ORGANIC CHEMICALS DIVISION RESEARCH Report

REPORT NO. P-1577 JOB NO. 2-21-760.01-1113115

TENTATIVE PROCESS
FOR
MCS 1041 (PYDRAUL A-200A)

DATE - August 31, 1970 WRITTEN BY - P. D. Fowlkes

Monsanto

ST. LOUIS, MISSOURI

DSW 620251

STLCOPCB4094278

1) MCS 1041 (Pydraul A-200A) a fire resistant Process A Fluid
Hydraulic fluid

2) Aroclor 1242 used for blending MCS1041

SAFETY REVIEW COMMITTEE
APPROVED BY K W Radue 9/8/70
9/8/70
9/14/70

MONSANTO COMPANY
Organic Chemicals Division
St. Louis Research Department

3) Aroclor 5432 used for blending MCS 1041

4) Santicizer 711 used for blending MCS 1041

St. Louis Research Report No. P-1577

REFERENCE BOOK
Not To Be Taken From Library

TENTATIVE PROCESS

FOR

MCS 1041 (PYDRAUL A-200A)

Job No. 2-21-760.01-1113115

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Date: August 31, 1970 Written by: P. D. Fowlkes

Work done by: P. D. Fowlkes
P. F. Heimsch
L. F. Smith
L. R. Stark

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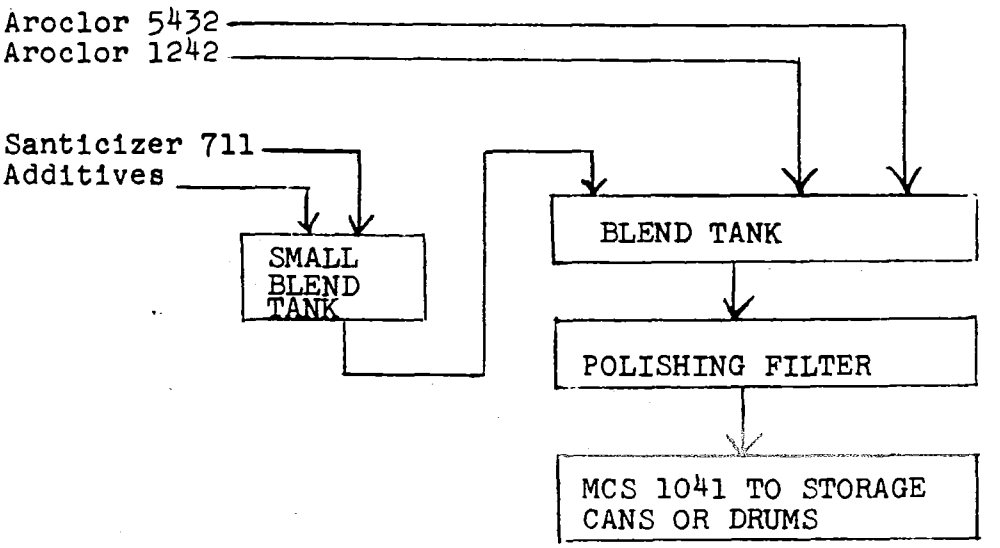
INTRODUCTION

MCS 1041 (Pydraul A-200A)is a fire resistant hydraulic fluid. It was developed to remove Aroclor 1248 from the Pydraul A-200 blend.

SYNOPSIS OF PROCESS

MCS 1041 is prepared by blending Aroclors 1242 and 5432, Santicizer 711 and additives. The blended product is filtered to remove any stray debris from raw materials or blending and then transferred to containers or storage.

FLOW SHEET



BILL OF MATERIALS

Basis, 100 lbs of Product

	Raw Material	Wt, lb
81101	Aroclor 1242	77.0
82621	Aroclor 5432	17.6
86840	Santicizer 711	5.0
51351	Santolube 70-A	0.3
60015	Tolyltriazole	0.1
31100	DC-200, 350 cs, Fluid	0.005
20640	DuPont Oil Blue A	.0010

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PROCESS IN DETAIL

The blending operation may be carried out in any suitable metal or glass-lined vessel. The materials are not corrosive and carbon steel equipment is suitable. An agitator should be provided.

