

FLOSAL[®] Drilling Mud Asbestos Additive

DRILLING SPECIALTIES COMPANY

Technical Services Division • Bartlesville, Oklahoma 74004

RECOMMENDED WORK PRACTICES



INTRODUCTION

The following recommended work practices are intended as general guides respecting the handling of Flosal[®] drilling mud grade asbestos (hereafter referred to as DMA). We believe that this booklet will be helpful to engineers, superintendents, contractors, foremen and drilling crews in understanding and explaining such procedures. Field tests conducted to date indicate that the recommended work practices set forth in this booklet, if followed, should result in an employee's 8-hour time-weighted average (TWA) exposure being below 0.1 fibers per cubic centimeter of air. (Such exposure would be well below OSHA's currently prescribed limits of two fibers longer than five micrometers per cubic centimeter of air as an 8-hour time-weighted average exposure and 10 fibers longer than 5 micrometers per cubic centimeter of air, as a ceiling concentration.) However, since field conditions do vary, these recommended work practices do not purport to be exclusive, and adherence to these recommended work practices does not guarantee an exposure level (8-hour TWA) the same as that shown by the aforementioned field tests, nor compliance with applicable federal, state or local health and/or safety laws or regulations.

On October 11, 1978, OSHA issued Program Directive #300-16 which provides uniform inspection and compliance procedures for medical examination requirements of the asbestos standard. The principal actions taken by OSHA in this directive were to clarify the term "exposed to airborne concentrations of asbestos fibers" and to indi-

cate the scope and applicability of medical examination requirements under the asbestos standards as follows:

- a. The term "exposed to airborne concentrations of asbestos fiber..." is administratively interpreted to mean "exposed to a minimum of 0.1 asbestos fibers longer than 5 micrometers per cubic centimeter of air..."
- b. Medical examinations will be required for any 7 to 8-hour time-weighted average concentration of 0.1 f/cc, or for a greater concentration.

We believe that if the following work practices are followed one might reasonably expect 8-hour TWA exposure levels to be below those specified by OSHA Program Directive #300-16. If, however, there is reasonable cause to believe that airborne asbestos concentrations exceed 0.1 f/cc greater than five microns on an 8-hour TWA basis, or have peak levels above 0.5 f/cc greater than five microns based on 15-minute sample periods, then the site should be monitored for airborne asbestos, and appropriate action taken as required by applicable safety or health laws and/or regulations.

PRODUCTS AND OPERATIONS

DMA is furnished in flake form.

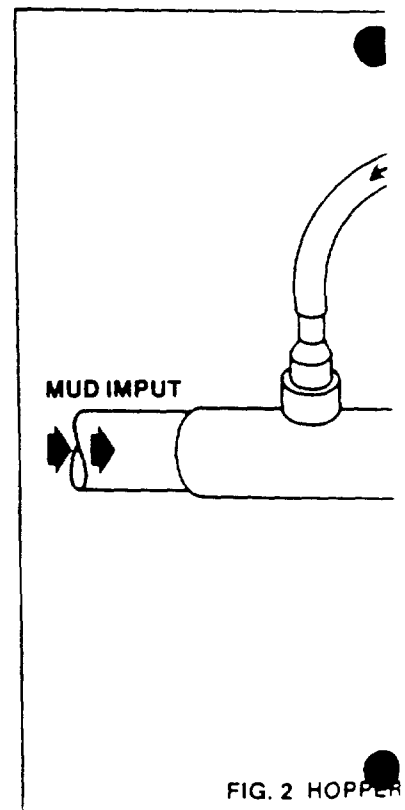
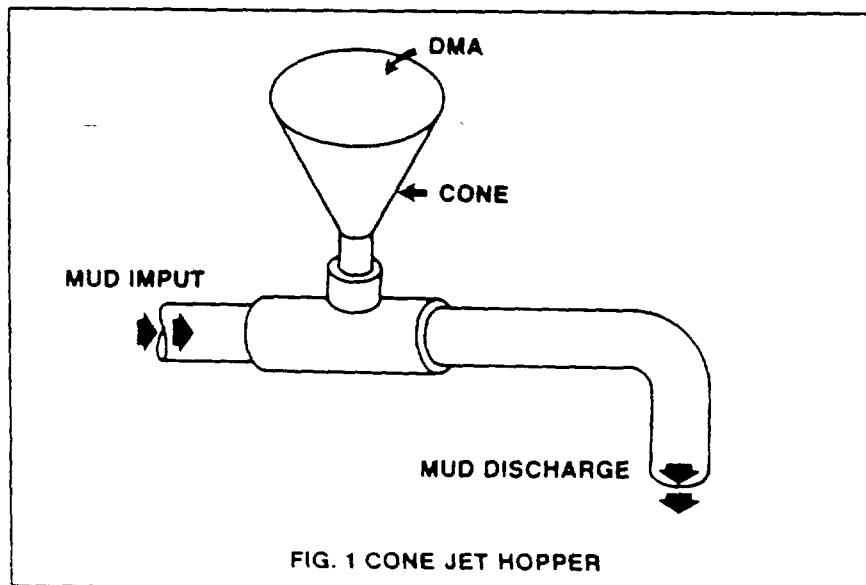
Operations to which these work practices apply include:

- Shipping, Receiving, Handling, Warehousing, and Storage
- Additions of DMA to the mud
- Handling of empty sacks
- Disposing of empty sacks
- Disposing of mud

SHIPPING, RECEIVING, HANDLING, WAREHOUSING, AND STORAGE

DMA is furnished in loose or palletized sacks (With palletized DMA, the pallets are sometimes shrink wrapped). The sealed, unopened sacks should be handled by normal warehouse practices.

Precautions must be taken if a sack is broken, torn or punctured. The sack should be sealed with heavy duty tape or placed in a slip-over sack (over-sized, open mouthed bag) to prevent spillage. The slip-over sack should be securely sealed, preferably by a twist wire. Any spillage should be cleaned up with a vacuum sweeper equipped with a disposable bag. Unless additional protection is required under applicable federal or other regulations, a certified, reusable or single use air purifying respirator should be worn by the person cleaning up. **DO NOT BLOW MATERIAL WITH COMPRESSED AIR, NOR DRY SWEEP.** The material in broken or damaged sacks should be used first. In storing DMA it is recommended that it be stacked no more than 10 sacks high.



ADDITIONS OF DMA TO THE MUD

DMA should be added to the mud in the same manner as other dry mud additives. The DMA should be added directly to the mud system, preferably by emptying the bag at a uniform rate into the hopper of a cone type jet mixer (eductor system). (Figure 1).

Other systems in use are also suitable for the addition of DMA, such as an eductor with suction hose attached to withdraw the DMA directly from the bag, or from a drum into which several bags have been emptied. (Figure 2). Care should be used in pouring the DMA into another container to reduce the amount of "fines" generated when air is displaced from the receiving hopper or drum.

In adding DMA to the mud, it is a recommended practice to position oneself so that any air currents present are moving from the individual's back toward the receiving container, rather than blowing into the face. A light weight streamer or "air sock" above the hopper may be used to determine wind direction (Figure 3).

HANDLING OF EMPTY SACKS

After a sack is emptied, it should be discarded in accordance with current federal regulations. Normally, sacks of all types should be carried away for disposal as soon as time permits.

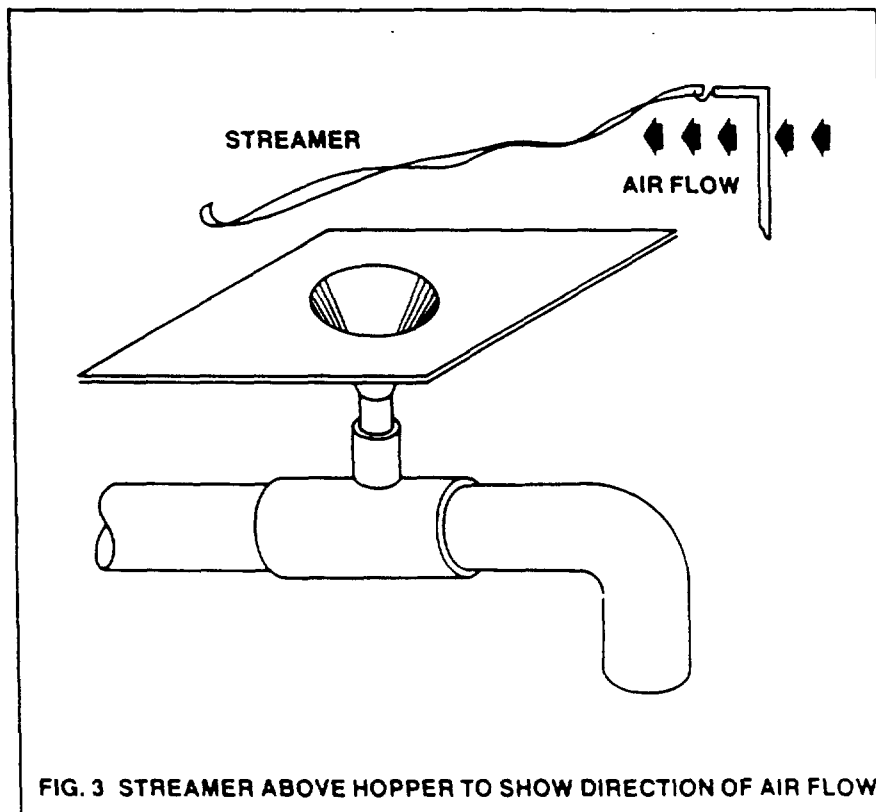
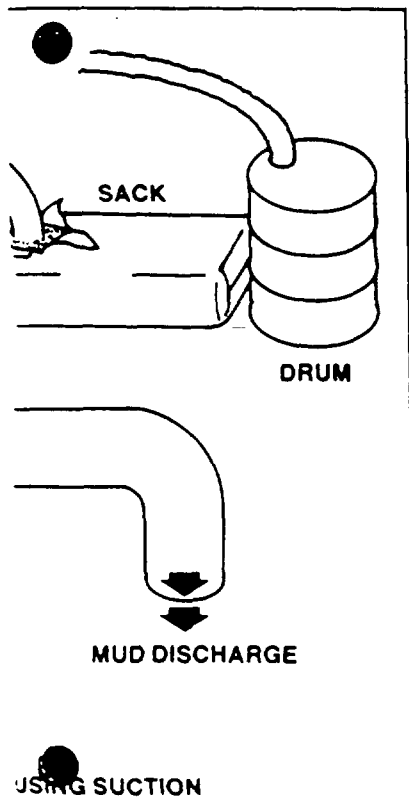
DISPOSING OF EMPTY SACKS

Unless an adequate precipitator is attached to the incinerator, onshore burial or incineration is the preferred method of disposing of empty DMA sacks from offshore sites. **DO NOT BURN DMA SACKS WITHOUT A PRECIPITATOR.** The empty sacks should be accumulated in sealed impermeable bags until a sufficient number is on hand to require burning or burial.

It is preferable to bury empty DMA sacks onshore. An incinerator with an adequate precipitator can be used. **DO NOT BURN DMA SACKS WITHOUT A PRECIPITATOR.**

DISPOSING OF MUD

When a well is finished, there is usually little or no DMA left in the mud. Any accepted method of storing the mud for reuse or disposing of it can be used.



**Dependable Supply and Delivery
Technical Service
Field Assistance
Engineering Experience
Highest Quality, Proven Products**

MUD ADDITIVES

DESCO®
DIASEAL M®
ORISCOSE®
ORISPAC®
ORISPAC® SUPERLO
FLOSAL®
SOLTEX®

CEMENT ADDITIVES

DIACEL® D
DIACEL® LWL

This bulletin reports accurate and reliable information to the best of our knowledge. Drilling Specialties Company assumes no obligation or liability for the use of the information presented herein.



DRILLING SPECIALTIES COMPANY

Technical Services Division • Bartlesville, Oklahoma 74004

Technical Data

HOLEMAKING IDEAS FOR KEY MEN

On June 7, 1972, stringent Federal regulations went into effect on the commercial use of asbestos. We at Montello determined to ascertain how our unique, wet-refined Super Visbestos would perform, in the context of these OSHA regulations, under the widely varying conditions found on drilling rigs.

Four on-site tests and their evaluation have now been completed. Three different forms of our asbestos were checked to determine the effects of fine grinding, coarse grinding (i.e. crushing) and granulating, on air-entrained dust concentrations.

Below is a recap of the more important points from this study. Feel free to contact our Sand Springs office for a complimentary copy of the complete report.

1. All tests were performed using Montello's exclusive wet processed asbestos products. The findings cannot be safely applied to any of the several dry ground products on the market.
2. Fiber counts were highest on fine ground material and lowest on granular material, with coarsely ground (crushed) material falling between these two.
3. Crushed Super Visbestos, which has been used in the field for several years, consistently fell well below the OSHA regulations as to maximum ceiling limit and 8 hour, time weighted average, (TWA).
4. New Granular Super Visbestos, now available in the field at no extra cost, proved to be from 20% to 50% cleaner than Crushed Super Visbestos.
5. Neither form of Super Visbestos exceeded even the much more stringent TWA level which will become effective in 1976.
6. Based on this test series, Super Visbestos in either form offers a safety margin of 5 to 1 or more, in complying with the limits set by the regulations. Therefore, we believe there is no reasonable expectation of exceeding the legal limits, when using Crushed or New Granular Super Visbestos.

Montello

P.O. BOX 130, SAND SPRINGS, OKLAHOMA 74063 / (918)-245-6661/TWX 910-840-3007

(See other side for corroborating data)

SUPER VISBESTOS

(Crushed or New Granular)
Wet-refined, chrysotile asbestos

SPECIAL NOTE ON SAFE USE:

An extensive field study has revealed that SUPER VISBESTOS (both grinds) offers a 5 to 1 or better safety margin in complying with OSHA health hazard regulations.

Based on this study, Montello believes there is no reasonable expectation of exceeding the legal exposure limits when using either Crushed or New Granular SUPER VISBESTOS.

Contact our office for a complimentary copy of this detailed, on-site evaluation, titled "Airborne Asbestos Dust Concentrations in Drilling Fluid Operations."

HOW PACKAGED:

Multi-wall paper sacks - 50 pounds each.

FUNCTION:

For hole cleaning in any aqueous drilling fluid. Builds quick yield with and without bentonite or attapulgite. Provides a "natural", inexpensive, low-solids drilling fluid for clear water drilling rates.

EFFECT ON DRILLING FLUID PROPERTIES:

- * Increases carrying capacity.
- * Improves flow properties.
- * Used 50/50 with bentonite, synergism gives 3 to 5 times greater yield than dry ground asbestos.
- * Stabilizes high temperature gelation of bentonite.
- * Stabilizes salt flocculation of bentonite.
- * Synergizes with attapulgite for higher yield.
- * Controls progressive gels.

(See How To Use on other side)

Montello

P.O. BOX 130, SAND SPRINGS, OKLAHOMA 74063 / (918)-245-6661/TWX 910-840-3007

Technical Data

HOLEMAKING IDEAS FOR KEY MEN

It's a fact...

Drilled cuttings must be flushed from the hole!

Super Visbestos does the job cheaper than
anything else!

*And we can **Prove it** for your particular
mud system—

Over **20,000,000 pounds** have already
proven it for others—

**Incidentally, if the asbestos health
angle bothers you, we've got a
report you need to read.*

*Just mail us the "**Prove it**" card.

Montello

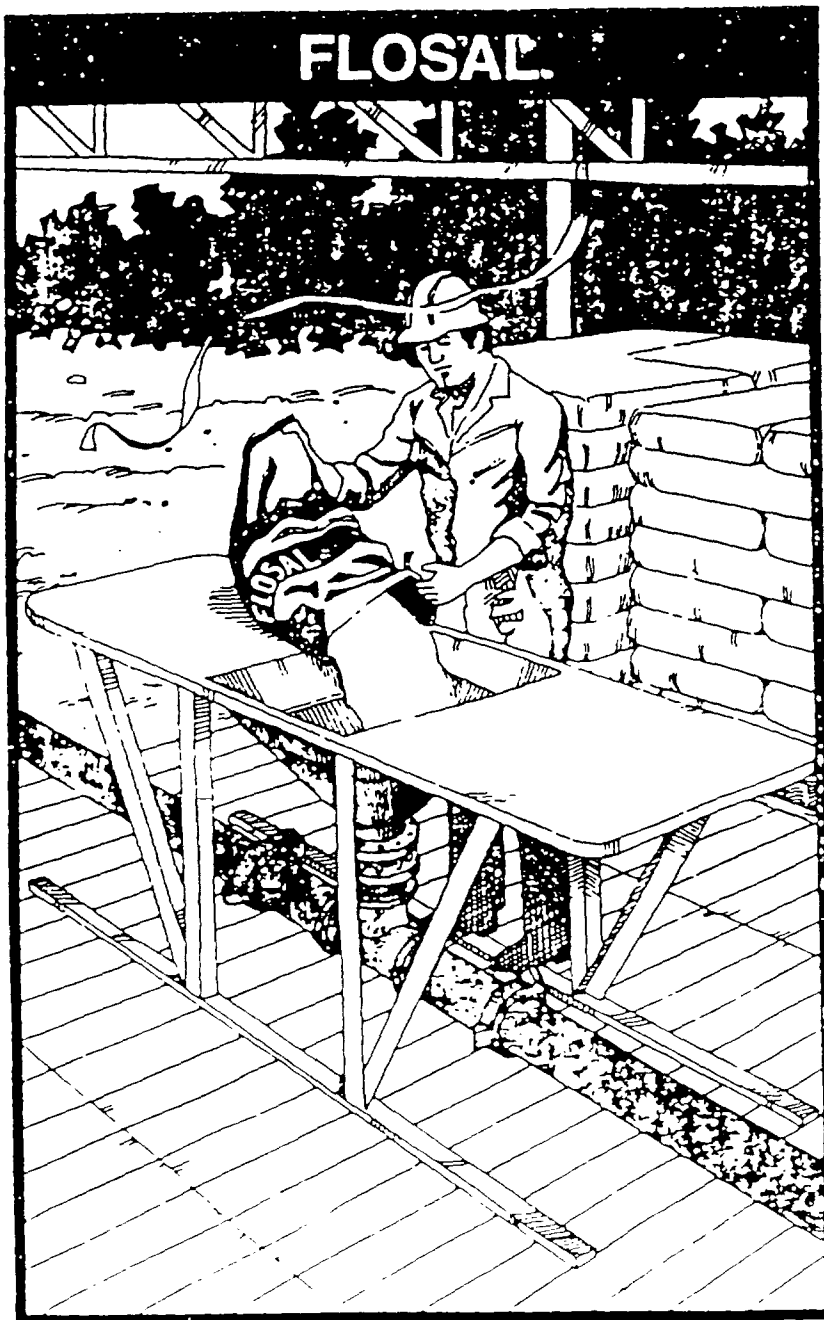
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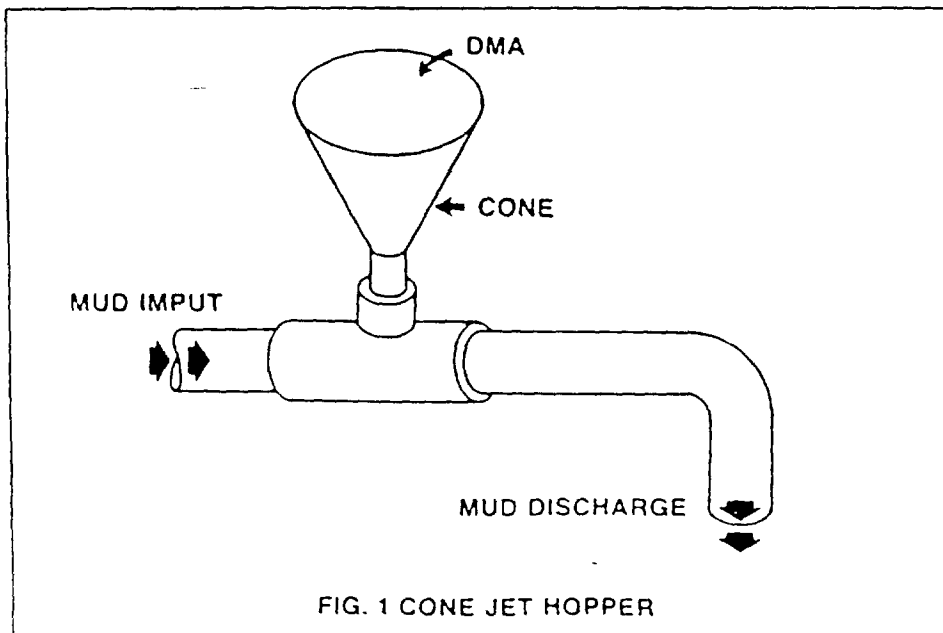
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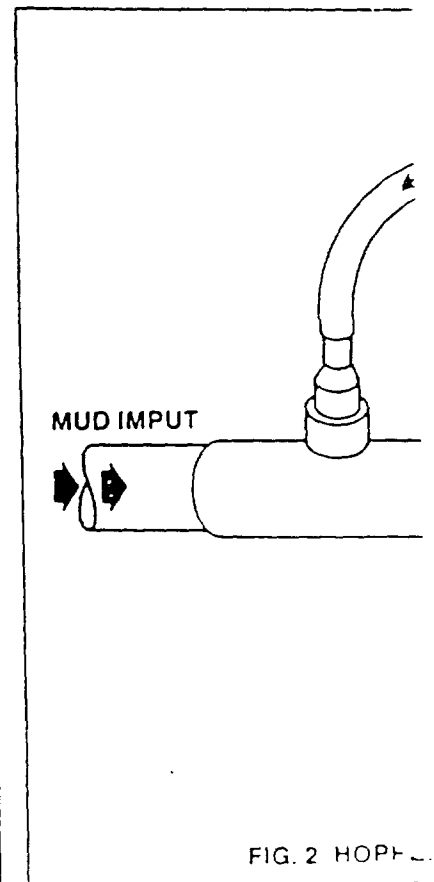
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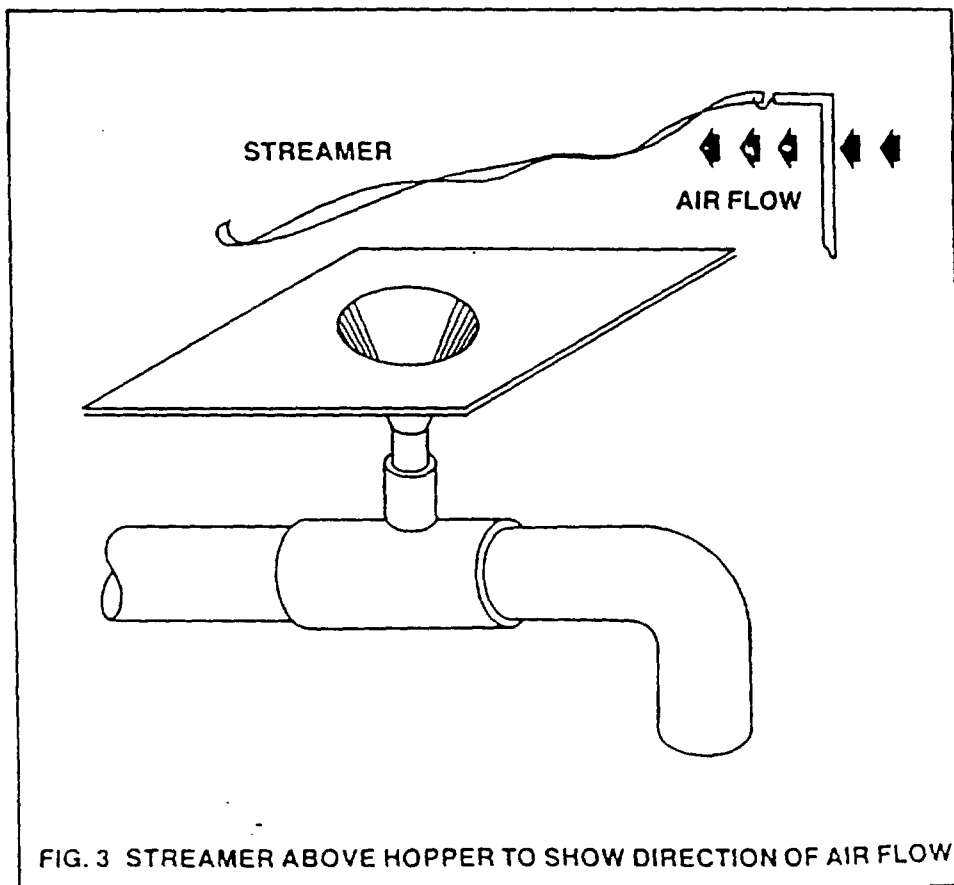
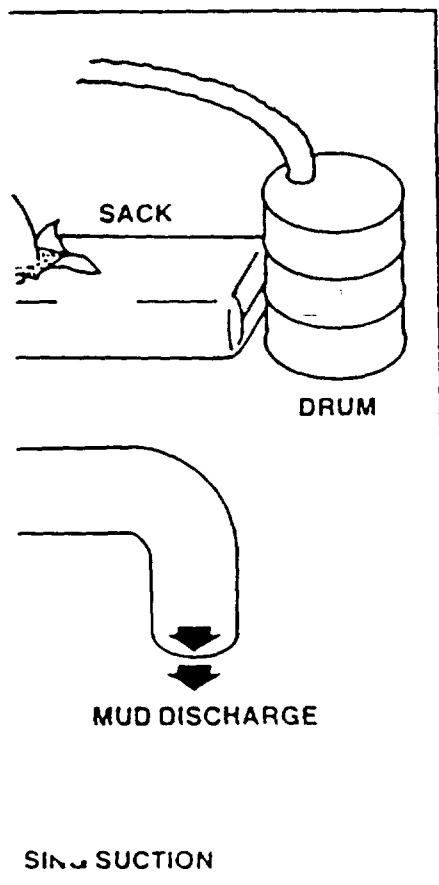
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NL

