc "A")	Pass
Pour Point	(ASTM D 97)	−15°F

Results After Heat Test

Color	(ASTM D 155)	2 Max. Increase
Neutralization No.	(ASTM D 664)	0.03 Max. Increase
Precipitate or Sludge		None
Condition of Steel Rod		Satisfactory
Condition of Copper Rod		Slight Discoloration

HEAT TEST PROCEDURE:

Place clean polished pieces of copper and steel rods (0.25" dia. x 3.0") in a 100 cc Griffin beaker containing a weighed amount of oil sample, about 35 to 40 grams. Put beaker and contents in an electric drying oven for 72 hours, maintaining a temperature of 210° to 220°F.

METHOD OF TEST:

The latest ASTM Standards are followed in making all tests with the exception of the heat test. This test is made to determine the evaporation loss, change in color and neutralization number, precipitate or sludge formation and the effect of the oil on steel and copper.

FIELD TEST REQUIREMENTS:

This lubricant must have all of the general qualities and properties required to insure its satisfactory performance as a lubricant for very high-speed lightly-loaded spindle bearings when used under conditions consistent with good machine tool practice.

SPECIFICATION

P-65

Approved Products

SUPPLIER	PRODUCT NAME
Socony-Mobil Oil Co.	Velocite 3

Purchase Specifications, concluded.

MARKING:

All shipments shall be made in clean, sealed containers clearly marked with the purchase order number, name of the lubricant, and grade identification number.

REJECTION:

All material which does not meet these specifications will be subject to rejection.

SAMPLE OIL PLATE

IMPORTANT

FOR SPINDLE LUBRICATION
USE HIGH QUALITY EXTRA LIGHT
OIL. VISCOSITY 50-65 S.U.S.
AT 100° F.
CHANGE OIL EVERY 6 TO 8 WEEKS

SEE LUBRICATION MANUAL FOR
RECOMMENDED SUPPLIERS
SPECIFICATION CMMCo. No. P-62

CMMCo. SPEC. NO.	VISCOSITY RANGE 100°F SUS	TYPE OF LUBRICANT	GENERAL DESCRIPTION AND APPLICATION	PAGE NO.
P-35	2000–2500	Gear Lubricant	Gear lubricant for worm gears or other gearing that requires an extra heavy lubricant.	2–3
P-38	145–160	Light Hydraulic Oil	A high quality rust and oxidation inhibited oil for use in hydraulic units and as a general purpose lubricant where a light oil is required to reduce temperature due to fluid friction.	4–5
P-45	100–115	Light Spindle Oil	A high quality rust and oxidation inhibited light oil for use in grinder spindle bearings.	6–7
P-47	300–350	Medium Way Oil	A specially compounded medium oil for lubrication of light to medium loaded slideways that operate in the stick-slip range.	8–9
P-50	850–950	Heavy Way Oil	A specially compounded heavy oil for lubrication of medium to heavily loaded slideways that operate in the stick-slip range	10–11
P-53	155–165	Combination Way—Hydraulic	A good quality light oil for use in central systems for lubricating hydraulic pump units and slideways that operate in the stick-slip range.	12–13
P-54	300–320	Medium-Heavy Hydraulic Oil	A medium-heavy premium grade rust and oxidation inhibited oil for hydraulic units and as a general purpose lubricant.	14–15
P-55	200–220	General Purpose	A good quality rust and oxidation inhibited medium oil for use in hydraulic and general lubricating service such as gear boxes, one-shot systems, oil cups and general shop use.	16–17

CMMCo. SPEC. NO.	VISCOSITY RANGE 100°F SUS	TYPE OF LUBRICANT	GENERAL DESCRIPTION AND APPLICATION	PAGE NO.
P-57	600–800	Heavy Hydraulic and General Purpose	A heavy, premium quality rust and oxidation inhibited oil for use where the hydraulic unit or general application requires a product having extremely good stability.	18–19
P-59	900–1500	Heavy EP Gear Lubricant	A good quality, heavy, lead naphthenate compounded extreme pressure oil. This lubricant is to be used in worm gear drives and other applications when an extreme pressure product is required.	20–21
P-62	50–65	Very Light Spindle Lubricant	A very light, high quality rust and oxidation inhibited oil. This lubricant is to be used for high speed light load applications or where heat due to fluid friction causes an undesirable increase in temperature when a more viscous spindle oil is used.	22–23
P-63	300–360	Medium EP Gear Lubricant	A good quality, medium, lead naphthenate compounded extreme pressure oil. This lubricant is to be used on elevating screws, work drive units and other applications when extreme pressure free flow-back lubricant is needed. This lubricant has excellent water repellent characteristics. It is recommended for use as a slideway lubricant for bearings exposed to water washing action that do not operate under conditions that require the use of a product that contains anti stick-slip properties.	24–25
P-64	NLGI-2	General Purpose	A premium quality general purpose No. 2 lithium base grease for cup service, gear boxes, ball and roller type bearings.	26–27
P-65	33–38	Extra Light Spindle Oil	A high quality, extra light oil for use in high speed grinder spindle bearings.	28–29

NOTES



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