The tolyltriazole is more soluble in Santicizer 711 than in Aroclor. A suggested procedure which would shorten mixing time is to blend the Santicizer 711, tolyltriazole, Santolube 70-A, dye, and DC fluid in a smaller tank for 1/2 to 1 hour at 125-150°F (50-65°C).

While the additives are dissolving, charge the Aroclor 1242 and 5432 to a clean, dry vessel. Aroclor 5432 is a resinous, sticky solid at room temperature. It may be handled easily if it is heated to 150-180°F (65-82°C). At 150°F, viscosity is 100-400 cs and at 180, 40-100 cs. Blend the Aroclors at 125-150°F (50-65°C) until the additive mixture is ready.

When the additives are all dissolved, add the contents of the smaller blending tank to the Aroclor mixture. Blend for 15-30 minutes at 125-150°F (50-65°C). Lower blending temperatures may be used if experience indicates satisfactory mixing. Heat from molten Aroclor 5432 may be sufficient to raise batch temperature. The batch is then circulated through a polishing filter. Samples are taken as required for analytical purposes. The batch may be held for possible viscosity adjustment or be sent to storage. After blending is complete, it is recommended that the temperature be reduced to 80 to 129F (26 to 49C). Prolonged exposure at higher temperatures may cause some product quality deterioration.

DISCUSSION OF IMPORTANT VARIABLES

The most important specification property of MCS 1041 is viscosity. Adjustments in the blend should be made to keep the 100°F viscosity within the required specification range.

If the 100°F viscosity is low, add Aroclor 5432. One lb of Aroclor 5432 per 100 lb of blend will increase the 100°F viscosity about 1.0 centistokes.

If the 100°F viscosity is high, add Aroclor 1242. One lb of Aroclor 1242 per 100 lb of blend will decrease the 100°F viscosity about 0.2 cs.

The quantity of dye added should be carefully measured on a suitable small balance or scale. This is important to insure uniform color from batch-to-batch.

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Another caution mentioned in the previous section concerned prolonged heating. It is suggested that maximum temperatures of 125 to 150°F be limited to 2 or 3 hours. Also, manner of heating the batch should control film temperatures so there are no significant hot spots. Prolonged heating may cause gradual darkening of the product as well as gradual increase in acidity due to decomposition of the CDP.

MATERIAL SPECIFICATIONS

Raw Materials

Refer to Raw Material Specification sheets included in the Appendix.

Finished MCS 1041

Typical analyses and suggested specification limits follow:

Property	Tentative Specification	Typical Value	JFQ Method
Appearance	Clear to slightly hazy blue liquid		16-B
Visc., cs At 100°F At 210°F	 31.3-33.3 3.10-3.22	 32.36 3.16	 126-A
Acidity, mg KOH/gm	0.30-0.60	0.38	80-B
Sp. Gr. 25/25°C	1.340-1.355	1.347	116-A
Moisture, KF	0.05 max	0.03	78-B
Pour Point (each 10th lot)	+5°F	+5°F	100-A

ANALYTICAL METHODS

No new or special analytical procedures are required for this product. A cross reference table appears in the Appendix listing standard analytical procedures used at J. F. Queeny Plant, W. G. Krummrich Plant, and at the Anniston Plant. These procedures are currently used on similar products.

TOXICITY AND HAZARDS

No unusual toxicity or hazards are expected with the raw materials or finished blend. The process is a simple blending procedure and no hazardous reactions should occur between the various components.

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Aroclor-1242 has been used in Pydraul fluids for years. Animal testing indicates a very low order of acute and oral toxicity for Aroclor 5432 and Santicizer 711.

(NOTE: Current specific toxicity information is being obtained from the Medical Department on these materials and it is suggested these be included in the Appendix of this report.)

General Precautions include the following:

1. Goggles should be worn where splashing or spillage may occur.

2. Any material in contact with the skin should be removed by washing with soap and water.

3. Prolonged or repeated exposure to the skin may cause irritation due to removal of skin oils with resulting dryness and chapping.