J. Paul Rupert

Internal
Memorandum

2/20/79

Date:

M L Baroid - Houston

To: W. B. Kirkland

Unit: M L Baroid - Houston

From: Diaseal M

Unit:

Subject:

Attached is a sample of "New" Diaseal M submitted by Drilling Specialties Company. Their letter of February 13, 1979 indicates this product no longer contains Asbestos fiber. A copy of their old Material Safety Data Sheets is also enclosed. We understand this new Diaseal M contains Diatomaceous Earth and Ground Paper.

Pricing on New Diaseal M packed in 50# bags is \$440.00/ton FOB Houston and Midland Texas in carload or truckload lots.

WBK:sa

Enclosure(s)

cc: J. J. Doyle w/encl.
H. Sutter w/encl. ✓

W. B. Kirkland

DRILLING SPECIALTIES COMPANY
BARTLESVILLE, OKLAHOMA 74004

918 661-5405
918 661-6153
918 661-5333

TELEX 49-2455
TWX 910 841-2560

February 13, 1979

Material Safety
Data Sheet
Sh-30-79

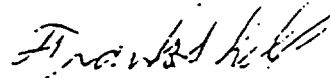
Mr. W. B. Kirkland
Director of Purchases
Baroid Division
NL Industries, Inc.
P. O. Box 1675
Houston, TX 77001

Dear Woody:

I understand we sent you a copy of a material safety data sheet on Diaseal M[®] on February 12, 1979. This was our old material safety data sheet. We have recently reformulated Diaseal M and it no longer contains chrysotile asbestos fiber.

Since the Diaseal M now contains only natural diatomaceous earth and other non-hazardous materials, chrysotile asbestos fiber can be deleted from the section on "Hazardous Mixtures of Other Liquids, Solids or Gases" on the material safety data sheet. All other information is the same.

Very truly yours,



F. J. Shell

FJS:tlb - RC

cc: R. R. Simmons
C. A. Wentz

1/29/77

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OSHA No. 22-R-1327

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME

Johns-Manville Corp & Subsidiaries

EMERGENCY TELEPHONE NO.

303/770-1000 Ext 2252

ADDRESS (Number, Street, City, State, and ZIP Code)
Greenwood Plaza, Denver, Colorado 80217

CHEMICAL NAME AND SYNONYMS

TRADE NAME AND SYNONYMS

Diaseal M

CHEMICAL FAMILY

FORMULA

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
Natural diatomaceous earth				88	*
Chrysotile asbestos fiber				10	*
* For TLV's see attached Federal Register of 6/7/72 (1910.93 and 1910.93a - pg 11320, Vol 37, #110)					

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)		SPECIFIC GRAVITY (H ₂ O=1)	
VAPOR PRESSURE (mm Hg.)		PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ *1)	
SOLUBILITY IN WATER			
APPEARANCE AND ODOR	Gray powder - no odor		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used): Non-flammable	FLAMMABLE LIMITS	LoL	UoL
EXTINGUISHING MEDIA			
SPECIAL FIRE FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARDS			

Product: _____

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

See Section II

EFFECTS OF OVEREXPOSURE

Long term exposure to high airborne concentrations of this

material may cause pulmonary disease

EMERGENCY AND FIRST AID PROCEDURES

SECTION VI - REACTIVITY DATA

STABILITY

UNSTABLE

CONDITIONS TO AVOID

STABLE

X

INCOMPATIBILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS
POLYMERIZATION

MAY OCCUR

CONDITIONS TO AVOID

WILL NOT OCCUR

X

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Vacuum clean spillage. If sweeping is necessary, wet spilled

material or use sweeping compounding.

WASTE DISPOSAL METHOD

Dispose of waste in closed containers.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

NIOSH approved for protection against pneumoconiosis-producing dusts

VENTILATION

LOCAL EXHAUST

SPECIAL

MECHANICAL (General)

OTHER

PROTECTIVE GLOVES

EYE PROTECTION

OTHER PROTECTIVE EQUIPMENT

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

OTHER PRECAUTIONS

§ 1910.93 Air contaminants.

TABLE G-3—MOSZAL DUST

Substance	Method	Limit
Fibers		
Crystalline silica (respirable).....	250 ¹	10mg/M ² = %SiO ₂ +4 20mg/M ²
Quartz (total dust).....		%SiO ₂ +2
Crystalline silica		
Crystalline silica (total dust).....		%SiO ₂ +2
Amorphous silica		
Amorphous silica (total dust).....	20	10mg/M ² %SiO ₂
Silicates		
Silicates (total dust).....	20	10mg/M ² %SiO ₂
Alumina.....	20	
Scoria.....	20	
Talc.....	20	
Portland cement.....	20	
Graphite (total dust).....	20	
Coal dust (respirable fraction less than 5% SiO ₂).....		2.4mg/M ² or 10mg/M ²
For more than 5% SiO ₂		%SiO ₂ +2
Inert or nuisance dust		
Respirable fraction.....	15	3mg/M ²
Total dust.....	20	15mg/M ²

NOTE: Conversion factors—
1 mg/M² = 1 million particles per cubic meter
= 100,000,000 particles per c.c.

¹ 250 fibers per cubic foot of air, based on
impactor samples collected by light-field techniques.

² The percentage of crystalline silica in the formula
is the amount determined from airborne samples,
except in those instances in which other methods have
been shown to be applicable.

³ As determined by the membrane filter method at
40X phase-contrast magnification.

⁴ Both concentration and percent quartz for the
application of this limit are to be determined from
the fraction passing a size-selector with the following
characteristics:

Aerodynamic diameter (unit density sphere)	Percent passing selector
2.5	90
2.5	75
3.5	50
5.0	25
10	0

The measurements under this table refer to the use of
an AEC (impactor) in the mode described in the
method of collection. The method of collection is described
in the AEC (impactor) manual, which is available from the
Bureau of Mines.

2. A new § 1910.93a is added to Part
1910, reading as follows:

§ 1910.93a Asbestos.

(a) **Definitions.** For the purpose of
this section, (1) "Asbestos" includes
chrysotile, amosite, crocidolite, tremo-
lite, anthophyllite, and actinolite.

(2) "Asbestos fibers" means asbestos
fibers longer than 5 micrometers.

(b) **Permissible exposure to airborne
concentrations of asbestos fibers.** (1) **Standard effective July 7, 1972.** The
8-hour time-weighted average airborne
concentrations of asbestos fibers in
which any employee may be exposed
shall not exceed five fibers, longer than
5 micrometers, per cubic centimeter of
air, as determined by the method pre-
scribed in paragraph (c) of this section.

(2) **Standard effective July 1, 1976.** The
8-hour time-weighted average air-
borne concentrations of asbestos fibers

to which any employee may be exposed
shall not exceed two fibers, longer than
5 micrometers, per cubic centimeter of
air, as determined by the method pre-
scribed in paragraph (c) of this section.

(3) **Ceiling concentration.** No em-
ployee shall be exposed at any time to
airborne concentrations of asbestos
fibers in excess of 10 fibers, longer than
5 micrometers, per cubic centimeter of
air, as determined by the method pre-
scribed in paragraph (c) of this section.

(c) **Methods of compliance.** (1) **En-
gineering methods.** (i) **Engineering con-
trols.** Engineering controls, such as, but
not limited to, isolation, enclosure, ex-
haust ventilation, and dust collection,
shall be used to meet the exposure limits
prescribed in paragraph (b) of this
section.

(ii) **Local exhaust ventilation.** (a)
Local exhaust ventilation and dust col-
lection systems shall be designed, con-
structed, installed, and maintained in
accordance with the American National
Standard Fundamentals Governing the
Design and Operation of Local Exhaust
Systems, ANSI Z9.2-1971, which is in-
corporated by reference herein.

(b) See § 1910.6 concerning the avail-
ability of ANSI Z9.2-1971, and the
maintenance of a historic file in connec-
tion therewith. The address of the Amer-
ican National Standards Institute is
given in § 1910.100.

(iii) **Particular tools.** All hand-op-
erated and power-operated tools which
may produce or release asbestos fibers
in excess of the exposure limits pre-
scribed in paragraph (b) of this section,
such as, but not limited to, saws, scorers,
abrasive wheels, and drills, shall be pro-
vided with local exhaust ventilation sys-
tems in accordance with subdivision (ii)
of this subparagraph.

(2) **Work practices.** (i) **Wet methods.**
Insofar as practicable, asbestos shall be
handled, mixed, applied, removed, cut,
scored, or otherwise worked in a wet
state sufficient to prevent the emission
of airborne fibers in excess of the ex-
posure limits prescribed in paragraph
(b) of this section, unless the usefulness
of the product would be diminished
thereby.

(ii) **Particular products and opera-
tions.** No asbestos cement, mortar, coat-
ing, grout, plaster, or similar material
containing asbestos shall be removed
from bags, cartons, or other containers
in which they are shipped, without being
either wetted, or enclosed or ventilated
so as to prevent effectively the release of
airborne asbestos fibers in excess of the
limits prescribed in paragraph (b) of
this section.

(iii) **Spraying, demolition, or removal.**
Employees engaged in the spraying of
asbestos, the removal, or demolition of
pipes, structures, or equipment covered
or insulated with asbestos, and in the
removal or demolition of asbestos in-
sulation or coverings shall be provided
with respiratory equipment in accord-
ance with paragraph (d)(2)(iii) of this
section and with special clothing in ac-
cordance with paragraph (d)(3) of this
section.

(d) **Personal protective equipment.**
(1) Compliance with the exposure limits
prescribed by paragraph (b) of this section
that may not be achieved by the use of
respirators or shift rotation of em-
ployees, except:

(i) During the time needed to maintain
to meet the engineering controls and
to institute the work practices required
by paragraph (c) of this section;

(ii) In work situations in which the
methods prescribed in paragraph (c) of
this section are either technically not
feasible or infeasible to an extent insuffi-
cient to reduce the airborne concentra-
tions of asbestos fibers below the limits
prescribed by paragraph (b) of this
section; or

(iii) In emergencies.

(iv) Where both respirators and per-
sonnel rotation are allowed by subdivi-
sions (i), (ii), or (iii) of this subpara-
graph, and both are practicable, person-
nel rotation shall be preferred and used.

(2) Where a respirator is permitted by
subparagraph (1) of this paragraph, it
shall be selected from among those ap-
proved by the Bureau of Mines, Depart-
ment of the Interior, or the National In-
stitute for Occupational Safety and
Health, Department of Health, Educa-
tion, and Welfare, and in the provisions of
30 CFR Part 11 (37 F.R. 634, Mar. 25,
1972), and shall be used in accordance
with subdivisions (i), (ii), (iii), and (iv)
of this subparagraph.

(i) **Air purifying respirators.** A res-
pirator or single use self-contained respirator,
or a respirator described in subdivision
(ii) or (iii) of this subparagraph shall
be used to reduce the concentration of
airborne asbestos fibers in the respirator
below the exposure limits prescribed in
paragraph (b) of this section, when the
ceiling or the 8-hour time-weighted aver-
age airborne concentrations of asbestos
fibers are reasonably expected to exceed
no more than 10 times those limits.

(ii) **Powered air purifying respirators.**
A full facepiece powered air purifying
respirator, or a powered air purifying
respirator, or a respirator described in
subdivision (iii) of this subparagraph,
shall be used to reduce the concentra-
tions of airborne asbestos fibers in the
respirator below the exposure limits pre-
scribed in paragraph (b) of this section,
when the ceiling or the 8-hour time-
weighted average concentrations of
asbestos fibers are reasonably expected
to exceed 10 times, but not 100 times,
those limits.

(iii) **Type "C" supplied-air respirators,**
continuous flow or pressure-demand
class. A type "C" continuous flow or pres-
sure-demand, supplied-air respirator
shall be used to reduce the concentra-
tions of airborne asbestos fibers in the
respirator below the exposure limits pre-
scribed in paragraph (b) of this section,
when the ceiling or the 8-hour time-
weighted average airborne concentra-
tions of asbestos fibers are reasonably
expected to exceed 100 times those limits.

(iv) **Establishment of a respirator pro-
gram.** (a) The employer shall establish
a respirator program in accordance with



Environmental, Safety and Transportation Data Sheet

FLOSAL

I PRODUCT IDENTIFICATION		
SUPPLIER NL BAROID	TELEPHONE NO. 713/987-5900	
ADDRESS P.O. BOX 1675 HOUSTON, TEXAS 77251		
TRADE NAME FLOSAL®		
GENERIC DESCRIPTION ASBESTOS		
II HAZARDOUS INGREDIENTS		
MATERIAL OR COMPONENT	%	HAZARD DATA
ASBESTOS	100	TLV = 2 FIBERS >5 µm/cc
III PHYSICAL DATA		
BOILING POINT (°F) NA	MELTING POINT ND	FREEZING POINT NA
SPECIFIC GRAVITY (H ₂ O = 1) 2.2	VAPOR PRESSURE (mm Hg) NA	
VAPOR DENSITY (AIR = 1) NA	SOLUBILITY IN H ₂ O, % BY WT. INSOLUBLE	
% VOLATILES BY VOL. NA	EVAPORATION RATE (BUTYL ACETATE = 1) NA	
APPEARANCE AND ODOR NO ODOR, WHITE FIBROUS DRY MATERIAL	Density @ 20°C: ND	
pH NA		

FLOSAL®

2

HEALTH HAZARD

0

FLAMMABILITY

0

REACTIVITY

Ratings based on NIOSH "Identification System for
Occupationally Hazardous Materials" (1974)

N/A = Not Applicable N/D = Not Determined

All information, recommendations and suggestions herein concerning our product are based upon tests and data believed to be reliable, however, it is the user's responsibility to determine the safety, toxicity, and suitability for his own use of the product described herein. Since the actual use by others is beyond our control, no guarantee, expressed or

to be obtained, or the safety and toxicity of the product nor does NL Petroleum Services, Inc., assume any liability arising out of use, by others, of the product referred to herein. Nor is the information herein to be construed as absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circum-

BEST Sheet

IV FIRE AND EXPLOSION DATA

ASBESTOS IS NONFLAMMABLE.

V HEALTH HAZARD INFORMATION

CARCINOGENICITY — ASBESTOS - NTP

ACUTE ORAL LD₅₀

ND

ACUTE DERMAL LD₅₀

ND

AQUATIC TOXICITY (LC₅₀)

ND

ROUTES OF EXPOSURE AND EFFECTS

INHALATION: PULMONARY DISEASE, CANCER, WITH PROLONGED EXPOSURE.

EYE: IRRITATION

SKIN: DERMATITIS

TYPICAL ANALYSIS OF TOXIC ELEMENTS

As 0.2 ppm

Cd 0.25 ppm

Cr 400.0 ppm

Co 23.1 ppm

Pb 2.0 ppm

Hg 0.26 ppm

Ni <1.0 ppm

EMERGENCY AND FIRST AID PROCEDURES

FLUSH EYES WITH WATER AND CONSULT PHYSICIAN.
WASH ALL CONTACTED AREAS WITH SOAP AND WATER.

BEST Sheet

VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

STABLE

INCOMPATIBILITY

NONE

HAZARDOUS DECOMPOSITION PRODUCTS

NONE

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

WILL NOT OCCUR

VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

MAINTAIN ALL SURFACES, IN WORKPLACE, FREE OF ASBESTOS FIBERS. VACUUM CLEAN SPILLAGE. REPAIR BROKEN BAGS. WET DOWN SPILLAGE PRIOR TO SWEEPING.

NEUTRALIZING CHEMICALS

NA

WASTE DISPOSAL METHOD

ASBESTOS WASTE, DEBRIS, BAGS, CONTAINERS, SHALL BE SEALED IN IMPERMEABLE BAGS OR CONTAINERS. DISPOSE IN SECURE LAND FILL.

VIII INDUSTRIAL HYGIENE CONTROL MEASURES

VENTILATION REQUIREMENTS

LOCAL EXHAUST VENTILATION AND DUST COLLECTION SYSTEM. TO WITHIN TLV LEVELS. DESIGN IN ACCORDANCE WITH THE AMERICAN NATIONAL STANDARD FUNDAMENTALS GOVERNING THE DESIGN AND OPERATION OF LOCAL EXHAUST SYSTEMS (ANSI 79.2 - 1971).

SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY

USE A NIOSH APPROVED MECHANICAL FILTER RESPIRATOR FOR ASBESTOS.

EYE

SAFETY GOGGLES

GLOVES

WORKING GLOVES

OTHER CLOTHING AND EQUIPMENT

COVERALLS, EYEWASH, SHOWER, HEAD COVERING, FOOT COVERING.

BEST Sheet

IX SPECIAL PRECAUTIONS

PRECAUTIONARY STATEMENTS

- 1) INSOFAR AS POSSIBLE ASBESTOS SHOULD BE HANDLED AND MIXED IN A WET STATE, SUFFICIENT TO PREVENT EMISSION OF AIRBORNE FIBERS.
- 2) PROVIDE CAUTION LABELS ON ALL ASBESTOS CONTAINERS (INCLUDING WASTE, SCRAP, MIXES, ETC.):

CAUTION
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
BREATHING ASBESTOS DUST MAY CAUSE SERIOUS BODILY HARM

- 3) PLACE CAUTION SIGNS WHERE ASBESTOS MAY BE IN EXCESS OF 2 FIBERS.
20" x 14" VERTICAL FORMAT SIGNS
ASBESTOS (1" GOTHIC OR BLOCK LETTERING)
DUST HAZARD (3/4" GOTHIC OR BLOCK LETTERING)
AVOID BREATHING DUST (1/4" GOTHIC LETTERING)
DO NOT REMAIN IN AREA UNLESS YOUR WORK REQUIRES IT. (1/4" GOTHIC LETTERING)
BREATHING ASBESTOS DUST MAY BE HAZARDOUS TO YOUR HEALTH. (14 pt. GOTHIC)

OTHER HANDLING AND STORAGE REQUIREMENTS

- 1) STOW AND HANDLE TO AVOID AIRBORNE PARTICLES.
- 2) PROVIDE TWO SEPARATE LOCKERS FOR EACH EMPLOYEE TO SEPARATE CONTAMINATED WORK CLOTHES FROM STREET CLOTHES.

