
SUN'S COASTAL SPOT[®] BLENDING INSTRUCTIONS

- I. Clean the mixing pit and equipment.
 - A. Flush all lines, tanks and pumps that will be used with fresh or seawater.
 - B. Drain all water from the equipment. Excess water or contamination from water-based mud will produce very high viscosity pills that will require additional COASTAL SPOT[®] concentrate to reduce the viscosity.

- II. Calculate the volume of spot required.
 - A. As a minimum, the pill volume should fill the annular space in the hole from the bit to the top of the jars plus an additional 10% of annular volume.
 - B. If the pipe is stuck above the drill collars the minimum pill volume should be the annular volume from the bit to at least 100 feet above the free point.
 - C. For small diameter holes (<8") and in slim hole operations, increase the minimum pill size by additional 100% of annular volume. Use this volume of spot even if the top of the pill extends into cased hole.

- III. Use the blend table below (page 2) to calculate the amounts of material required to produce the desired size and density pill.
 - A. Intermediate densities can be formulated by extrapolating the amounts of COASTAL SPOT[®] concentrate, water, salt and barite to be added from the two nearest whole number densities.
 - B. To prevent excessive migration of the pill, formulate the density of the pill to be the same as that of the mud system.

- IV. Mix the spot components with the greatest amount of shear and agitation available.
 - A. Add all components to the COASTAL SPOT[®] concentrate through the hopper.
 - B. Use available mixers and submerged mud guns (if available) at all times during the spot preparation.

- V. Begin mixing the pill. (Mixing time is dependent on equipment on location)
 - A. Add the COASTAL SPOT[®] concentrate to the mix tank.
 - B. Add the required amount of lime. Mix for 30 minutes or until a homogenous consistency is achieved.
 - C. Add SX-PLUS[™]. Mix for 10 minutes
 - D. Add salt. Mix for 15 minutes. ***Do not substitute brine for salt and water!***
 - E. Begin adding the water and monitoring the viscosity of the pill. The water volumes shown in the blend table are the maximum volumes required and should be adjusted for any residual water in the tanks and lines.
 1. Add the water slowly, so that it is incorporated evenly into the pill.
 2. If the emulsion's funnel viscosity exceeds 90 seconds per quart for pills less than 14 lb./gal. Or 70 seconds for pills of 14 lb./gal. Or greater, stop adding water. Allow the emulsion to mix. If the viscosity drops below the indicated funnel viscosity, add additional water until all the water has been added or until the emulsion viscosity exceeds the recommended limits.

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- F. Mix the emulsion for 30 minutes or until a homogenous consistency is achieved after the last water addition.
- G. Add barite. Since the pill's density is important, add 90% of the barite to the pill and check the density. Adjust the final density by carefully adding additional barite.
- VI. Mix the entire pill until it is uniform.

BLEND CHART

(Makes one 42 gallon barrel)

DENSITY LBS/GAL	8	9	10	11	12	13	14	15	16	17	18
COASTAL SPOT® (Gals)	31.1	30.1	30.3	29.6	28.4	27.6	27.2	26.3	25	24.8	23.3
Lime (Lbs)	10	10	10	10	10	10	10	10	10	10	10
SX-PLUS™ (Lbs)	12.5	12.5	12.5	9	9	7	7	7	7	7	7
Salt (Lbs)	16.2	15	11.6	10.4	10	8.6	6.4	5.4	5	3	2.75
Water (Gals)	8.1	7.5	5.8	5.2	5	4.3	3.2	2.7	2.5	1.2	1.1
Barite (Lbs)	23	78.7	137	192.5	244.3	301.6	358.6	409.7	463	519.5	575
Approximate number of bbls of Spot finished blend per 13 bbl transporter tank											
BBLs/13 BBL TANK	17.6	18.2	18.2	18.4	19.2	19.8	20	20.8	21.8	22.2	23.4

Application Notes: Allow a minimum of 24 hours for COASTAL SPOT® to free the pipe. When the COASTAL SPOT® pill is circulated out of the hole. Allow the pill to pass over the shakers to remove any contaminated mud and wall cake. The pill itself should be incorporated into the active mud system to reduce the tendency for stuck pipe and to function as a lubricant. If the active mud system contains an asphalt or Gilsonite additive MULSPERSE™ should be added to the active system to ensure continued water wetting of the asphalt or Gilsonite.

Questions?

Contact customer service 800-962-6490.

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READ THIS BEFORE BEGINNING BLENDING PROCEDURE

SUN'S COASTAL SPOT® concentrate is a synthetic fluid product that will function much like the diesel and mineral oils used in the drilling industry, with the advantage of being non-toxic. The pill you will be making is an invert emulsion that is formulated and mixed similar to oil base fluid. Knowledge of oil base mud will be very helpful when working with **SUN'S COASTAL SPOT®**.

SUN'S COASTAL SPOT® concentrate is supplied in 13-barrel transport containers. The water/oil emulsifiers necessary to produce a stable blend have been incorporated into this concentrate. No additional emulsifiers are needed; additional emulsifiers could destroy the effectiveness of the product and increase toxicity.

The addition of lime to the **COASTAL SPOT®** concentrate forms a calcium-based soap necessary to form a stable emulsion. It is necessary for the **COASTAL SPOT®** concentrate and lime to mix thoroughly with as little water as possible. Depending on equipment this may take thirty (30) minutes blending time. The residual water in the transfer lines can affect the blend viscosity and should be kept to a minimum. The effect of the remaining water is more noticeable on small volume spots (<75 bbls). Flushing these transfer lines with water is recommended to remove drilling mud or residual water wet barite.

SX-PLUS™ is graded carbon resin compound which provides an effective particle size distribution of sealing solids and serves as an effective sealant in the spotting fluid blend.

Salt (NaCl) is used as an electrolyte; it speeds the formation of the emulsion and serves as one of the active agents in the cracking of the water base drilling mud wall cake. The **SX-Plus™** and salt are to be added to the thoroughly blended spot and lime blend. This stage should be blended for a minimum of fifteen (15) minutes or until a homogeneous consistency is achieved. **DO NOT SUBSTITUTE BRINE FOR SALT.**

The water phase of the **COASTAL SPOT®** blend is necessary to produce a funnel viscosity sufficient to support the barite. *The volumes of water provided in the blending chart are MAXIMUMS.* Any additional water should be added slowly and in small enough increments to allow for monitoring of the increasing viscosity. Once an acceptable funnel viscosity is reached, at the desired weight for the finished blend, the entire blend should be mixed with maximum shear to achieve a homogeneous consistency which is necessary to properly wet the barite with the synthetic hydrocarbon. Note: The blending time will vary depending on the level of shearing provided by the blending system on location.

SUN'S COASTAL SPOT® is designed to be discharged once incorporated into your active mud system after being applied downhole. The use of **MULSPERSE™** coupler may be needed when spot is used in conjunction with an asphaltic mud additive. Contact Sun's customer service prior to discharging a pill that has been blended but was not incorporated into the active system or applied downhole.

NOTICE: the patents for the use PAO as an additive (Spotting Fluid and Lubricant) have been granted to Sun Drilling Products Corporation exclusively. U.S. Patents 4,879,017 & 5,045,219; Australian Patent No. 619253; Mexican Patent No. 164294; Taiwanese Patent No. 39337; Venezuela 66/89; India No. 173891; other foreign patents pending.

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