4. Material may be irritating to sensitive skin areas and eyes. In case of contact with eye tissue, flush copiously with water and then get medical attention.

5. In case of internal ingestion, get immediate medical attention.

6. Avoid inhaling volation material or mists.

POLLUTION CONTROL

No waste by-products are generated by this process. Used filtering material, flushings from the system during cleaning, as well as any spoiled product should be disposed of as dictated by local regulations.

Every effort must be made to prevent Aroclor 1242 from being mixed with water and drained into the sewer. Non-aqueous solvents should be used to clean the blending tanks and equipment. A suggested fire resistant solvent would be trichloroethylene.

Waste liquids containing polychlorinated biphenyl may be sent to the Supervisor, Dept. 246, W. G. Krummrich Plant for disposal.

Vapor generation should be reduced by limiting the heating of PCB to the lowest required temperature for the process.

Solids containing PCB must be disposed of at the toxic landfill. Burning of these materials must be avoided.

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APPENDIX

P. D. Fowlkes

P. D. Fowlkes

ms
9/1/70

File Copy Approved by
Manager of Research:

W. R. Richard — 9/8/70

W. R. Richard (Date)

J. R. Savage — 9/16/70

J. R. Savage (Date)
Mfg. for Func. Fluids

DSW 620259

STLCOPCB4094286

IN 619

PHYSICAL CONSTANTS DATA

SUBSTANCE	STRUCTURAL FORMULA
MCS 1041	Aroclor 1242 77.0% Aroclor 5432 17.6% Santicizer 711 5.0% Additives 0.4%
COMPILED BY: P. D. Fowlkes	DATE: 8/31/70

NAME		SOURCE & DATE
Formula	Blend	
Molecular Weight		
Appearance	Clear to hazy blue liquid	
Boiling Point at 760 mm		
Boiling Point at mm		
Boiling Point at mm		
Boiling Point at mm		
Crystallizing Point	None	
Melting Point	None	
Solution Point		
Specific Gravity @ 25/25°C	1.347	
Specific Gravity @		
Pounds per Gal. @ 25°C	11.34	
Coefficient of Expansion		
Refractive Index @ $n_D^{\ }$		
Infra Red Spectrum *(Reference)*		
Ultra Violet Spectrum *(Reference)*		
Viscosity @ 100°F	32.36 cs	
Viscosity @ 210°F	3.16	
Surface Tension		
Solubility in Water	Nil	
Solubility in		
Solubility in		
Flash Point °F *(Method)* COC	395°F	
Fire Point °C	650°F	
Heat of Combustion		
Heat of Formation		
Thermal Stability (cal./kg/min.)		
Latent Heat of Fusion		
Latent Heat of Vap.		
Specific Heat		
Critical Temperature		
Critical Pressure		
Dissociation Constant		
Other Constants		
Toxicity *(Give Reference)*		

DSW 620260

NOTE: *These data should not be released outside of Monsanto Chemical Company. Use additional sheets if necessary.*

Analytical Procedures

Property	WGK	JFQ	Anniston	ASTM *
Appearance	12809	16-B	G-1	-
Viscosity	12837	126-A	049	D-445
Flash & Fire Point	12803	50-A	114	D-92
Specific Gravity	12804	116-B	052	-
Pour Point	13005	100-A	053	D-97
Cloud Point	-	36-A	-	D-2500
Acidity	12794	80-B	050	D-664/D-974
Moisture	12810	78-B	047	D-1744
Foam	12805	54-A	-	D-892
Refractive Index	13123	104-A	048	D-1218
Distillation Range	10117	-	054	Modified D-20

* Approximate equivalent ASTM method.