DEPARTMENT OF TRANSPORTATION INFORMATION

PROPER SHIPPING NAME: ASBESTOS

HAZARD CLASS: ORM-C

HAZARDOUS SUBSTANCE: ASBESTOS

LABEL: NONE REQUIRED

PREPARED BY **NL Barold**
ENVIRONMENTAL SERVICES

DATE
JULY, 1987

1/29/72

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OSHA No. 44-01127

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME Johns-Manville Corp & Subsidiaries		EMERGENCY TELEPHONE NO. 303/770-1000 Ext 2252
ADDRESS (Number, Street, City, State, and ZIP Code) Greenwood Plaza, Denver, Colorado 80217		
CHEMICAL NAME AND SYNONYMS		TRADE NAME AND SYNONYMS Diaseal M
CHEMICAL FAMILY	FORMULA	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
Natural diatomaceous earth				88	*
Chrysotile asbestos fiber				10	*
* For TLV's see attached Federal Register of 6/7/72 (1910.93 and 1910.93a pg 11320, Vol 37, #110)				-	

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)		SPECIFIC GRAVITY (H ₂ O=1)	
VAPOR PRESSURE (mm Hg.)		PERCENT. VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ %)	
SOLUBILITY IN WATER			
APPEARANCE AND ODOR Gray powder - no odor			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used): Non-flammable	FLAMMABLE LIMITS	Let	Uel
EXTINGUISHING MEDIA			
SPECIAL FIRE FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARDS			

TABLE Z-3—MINERAL DUSTS

Substance	Mppcf*	Mg/M ³
Silica:		
Crystalline:		
Quartz (respirable).....	250 ¹	10mg/M ³ =
	%SiO ₂ +4	%SiO ₂ +2
Quartz (total dust).....		30mg/M ³
		%SiO ₂ +2
Cristobalite: Use 1/2 the		
value calculated from the		
count or mass formulae for		
quartz.		
Tridymite: Use 1/2 the value		
calculated from the for-		
mulae for quartz.		
Amorphous, including natural		
diatomaceous earth.....	20	80mg/M ³
		%SiO ₂
Silicates (less than 1% crys-		
talline silica):		
Mica.....	20	
Soapstone.....	20	
Talc (non-asbestos-form)...	20 ²	
Talc (fibrous). Use asbestos		
limit.		
Tremolite (see talc, fibrous)		
Portland cement.....	80	
Graphite (natural).....	16	
Coal dust (respirable fraction		
less than 5% SiO ₂).....		2.4mg/M ³
		or
		10mg/M ³
For more than 5% SiO ₂		%SiO ₂ +2
Inert or Nuisance Dust:		
Respirable fraction.....	16	6mg/M ³
Total dust.....	30	18mg/M ³

NOTE: Conversion factors—
mppcfX35.3=million particles per cubic meter
= particles per c.c.

* Millions of particles per cubic foot of air, based on
impinger samples counted by light-field techniques.

¹ The percentage of crystalline silica in the formula
is the amount determined from airborne samples, ex-
cept in those instances in which other methods have been
shown to be applicable.

² As determined by the membrane filter method at
100X phase contrast magnification.

* Both concentration and percent quartz for the appli-
cation of this limit are to be determined from the fraction
passing a size-selector with the following characteristics:

* Containing < 1% quartz; if > 1% quartz, use quartz
limit.

Aerodynamic diameter (unit density sphere)	Percent passing selector
2	90
2.5	75
3.5	50
5.0	25
10	0

The measurements under this note refer to the use of
an AEC instrument. If the respirable fraction of coal
dust is determined with a MRE the figure corresponding
to that of 2.4 Mg/M³ in the table for coal dust is 4.5 Mg/M³.
[39 FR 23502, June 27, 1974. Redesignated
and amended at 40 FR 23073, May 28, 1975]

§ 1910.1001 Asbestos.

(a) *Definitions.* For the purpose of
this section, (1) "Asbestos" includes
chrysotile, amosite, crocidolite, tremo-
lite, anthophyllite, and actinolite.

(2) "Asbestos fibers" means asbestos
fibers longer than 5 micrometers.

(b) *Permissible exposure to airborne
concentrations of asbestos fibers—*(1)
Standard effective July 7, 1972. The
8-hour time-weighted average airborne
concentrations of asbestos fibers to
which any employee may be exposed
shall not exceed five fibers, longer than
5 micrometers, per cubic centimeter of
air, as determined by the method pre-
scribed in paragraph (c) of this section.

(2) Standard effective July 1, 1976.
The 8-hour time-weighted average air-
borne concentrations of asbestos fibers
to which any employee may be exposed
shall not exceed two fibers, longer than
5 micrometers, per cubic centimeter of
air, as determined by the method pre-
scribed in paragraph (c) of this section.

(3) *Ceiling concentration.* No em-
ployee shall be exposed at any time to
airborne concentrations of asbestos
fibers in excess of 10 fibers, longer than
5 micrometers, per cubic centimeter of
air, as determined by the method pre-
scribed in paragraph (c) of this section.

(c) *Methods of compliance—*(1) *En-
gineering methods.* (i) *Engineering con-
trols.* Engineering controls, such as, but
not limited to, isolation, enclosure, ex-
haust ventilation, and dust collection,
shall be used to meet the exposure limits
prescribed in paragraph (b) of this
section.

(ii) *Local exhaust ventilation.* (a)
Local exhaust ventilation and dust col-
lection systems shall be designed, con-
structed, installed, and maintained in
accordance with the American National
Standard Fundamentals Governing the
Design and Operation of Local Exhaust
Systems, ANSI Z9.2-1971, which is in-
corporated by reference herein.

(b) See § 1910.6 concerning the avail-
ability of ANSI Z9.2-1971, and the
maintenance of a historic file in connec-
tion therewith. The address of the Amer-
ican National Standards Institute is
given in § 1910.100.

(iii) *Particular tools.* All hand-op-
erated and power-operated tools which
may produce or release asbestos fibers
in excess of the exposure limits pre-

511

(b) See § 1910.6 concerning the availability of ANSI Z89.2-1969 and the maintenance of an historic file in connection therewith. The address of the American National Standards Institute is given in § 1910.100.

(c) No employee shall be assigned to tasks requiring the use of respirators if, based upon his most recent examination, an examining physician determines that the employee will be unable to function normally wearing a respirator, or that the safety or health of the employee or other employees will be impaired by his use of a respirator. Such employee shall be rotated to another job or given the opportunity to transfer to a different position whose duties he is able to perform with the same employer, in the same geographical area and with the same seniority, status, and rate of pay he had just prior to such transfer, if such a different position is available.

(3) Special clothing: The employer shall provide, and require the use of, special clothing, such as coveralls or similar whole body clothing, head coverings, gloves, and foot coverings for any employee exposed to airborne concentrations of asbestos fibers, which exceed the ceiling level prescribed in paragraph (b) of this section.

(4) Change rooms: (i) At any fixed place of employment exposed to airborne concentrations of asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section, the employer shall provide change rooms for employees working regularly at the place.

(ii) Clothes lockers: The employer shall provide two separate lockers or containers for each employee, so separated or isolated as to prevent contamination of the employee's street clothes from his work clothes.

(iii) Laundering: (a) Laundering of asbestos contaminated clothing shall be done so as to prevent the release of airborne asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section.

(b) Any employer who gives asbestos-contaminated clothing to another person for laundering shall inform such person of the requirement in (a) of this subdivision to effectively prevent the release of airborne asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section.

(c) Contaminated clothing shall be transported in sealed impermeable bags, or other closed, impermeable containers,

and labeled in accordance with paragraph (g) of this section.

(e) *Method of measurement.* All determinations of airborne concentrations of asbestos fibers shall be made by the membrane filter method at 400-450 X (magnification) (4 millimeter objective) with phase contrast illumination.

(f) *Monitoring—(1) Initial determinations.* Within 6 months of the publication of this section, every employer shall cause every place of employment where asbestos fibers are released to be monitored in such a way as to determine whether every employee's exposure to asbestos fibers is below the limits prescribed in paragraph (b) of this section. If the limits are exceeded, the employer shall immediately undertake a compliance program in accordance with paragraph (c) of this section.

(2) *Personal monitoring—(i) Samples* shall be collected from within the breathing zone of the employees, on membrane filters of 0.8 micrometer porosity mounted in an open-face filter holder. Samples shall be taken for the determination of the 8-hour time-weighted average airborne concentrations and of the ceiling concentrations of asbestos fibers.

(ii) *Sampling frequency and patterns.* After the initial determinations required by subparagraph (1) of this paragraph, samples shall be of such frequency and pattern as to represent with reasonable accuracy the levels of exposure of employees. In no case shall the sampling be done at intervals greater than 6 months for employees whose exposure to asbestos may reasonably be foreseen to exceed the limits prescribed by paragraph (b) of this section.

(3) *Environmental monitoring—(i) samples* shall be collected from areas of a work environment which are representative of the airborne concentrations of asbestos fibers which may reach the breathing zone of employees. Samples shall be collected on a membrane filter of 0.8 micrometer porosity mounted in an open-face filter holder. Samples shall be taken for the determination of the 8-hour time-weighted average airborne concentrations and of the ceiling concentrations of asbestos fibers.

(ii) *Sampling frequency and patterns.* After the initial determinations required by subparagraph (1) of this paragraph, samples shall be of such frequency and pattern as to represent with reasonable accuracy the levels of exposure of the

employees. In no case shall sampling be at intervals greater than 6 months for employees whose exposures to asbestos may reasonably be foreseen to exceed the exposure limits prescribed in paragraph (b) of this section.

(4) *Employee observation of monitoring.* Affected employees, or their representatives, shall be given a reasonable opportunity to observe any monitoring required by this paragraph and shall have access to the records thereof.

(g) *Caution signs and labels.* (1) *Caution signs.* (i) *Posting.* Caution signs shall be provided and displayed at each location where airborne concentrations of asbestos fibers may be in excess of the exposure limits prescribed in paragraph (b) of this section. Signs shall be posted at such a distance from such a location so that an employee may read the signs and take necessary protective steps before entering the area marked by the signs. Signs shall be posted at all approaches to areas containing excessive concentrations of airborne asbestos fibers.

(ii) *Sign specifications.* The warning signs required by subdivision (i) of this subparagraph shall conform to the requirements of 20" x 14" vertical format signs specified in § 1910.145(d)(4), and to this subdivision. The signs shall display the following legend in the lower panel, with letter sizes and styles of a visibility at least equal to that specified in this subdivision.

Legend	Notation
Asbestos.....	1" Sans Serif, Gothic or Block.
Dust Hazard.....	¾" Sans Serif, Gothic or Block.
Avoid Breathing Dust....	½" Gothic.
Wear Assigned Protective Equipment.	½" Gothic.
Do Not Remain In Area Unless Your Work Requires It.	½" Gothic.
Breathing Asbestos Dust May Be Hazardous To Your Health.	14 point Gothic.

Spacing between lines shall be at least equal to the height of the upper of any two lines.

(2) *Caution labels.*—(i) *Labeling.* Caution labels shall be affixed to all raw materials, mixtures, scrap, waste, debris, and other products containing asbestos fibers, or to their containers, except that no label is required where asbestos fibers have been modified by a bonding agent,

coating, binder, or other material so that during any reasonably foreseeable use, handling, storage, disposal, processing, or transportation, no airborne concentrations of asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section will be released.

(ii) *Label specifications.* The caution labels required by subdivision (i) of this subparagraph shall be printed in letters of sufficient size and contrast as to be readily visible and legible. The label shall state:

CAUTION

Contains Asbestos Fibers

Avoid Creating Dust

Breathing Asbestos Dust May Cause Serious Bodily Harm

(h) *Housekeeping.*—(1) *Cleaning.* All external surfaces in any place of employment shall be maintained free of accumulations of asbestos fibers if, with their dispersion, there would be an excessive concentration.

(2) *Waste disposal.* Asbestos waste, scrap, debris, bags, containers, equipment, and asbestos-contaminated clothing, consigned for disposal, which may produce in any reasonably foreseeable use, handling, storage, processing, disposal, or transportation airborne concentrations of asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section shall be collected and disposed of in sealed impermeable bags, or other closed, impermeable containers.

(i) *Recordkeeping.*—(1) *Exposure records.* Every employer shall maintain records of any personal or environmental monitoring required by this section. Records shall be maintained for a period of at least 3 years and shall be made available upon request to the Assistant Secretary of Labor for Occupational Safety and Health, the Director of the National Institute for Occupational Safety and Health, and to authorized representatives of either.

(2) *Employee access.* Every employee and former employee shall have reasonable access to any record required to be maintained by subparagraph (1) of this paragraph, which indicates the employee's own exposure to asbestos fibers.

(3) *Employee notification.* Any employee found to have been exposed at any time to airborne concentrations of asbestos fibers in excess of the limits prescribed in paragraph (b) of this section shall be notified in writing of the exposure as soon as practicable but not later

than 5 days of the finding. The employee shall also be timely notified of the corrective action being taken.

(j) *Medical examinations*—(1) *General*. The employer shall provide or make available at his cost, medical examinations relative to exposure to asbestos required by this paragraph.

(2) *Preplacement*. The employer shall provide or make available to each of his employees, within 30 calendar days following his first employment in an occupation exposed to airborne concentrations of asbestos fibers, a comprehensive medical examination, which shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 x 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV₁).

(3) *Annual examinations*. On or before January 31, 1973, and at least annually thereafter, every employer shall provide, or make available, comprehensive medical examinations to each of his employees engaged in occupations exposed to airborne concentrations of asbestos fibers. Such annual examination shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 x 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV₁).

(4) *Termination of employment*. The employer shall provide, or make available, within 30 calendar days before or after the termination of employment of any employee engaged in an occupation exposed to airborne concentrations of asbestos fibers, a comprehensive medical examination which shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 x 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV₁).

(5) *Recent examinations*. No medical examination is required of any employee, if adequate records show that the employee has been examined in accordance with this paragraph within the past 1-year period.

(6) *Medical records*—(1) *Maintenance*. Employers of employees examined pursuant to this paragraph shall cause to be maintained complete and accurate records of all such medical examina-

tions. Records shall be retained by employers for at least 20 years.

(2) *Access*. The contents of the records of the medical examinations required by this paragraph shall be made available, for inspection and copying, to the Assistant Secretary of Labor for Occupational Safety and Health, the Director of NIOSH, to authorized physicians and medical consultants of either of them, and, upon the request of an employee or former employee, to his physician. Any physician who conducts a medical examination required by this paragraph shall furnish to the employer of the examined employee all the information specifically required by this paragraph, and any other medical information related to occupational exposure to asbestos fibers.

§ 1910.1002 Coal tar pitch volatiles; interpretation of term.

As used in § 1910.1000 (Table Z-1), coal tar pitch volatiles include the fused polycyclic hydrocarbons which volatilize from the distillation residues of coal, petroleum, wood, and other organic matter.

(Sec. 6(g), 84 Stat. 1600, 29 U.S.C. 657) [39 FR 23502, June 27, 1974. Redesignated and amended at 40 FR 23073, May 28, 1975]

§ 1910.1003 4-Nitrophenyl.

(a) *Scope and application*. (1) This section applies to any area in which 4-Nitrophenyl. Chemical Abstracts Service Registry Number 92933 is manufactured, processed, repackaged, released, handled, or stored, but shall not apply to trans-shipment in sealed containers, except for the labeling requirements under paragraphs (c) (2), (3), and (4) of this section.

(2) This section shall not apply to solid or liquid mixtures containing less than 0.1 percent by weight or volume of 4-Nitrophenyl.

(b) *Definitions*. For the purposes of this section: (1) "Absolute filter" is one capable of retaining 99.97 percent of a mono disperse aerosol of 0.3 μ m particles.

(2) "Authorized employee" means an employee whose duties require him to be in the regulated area and who has been specifically assigned by the employer.

(3) "Clean change room" means a room where employees put on clean clothing and/or protective equipment in an environment free of 4-Nitrophenyl. The clean change room shall be contiguous to and have an entry from a shower room, when the shower room



PHILLIPS PETROLEUM COMPANY

BARTLESVILLE, OKLAHOMA 74004
PHONE: 918 681-6600 CABLE CODE: PHILPETROL TELEX: 49-2455

ENGINEERING AND SERVICES

February 22, 1979

Material Safety Data Sheet ..

Mr. W. B. Kirkland
Baroid Division
NL Industries, Inc.
P.O.Box 1675
Houston, TX 77001

Dear Mr. Kirkland:

As stated in Mr. F. J. Shell's letter of February 20, 1979, Diaseal M[®] has been reformulated and no longer contains chrysotile asbestos fiber.

We have revised our Material Safety Data Sheet accordingly and a copy is attached for your use. Please destroy the Data Sheet on Diaseal M presently in your files and replace with the attached updated copy.

Very truly yours,

R. R. Simmons
Senior Standards & Regulations
Analyst

PRS/vmr
Attachment

2-22-79

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OSHA No. 26-R130

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME

Johns-Manville Corp & Subsidiaries

EMERGENCY TELEPHONE NO.

303/770-1000 Ext 2252

ADDRESS (Number, Street, City, State, and ZIP Code)

Greenwood Plaza, Denver, Colorado 80217

CHEMICAL NAME AND SYNONYMS

TRADE NAME AND SYNONYMS

Diaseal M

CHEMICAL FAMILY

FORMULA

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
Natural diatomaceous earth				88	*
* For TLV's see attached Federal Register of 6/7/72 (1910.93 and 1910.93a pg 11320, Vol 37, #110)				-	

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)		SPECIFIC GRAVITY (H ₂ O=1)	
VAPOR PRESSURE (mm Hg.)		PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ =1)	
SOLUBILITY IN WATER			
APPEARANCE AND ODOR Gray powder - no odor			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used): Non-flammable	FLAMMABLE LIMITS	Let	Uel
EXTINGUISHING MEDIA			
SPECIAL FIRE FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARDS			

Product: _____

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

See Section II

EFFECTS OF OVEREXPOSURE

Long term exposure to high airborne concentrations of this

material may cause pulmonary disease

EMERGENCY AND FIRST AID PROCEDURES

SECTION VI - REACTIVITY DATA

STABILITY

UNSTABLE

CONDITIONS TO AVOID

STABLE

X

INCOMPATIBILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS
POLYMERIZATION

MAY OCCUR

CONDITIONS TO AVOID

WILL NOT OCCUR

X

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Vacuum clean spillage. If sweeping is necessary, wet spilled

material or use sweeping compounding.

WASTE DISPOSAL METHOD

Dispose of waste in closed containers.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

NIOSH approved for protection against pneumoconiosis-producing dusts

VENTILATION

LOCAL EXHAUST

SPECIAL

MECHANICAL (General)

OTHER

PROTECTIVE GLOVES

EYE PROTECTION

OTHER PROTECTIVE EQUIPMENT

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

OTHER PRECAUTIONS

PAGE (2)

GPO 9-21-557

While the information and recommendations set forth herein
are believed to be accurate as of the date hereof,
JOHNS-MANVILLE CORPORATION MAKES NO WARRANTY WITH RESPECT
HEREIN.

1910.93 Air contaminants.

TABLE O 3—MINERAL DUSTS

Substance	Mppcl	Mg/M
Fibers:		
Crystalline silica (respirable).....	250	10mc/M ³
Quartz (total dust).....	250+4	250+4 10mc/M ³
Cellulose: Use 1/2 the value calculated from the equal volume formula for quartz.		250+2
Tridymite: Use 1/2 the value calculated from the formula for quartz.		
Amorphous, including natural diatomaceous earth.....	20	80mc/M ³ 250
Silicates from 1% crystalline silica:		
Albite.....	20	
Forsterite.....	20	
Pyroxene.....	20	
Pericard mineral.....	20	
Graphite (natural).....	10	
Coal dust (respirable fraction less than 5% SiO ₂).....		2.0mc/M ³ or 10mc/M ³
For more than 5% SiO ₂		250+2
Inert or nuisance dust:		
Respirable fraction.....	15	8mc/M ³
Total dust.....	80	15mc/M ³

Note: Conversion factors—
1 mg/M³ = 1 million particles per cubic meter
= particles per cc.

(1) The percentage of crystalline silica in the formula is the amount determined from x-ray analysis, except in those instances in which other methods have been shown to be applicable.

(2) As determined by the membrane filter method at 45°C plus a high concentration and percent quartz for the equivalent of this limit are to be determined from the fraction passing a size-selector with the following characteristics:

Aerodynamic diameter (unit density sphere)	Percent passing selector
2	90
2.5	75
3	50
3.5	25
4	10

The measurements under this table refer to the size of an AEC instrument. If the respirable fraction of a dust is determined with a NIOSH instrument, the corresponding limit of 2.5 mg/M³ must be converted to 1.5 mg/M³.

2. A new § 1910.93A is added to Part 1910, reading as follows:

§ 1910.93A Asbestos.

(a) Definitions. For the purpose of this section, (1) "Asbestos" includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite.

(2) "Asbestos fibers" means asbestos fibers longer than 5 micrometers.

(b) Permissible exposure to airborne concentrations of asbestos fibers—(1) Standard effective July 7, 1972. The 8-hour time-weighted average airborne concentrations of asbestos fibers to which any employee may be exposed shall not exceed five fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (c) of this section.

(2) Standard effective July 1, 1976. The 8-hour time-weighted average airborne concentrations of asbestos fibers

to which any employee may be exposed shall not exceed two fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (c) of this section.

(3) Ceiling concentration. No employee shall be exposed at any time to airborne concentrations of asbestos fibers in excess of 10 fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (c) of this section.

(c) Methods of compliance—(1) Engineering methods. (i) Engineering controls. Engineering controls, such as, but not limited to, isolation, enclosure, exhaust ventilation, and dust collection, shall be used to meet the exposure limits prescribed in paragraph (b) of this section.

(ii) Local exhaust ventilation. (a) Local exhaust ventilation and dust collection systems shall be designed, constructed, installed, and maintained in accordance with the American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, ANSI Z9.2-1971, which is incorporated by reference herein.

(b) See § 1910.6 concerning the availability of ANSI Z9.2-1971, and the maintenance of a historic file in connection therewith. The address of the American National Standards Institute is given in § 1910.100.

(iii) Particular tools. All hand-operated and power-operated tools which may produce or release asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section, such as, but not limited to, saws, scorers, abrasive wheels, and drills, shall be provided with local exhaust ventilation systems in accordance with subdivision (ii) of this subparagraph.

(2) Work practices—(i) Wet methods. Insofar as practicable, asbestos shall be handled, mixed, applied, removed, cut, scored, or otherwise worked in a wet state sufficient to prevent the emission of airborne fibers in excess of the exposure limits prescribed in paragraph (b) of this section, unless the usefulness of the product would be diminished thereby.

(ii) Particular products and operations. No asbestos cement, mortar, coating, grout, plaster, or similar material containing asbestos shall be removed from bags, cartons, or other containers in which they are shipped, without being either wetted, or enclosed, or ventilated so as to prevent effectively the release of airborne asbestos fibers in excess of the limits prescribed in paragraph (b) of this section.

(iii) Spraying, demolition, or removal. Employees engaged in the spraying of asbestos, the removal, or demolition of pipes, structures, or equipment covered or insulated with asbestos, and in the removal or demolition of asbestos insulation or coverings shall be provided with respiratory equipment in accordance with paragraph (d)(2)(iii) of this section and with special clothing in accordance with paragraph (d)(3) of this section.

(iv) Personal protective equipment. (1) Compliance with the exposure limits prescribed by paragraph (b) of this section may not be achieved by the use of respirators or shift rotation of employees, except:

(i) During the time period necessary to install the engineering controls and to institute the work practices required by paragraph (c) of this section;

(ii) In work situations in which the methods prescribed in paragraph (c) of this section are either technically not feasible or impracticable to an extent insufficient to reduce the airborne concentrations of asbestos fibers below the limits prescribed by paragraph (b) of this section; or

(iii) In emergencies.

(iv) Where both respirators and personnel rotation are allowed by subdivisions (i), (ii), or (iii) of this subparagraph, and both are practicable, personnel rotation shall be preferred and used.

(2) Where a respirator is permitted by subparagraph (1) of this paragraph, it shall be selected from among those approved by the Bureau of Mines, Department of the Interior, or the National Institute for Occupational Safety and Health, Department of Health, Education, and Welfare, under the provisions of 30 CFR Part 11 (37 F.R. 6244, Mar. 25, 1972), and shall be used in accordance with subdivisions (1), (ii), (iii), and (iv) of this subparagraph.

(i) Air purifying respirators. A reusable or single use air-purifying respirator, or a respirator described in subdivision (ii) or (iii) of this subparagraph, shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits presented in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average airborne concentrations of asbestos fibers are reasonably expected to exceed no more than 10 times those limits.

(ii) Full facepiece air purifying respirators. A full facepiece powered air purifying respirator, or a powered air purifying respirator, or a respirator described in subdivision (iii) of this subparagraph, shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average concentrations of asbestos fibers are reasonably expected to exceed 10 times, but not 100 times, those limits.

(iii) Type "C" supplied-air respirators, continuous flow or pressure-demand class. A type "C" continuous flow or pressure-demand, supplied-air respirator shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average airborne concentrations of asbestos fibers are reasonably expected to exceed 100 times those limits.

(iv) Establishment of a respirator program. (a) The employer shall establish a respirator program in accordance with

DRILLING SPECIALTIES COMPANY
BARTLESVILLE OKLAHOMA 74004

918 661-5405
918 661-6153
918 661-5333

TELEX 49-2455
TWX 910 841-2560

September 2, 1982

Material Safety Data Sheets

J. H. Moore
Manager of Purchases
NL Baroid/NL Industries, Inc.
P.O. Box 1675
Houston, TX 77251

Dear Mr. Moore:

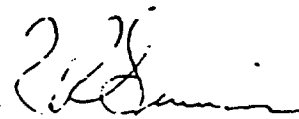
Attached, per your request, are Material Safety Data Sheets for the following products:

"Drispac polymer"
"Flosal"
"Soltex®"

Communication of physical property, health and safety information in Material Safety Data Sheets is a key element in our product safety program. With this information you can better fulfill your obligation to educate exposed personnel in the proper product handling techniques required to maintain safety in the workplace.

If additional information is required, please advise us.

Very truly yours,



R. R. Simmons
Senior Standards &
Regulations Analyst
Seneca Building
(918) 661-8327

RRS:afb

Attachments

RECEIVED

SEP 7 1982

BAROID PURCHASING DEPT.
HOUSTON, TEXAS

U.S. DEPARTMENT OF LABOR

WAGE AND LABOR STANDARDS ADMINISTRATION Bureau of Labor Standards

MATERIAL SAFETY DATA SHEET

SECTION I	
MANUFACTURER'S NAME Hercules Inc	EMERGENCY TELEPHONE NO. 302 575-5000
ADDRESS (Number, Street, City, State, and ZIP Code) 900 Market Street, Wilmington, DE 19899	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS Drispac polymer
CHEMICAL FAMILY Cellulose ether	POSSIBLE Available in high or low viscosity grade

SECTION II HAZARDOUS INGREDIENTS					
PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
Note: As we interpret the Occupational Safety and Health Act of 1970, this product should not be considered hazardous.					

SECTION III PHYSICAL DATA		
BOILING POINT (°F.)	NA	SPECIFIC GRAVITY (H ₂ O=1) ca. 1.6 g/ml (film)
VAPOR PRESSURE (mm Hg.)	NA	PERCENT VOLATILE BY VOLUME (%) Moisture 8% max.
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ = 1) (Butyl acetate = 1) NA
SOLUBILITY IN WATER % by wt @ 25 C complete		
APPEARANCE AND ODOR	dry, granular powder of light color; odorless	

SECTION IV FIRE AND EXPLOSION HAZARD DATA			
FLASH POINT (Method used)	NA	FLAMMABLE LIMITS	Let Vol 0.150 oz NA
EXTINGUISHING MEDIA	water, CO ₂ , foam or dry chemical		per cu ft
SPECIAL FIRE FIGHTING PROCEDURES	None		
UNUSUAL FIRE AND EXPLOSION HAZARDS	Treat as a flammable dust in the finely divided and suspended state.		

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME Arnold & Clarke Chemical Company		EMERGENCY TELEPHONE NO. 713 869-0541
ADDRESS (Number, Street, City, State, and ZIP Code) 6325 Hurst Street, P.O. Box 10660, Houston, TX 77018		
CHEMICAL NAME AND SYNONYMS sodium asphalt sulfonate		TRADE NAME AND SYNONYMS Soltex®
CHEMICAL FAMILY sulfonate	FORMULA	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	NA	SPECIFIC GRAVITY (H ₂ O=1)	0.98
VAPOR PRESSURE (mm Hg.)	NA	PERCENT. VOLATILE BY VOLUME (%)	8% max
VAPOR DENSITY (AIR=1)	NA	EVAPORATION RATE (_____ =1)	moisture
SOLUBILITY IN WATER	75 ± 10% at 90 C		
APPEARANCE AND ODOR	Dark brown-black friable flake		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	NA	FLAMMABLE LIMITS	Let	Uel
EXTINGUISHING MEDIA				
SPECIAL FIRE FIGHTING PROCEDURES				
UNUSUAL FIRE AND EXPLOSION HAZARDS				



August 27, 1982

Mr. R.L. Clampitt
Drilling Specialties Co.
309 Short St.
Bartlesville, OK 74004

Dear Mr. Clampitt:

NL Baroid is in the process of updating its safety files, and need
Material Data Sheets for the product(s) currently purchased from
your company:

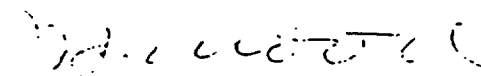
Drispac Polymer
Flosal/Asbestos
Soltex

Please send these sheets to the following:

J.H. Moore, Manager of Purchases
NL Baroid/NL Industries, Inc.
P.O. Box 1675
Houston, TX 77251

Your cooperation and assistance in this matter is greatly
appreciated.

Yours truly,


J.H. Moore
Manager of Purchases

JHM/css

CC: K. Somers
K. Thoresen

NL Baroid NL Industries, Inc
P O Box 1675, Houston, Texas 77001. Tel (713) 527-1100

SECTION V - HEALTH HAZARD DATA	
THRESHOLD LIMIT VALUE	See Section II and attached Federal Register - 6/7/72
EFFECTS OF OVEREXPOSURE	Long term exposure to high concentrations of asbestos fiber may cause pulmonary disease.
EMERGENCY AND FIRST AID PROCEDURES	Avoid breathing excessive dust when handling, dumping and mixing. See caution label on bag.

SECTION VI - REACTIVITY DATA			
STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	
INCOMPATIBILITY (Materials to avoid)			
HAZARDOUS DECOMPOSITION PRODUCTS			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Vacuum clean spillage. Repair broken bags. If sweeping is necessary, wet down spillage. Use approved respiratory equipment when required.	
WASTE DISPOSAL METHOD Place waste in closed containers. Dispose of waste in closed containers. Avoid breathing excessive dust.	

SECTION VIII - SPECIAL PROTECTION INFORMATION		
RESPIRATORY PROTECTION (Specify type) U.S. Bureau of Mines approved respirator - See OSHA 1910.93 Asbestos, Fed. Reg. 6		
VENTILATION	LOCAL EXHAUST MECHANICAL (General) Control with mechanical dust collection equip. to within TLV	SPECIAL OTHER
PROTECTIVE GLOVES		EYE PROTECTION
OTHER PROTECTIVE EQUIPMENT		

SECTION IX - SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Maintain good housekeeping practices. Vacuum clean waste and place in closed containers.	
OTHER PRECAUTIONS SEE CAUTION LABEL ON BAG.	

PAGE (2) While the information and recommendations set forth herein are believed to be accurate as of the date hereof, JOHNS-MANVILLE CORPORATION MAKES NO WARRANTY WITH RESPECT THERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

§ 1910.93 Air contaminants.

TABLE G 3—MINERAL DUSTS

Substance	Method	Limit
Fibers		
Crystalline silica (respirable).....	250'	10mc/M ³
Quartz (total dust).....	2510+4	2510+2 10mc/M ³
Crystalline silica (total dust).....	2510+4	2510+2
Crystalline silica: Use 1/2 the value calculated from the count in these formulae for quartz.		
Tremolite: Use 1/2 the value calculated from the count in these formulae for quartz.		
Amphibole, including natural chrysotile asbestos.....	20	10mc/M ³ 2510
Fibers (less than 5% crystalline silica):		
Aluminum silicate.....	20	
Asbestos.....	20	
Talc.....	20	
Pyrophyllite.....	20	
Graphite (natural).....	15	
Coal dust (respirable fraction less than 5% SiO ₂).....		2.0mc/M ³ or 10mc/M ³
For more than 5% SiO ₂		2510+2
Inert or Nuisance Dust:		
Respirable fraction.....	15	5mc/M ³
Total dust.....	20	15mc/M ³

Note: Conversion between mg/M³ and million particles per cubic meter (mppcf) is as follows:

(1) Number of particles per cubic foot of air, based on immediate samples obtained by light-scatter technique.
(2) The percentage of crystalline silica in the formula is the amount determined from airborne samples, except in those instances in which other methods have been shown to be applicable.
(3) As determined by the membrane filter method at 40 X phase-contrast magnification.
(4) Both extrapolation and percent quartz for the application of the limit are to be determined from the fraction passing a size-selector with the following characteristics:

Aerodynamic diameter (unit density sphere)	Percent passing selector
2.5	10
2.5	25
3.0	40
4.0	75
10	90

The measurements under this table refer to the use of an Andersen sampler. If the respirable fraction of a dust is determined with a NIOS sampler, the corresponding limit will be 10 times the limit shown by this table.

2. A new § 1910.93a is added to Part 1910, reading as follows:

§ 1910.93a Asbestos.

(a) Definitions. For the purpose of this section, (1) "Asbestos" includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite.

(2) "Asbestos fibers" means asbestos fibers longer than 5 micrometers.

(b) Permissible exposure to airborne concentrations of asbestos fibers—(1) Standard effective July 7, 1972. The 8-hour time-weighted average airborne concentrations of asbestos fibers in which any employee may be exposed shall not exceed five fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (c) of this section.

(2) Standard effective July 1, 1976. The 8-hour time-weighted average airborne concentrations of asbestos fibers

to which any employee may be exposed shall not exceed two fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (c) of this section.

(3) Ceiling concentration. No employee shall be exposed at any time to airborne concentrations of asbestos fibers in excess of 10 fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (c) of this section.

(c) Methods of compliance—(1) Engineering methods. (i) Engineering controls. Engineering controls, such as, but not limited to, isolation, enclosure, exhaust ventilation, and dust collection, shall be used to meet the exposure limits prescribed in paragraph (b) of this section.

(ii) Local exhaust ventilation. (a) Local exhaust ventilation and dust collection systems shall be designed, constructed, installed, and maintained in accordance with the American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, ANSI Z9.2-1971, which is incorporated by reference herein.

(b) See § 1910.6 concerning the availability of ANSI Z9.2-1971, and the maintenance of a historic file in connection therewith. The address of the American National Standards Institute is given in § 1910.100.

(iii) Particular tools. All hand-operated and power-operated tools which may produce or release asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section, such as, but not limited to, saws, scorers, abrasive wheels, and drills, shall be provided with local exhaust ventilation systems in accordance with subdivision (ii) of this subparagraph.

(2) Work practices—(i) Wet methods. Insofar as practicable, asbestos shall be handled, mixed, applied, removed, cut, scored, or otherwise worked in a wet state sufficient to prevent the emission of airborne fibers in excess of the exposure limits prescribed in paragraph (b) of this section, unless the usefulness of the product would be diminished thereby.

(ii) Particular products and operations. No asbestos cement, mortar, coating, grout, plaster, or similar material containing asbestos shall be removed from bags, cartons, or other containers in which they are shipped, without being either wetted, or enclosed, or ventilated so as to prevent effectively the release of airborne asbestos fibers in excess of the limits prescribed in paragraph (b) of this section.

(iii) Spraying, demolition, or removal. Employees engaged in the spraying of asbestos, the removal, or demolition of pipes, structures, or equipment covered or insulated with asbestos, and in the removal or demolition of asbestos insulation or coverings shall be provided with respiratory equipment in accordance with paragraph (d)(2)(iii) of this section and with special clothing in accordance with paragraph (d)(3) of this section.

(d) Personal protective equipment—(1) Compliance with the exposure limits prescribed by paragraph (b) of this section may not be achieved by the use of respirators or shift rotation of employees, except:

(i) During the time period necessary to install the engineering controls and to institute the work practices required by paragraph (c) of this section;

(ii) In work situations in which the methods prescribed in paragraph (c) of this section are either technically not feasible or impracticable to an extent insufficient to reduce the airborne concentrations of asbestos fibers below the limits prescribed by paragraph (b) of this section; or

(iii) In emergencies.

(iv) Where both respirators and personnel rotation are allowed by subdivisions (i), (ii), or (iii) of this subparagraph, and both are practicable, personnel rotation shall be preferred and used.

(2) Where a respirator is permitted by subparagraph (1) of this paragraph, it shall be selected from among those approved by the Bureau of Mines, Department of the Interior, or the National Institute for Occupational Safety and Health, Department of Health, Education, and Welfare, under the provisions of 30 CFR Part 11 (37 F.R. 6244, Mar. 25, 1972), and shall be used in accordance with subdivisions (i), (ii), (iii), and (iv) of this subparagraph.

(i) Air purifying respirators. A reusable or single-use air-purifying respirator, or a respirator described in subdivision (ii) or (iii) of this subparagraph, shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits presented in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average airborne concentrations of asbestos fibers are reasonably expected to exceed no more than 10 times those limits.

(ii) Powered air-purifying respirators. A full facepiece powered air-purifying respirator, or a powered air-purifying respirator, or a respirator described in subdivision (iii) of this subparagraph, shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average concentrations of asbestos fibers are reasonably expected to exceed 10 times, but not 100 times, those limits.

(iii) Type "C" supplied-air respirators, continuous flow or pressure-demand class. A type "C" continuous flow or pressure-demand, supplied-air respirator shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average airborne concentrations of asbestos fibers are reasonably expected to exceed 100 times those limits.

(iv) Establishment of a respirator program. (a) The employer shall establish a respirator program in accordance with



PHILLIPS PETROLEUM COMPANY
BARTLESVILLE, OKLAHOMA 74004 918 661-6600

ENGINEERING AND SERVICES

January 22, 1976

Material Safety Data Sheets
Dyer-17-76

Mr. W. B. Kirkland
Director of Purchases
Bariod Division
NL Industries
P. O. Box 1675
Houston, TX 77001

Dear Mr. Kirkland:

In accordance with your request (copy attached), we are forwarding Material Safety Data Sheets for our products "Diacel® D", "Drispac" and "Driscose® (Cellex) CMC".

We are presently in the process of preparing Data Sheets for the other products in your request and will send copies when completed.

Very truly yours,

A. F. Dyer, Director
Standards and Regulations

AFD:fh
Attachments

December 22, 1973

Drilling Specialties Company
Attn: F. J. Shell
309 Short Street
Bartlesville, Oklahoma 74004

Re: Material Safety Data Sheets

Dear Sir:

Requests are continually being received from our customers for Material Safety Data Sheets on the various products that we sell. Among these are the following Drilling Specialties' products.

Floal
Diaseal M
Diacel D
Desco
Cellox
Drispac
Soltex

Enclosed are Material Safety Data Sheets with the request that you submit in duplicate all the technical information available on each of these products.

Very truly yours,


W. B. Kirkland
Director of Purchases

WBK:cg

Attachments

Don H. Sutter

Drilling Specialties Company

BARTLESVILLE, OKLAHOMA 74004



DRISPAC
DRISPAC SUPER
DRISCOSE CMC
SOLTEX
DESCO
FLOSA
DIASEAL M

DIACEL LWL
DIACEL D
DIACEL A

PROD

SEE DRISPAC FILE

PRODUCT INFORMATION

DRILLING SPECIALTIES COMPANY
BARTLESVILLE, OKLAHOMA 74004

918 661-5405
918 661-6153
918 661-5333

TELEX 49-7455
TWX 910 841-25

March 16, 1979

New Diaseal M[®], Lost
Circulation Slurry
Sau-37-79

Mr. W. B. Kirkland
Baroid Petroleum Services Co.
NL Industries Inc.
P. O. Box 1675
Houston, TX 77001

Dear Mr. Kirkland:

New Diaseal M has been markedly improved. It no longer contains asbestos (our last sale of Diaseal M that contained asbestos was in August, 1977). Also, concentrations of new Diaseal M can be added to a high solids-high water loss slurry without causing too high a slurry viscosity: the result is a better slurry for overcoming severe lost circulation. In other words, the standard formulation is adequate in most cases, but when additional new Diaseal M is added, the chance for success, when dealing with severe losses, is improved. There is also the advantage that there is more margin for error by field personnel in mixing a Diaseal M slurry than with the previous product.

New Diaseal M is now being blended at Midland, TX primarily because of labor and governmental agency problems in California, where it was previously blended. Shipment of the components to another site for blending has increased our costs significantly. Inflation has also increased costs. As a result, the current price of new Diaseal M is \$440/short ton*, FOB Midland, TX. However, we have secured a "Mixing in Transit Tariff (MITT)" which will allow our customers to purchase Diaseal M in 40 ton carload lots for \$440/short ton, FOB Houston. Here's how this works: the components are shipped to Midland, blended and then reloaded for shipment on to Houston at no additional freight cost. This will save our customers additional freight on material needed in the Gulf Coast area. To take advantage of the MITT, the purchase of Diaseal M, FOB Houston will have to be programmed and coordinated, resulting in estimated delivery time of two months. For normal delivery times, it will be necessary to purchase Diaseal M, FOB Midland (20,000# TL minimum).

* All orders are subject to acceptance by Drilling Specialties Company and to the terms and conditions of sale in effect by it at the time of shipment. This price list supersedes all previous price lists of these sales.

March 16, 1979

Sau-37-79

While awaiting the MITT, we warehoused some new Diaseal M in the Houston area, at our own expense, in order to introduce the new product. We will no longer do this. We plan to start promoting the sales of new Diaseal M aggressively once more now that the MITT has been allowed. Hence, it may be to your benefit to order new Diaseal M now for your future needs in the Gulf Coast area.

Yours very truly,



C. A. Sauber

CAS:tlb -RC

DRILLING SPECIALTIES COMPANY

BARTLESVILLE, OKLAHOMA 74003

October 4, 1972

Material Safety Data - Cellex,
Drispac[®], Diacel[®] D and Soltex[®]

P-1-Sh-183-72D

Mr. W. B. Kirkland
Purchasing Agent
Baroid Division
P.O. Box 1675
Houston, Texas 77001

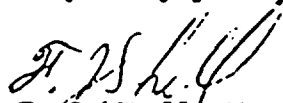
Dear Sir:

You have asked for material safety information on the products we sell you. This is to advise you that our products Cellex (Regular, High Viscosity and Technical Grade), Drispac, Diacel D and Soltex are not hazardous as defined by the Occupational Safety and Health Act of 1970. We will be pleased to give you any non-proprietary information on these products if you still feel you need it. This information in your U. S. Department of Labor Form LSB-OOS-4 would just clutter your files with non-essential information.

The U. S. Department of Labor's "Instructions and Explanation of Terms" for LSB-OOS-4 says, "The Material Safety Data Sheet (Form LSB-OOS-4), or one essentially similar, approved by the Bureau of Labor Standards, is required to be filled out only on materials which, when used without special precautions and controls, will constitute a health hazard to workers."

We are preparing forms for you on our products Flosal[®], Diaseal M[®] and Desco[®]. These will be sent to you in the near future.

Very truly yours,



F. J. Shell, Manager
Technical Services
309 Short Street
Telephone 918 661-5406

FJS:dr

Preshearing, pelletizing improves asbestos fibers for drilling mud

ASBESTOS materials used as drilling mud additives provide one method of increasing the carrying capacity and suspending ability of clear fluids, without sacrificing the high penetration rates possible when using clear water.