DSW 620261

ORGANIC CHEMICALS DIVISION
J. F. QUEENY PLANT
RAW MATERIAL SPECIFICATION

USING DEPTS.
Pydraul 150

SUPPLIER
Monsanto, WGK or Anniston Plants

ISSUED NOV. 13, 1967
STANDARDS DEPARTMENT
John B. Queeny Plant
By Paul N. Briggs

MATERIAL
AROCLOR 1242 - NON-ELECTRICAL GRADE

CHEMICAL FORMULA
Mixture

MOL WT. -----

SUPERSEDES SPECS OF
October 13, 1964

SAMPLE FOR ANALYSIS
1 x 16-ounce NN Bottle

REQUIRED TESTS*	RESTRICTED INTERNAL LIMITS	JFQ CONTROL LIMITS	PROCEDURES WGK	PROCEDURES JFQ
Appearance	Clear, colorless to light yellow-green liquid	-----	10084	16-B
Color	APHA 100 max.	-----	10084	38-D
Refractive index @ 25°C	-----	1.6240 to 1.6260	10125	104-A
1.33 Specific gravity @ 25/15.5°C	1.381 to 1.392	-----	10114	116-A
TREND TESTS*				
Acidity (mg. KOH/g.)	0.010 max.	-----	10087	4-A
Moisture	50 ppm max.	-----	10620	78-C
Viscosity @ 100°F	82 to 92 SUS	-----	10086	126-A
5.41				
General Tests(made only upon request at producing plant)				
Distilling range:(ASTM D-20 corrected):			10117	
10% distilled by wt.	325°C min.			
90% distilled by wt.	360°C max.			
Fire point	None	-----	10123	50-A
Flash point	338 to 392°F	-----	10123	50-A

*This information will be transmitted to JFQ Plant in accordance with Procedure 928 on all shipments from WGK Plant.

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IN 65 (REV. 12/58)

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MONSANTO COMPANY
ORGANIC CHEMICALS DIVISION
EVERETT PLANT
FINISHED PRODUCT SPECIFICATION

PRODUCT CODE: 86848
DEPT. OR JOB:
USE: Sales and internal
SALES CODE: 3960-300-04-011

ISSUED Dec. 26, 1969
STANDARDS DEPARTMENT
John F. Queeny Plant
By W. B.

PRODUCT (Trade Name): SANTICIZER 711
TYPE:
PRODUCT (Chemical Name):
TYPE:
CHEMICAL FORMULA:
MOL WT.:

SUPERSEDES SPECS OF: January 9, 1969 (Tentative)
SAMPLE FOR ANALYSIS: 1 x 16 ounce NN Bottle

TEST	UNRESTRICTED SALES LIMITS	INTERNAL CONTROL LIMITS	EVERETT PROCEDURES
On each lot			
Acidity, meq/100 grams	0.12 maximum	----	801-01-03
Appearance	Clear, oily liquid	----	600-01-02
Color	APHA 50 maximum	----	801-01-04
Moisture (By KF in methanol)	0.10% maximum	----	801-01-02
Odor	Slight, characteristic	----	600-15-01
Refractive Index @ 25°C	1.480 to 1.483	----	600-18-01
Specific Gravity @ 25/25°C	0.965 to 0.973	----	801-01-05
Upon request			
Composition:			GLC
Low boilers including alcohols		0.8% maximum	
Plasticizers other than Santicizer 711		1.5% maximum	

Sampling procedure

1. Tank Cars or Trucks

   a. Take one or two 16-ounce dip samples, as per plant practice, after tank or car is filled.
   b. Submit one bottle to the laboratory for analysis. When a spare is taken, hold in the department for reference.

2. Drums

DSW 620263

   a. Withdraw a thief sample from every fifth drum and composite to give one or two 16-ounce bottles, as per plant practice.
   b. Submit one bottle to the laboratory for analysis. When a spare is taken, hold in the department for reference.

STLCOPCB4094290

IN BY RM

MONSANTO COMPANY
ORGANIC CHEMICALS DIVISION
J. F. QUEENY PLANT

TENTATIVE
RAW MATERIAL SPECIFICATION

MATERIAL CODE: 60015

USED IN: Hydraul Blends

PROPOSED BY: P. D. Fowlkes

NAME: TOLYLTRIAZOLE (Cobratec TT-100)

CHEMICAL FORMULA:

MOL. WT.:

DISTRIBUTION:
R. L. Wagner - 1 - JFQ
P. F. Catens - 1 - JFQ
R. A. Geisman - 4 - JFQ
J. D. Leyerle - 1 - JFQ
H. L. Powell - 1 - JFQ
N. T. Johnson - 1 - GO/B2S
J. R. Savage - 1 - GO/B2N
B. Petty - 1 - GO/B2N
P. D. Fowlkes - 1 - GO/Res.
L. R. Stark - 1 - GO/Research
Standards - 4 -

DATE PROPOSED	EFFECTIVE UNTIL	SUPPLIER	SAMPLE FOR ANALYSIS
4/30/70	4/30/71	Sherwin Williams	1 x 8-ounce WM Bottle

NOTE: All samples processed by this tentative specification will require disposition of the authorized releasing agent.