But asbestos products have presented two main problems in the past—high bulk and slow yield. An improved asbestos material is now available which eliminates these two problems and reduces the cost of using asbestos as an additive.

By chemically and hydraulically shearing a top-grade chrysotile asbestos in a wet process, a high degree of fiber separation is achieved. Then for convenience, this presheared material is pelletized.

The process for shearing the asbestos was developed by Union Carbide Corp. and is still proprietary. But the presheared asbestos distributed as Super Visbesto by Montello, Inc., Sand Springs, Okla., is said to have these advantages over asbestos materials now being used in drilling muds:

- It has only about one-half the bulk. The material is compressed into pellets about 1/2-in. long and 1/4-in. diameter and a given volume contains approximately twice the amount of asbestos as other products now available.

- It yields 8-10 times faster. Until now, asbestos products have been sheared on the location using special pumps or shearing equipment. This sometimes requires from several hours up to several days.

- It is more effective on a pound-per-pound basis. Lab and field tests indicate that the presheared material gives much better mud properties than other asbestos products.

The need for a low-solids, low-viscosity, and high-carrying capacity fluid will offer good possibilities for use of this material. And it will find application in shallow holes where mixing time and money are critical.

The difference. The electron micrographs in Fig. 1 show why the new material has provided some favorable results.

Typical Canadian chrysotile ore (A) is linear in structure and made up of bundles of asbestos fibers that are

JOHN L. KENNEDY
Drilling Editor

usually assays about 7-15% asbestos and the rest is generally serpentine rock.

California chrysotile (B) is a unique formation in which the asbestos fibers are arranged in a random pattern.

The bonding is basically on a point-to-point contact, and the ore assays about 50% asbestos with some deposits going as high as 60%.

The higher purity and less tightly held bond of this ore makes it very suitable for a hydraulic separation process.

Micrograph (C) represents the fiber structure of California asbestos additives that have been dry processed with conventional methods. It still contains fiber bundles and maintains a considerable amount of linear contact.

Micrograph (D) shows the presheared asbestos of extremely high purity with up to 98% of the fibers being liberated. Since the fibers are the material that does the work in a drilling mud additive, this material is more efficient and economical.

After the separation of the fibers to the point shown in (D), the presheared asbestos is pelletized for storage and handling convenience.

Lab and field tests. In lab tests made to evaluate the effectiveness of the presheared asbestos each material was tested following the same procedure.

Five g of the material was added to 350 cc's of distilled water containing 3.5 g of common salt. The mixture was stirred for 10 min and then tested in a Fann v-g meter. Laboratory results are shown in Table 1.

Comparison field tests were also made on six wells—three using

the presheared material and three using a regular asbestos product—in the Texas Panhandle.

These 7,100-ft wells in the Perryton, Tex. area usually encounter a geologic column something like this: down to 3,000-4,000 ft are redbeds, (silty) dolomite and hydrates, and shale; at approximately 4,000 ft is the Wolfcamp dolomite; and from there to total depth—about 7,200 ft—sheets of shale, lime, and sand are found.

Completions are usually made in limestone that exhibits varying degrees of fracture.

In the three wells that were drilled with the presheared material, average rotating time per well was 186 hr compared to a 242-hr average for the wells in which regular asbestos products were used.

The average number of bits used on the wells using the regular asbestos-bentonite mud was 18, compared to 12.33 bits per well on the wells in which the presheared material was added to the bentonite mud system.

As far as the mud costs were concerned, the wells using the presheared additive averaged about \$4,220 com-

Table 1

Lab test results

	Pre-sheared	Un-sheared (regular)	Product F
Apparent viscosity	14.5	8	7
Fann V-G meter 600 rpm	29	16	14
Fann V-g meter 300 rpm	18	9	8
Plastic viscosity (centipoises)	11	7	6
Yield point (lb per 100 sq ft)	7	2	2
Initial gel (lb per 100 sq ft)	5	3	3

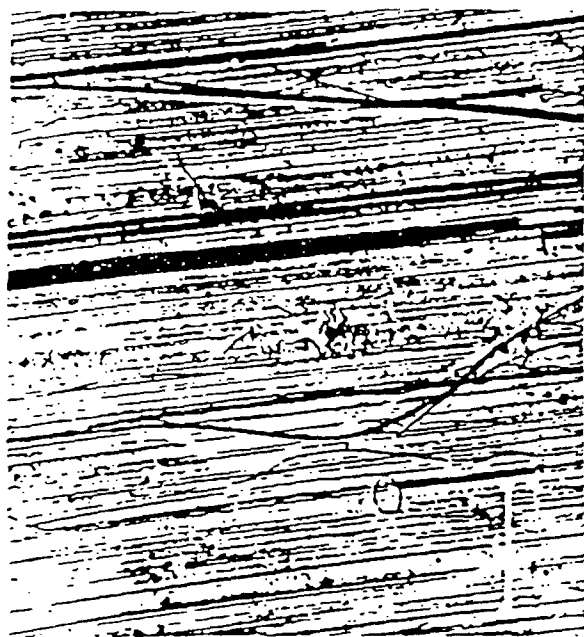
Table 2

Here's how field comparison turned out

Well No.	Unsheared asbestos			Presheared asbestos		
	1	2	3	4	5	6
Hours rotating	209.75	251.75	267.25	175.5	180.25	203.5
Number bits	19	21	14	13	13	11
Mud cost	\$14,586.31	\$25,474.82	\$7,544.23	\$2,573.05	\$4,232.98	\$4,861.65
Days on location	14	27	15	13	12	11
Depth in ft	7,475	7,160	7,202	7,200	7,142	7,300

These micrographs show the difference

Fig. 1



Typical Canadian asbestos-fiber structure

A



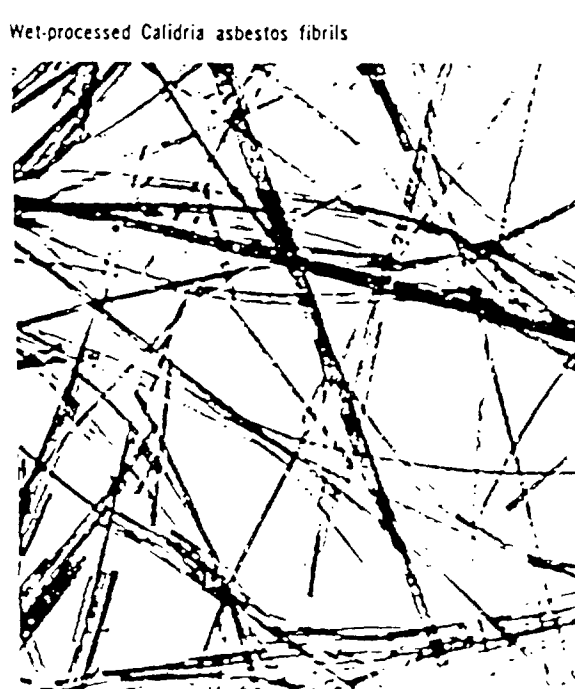
Typical Calidria asbestos fibers

B



Dry-processed asbestos fibers

C



Wet-processed Calidria asbestos fibrils

D

pared to an average mud cost for the other wells of about \$15,870.

These average figures are broken down into individual well data in Table 2.

An additional characteristic of the test wells drilled with the presheared

asbestos was the reduction in lost circulation troubles.

Lost circulation occurred from 3 to 11 times in each of the wells drilled with other asbestos products. Circulation was lost in only two of the wells drilled with the presheared as-

bestos, and then only once in each well.

Makers of the presheared asbestos attribute much of its drilling cost savings to the need for less material, less mixing time, less supervision and ease of storage and handling.

Product Bulletin

Super VISBESTOS® Viscosifier

...Effectively Increases Viscosity of All Drilling Fluids

Super "Visbestos" viscosifier is a presheared chrysotile-asbestos product that can increase the viscosity of all aqueous drilling fluids. Since the product is sheared in the processing plant—not on the rig—users get almost instant liberation of the individual asbestos fibers in the drilling fluid. Thus, the viscosifier effectively allows the fluid to suspend and carry cuttings and barites, providing as much as a 50% reduction in slip velocity. The result is higher drill-bit penetration rates plus several other operating benefits shown in the chart below.

Super "Visbestos" viscosifier is a product whose fibers have been liberated for fast mixing. "Univis" viscosifier is a pelletized version of the same product that is free-flowing, minimizes dust, and reduces storage and shipping costs. The pellets break down readily during mixing.

Experience with a Proven Product

Super "Visbestos" viscosifier has a proven record as an additive to drilling fluids. Interviews with operator personnel, drilling-mud engineers, and drilling contractors show that Super "Visbestos" viscosifier gives 40 to 50% higher yields than regular asbestos additives, allowing reductions in material costs of 25 to 30%. In addition, Super "Visbestos" viscosifier mixes twice as fast as regular asbestos products.

These reports also indicate that Super "Visbestos" viscosifier controls progressive gels and stabilizes the salt flocculation of bentonite. It also synergizes with bentonite or attapulgite to provide as much as five times higher yield. An addition of two or three lbs. of Super "Visbestos" viscosifier has proven to be as effective as 15 lbs. of attapulgite.

Advantages of Super VISBESTOS® Viscosifier in Drilling Fluids

- Faster drill-bit penetration rates
- Better hole cleaning with lower annular velocity
- Larger and better cuttings and cutting samples
- Reduced water breakout in mud pits
- Lower costs and less solids in mud from reduced viscosifier additions
- Improved circulation with less washout and better gauge holes
- Faster yields and no yield lag, minimizing possibility of overtreating
- Mud-acid soluble.
- No need to bypass shale shakers, desilters, or desanders
- Not affected by contamination, pressure, or temperature

Super VISBESTOS[®] Viscosifier

How It Works in Drilling Fluids

Super "Visbestos" viscosifier is the only type of asbestos that has all the properties desired in a drilling-fluid additive. It is a chrysotile asbestos that has been presheared in the manufacturing process so that it disperses rapidly in the fluid. There is no confusing lag in yield, so that the possibility of over-treating is minimized.

Super "Visbestos" viscosifier provides high-carrying capacities at low viscosities. At high-pumping rates, this property yields a relatively thin fluid with low viscosity. At low-pumping rates, a thicker fluid with high viscosity is formed.

Super "Visbestos" viscosifier also builds low-solids fluids with "clear-water" hydraulics. These fluids are stable at high temperatures so that there is no gelation.

How It is Used

Super "Visbestos" viscosifier can be added to the drilling fluid at the mud pump suction or through the mud hopper. Generally, two to four lbs. are added per barrel of drilling fluid.

As a sweep to avoid fill-up during trips of the drill pipe, two to five bags may be flushed through the mud hopper. Low-cost packer and workover fluids may be prepared with six to eight lbs. of Super "Visbestos" viscosifier per barrel of fluid.

Super "Visbestos" viscosifier is compatible with all mud systems. It may be used in fresh water, brackish water, lease salt water, sea water, brine, and invert emulsions.

Safe-Handling Practices for Super VISBESTOS[®] Viscosifier

Super "Visbestos" viscosifier is packed in 50-lb. multi-wall, individually shrink-wrapped packages. When used carefully in the field according to instructions, the number of airborne asbestos fibers should be within standards set by the Occupational Safety and Health Administration (OSHA).

Breathing asbestos dust can cause lung damage and cancer, especially in smokers. Therefore, users should—as a minimum—employ the following work practices:

- Do not create or breathe dust.
- Wear approved respiratory protection and protective clothing as required by applicable regulations.

- Use vacuum or wet-cleaning methods. Do not dry-sweep or blow spills with compressed air.
- Dispose of dust, contaminated equipment, and packaging materials in dust-tight containers.
- Inspect stored material frequently and repair any damage promptly with heavy-duty tape.
- Do not reuse packaging materials.

When drilling operations are completed, there is usually little or no asbestos left in the mud. Any acceptable method of storing the mud for reuse or disposing of it can be used.

Further information, including a Material Safety Data Sheet, can be obtained by contacting the Atlanta Sales and Marketing Office.

KCAC INC.

SALES: 500 Sugar Mill Road, Suite 180A; Atlanta, Georgia 30338;
Telephone: (404) 992-4957

PLANT: P.O. Box K; King City, California 93930; Telephone: (408) 385-5961;
Telex: 510-600-1346

Material Safety Data Sheet

Calidria
ASBESTOS

A PRODUCT OF **KCAC** INC.

KCAC, Inc. requests that users of "Calidria" Asbestos study this data sheet to become aware of the product's hazards, and promote safe handling of the product by making this information available to its employees, agents, and contractors. If the material is resold, KCAC Inc. requests that the purchaser be furnished a copy of this data sheet and advised to provide the information herein to its employees, agents and contractors.

SECTION I PRODUCT IDENTIFICATION	
Product Name: CALIDRIA® ASBESTOS	C.A.S. Numbers: 1332-21-4; 1309-38-2
Chemical Name: Chrysotile Asbestos	Formula/Composition: $Mg_6(OH)_8Si_4O_{10} + Fe_3O_4$
Synonyms: Asbestos, White Asbestos Hydrated Magnesium Silicate	

SECTION II PHYSICAL DATA	
Sizes: 3/8" pellets to powder	Solubility in Water: Very slightly soluble
Specific Gravity: ($H_2O=1$) 2.45 approximately	Melting Point: °F (°C) Dehydrates above 1112 (600)
Odor: None	Boiling Point: °F (°C) Not applicable
Appearance: White fibrous solid or pellets	Vapor Pressure: Not applicable
Bulk Density: 15-45 lb/ft ³ , as packaged (depends on product form)	Percent Volatile: Absorbed H_2O 1-4% by weight Structural H_2O ~13% by weight
Molecular Weight: Not applicable	Evaporation Rate: Not applicable

SECTION III HAZARDOUS INGREDIENTS		
Material or Component (CAS #)	Weight %	PEL Data (TWA Unless Noted)
Chrysotile Asbestos (1332-21-4)	95-98	0.2 fibers/cc longer than 5 μ (1) 2 fibers/cc longer than 5 μ (2)(3) 10 fibers/cc longer than 5 μ , ceiling (2)
Magnetite Fe_3O_4 (1309-38-2)	0.5-2	None established (1) (2) (3)
H.M.I.S. Rating Numbers		
Health: * (Possible Chronic Effects)		
Flammability: 0		
Reactivity: 0		
References: (1) OSHA Regulation (2) MSHA Regulation (3) ACGIH		

Emergency CHEMTREC Telephone: 800-424-9300

KCAC, Inc.

Marketing/Sales: 500 Sugar Mill Rd., Suite 180A, Atlanta, GA 30338 Telephone: 404-992-4957
Plant: P.O. Box K; Cattlemen Rd., King City, CA 93930 Telephone: 408-385-5961

SECTION IV HEALTH HAZARD DATA	
ACUTE EFFECTS OF OVEREXPOSURE	
Route of Exposure:	
Inhalation:	Any dust (including asbestos) which is inhaled in substantial amounts, may irritate the respiratory tract. Extreme exposures can overwhelm the normal respiratory defense mechanisms and result in temporary difficulty in breathing.
Skin Contact:	Asbestos splinters may penetrate the skin and cause asbestos "corns".
Skin Absorption:	Not applicable
Eye Contact:	May cause irritation and abrasions.
Ingestion:	No known effects.
CHRONIC EFFECTS OF OVEREXPOSURE	
Route of Exposure:	
Inhalation:	Overexposure to Chrysotile Asbestos has caused damage to lungs (asbestosis), lung cancer and mesothelioma of the pleura and peritoneum. Symptoms, which are usually not manifested until 15-20 years after exposure, include labored breathing, chest pains, weakness, and chest tightness. Pleural thickening, plaques and effusion are nondisabling conditions, seen separately or together, that have been associated with prolonged asbestos exposure. The risk of lung cancer is greatly increased for those who smoke cigarettes regularly in addition to having asbestos exposures.
Skin Contact:	Not applicable
Skin Absorption:	Not applicable
Eye Contact:	Same as acute effects. Usually reversible on removal from exposure.
Ingestion:	Some studies indicate that asbestos overexposure is implicated as a cause of gastro-intestinal and laryngeal cancers, but the evidence is conflicting.
EMERGENCY AND FIRST AID PROCEDURES	
Route of Exposure:	
Inhalation:	No acute toxicity: Remove to fresh air. If breathing is difficult, oxygen may be administered. If breathing has stopped, administer artificial respiration. Call a physician.
Skin Contact:	Remove asbestos slivers promptly. If "asbestos corn" develops, surgical removal may be required.
Eye Contact:	Irrigate gently with water for 15 minutes. Refer to ophthalmologist to rule out possibility of damage to cornea or eyeball by fibers.
Ingestion:	None indicated.
NOTES TO PHYSICIAN	
A medical surveillance program must be established for asbestos-exposed persons in accordance with the requirements of the Occupational Safety and Health Administration's standard for Asbestos (29 CFR Part 1910.1001).	

SECTION V FIRE AND EXPLOSION DATA

Combustibility: Not combustible.

Flammable Limits: Not applicable

Flash Point (Test Method): Not applicable

Autoignition Temperature: Not applicable

Explosion Tendency: Not applicable

Extinguishing Media: Use media appropriate for surrounding material in fire situation.

Special Fire-Fighting Procedures: Avoid media and procedures that cause airborne dust. Personnel involved in fire-fighting should use NIOSH/MSHA-approved self-contained breathing apparatus and full protective clothing.

Unusual Fire and Explosive Hazard: See Below.

SECTION VI REACTIVITY DATA

Stability: Stable (Temperature in excess of 1112 °F (600 °C) cause loss of bound water).

Conditions to Avoid: None

Hazardous Decomposition Products: None

Material to Avoid: None

SECTION VII SPILL, LEAK, AND DISPOSAL INFORMATION

Steps to be Taken if Material is Spilled or Released: Avoid breathing dust. Notify Safety personnel of spill. Permit only trained clean-up personnel in the spill area. Use wet methods or approved vacuum cleaning system to pick up spilled materials. Use water or other dust suppressants where sweeping is unavoidable. Do not stir up dust. Clean-up personnel should wear approved respirators and protective clothing. Waste and contaminated protective clothing must be placed in dust-tight containers and be properly labeled for disposal.

Neutralizing Agents: Not applicable

Waste Disposal Method: Bags, friable asbestos, waste and scrap material should be disposed of in a manner which will avoid airborne concentrations of asbestos, such as the use of dust-tight trash bags or containers. Such containers should be labeled in accordance with 40 CFR 61.20. Asbestos is also classified as a hazardous material under CWA 307(a) and has a reportable quantity of one pound. Deposit waste containers in a secured landfill in accordance with Federal, State, and local regulations.

SECTION VIII SPECIAL PROTECTION INFORMATION

Ventilation: Provide adequate exhaust ventilation and capture filtration to remove asbestos particulate from the workplace and minimize its dispersion into the environment. Isolate work areas and post signs where asbestos contamination may exceed PEL. Hand- or power-operated tools which may release asbestos in excess of the PEL must be equipped with local exhaust systems.

SECTION VIIISPECIAL PROTECTION INFORMATION (Continued)**Personal Protective Equipment:**

Respirators: Where asbestos exposure in excess of the PEL is anticipated, wear a NIOSH/MSHA-approved respirator, as follows: up to 10 times the PEL - half-mask air-purifying respirator with high-efficiency filters; up to 50 times the PEL - full facepiece air-purifying respirator with high-efficiency filters; up to 100 times the PEL - powered air-purifying respirator with high-efficiency filters or supplied-air respirator operated in continuous flow mode.

Eye Protection: Goggles are recommended. Follow Safety Rules.

Gloves/Clothing: Gloves are recommended during handling.

Other: For concentrations in excess of the OSHA PEL, special clothing, such as coveralls, whole-body clothing, head coverings, gloves, and foot coverings, are required under CFR 1910.1001.

SECTION IXSPECIAL PRECAUTIONS**Precautionary Statements:**WARNINGCANCER HAZARD

Breathing asbestos dust can cause lung damage and cancer. The risk of lung cancer is greatly increased for smokers.

Do not create or breathe dust.

Do not dry-sweep or use air hose for cleaning.

Do not take protective equipment or clothing home.

Do follow recommended work practices.

Do wear approved respiratory protection and protective clothing as required by applicable regulation.

Do use vacuum or wet cleaning methods.

Do dispose of dust, friable waste materials and contaminated protective equipment in dust-tight containers.

FOR INDUSTRIAL USE ONLY

Precautions for Handling and Storage: Store asbestos in closed containers (dust-tight) in a clean, dry, secure area. Protect containers from damage. Do not open containers in a manner that can release dust without providing proper enclosure or control measures. Use dust suppression control measures at all stages of asbestos handling, use and disposal. Follow good housekeeping practices to prevent accumulation of asbestos-containing dusts. Avoid inhalation of asbestos.

Other Information:**Material Listed as Carcinogen in:**

National Toxicology Program Annual Report (NTP): Known carcinogen.

International Agency for Research on Cancer (IARC): Group I - Carcinogenic to humans.

Product Bulletin

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...Effectively Increases Viscosity of All Drilling Fluids

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KCAC INC.

SALES: 500 Sugar Mill Road, Suite 180A; Atlanta, Georgia 30338;
Telephone: (404) 992-4957
PLANT: P.O. Box K; King City, California 93930; Telephone: (408) 385-5961;
Telex: 510-600-1346

SUPER VISBESTOS

(Crushed or New Granular)
Wet-refined, chrysotile asbestos

SPECIAL NOTE ON SAFE USE:

An extensive field study has revealed that SUPER VISBESTOS (both grinds) offers a 5 to 1 or better safety margin in complying with OSHA health hazard regulations.

Based on this study, Montello believes there is no reasonable expectation of exceeding the legal exposure limits when using either Crushed or New Granular SUPER VISBESTOS.

Contact our office for a complimentary copy of this detailed, on-site evaluation, titled "Airborne Asbestos Dust Concentrations in Drilling Fluid Operations."

HOW PACKAGED:

Multi-wall paper sacks - 50 pounds each.

FUNCTION:

For hole cleaning in any aqueous drilling fluid. Builds quick yield with and without bentonite or attipulgite. Provides a "natural", inexpensive, low-solids drilling fluid for clear water drilling rates.

EFFECT ON DRILLING FLUID PROPERTIES:

- * Increases carrying capacity.
- * Improves flow properties.
- * Used 50/50 with bentonite, synergism gives 3 to 5 times greater yield than dry ground asbestos.
- * Stabilizes high temperature gelation of bentonite.
- * Stabilizes salt flocculation of bentonite.
- * Synergizes with attipulgite for higher yield.
- * Controls progressive gels.

(See How To Use on other side)

Montello

P.O. BOX 130, SAND SPRINGS, OKLAHOMA 74063 / (918)-245-6661/TWX 910-840-3007



Baroid Drilling Fluids, Inc.

FAX TRANSMITTAL COVER SHEET

FAX NO. (713) 987-6002

DATE: November 7, 1989

MESSAGE TO: Mr. Thomas Byerley

TELECOPY NO. (405) 672-8281 / 178/ NO. OF PAGES: 11
INCLUDING COVER PAGE

FROM: Mr. Harvey M. Oyler

SPECIAL INSTRUCTIONS:

SEE ATTACHMENTS!

IF TRANSMITTAL IS NOT RECEIVED IN GOOD, READABLE CONDITION, PLEASE
CALL: (713) 987-4897 (MARGARET DOUGHERTY) WITHIN 20 MINUTES. IF
CONFIRMATION IS NOT RECEIVED WITHIN THIS TIME, WE WILL ASSUME
TRANSMITTAL WAS RECEIVED AS SENT.

3000 North Sam Houston Pkwy. East (77032) • P.O. Box 1675 • Houston, Texas 77251 • (713) 987-5900

NL Baroid

Environmental, Safety and Transportation Data Sheet

FLOSAL

I PRODUCT IDENTIFICATION		
SUPPLIER NL BAROID	TELEPHONE NO 713/987-5900	
ADDRESS PO. BOX 1675 HOUSTON, TEXAS 77251		
TRADE NAME FLOSAL [®]		
GENERIC DESCRIPTION ASBESTOS		
II HAZARDOUS INGREDIENTS		
MATERIAL OR COMPONENT	%,	HAZARD DATA
ASBESTOS	100	TLV = 2 FIBERS >5 µm/cc
III PHYSICAL DATA		
BOILING POINT (°F) NA	MELTING POINT ND	FREEZING POINT NA
SPECIFIC GRAVITY (H ₂ O = 1) 2.2	VAPOR PRESSURE (mm Hg) NA	
VAPOR DENSITY (AIR = 1) NA	SOLUBILITY IN H ₂ O, % BY WT. INSOLUBLE	
% VOLATILES BY VOL. NA	EVAPORATION RATE (BUTYL ACETATE = 1) NA	
APPEARANCE AND ODOR NO ODOR, WHITE FIBROUS DRY MATERIAL	Density @ 20°C. ND	
pH NA		

FLOSAL[®]

2

HEALTH HAZARD

0

FLAMMABILITY

0

REACTIVITY

Ratings based on NIOSH "Identification System for
Occupationally Hazardous Materials" (1974)

N/A = Not Applicable N/D = Not Determined

All information, recommendations and suggestions herein concerning our product are based upon tests and data believed to be reliable; however, it is the user's responsibility to determine the safety, toxicity and suitability for his own use of the product described herein. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by NL Petroleum Services, Inc. as to the effects of such use. The results

to be obtained, or the safety and toxicity of the product nor does NL Petroleum Services, Inc. assume any liability arising out of use by others of the product referred to herein. Nor is the information herein to be construed as absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

BEST Sheet

IV FIRE AND EXPLOSION DATA

ASBESTOS IS NONFLAMMABLE.

V HEALTH HAZARD INFORMATION

CARCINOGENICITY — ASBESTOS - NTP

ACUTE ORAL LD₅₀

ND

ACUTE DERMAL LD₅₀

ND

AQUATIC TOXICITY (LC₅₀)

ND

ROUTES OF EXPOSURE AND EFFECTS

INHALATION: PULMONARY DISEASE, CANCER, WITH PROLONGED EXPOSURE.

EYE: IRRITATION

SKIN: DERMATITIS

TYPICAL ANALYSIS OF TOXIC ELEMENTS

As	0.2 ppm
Cd	0.25 ppm
Cr	400.0 ppm
Co	23.1 ppm
Pb	2.0 ppm
Hg	0.26 ppm
Ni	<1.0 ppm

EMERGENCY AND FIRST AID PROCEDURES

FLUSH EYES WITH WATER AND CONSULT PHYSICIAN.
WASH ALL CONTACTED AREAS WITH SOAP AND WATER.

BEST Sheet

VI REACTIVITY DATA
CONDITIONS CONTRIBUTING TO INSTABILITY
STABLE
INCOMPATIBILITY
NONE
HAZARDOUS DECOMPOSITION PRODUCTS
NONE
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION
WILL NOT OCCUR
VII SPILL OR LEAK PROCEDURES
STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED
MAINTAIN ALL SURFACES, IN WORKPLACE, FREE OF ASBESTOS FIBERS. VACUUM CLEAN SPILLAGE. REPAIR BROKEN BAGS. WET DOWN SPILLAGE PRIOR TO SWEEPING.
NEUTRALIZING CHEMICALS
NA
WASTE DISPOSAL METHOD
ASBESTOS WASTE, DEBRIS, BAGS, CONTAINERS, SHALL BE SEALED IN IMPERMEABLE BAGS OR CONTAINERS. DISPOSE IN SECURE LAND FILL.
VIII INDUSTRIAL HYGIENE CONTROL MEASURES
VENTILATION REQUIREMENTS
LOCAL EXHAUST VENTILATION AND DUST COLLECTION SYSTEM. TO WITHIN TLV LEVELS. DESIGN IN ACCORDANCE WITH THE AMERICAN NATIONAL STANDARD FUNDAMENTALS GOVERNING THE DESIGN AND OPERATION OF LOCAL EXHAUST SYSTEMS (ANSI 79.2 - 1971).
SPECIFIC PERSONAL PROTECTIVE EQUIPMENT
RESPIRATORY
USE A NIOSH APPROVED MECHANICAL FILTER RESPIRATOR FOR ASBESTOS.
EYE
SAFETY GOGGLES
GLOVES
WORKING GLOVES
OTHER CLOTHING AND EQUIPMENT
COVERALLS, EYEWASH, SHOWER, HEAD COVERING, FOOT COVERING.

BEST Sheet

IX SPECIAL PRECAUTIONS

PRECAUTIONARY STATEMENTS

- 1) INsofar AS POSSIBLE ASBESTOS SHOULD BE HANDLED AND MIXED IN A WET STATE, SUFFICIENT TO PREVENT EMISSION OF AIRBORNE FIBERS.
- 2) PROVIDE CAUTION LABELS ON ALL ASBESTOS CONTAINERS (INCLUDING WASTE, SCRAP, MIXES, ETC.):

CAUTION
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
BREATHING ASBESTOS DUST MAY CAUSE SERIOUS BODILY HARM

- 3) PLACE CAUTION SIGNS WHERE ASBESTOS MAY BE IN EXCESS OF 2 FIBERS.
20" x 14" VERTICAL FORMAT SIGNS
ASBESTOS (1" GOTHIC OR BLOCK LETTERING)
DUST HAZARD (3/4" GOTHIC OR BLOCK LETTERING)
AVOID BREATHING DUST (1/4" GOTHIC LETTERING)
DO NOT REMAIN IN AREA UNLESS YOUR WORK REQUIRES IT. (1/4" GOTHIC LETTERING)
BREATHING ASBESTOS DUST MAY BE HAZARDOUS TO YOUR HEALTH. (14 pt. GOTHIC)

OTHER HANDLING AND STORAGE REQUIREMENTS

- 1) STOW AND HANDLE TO AVOID AIRBORNE PARTICLES.
- 2) PROVIDE TWO SEPARATE LOCKERS FOR EACH EMPLOYEE TO SEPARATE CONTAMINATED WORK CLOTHES FROM STREET CLOTHES.

DEPARTMENT OF TRANSPORTATION INFORMATION

PROPER SHIPPING NAME: ASBESTOS

HAZARD CLASS: ORM-C

HAZARDOUS SUBSTANCE: ASBESTOS

LABEL: NONE REQUIRED

PREPARED BY **NL Barold**
ENVIRONMENTAL SERVICES

DATE
JULY, 1987



GUIDELINES FOR PACKAGING ASBESTOS
WASTE BEFORE DISPOSAL

It is the concern of the BFI Oklahoma Landfill to inform our customers upon the proper preparations of asbestos waste prior to landfill disposal. This following list of requirements must be completed before each disposal of asbestos materials to comply with federal EPA, state, county, and city regulations.

- I. Packaging of asbestos waste prior to hauling.
 1. All asbestos is to be in a wetted form prior to packaging.
 2. All asbestos must be packaged in plastic poly ethene bags at least 6 mil in thickness. If applicable the bags may be placed into drums.
 3. All asbestos packaging is to be labeled with the following warning:

"Danger...contains asbestos fibers
avoid creating dust...cancer and
lung disease hazard".

The label is to be no smaller than 3" by 5".
If applicable, other labels approved by O.S.H.A., may be substituted.
- II. Lining of vehicle prior to loading asbestos.
 1. The cargo area of any vehicle hauling asbestos shall be free of debris and lined with polyethylene sheeting at least 6 mil thick. The floor sheeting shall be installed first and extend up the sidewalls, wall sheeting shall be overlapped and taped into place.
- III. Notifying landfill prior to disposal.
 1. The landfill is to be notified a minimum of 72 hours prior to disposal.
 2. When an appointment is set, BFI Oklahoma landfill will notify Oklahoma City-County Department of Health which requires a 72 hour advance notice prior to disposal.

IV. Transporting to Landfill.

1. All vehicles transporting asbestos must have the following label placed on sides and back of vehicle.

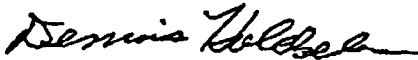
"Danger...contains asbestos fibers
avoid creating dust...cancer and
lung disease hazard".

2. The lettering must be no smaller than 2" in height.

V. Disposal at the Landfill.

1. All asbestos loads are to be properly manifested.
2. The generator or broker is responsible for all unloading of asbestos.
3. Personnel unloading asbestos must wear protective clothing and use an approved respirator.
4. All bags ruptured during unloading must be packaged.
5. A City-County Department of Health official will witness all disposal. Any suggestions given by this official must be followed.

Following these requirements will insure proper, legal, and timely disposal of your asbestos waste. Your assistance is greatly appreciated. Please feel free to contact me if I can be of further assistance. Thank you.


Dennis Holdscrow

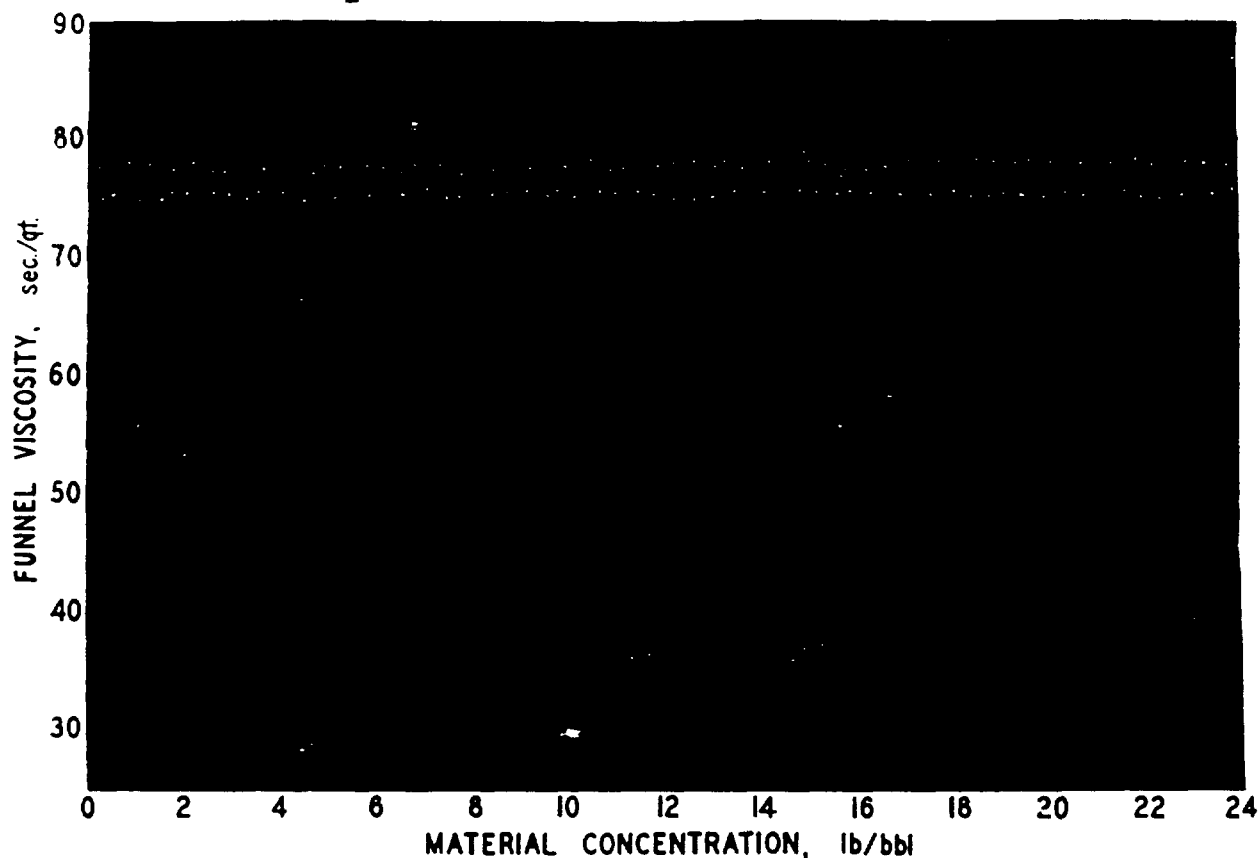


FIG.1, MATERIALS IN 9.2 lb/gal. FIELD BRINE (32:40)

with fresh water in the early stages of drilling to keep the hole clean and seal seepage losses, or in the latter stages of drilling as the well nears completion. In the interim stages of drilling, when salt formations are often encountered, Flosal continues to be useful because its presence eliminates the problem of gelling. Thus it plays an important role in the entire drilling program, providing opportunities for savings in both labor and material costs.

The effectiveness of Flosal in both fresh and salt water systems is demonstrated in Table I. In many instances, it can achieve the same results with as little as $\frac{1}{4}$ the ma-

terial requirements when bentonite or attapulgite is used. A more common method of determination is the funnel viscosity check. Figure 1 plots funnel viscosity versus material requirements for several materials. It is fairly evident that Flosal achieves the best results for the least amount of material added.

Another important feature of Flosal is its effect on mud properties with regard to weight and viscosity. It has already been mentioned that Flosal will increase viscosity without significant increase in mud weight. Generally speaking, it does not contribute to progressive gel strength nor is it affected noticeably by variations

in pH. Flosal is not affected by mud contaminants and it is stable at high temperature.

In every respect then, this material is very stable and is compatible with all drilling muds.

There are many different ways in which Flosal has been used economically in conjunction with fresh or salt water drilling muds. These include:

Spud muds
Sample muds
Emulsion muds
Workover muds
Brine or Fresh Water-
Flosal muds

Flosal has been used in spud muds to replace bentonite. It has also been used on a number of wells, in both fresh water and brine, to improve sample size and reduce fill-up. In a recent test, Flosal was used to increase sample size on a well drilling at 17,500 feet. The results were successful: the samples were obtained with a 31 viscosity fluid, without change in rate of penetration.

Flosal has been used on a number of wells in a 5 to 15% oil emulsion in fresh water or brine. In these instances, Flosal is an effective emulsifier. As previously discussed, it has also been used successfully in weighted muds, workover muds and clear water muds.

There are many economics that can be realized through the use of Flosal. Its versatility in fresh or salt water eliminates the need for stocking different types of materials. Table I and Figure I both show clearly that economics can be achieved with less material. Another important feature of Flosal is its synergistic relationship to water loss controllers. Table II shows the reduction in polymer requirements that can be realized using Flosal as compared to polymer requirements for comparable materials. These benefits are direct; there are others of a more indirect nature which result in more economical drilling operations. An example of this is reduced drilling time that is realized through lower solids muds.

Handling and mixing instructions for Flosal are relatively simple. It is a chemically inert material which requires no special storage or handling techniques. It should be added slowly to the mud system through a conventional hopper. Insofar as mixing of Flosal is concerned, generally, increased shear will result in increased yield.

TABLE I

FRESH WATER

CONC lb/bbl	FLOSAL			
	AV	PV	YP	Gels
5	8	7	1	3/5
10	24	10	29	31/44
Bentonite				
10	4	3	2	1/1
20	26	16	19	2/36

4000 ppm CHLORIDES

CONC lb/bbl	FLOSAL			
	AV	PV	YP	Gels
5	10.5	8	5	1/1
10	31.5	9	45	1/1
Bentonite				
20	14	9	14	1/2
30	46.5	10	73	1/44

SATURATED BRINE

CONC lb/bbl	FLOSAL			
	AV	PV	YP	Gels
2.5	12	8	8	4/5
Attapulgitte Clay				
5	4	2	4	1/4
10	8	4	8	4/8

TABLE II

FLOSAL lb/bbl	ATTAPULGITE lb/bbl	AV	PV	YP	GELS	WL
Base Mud. Natural saturated brine treated with soda ash to reduce hardness; 10 lb/bbl Polymer added with FLOSAL OR attapulgitte						
5	—	17.5	13	9	3/5	14.9
—	20	17.5	7	21	6/19	78



Dependable supply and delivery
Technical service
Field assistance
Engineering experience
Highest quality, proven products

MUD ADDITIVES

DRISPAC
DRISCOSE
SOLTEX
FLOSAL
DIASEAL M

CEMENT ADDITIVES

DIACEL "A"
DIACEL "LWL"
DIACEL "D"

PLASTIC PIPE AND FITTINGS

DRISCOPIPE 1000 Series Drain, Waste and Vent
DRISCON 2000 Series PVC Conduit and Duct
DRISCON 3000 Series Polyethylene Conduit and Duct
DRISCOPIPE 4000 Series PVC Pressure Rated Pipe
DRISCOPIPE 5000 Series Polyethylene Pressure Rated Pipe
DRISCOPIPE 6000 Series ABS Pressure Rated Pipe
DRISCOPIPE 7000 Series Ultra High Molecular Weight High Density Polyethylene Engineered Pipe

DRISCOPIPE Installation Service

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DRILLING SPECIALTIES COMPANY

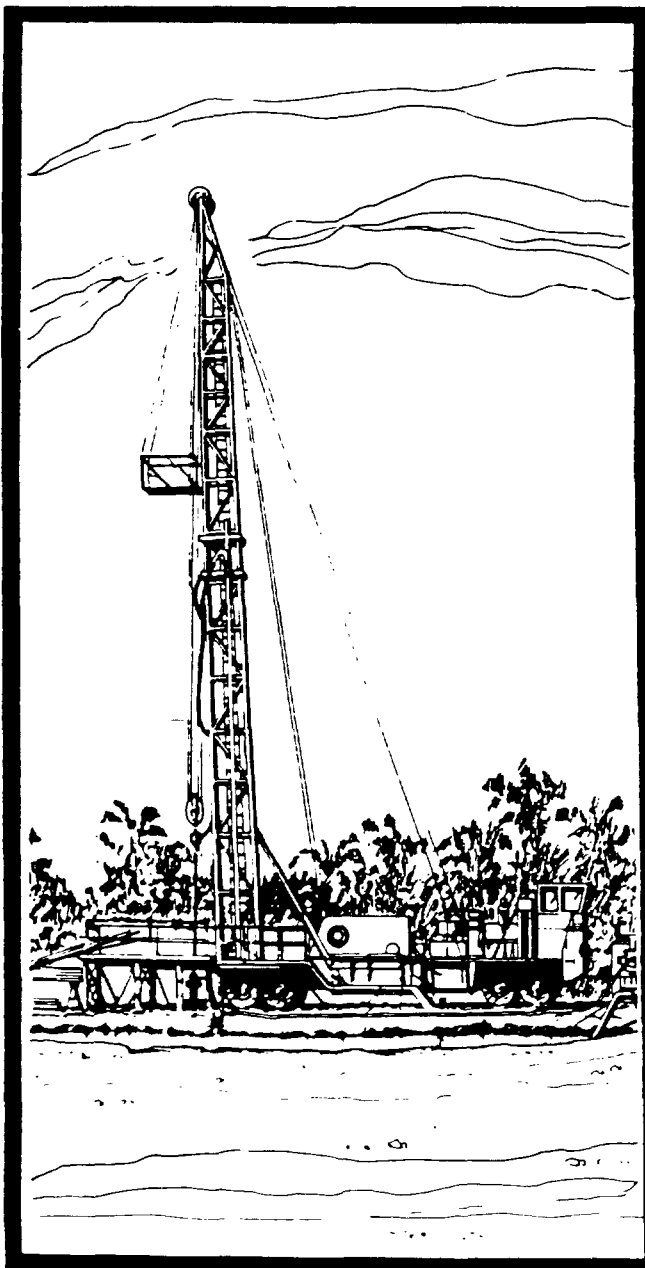
Technical Services Division • Bartlesville, Oklahoma

FLOSAL* / DRISPAC*

DRILLING SPECIALTIES COMPANY

Technical Services Division • Bartlesville, Oklahoma 74003

**USES IN SALT WATER
WORKOVER FLUIDS**



FLOSAL

DRISPAC

INTRODUCTION

Flosal and Drispac additives, having been used successfully in drilling muds, are now gaining popularity as additives used in the preparation of workover fluids from brines and field salt waters. These proven performers are thus providing the industry with a new and unique type of workover fluid to solve many of its problems.