TESTS	LIMITS	PROCEDURES
Appearance	Light tan granules	16-A
Melting point	81 to 84°C	76-A
Product information		
Bulk density	40 - 45 lbs. /ft.^{3}	
Screen test:		
Retained on 6 mesh	0%	
Retained on 60 mesh	99%	
Solubility @ 25°C (by wt.)		
Benzene	1.7%	
Ether	23.0%	
Methanol	92.5%	
Polyethylene Glycol	53.3%	
Water	1.03% (1.90% @ 60°C)	
Water	0.7% maximum	

DSW 620264

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MONSANTO COMPANY
ORGANIC CHEMICALS DIVISION

J. F. QUEENY PLANT
RAW MATERIAL
SPECIFICATION

MATERIAL CODE
~~81797~~ 51251

USING DEPTS
Fluid Blends

SUPPLIER
Monsanto - Nitro Plant

ISSUED MAY 9, 1968
STANDARDS SECTION
c/o J. F. Queeny Plant
By Paul R. Brown

MATERIAL
SANTOLUBE 70-A

CHEMICAL FORMULA

Blend of: Santolube 70 98.35%
Santolene C 1.65%

MOL. WT.

SUPERSEDES SPECS OF 6-21-67 for Santolube 70; Nitro code 81787

SAMPLE FOR ANALYSIS
1 x 16-ounce WM Bottle

TEST	RESTRICTED INTER-PLANT LIMITS	PROCEDURES NITRO	JFQ
On each lot			
Appearance	Dark, oily liquid	6-C-01	16-B
Color, ASTM Dilute	5.5 max.	6-C-21	38-I
Neutralization No.	51 to 61	6-A-24	80-A
Solubilities: 5%/vol. in PE	Clear	6-V-15	112-B
Specific gravity @ 25/25°C	0.89 to 0.97*	6-D-07	116-B
Upon request			
Emulsification test	40, 40, 0 (30 min.)	6-S-28	-- --
Santolene C presence	Positive phosphorous test	-----	-- --
Viscosity @ 210°F	70 to 300 SUS*	6-X-02	126-A

*Typical ranges submitted by Nitro.

Special requirements

This material is shipped upon invoice certification of compliance with specifications. Prior permission will be obtained to ship non-specification grade material.

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J. F. QUINCY PLANT
MONSANTO COMPANY
ORGANIC CHEMICALS DIVISION

RAW MATERIAL SPECIFICATION

MATERIAL CODE: 31100

USING DEPTS.: Fluid Blends

SUPPLIER: Dow Corning Corporation

ISSUED FEB. 8, 1968

STANDARD GRAVITY

MATERIAL: DOW CORNING 200 FLUID - 350 cs.

CHEMICAL FORMULA:

SUPERSEDING SPEC. OF: October 28, 1964

SAMPLE FOR ANALYSIS: 1 x 8-ounce Bottle

TEST	UNRESTRICTED PURCHASE LIMITS	METHODS
On each lot		
Appearance	Syrupy liquid	16-B
Refractive index @ 25°C	1.4020 to 1.4040	104-A
Specific gravity @ 25/25°C	0.969 to 0.975	116-A
Viscosity @ 25°C	332.5 - 367.5	126-31100
Upon request		
Color - modified Barrett	1.5 max.	38-H
Flash point	600°F min.	50-A
Neutralization No.	0.01 max.	80-B
Volatility (24 hrs./150°C)	0.5% max.	128-B

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IN 93 (REV. 12/53)

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1113115

#1

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