Quite frequently when an expensive workover job is completed, the well doesn't come back as productive as it was before being worked over. When this happens, the well was already on a sharp production decline and the production wasn't there anymore, or the formation adjacent to the bore hole was damaged by the workover fluid that was used, or both.

The main concern when choosing a workover fluid is to select one that will not damage the producing formations. This is easy to understand when one realizes that the degree of productivity of a well depends largely upon the correct choice of a workover fluid. The choice of a wrong type of fluid will damage the well irreparably. Therefore, the best workover fluid to use is one that permits the formation permeability to be returned to its original state upon completion.

Workover fluids therefore are necessary and important tools used in working over wells in order to start them producing again. Workover fluids are used to kill and control wells while necessary remedial work is being performed on them. They should possess sufficient carrying capacity to remove sands, formation cuttings and other debris from the well. Moreover, salt water workover fluids containing Flosal and Drispac offer many additional advantages which will be discussed in this bulletin.

*A trademark

FLOSAL / DRISPAC

USES IN SALT WATER WORKOVER FLUIDS

FLOSAL/DRISPAC WORKOVER FLUIDS MINIMIZE FORMATION BLOCKAGE

The Flosal additive is an inorganic mineral used to increase the carrying capacity and suspending ability of drilling muds and workover fluids. The material is in the form of short length bundles of fibers which, upon being sheared, are torn apart and separated and thus impart viscosity and carrying capacity to either salt water or fresh water. The Drispac additive is a white, free-flowing powder. It is a long-chain polymer that imparts both viscosity and water loss control to salty or fresh water, and is an extremely high yield material.

Flosal/Drispac workover fluids are outstanding for two reasons: (1) Flosal/Drispac workover fluids are low in solids and do not tend to damage producing formations by plugging the permeability of the producing formations with solids; (2) Flosal/Drispac workover fluids have low water loss, minimizing the amount of fluid lost to a producing formation which could cause water blocking due to an emulsion plugging the formation.

The Flosal/Drispac workover fluid may be prepared using brine having the same chemical nature as the brine originally in the formation. This makes blocking of permeability due to clay swelling in the formation less likely. In his technical report on "Clay Mineralogy Problems in Oil Recovery," Dr. John Moore points out that the susceptibility to damage of a producing sand by a foreign fluid is largely dependent on its clay con-

tent. Many others have written technical papers verifying Dr. Moore's findings. It is widely known that saline filtrates cause less trouble than other fluids when used in wells where dirty sands are present. Waters containing dissolved salt in such quantities as to be inhibitive are less likely to cause formation damage in dirty sands and it is strongly recommended that the native formation water be put back in the well. In order to guard against formation damage from the liquid used in preparing the workover fluids, it is best to use formation water from the zone to be exposed if at all possible. Formation water is recommended in the preparation of the Flosal/Drispac workover fluids. Both materials have worked well in almost every type of field salt water, bay water or sea water used thus far. If the calcium ion is extremely high, soda ash treatment is beneficial.

Dr. Moore and many others also point out that clay solids from a drilling mud or workover mud can penetrate an oil sand and impart permanent damage by becoming lodged in the pore spaces. When the well is brought in, the clay solids remain in place and restrict the flow of formation fluids into the well bore. There are ways and means to stimulate these wells but most of them are expensive and many times attempts at stimulating the wells are unsuccessful. Of course, the penetration of clay solids into a rock requires that the clay solids be smaller than the pore openings. This arrangement is quite commonly present. An extreme case would be the loss of whole mud to a formation when returns are lost. Because of the general nature of most clays, the particles continue to hydrate and swell after having penetrated the formation around the well bore. An elevated well temperature will promote this swelling tendency. This sometimes causes the clay particles to become lodged so tightly that it is impossible to backflush them and clean up the formation when bringing in the well. Another factor too, in this respect, is differential pressure. The greater the differential between the fluid column and the formation pressure, the tighter the solids particles will be jammed into the formation.

To guard against formation blockage from minute clay solids it is quite logical to believe that a non-swelling, non-clay material would tend to help eliminate the problem. Flosal fibers are at least 50 times larger than the average sized clay particle. The short-length Flosal fibers will tend to seal off the face of the formation rather than penetrate. If there should be pore spaces large enough for the Flosal particles to pass through, there could never be any swelling or expansion of the particles that might form a block in the permeability. Filtration of a Flosal/Drispac fluid produces a film rather than a filter cake. Field experience with this system indicates Drispac effectively seals the spaces between Flosal fibers and provides water loss control.

FLOSAL/DRISPAC WORKOVER FLUIDS CLEAN THE HOLE

In addition to protecting the producing formation from damage and at the same time containing the formation pressures, it is sometimes necessary to circulate the hole clean of sand, cement cuttings, steel millings and the like. Usually field salt water alone will not serve this purpose. Since a lot of workover rigs are equipped with very small piston pumps, it is sometimes necessary to clean the hole with low annular velocities. One of the unique features of a workover fluid containing Flosal is its ability to clean the hole or its "carrying capacity". This is explained by the "fiberization," or the tearing apart of the Flosal fibers and their resultant hanging together as the fluid is in motion.

Contrary to popular belief, funnel viscosity and carrying capacity are not necessarily analogous. Flosal slurries refute this idea completely. A Flosal slurry having a measured funnel viscosity of 35 sec API has about the same carrying capacity as a clay slurry with a funnel viscosity in the range of 45-50 sec API or even higher. On several occasions 10 lb/bbl Flosal has been added to fresh water for use as a spacer fluid or "wash" between cement slurries and the drilling mud. The material was added to the water and twice pumped through the Halliburton mixing hopper. The resulting mixture would almost peak up like pie meringue, but when the funnel viscosity was checked it was 45 sec API.

ADDITIONAL BENEFITS OF FLOSAL/ DRISPAC WORKOVER FLUIDS

WITHSTANDS CEMENT CONTAMINATION

All operators are interested in the ability of the Flosal/Drispac system to withstand cement contamination. They want to be able to drill cement with this fluid and yet not lose the viscosity and water loss control. On a recent job, the remaining cement was drilled out from six squeeze jobs and several cement plugs were drilled with that same fluid. There were no adverse effects to the viscosity or the water loss control of the system. If at any time cement contamination might appear to be a problem, sodium bicarbonate can be added to counteract the effects of the cement.

REQUIRES LITTLE MAINTENANCE

Flosal/Drispac workover fluids are non-biodegradable, therefore they can be stored for re-use. They require no preservative and considerably less maintenance than systems containing natural gums. Like all water base fluids, they are much less expensive than oil base fluids.

FOAMING NOT A PROBLEM

All salt water muds foam. A benefit of the Flosal/Drispac workover fluids as a low solids salt water fluid is the minimizing of this foaming problem. Most of the foaming of Flosal/Drispac workover fluids occurs during mixing operations when air is being introduced into the fluid through the mud hopper. Usually if the system does foam, the foam will soon dissipate when the hopper is shut off. With the Flosal/Drispac workover fluids, foaming has never been so severe as to be a problem. Care should be taken, however, that surface guns not be used with a salt water fluid because of the air entrainment that results.

EASY TO MIX

Flosal/Drispac additives used in workover fluids are easy to mix. A mud hopper in working condition will do a good job of mixing both materials. Flosal does its best job after having been sheared vigorously. This means pumping it through a jet nozzle at a fast rate with a piston type pump which can attain at least 200-300 pounds pump pressure. Drispac, being a high yield material, has to be mixed slower than the Flosal. However, because of the small amount of Drispac required, the time taken for mixing is of little consequence. A mud jet rigged up with a suction hose will do an excellent job of mixing these products.

Field experiences to date have shown that by using the recommended concentrations of materials — 5 lb/bbl Flosal and $\frac{3}{4}$ lb/bbl Drispac — the result will be a funnel viscosity of about 35-40 sec API and water loss in the range of 10-20 milliliters (as tested by the Standard API 30 minute test).

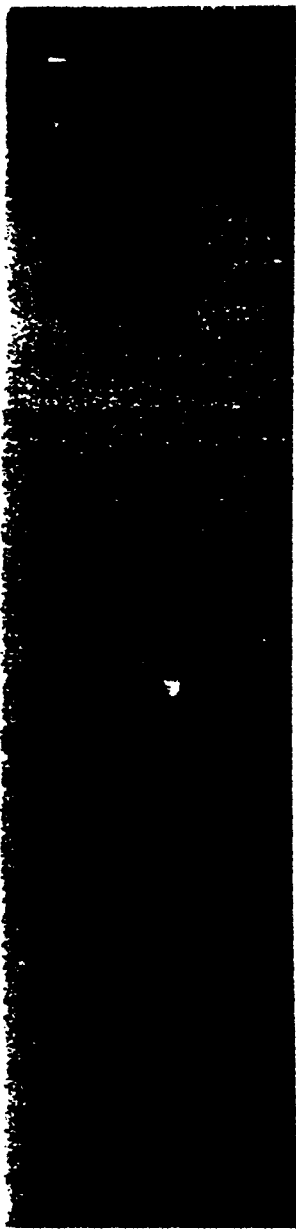
SUMMARY

A salt water workover fluid containing Flosal and Drispac mud additives offers these advantages over other workover fluids:

- protection against permanent damage to the producing formation.
- carrying capacity for cleaning the hole.
- ability to withstand cement contamination.
- little or no maintenance required.
- fewer foaming problems.
- easier mixing.
- much lower cost than oil muds.
- can be stored or transferred from well to well.

If you desire further information on Flosal/Drispac for workover fluids, see your mud engineer or contact:

TECHNICAL SERVICE DIVISION
DRILLING SPECIALTIES COMPANY
BARTLESVILLE, OKLAHOMA 74003



**Dependable Supply and Delivery
Technical Service
Field Assistance
Engineering Experience
Highest Quality Proven Products**

MUD ADDITIVES

DESCO*
DIASEAL M*
DRISCOSE*
DRISPAC*
FLOSAL*
SOLTEX*

CEMENT ADDITIVES

DIACEL "A" *
DIACEL "D" *
DIACEL "LWL" *

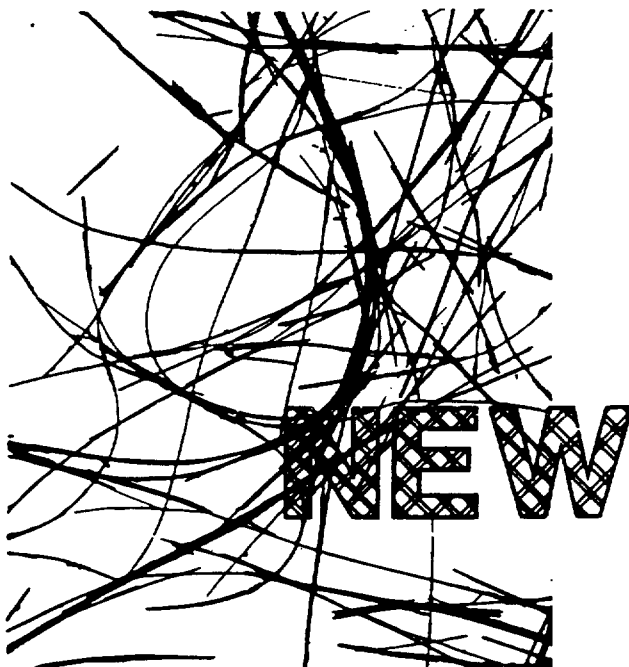
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* A trademark



DRILLING SPECIALTIES COMPANY

Technical Services Division • Bartlesville, Oklahoma 74003



NEW FLAKES FOR:
SUSPENDING SOLIDS
LIFTING CUTTINGS
HOLE CLEANING
CARRYING CAPACITY

FLOSAL

MUD ADDITIVE

At Drilling Specialties Company innovation has been the name of the game. In 1964 Drilling Specialties Company introduced to the drilling industry a novel suspending agent trademarked Flosal. Flosal was widely accepted and used from the very beginning. Operators and contractors alike changed their mud programs to include this effective hole cleaning additive.

Today there is an improved Flosal additive. It is safer, more effective and less bulky than the former additive, which accounts for its being the most extensively used additive of its type.

WHAT IS NEW ABOUT FLOSAL ADDITIVE

Major changes have been made in the processing and bagging of Flosal additive. It is made from distinctively gray colored inorganic fibers that have been pre-wet, compacted and sized according to specifications into flake form which are fast-acting, relatively dust-free and dispersible in water of any salinity. The bag size for Flosal flakes has been reduced 60% from previous bags to 1.11 cubic feet. Table I shows the increased initial effectiveness of Flosal flaked additive fibers in water. Higher initial viscosity is developed without sacrificing stability in ultimate viscosity. This phenomenon is unique with Flosal flaked fibers. The result is fast, but lasting, suspending ability regardless of horsepower or shear power available at the mixing pump.

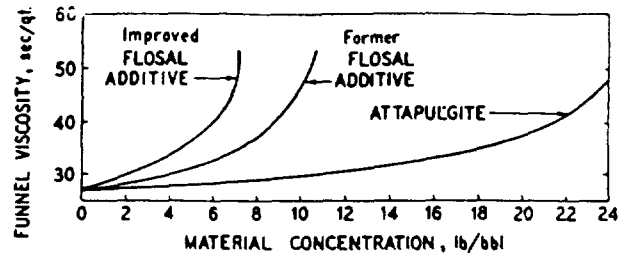
TABLE I
APPARENT VISCOSITY PRODUCED
BY FLOSAL ADDITIVE IN
FRESH AND SATURATED SALT WATER

Conc., lb/bbl	AV, cp After Stirring on a MM for:		
	2 min.	5 min.	30 min.
IN FRESH WATER			
Original Flosal			
2	1.5	2	3
4	2.5	3.5	7
IMPROVED FLOSAL			
2	3	3.5	4
4	6	6.5	7
IN SATURATED SALT WATER			
Original Flosal			
2	3.5	4	6
4	6	9	12.5
IMPROVED FLOSAL			
2	6	6.5	7.5
4	10	11	11

HOW AND WHY IT WORKS

How and why the improved Flosal additive works in mud can be shown in the laboratory and in the field. In Graph No. 1 typical funnel viscosities are shown in field brine. Funnel viscosity, however, is not wholly indicative of how the additive works. A latticework of fibers is formed when the flakes are dispersed in fluid. This structure suspends solids and suppresses particle migration. It supports solids of density greater than 1.0 and restrains solids of density less than 1.0. Because the reaction is physical rather than chemical, rheological properties of Flosal containing fluids do not correlate with those of clay fluids. In fact, no commonly used rheology measuring device or formula is accurate in predicting Flosal's capabilities as a carrying agent. However, an apparatus has been devised that demonstrates visually Flosal's lifting ability. In applying the non-Newtonian Power Law to drilling fluids, "n" and "K" values indicate Flosal fluids to be superior to clay fluids for drilling. Yet, even this evidence does not adequately describe Flosal's superior suspending and cleaning ability in field mud. The suspending ability of a clay fluid is not as great as a clay-Flosal fluid at equal viscosities.

The lifting power and ability to overcome slip velocity of Flosal additive compared to bentonite and attapulgite clay can be demonstrated in the



GRAPH 1
MATERIALS IN 9.2 LB/GAL. FIELD BRINE

apparatus in Figure 1. Chips are released into the mud stream, and their direction and rate of travel are noted. Flosal additive is over 10 times more effective than bentonite in fresh water, and over five times more effective than salt water clay in salt water. In Figures 2 and 3 suspending characteristics of Flosal and salt water clay are compared in saturated salt water. In time, separation of water from solids will occur and the suspension will stratify to some extent. Yet, solids will not settle and compact as clay solids in the clay-salt water cylinder.

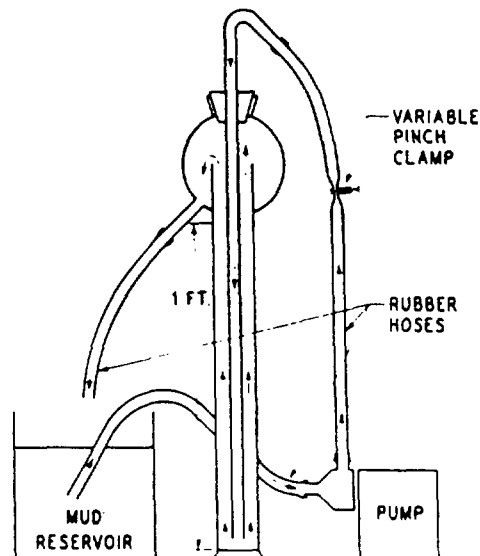


FIGURE 1
CIRCULATING SYSTEM

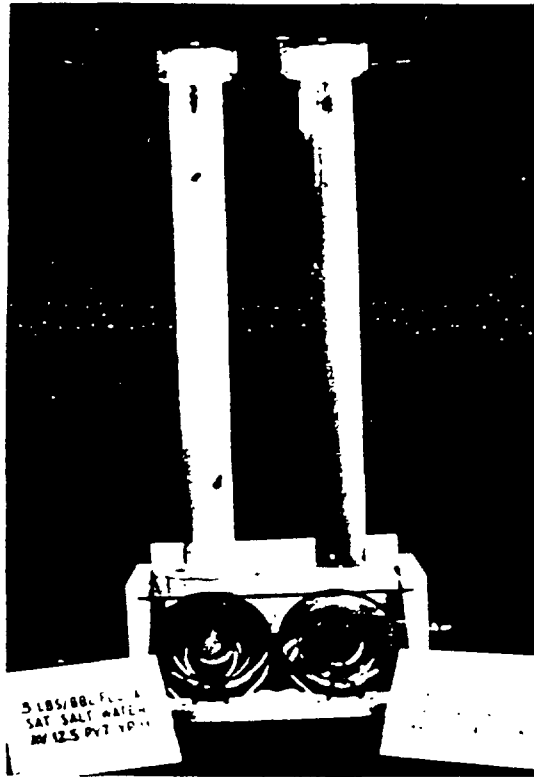


FIGURE 2

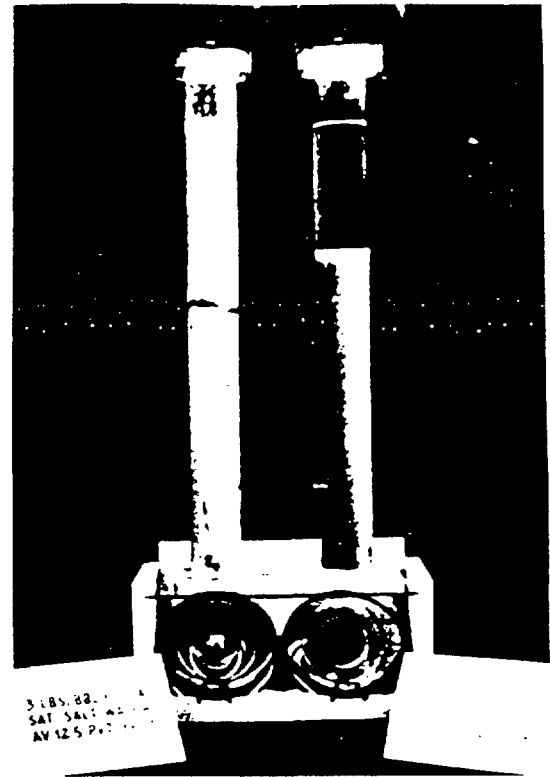


FIGURE 3

FIGURES 2 & 3 — SUSPENDING CHARACTERISTICS OF FLOSA AND SALT WATER CLAY COMPARED IN SATURATED SALT WATER.

Further comparisons of Flosal and clays are shown and described in Drilling Specialties Company's bulletin "The Carrying Capacity of Flosal Viscosifier in Muds."

HOW IT IS USED

SPUD MUD

Spud mud is made by adding 3-4 lbs/bbl Flosal additive and approximately 10 lbs/bbl or more bentonite to water of any salinity. For best results pre-hydrate bentonite in fresh water if salt water is used for makeup. Lime or caustic can be used as a flocculant when fresh water is used if desired. Improved Flosal and bentonite maintenance treatments should be in the ratio of 1:3 on a weight basis (two 50 lb. bags Flosal for each three 100 lb. bags of bentonite). This formulation insures hole cleaning even in the viscosity range of 32-33 sec/qt. Both spud mud and upper hole drilling mud containing Flosal and bentonite will lift dense sand, large cuttings, and even rocks and gravel up and over the shaker. See Figure 4.

In the spud mud Flosal is used for carrying capacity and bentonite for wallcake control. In drilling porous formations bentonite is preferable to other clays for building wallcake. Low flat gels are characteristic of the system. The PV/YP ratio should be in the range of 1:2 to 1:3 for maximum cleaning action and minimum hole enlargement. This profile of characteristics is unique in mud and is made possible by the use of the improved Flosal additive.

LOW SOLIDS MUDS

All too often clear fluids fail to clean the hole. On the other hand high solids muds are not the best drilling fluids. In many areas low solids muds are the best choice. Obviously, the most efficient low solids mud is the one which serves the purpose with the lowest concentration of solids. A good low solids drilling fluid has a low plastic viscosity. A good hole cleaning fluid has a relatively high yield point. Low solids with a low PV/YP ratio are not common to muds made with clays alone. By the time the clay concentration is high enough to develop proper

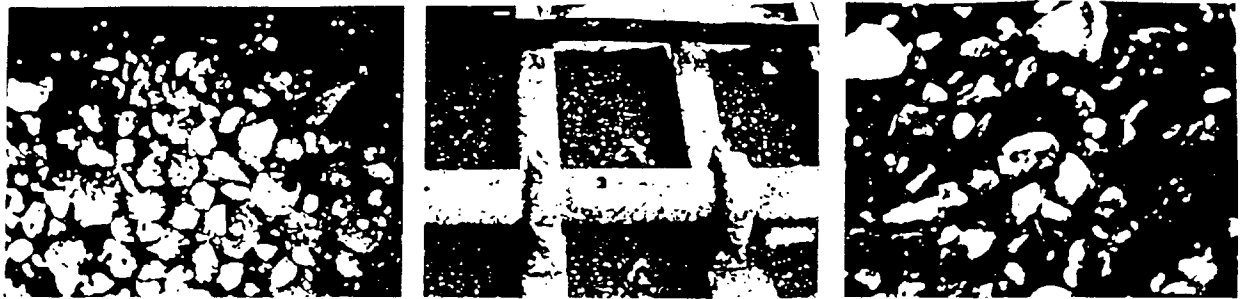


FIGURE 4

yield value the gels, the plastic viscosity and the solids are all too high for maximum drilling rate. This occurs even when beneficiated clays are used. A portion of the mud's clay content must be replaced with Flosal in order to develop a proper PV/YP ratio at minimum solids content. Up to 3 lbs./bbl. Flosal additive makes the proper concentration of properties possible. The use of inert fibers also reduces the need for dispersion and thinning. Flosal additive is especially adaptable to non-dispersed low solids muds.

FLUSH CLEANING

Fast economical hole cleaning can be accomplished by mixing a small concentrated batch or pill of improved Flosal with or without bentonite. The mix is circulated through the hole to flush it clean. Ten or more sacks of Flosal can be used alone or a

50-100 bbl. pill of 1-4 lbs./bbl. Flosal and 10 lbs./bbl. bentonite can be used. Flush cleaning with Flosal is especially effective when drilling with water. As many flushes as necessary can be used to insure cleaning and to prevent slippage and regrinding of cuttings. The flush can be recirculated or removed with the cuttings as desired.

SAMPLE MUD

Geologists need and demand better formation samples than those sometimes brought to the surface by water or solids-free drilling fluids. One to two lbs./bbl. Flosal added to these fluids will not only bring up larger cuttings but will also prevent "stringing out" of samples. Figure 5 shows the sampling results of adding Flosal to a clear drilling fluid.

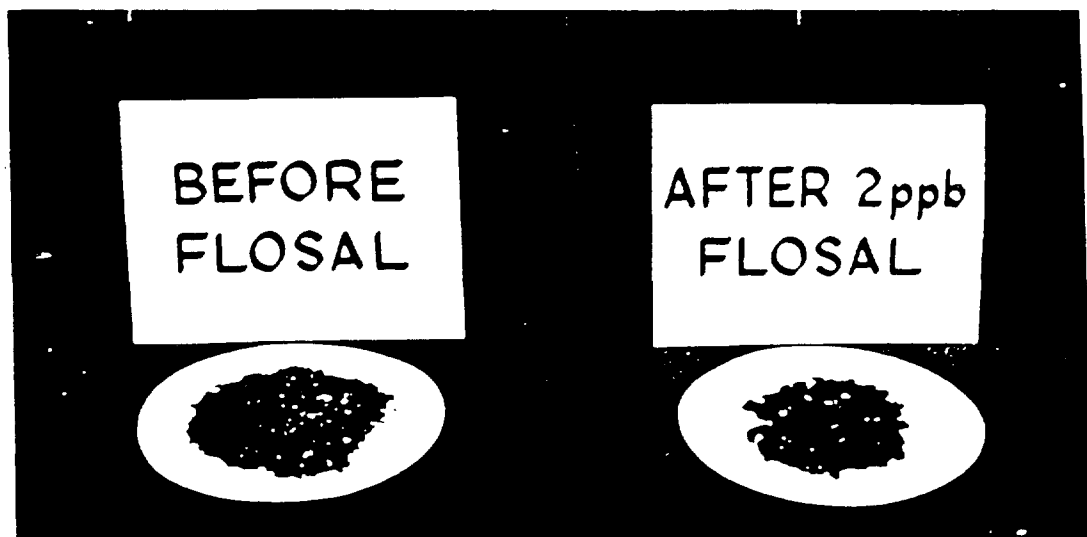


FIGURE 5

LARGE DIAMETER HOLES

In drilling large diameter holes annular velocities are often low. In drilling or reaming holes 24 to 48 inches and larger the annular velocity may be as low as 10 ft/min or less. Hole cleaning is solely dependent upon the carrying capacity of the mud. The latticework structure formed by Flosal additive in mud supports cuttings and cavings in this low fluid velocity environment. Mud with a minimum of 3 lbs/bbl. Flosal and a funnel viscosity of 40-45 sec/qt. will clean large diameter holes.

The use of Flosal along with bentonite, Driscose® or Drispac® is desirable, if not absolutely necessary, to suspend cuttings and to support the walls of the well bore in large diameter holes. This application is applied to reverse circulation as well as to conventional circulation in the drilling of storage wells, mining shafts, offshore platform legs, building foundations and other excavations where the upward velocity of the fluid is extremely low.

SEEPAGE LOSS

Flosal additive can be used to overcome seepage loss when using water or clear fluids in drilling or workover operations. One to five lbs/bbl. Flosal are usually used alone or with Drispac polymer, or bentonite for sealing porous formations. In drilling muds the flaked fiber provides particles large enough to plaster over the porous zone. This initiates a filtercake for screening out other particles that form a seal. Drispac polymer is preferable to clays because it is water soluble, acid dissolvable and less injurious to productive zones.

CEMENTING

Improved Flosal in water or mud makes a very effective flush fluid for hole cleaning prior to running

casing or liners. Cuttings and debris can sometimes plug off tops of liners in the hanger, causing poor cement jobs. The flush fluid is mixed in the same manner as the fluid described in flush cleaning.

Flosal slurries containing 5 lbs/bbl. or more in water can also be used as spacers between mud and cement. The spacer slurry is easy to prepare, inexpensive, inert and effective in cleaning mud and cuttings from the hole prior to cementing. It does not contaminate either the mud system or the cement slurry.

WORKOVER AND COMPLETION

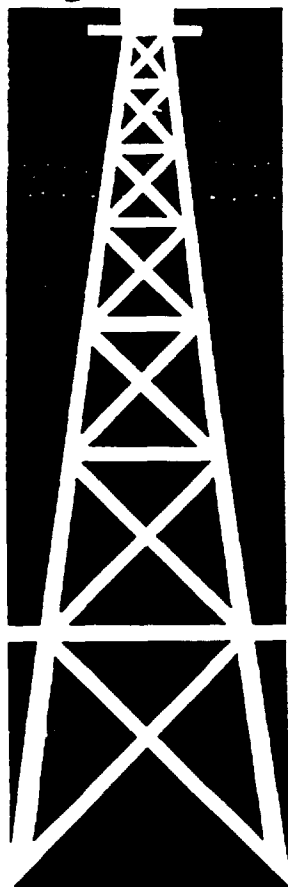
Flosal is usable in workover and completion operations because it provides viscosity and lifting power to almost any type of liquid. Flosal is normally used with Drispac polymer to formulate a near solids-free workover fluid. Being at least 50 times larger than clay particles, the fibers mat across a formation face rather than penetrate it. Drispac polymer seals the space between the fibers and reduces waterloss. Improved Flosal is inert, but acid soluble. Drispac polymer is also acid soluble. A Typical workover mud is made with 5 lbs/bbl. Flosal and ¾ to 1 lb/bbl. Drispac in field brine. The resulting funnel viscosity is 35-40 sec/qt. and the API waterloss is 10-20 ml. See Drilling Specialties Company Flosal/Drispac brochure No. 221

PACKER FLUIDS

Because of its suspending ability, its inertness and its resistance to temperature, degradation and gelation, Flosal additive is an excellent conditioner for packer fluids. Flosal additive will not settle and compact in time like clays.

REMEMBER THIS ABOUT IMPROVED FLOSAL ADDITIVE

- *DISPERSIBLE FLAKE FORM*
- *FASTER ACTING, LONGER LASTING*
- *RELATIVELY DUST-FREE*
- *IN SMALLER BAG*
- *INERT, BUT ACID SOLUBLE*
- *WORKS IN ALMOST ANY LIQUID*
- *MAKES LOW SOLIDS, HIGH CARRYING CAPACITY MUDS POSSIBLE*
- *PROVIDES LATTICEWORK SUSPENSION*
- *DOES NOT COMPACT BY SETTLING*
- *COMPATIBLE WITH ALL MUD ADDITIVES*



DRISPAC[®]
DRISPAC[®] SUPERLO
DRISCOSE[®] CMC
SOLTEX[®]
DESCO[®]
FLOSAL[®]
DIASEAL[®] M

PROD[®] POLYMER
ARADAC[™] POLYMER

DIACEL[®] D
DIACEL[®] LWL
DIACEL[®] A

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BAROID PURCHASING DEPT.
HOUSTON, TEXAS


DRILLING SPECIALTIES COMPANY

BARTLESVILLE OKLAHOMA 74004

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U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME Johns-Manville Corp. & Subsidiaries		EMERGENCY TELEPHONE NO. 303 770-1000 (Ext 2252)
ADDRESS (Number, Street, City, State, and ZIP Code) Greenwood Plaza, Denver, Colorado 80217		
CHEMICAL NAME AND SYNONYMS Chrysotile Asbestos		TRADE NAME AND SYNONYMS FLOSAL
CHEMICAL FAMILY Asbestos	FORMULA	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS		N/A	BASE METAL		N/A
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
Chrysotile Asbestos Fiber				Approx 100	*
* For TLV - See attached Federal Register - 6/7/72 (1910.93 and 1910.93a - pg 11320, Vol 37, #110)					

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	N/A	SPECIFIC GRAVITY (H ₂ O=1)	N/A
VAPOR PRESSURE (mm Hg.)		PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ =1)	
SOLUBILITY IN WATER			
APPEARANCE AND ODOR	White fibrous dry material - no odor		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
EXTINGUISHING MEDIA Non flammable			
SPECIAL FIRE FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARDS			

§ 1910.93 Air contaminants.

Table O-3—Mineral Dusts

Substance	Mppcf	Mg/M ³
Fibers		
Crystalline silica (respirable).....	250	10mg MPP = %SiO ₂ +4
Quartz (total dust).....		30mg MPP %SiO ₂ +2
Crystalline silica (the value calculated from the dust in the formula for quartz)		
Total dust (the value calculated from the formula for quartz)		
Airborne dusts including natural atmospheric earth.....	20	80mg MPP %SiO ₂
Silicates (less than 1% crystalline silica):		
Silica.....	20	
Feldspar.....	20	
Talc.....	20	
Portland cement.....	80	
Graphite (natural).....	15	
Crystalline silica fraction (less than 5% SiO ₂).....		24mg MPP or 10mg MPP
For more than 5% SiO ₂		%SiO ₂ +2
Inert or nuisance dust:		
Respirable fraction.....	15	5mg MPP
Total dust.....	50	15mg MPP

NOTE: Conversion factors—
1 mppcf = 35.4 million particles per cubic meter
1 mg/M³ = 1.36 mppcf

(1) Airborne dusts are per cubic foot of air, based on impaction samples obtained by high-field techniques.
(2) The percentage of crystalline silica in the formula is the amount determined from airborne samples, except in those instances in which other methods have been shown to be applicable.

As determined by the membrane filter method as described in paragraph (c) of this section.
(3) Both concentration and percent quartz for the purpose of this table are to be determined from the fraction passing a size-selector with the following characteristics:

Aerodynamic diameter (unit density sphere)	Percent passing selector
2	70
2.5	75
3	80
3.5	85
4	90
5	95
6	100

The percentage of crystalline silica in the formula is the amount determined from airborne samples, except in those instances in which other methods have been shown to be applicable.

2 A new § 1910.93a is added to Part 1910, reading as follows:

§ 1910.93a Asbestos.

(a) **Definitions.** For the purpose of this section, (1) "Asbestos" includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite.

(2) "Asbestos fibers" means asbestos fibers longer than 5 micrometers.

(b) **Permissible exposure to airborne concentrations of asbestos fibers—**(1) **Standard effective July 7, 1972.** The 8-hour time-weighted average airborne concentrations of asbestos fibers to which any employee may be exposed shall not exceed five fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (c) of this section.

(2) **Standard effective July 1, 1976.** The 8-hour time-weighted average airborne concentrations of asbestos fibers

to which any employee may be exposed shall not exceed two fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (c) of this section.

(3) **Ceiling concentration.** No employee shall be exposed at any time to airborne concentrations of asbestos fibers in excess of 10 fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (c) of this section.

(c) **Methods of compliance—**(1) **Engineering methods.** (i) **Engineering controls.** Engineering controls, such as, but not limited to, isolation, enclosure, exhaust ventilation, and dust collection, shall be used to meet the exposure limits prescribed in paragraph (b) of this section.

(ii) **Local exhaust ventilation.** (a) Local exhaust ventilation and dust collection systems shall be designed, constructed, installed, and maintained in accordance with the American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, ANSI Z9.2-1971, which is incorporated by reference herein.

(b) See § 1910.6 concerning the availability of ANSI Z9.2-1971, and the maintenance of a historic file in connection therewith. The address of the American National Standards Institute is given in § 1910.100.

(iii) **Particular tools.** All hand-operated and power-operated tools which may produce or release asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section, such as, but not limited to, saws, scorers, abrasive wheels, and drills, shall be provided with local exhaust ventilation systems in accordance with subdivision (ii) of this subparagraph.

(2) **Work practices—**(i) **Wet methods.** Insofar as practicable, asbestos shall be handled, mixed, applied, removed, cut, scored, or otherwise worked in a wet state sufficient to prevent the emission of airborne fibers in excess of the exposure limits prescribed in paragraph (b) of this section unless the usefulness of the product would be diminished thereby.

(ii) **Particular products and operations.** No asbestos cement, mortar, coating, grout, plaster, or similar material containing asbestos shall be removed from bags, cartons, or other containers in which they are shipped, without being either wetted, or enclosed or ventilated so as to prevent effectively the release of airborne asbestos fibers in excess of the limits prescribed in paragraph (b) of this section.

(iii) **Spraying, demolition, or removal.** Employees engaged in the spraying of asbestos, the removal, or demolition of pipes, structures, or equipment covered or insulated with asbestos, and in the removal or demolition of asbestos insulation or coverings shall be provided with respiratory equipment in accordance with paragraph (d)(2)(iii) of this section and with special clothing in accordance with paragraph (d)(3) of this section.

(d) **Personal protective equipment—**(i) Compliance with the exposure limits prescribed by paragraph (b) of this section may not be achieved by the use of respirators or shift rotation of employees, except:

(ii) During the time period necessary to install the engineering controls and to institute the work practices required by paragraph (c) of this section;

(iii) In work stations in which the methods prescribed in paragraph (c) of this section are either technically not feasible or unable to an extent insufficient to reduce the airborne concentrations of asbestos fibers below the limits prescribed by paragraph (b) of this section; or

(iv) In emergencies.

(e) Where both respirators and personnel rotation are allowed by subdivisions (ii), (iii), or (iv) of this subparagraph, and both are practicable, personnel rotation shall be preferred and used.

(2) Where a respirator is permitted by subparagraph (1) of this paragraph, it shall be selected from among those approved by the Bureau of Mines, Department of the Interior, or the National Institute for Occupational Safety and Health, Department of Health, Education, and Welfare, under the provisions of 30 CFR Part 11 (37 FR 6244, Mar. 25, 1972), and shall be used in accordance with subdivisions (1), (2), (3), (4), and (5) of this subparagraph.

(i) **Air purifying respirators.** A reusable or single-use air-purifying respirator, or a respirator described in subdivision (ii) or (iii) of this subparagraph, shall be used to reduce the concentration of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average airborne concentrations of asbestos fibers are reasonably expected to exceed no more than 10 times those limits.

(ii) **Full facepiece powered air-purifying respirators.** A full facepiece powered air-purifying respirator, or a powered air-purifying respirator, or a respirator described in subdivision (iii) of this subparagraph, shall be used to reduce the concentration of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average concentrations of asbestos fibers are reasonably expected to exceed 10 times, but not 100 times, those limits.

(iii) **Type "C" supplied-air respirators, continuous flow or pressure-demand class.** A type "C" continuous flow or pressure-demand, supplied-air respirator shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average airborne concentrations of asbestos fibers are reasonably expected to exceed 100 times those limits.

(iv) **Establishment of a respirator program.** (a) The employer shall establish a respirator program in accordance with

1/9/76 Discontinued Product

MATERIAL SAFETY DATA SHEET

SECTION I

MANUFACTURER'S NAME Johns-Manville Corp. & Subsidiaries		EMERGENCY TELEPHONE NO. 303/979-1000 Ext. 3811
ADDRESS (Number, Street, City, State, and ZIP Code) Ken-Caryl Ranch, Denver, Colorado 80217		
CHEMICAL NAME AND SYNONYMS		TRADE NAME AND SYNONYMS DIASEAL M
CHEMICAL FAMILY	FORMULA	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	
Natural diatomaceous earth				88	*
Chrysotile asbestos fiber				10	*
*For TLV's, see attached Federal Register of 6/7/72					

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)		SPECIFIC GRAVITY (H ₂ O=1)	
VAPOR PRESSURE (mm Hg.)		PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ =1)	
SOLUBILITY IN WATER			
APPEARANCE AND ODOR	Gray powder - no odor		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) Non-flammable	FLAMMABLE LIMITS	Lel	Uel
EXTINGUISHING MEDIA			
SPECIAL FIRE FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARDS			

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

See Section II

EFFECTS OF OVEREXPOSURE

Long term exposure to high airborne concentrations of this material may cause pulmonary disease.

EMERGENCY AND FIRST AID PROCEDURES

SECTION VI - REACTIVITY DATA

STABILITY

UNSTABLE

CONDITIONS TO AVOID

STABLE

X

INCOMPATIBILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS
POLYMERIZATION

MAY OCCUR

CONDITIONS TO AVOID

WILL NOT OCCUR

X

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Vacuum clean spillage. If sweeping is necessary, wet spilled material or use sweeping compound.

WASTE DISPOSAL METHOD

Comply with 40 CFR Chapter 1, Part 61

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

NIOSH approved for protection against pneumoconiosis-producing dusts.

VENTILATION

LOCAL EXHAUST

SPECIAL

MECHANICAL (General)

OTHER

PROTECTIVE GLOVES

EYE PROTECTION

OTHER PROTECTIVE EQUIPMENT

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

OTHER PRECAUTIONS

PAGE (2)
GPO 9-10-540

While the information and recommendations set forth herein are believed to be accurate as of the date hereof, JOHN'S-MANVILLE CORPORATION MAKES NO WARRANTY WITH RESPECT THERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

OSHA-20
Rev. May 72



Johns-Manville
Sales Corporation

Ken-Caryl Ranch
Denver, Colorado 80217

Edmund M. Fenner
Vice President
Director, Environmental Services
Health, Safety & Environment Department

December 19, 1980

Mr. James H. Baker
Environmental Section
Imco Services
P. O. Box 22605
Houston, TX 77027

Dear Mr. Baker:

In accordance with your recent telephone request, I
enclose Material Safety Data Sheets for the following
Johns-Manville products.

CELITE 292
DIASEAL M

Please note that DIASEAL M is a discontinued product
and has not been manufactured since 1976.

Very truly yours,

/jfh
Encl.

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME Montello, Inc.		EMERGENCY TELEPHONE NO. 918+665-1170
ADDRESS (Number, Street, City, State, and ZIP Code) 6106 E. 32nd Place, Tulsa, Oklahoma 74135		
CHEMICAL NAME AND SYNONYMS Chrysotile asbestos		TRADE NAME AND SYNONYMS Super Visbestos
CHEMICAL FAMILY Asbestos	FORMULA Mg ₆ (OH) ₈ Si ₄ O ₁₀	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS		NA	BASE METAL		NA
CATALYST		NA	ALLOYS		NA
VEHICLE		NA	METALLIC COATINGS		NA
SOLVENTS		NA	FILLER METAL PLUS COATING OR CORE FLUX		NA
ADDITIVES		NA	OTHERS		NA
OTHERS		NA			
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES				%	TLV (Units)
None					

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	NA	SPECIFIC GRAVITY (H ₂ O=1)	2.45
VAPOR PRESSURE (mm Hg.)	NA	PERCENT. VOLATILE BY VOLUME (%)	Structural H ₂ O 13% by weight
VAPOR DENSITY (AIR=1)	NA	EVAPORATION RATE (_____ = 1)	NA
SOLUBILITY IN WATER	Very Slight		
APPEARANCE AND ODOR	White powder. No odor.		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	None	FLAMMABLE LIMITS	NA	Lel	Uel
EXTINGUISHING MEDIA	None required				
SPECIAL FIRE FIGHTING PROCEDURES	Material is not combustible.				
UNUSUAL FIRE AND EXPLOSION HAZARDS	No fire or explosion hazard.				

THRESHOLD LIMIT VALUE	Fed'l. Register, Vol.39, No.125, Par.1910.93a '6/27/74) TLV=10 fibers/cc
EFFECTS OF OVEREXPOSURE	Prolonged overexposure may result in lung damage.
EMERGENCY AND FIRST AID PROCEDURES	NA. Material has no acute toxicity.

SECTION VI - REACTIVITY DATA			
STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	None
INCOMPATIBILITY (Materials to avoid) None			
HAZARDOUS DECOMPOSITION PRODUCTS None (inert material)			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	None

SECTION VII - SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
Federal regulations (Par. 1910.93a) apply when there is a reasonable expectation of exceeding TLV. Avoid inhalation of dust.	
Remove spills by vacuum or water wash.	
WASTE DISPOSAL METHOD	
Burial in approved sites.	
Special handling not required when allowable limits are not exceeded.	

SECTION VIII - SPECIAL PROTECTION INFORMATION		
RESPIRATORY PROTECTION (Specify type) Not required when allowable limits are not exceeded. (TLV = 10 fibers/cc; 8 hr. TWA = 2 fibers/cc)		
VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL (General)	None
PROTECTIVE GLOVES	None	EYE PROTECTION
OTHER PROTECTIVE EQUIPMENT	None	None
None required when TLV is not exceeded.		

SECTION IX - SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	
Avoid creating dust. Avoid inhaling dust.	
OTHER PRECAUTIONS	
(Ref. Fed'l. Register, Vol. 39, No. 125, Par.1910.93a, 6/27/74.)	

PAGE (2)

CPD 930-540

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Rev. May 72