



# ENVIROPLUG<sup>®</sup> MEDIUM AND COARSE



ENVIROPLUG<sup>®</sup> MEDIUM & COARSE were the FIRST bentonite chips developed and marketed. They are pure Wyoming Bentonite, designed for use as sealants for hole abandonment, casing seals or any vertical seal to prevent water movement up or down a bore hole. When absorbing water, ENVIROPLUG<sup>®</sup> MEDIUM and COARSE swell to fill voids, exerting pressure against all surfaces to create a flexible low permeability seal. Since ENVIROPLUG<sup>®</sup> is introduced in a “dry” state, shrinkage cannot occur and there is a reserve expansion capacity. Generally hydration takes 1 to 2 hours.

## PRODUCT SPECIFICATIONS

	Sizing	Bulk Density	Moisture Content	Permeability
ENVIROPLUG <sup>®</sup> MEDIUM	-3/8” + 1/4”	68 lb/ft <sup>3</sup>	15% ± 2	1 x 10 <sup>-9</sup> cm/sec
ENVIROPLUG <sup>®</sup> COARSE	-3/4” + 3/8”	64 lb/ft <sup>3</sup>	15% ± 2	1 x 10 <sup>-9</sup> cm/sec

## HOLE ABANDONMENT AND APPLICATION GUIDELINES

ENVIROPLUG<sup>®</sup> COARSE has been used for abandoning drill holes since 1983. It easily falls through standing water and thin drilling fluids filling the column from the bottom upward. A fall rate of 1 foot/second through water can be expected and has been successfully applied through water to depths of over 1600 feet. Consult local regulations before beginning any abandonment procedure. Hole abandonment should be done by “Groundwater Professionals Only.”

### CASED HOLES OR UNCASED HOLES

For decommissioning cased or uncased holes larger than 3" diameter, use ENVIROPLUG<sup>®</sup> COARSE. If static water is present, pour chips from the bag at a rate of 1 1/2 to 2 minutes per 50 pounds. A funneling device with a 2" opening can be used to insure a constant flow of material into the hole. Should the water level be quite low - a screen can be used to drop out "fines" from the material before entering the hole.

For holes less than 3" in diameter use ENVIROPLUG<sup>®</sup> MEDIUM. The technique is the same but a funnel with a 1" to 1 1/2" opening is recommended to regulate the flow. Holes with less than a 1" diameter should be plugged with a pumpable material such as ENVIROPLUG<sup>®</sup> GROUT.

### ABANDONING DUG WELLS

Completely filling dug wells with bentonite chips can be very expensive and unnecessary. To economically decommission and stabilize dug wells, ENVIROPLUG<sup>®</sup> COARSE should be placed from the bottom section upward to 3 feet above the water bearing zone. Alternate sections of sand, fine gravel, or clay upward with a 12" layer of ENVIROPLUG<sup>®</sup> COARSE or MEDIUM every 5 to 6 feet.

Any of the above methods should be finished off approximately 3 feet below the surface, then filled with native soil or cement depending upon local regulatory requirements.



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## SEALING CASING

Slowly pour ENVIROPLUG<sup>®</sup> MEDIUM into annulus and allow to drop to the gravel pack. For bentonite grouting, continue to pour ENVIROPLUG<sup>®</sup> MEDIUM directly into annulus, alternating from one side of the casing to the other. This aids in even distribution of particles around the casing. To avoid bridging problems pour at a rate of 1½ to 2 minutes per bag. If available, a funnel-type device with a 1½” bottom opening has proven very successful in regulating the flow into the hole and thus reducing the chances for bridging. When used in conjunction with pumpable grouts, ENVIROPLUG<sup>®</sup> MEDIUM can be used immediately above the sand or gravel pack and at the top of the hole for a more rigid seal.

## GROUNDING ROD AND HEAT PUMP CONDUCTOR HOLES

After drilling a 4½” to 5” diameter hole to the desired depth, simply center the grounding rod with the ground wire attached or the circulating loop from the heat pump in the bore hole. In the case of a wet hole condition, pour hole ENVIROPLUG<sup>®</sup> MEDIUM slowly (1½ - 2 minutes per bag) down the bore alternating each bag from one side of the hole to the other. In dry hole conditions, fill the hole with water, then add the ENVIROPLUG<sup>®</sup> MEDIUM displacing the water upward. If the water dissipates into formations while filling the hole, continue to add water while adding ENVIROPLUG<sup>®</sup> MEDIUM until the hole is sealed. Adding 5 gallons of water per 50 pound bag is usually adequate to provide hydration. Expected values for hydrated chips: Thermal Conductivity 0.50 Btu/hr-ft-°F Resistance < 0.3 ohms-meter.

## SEISMIC SHOT HOLES

After the hole is drilled and charge is placed, pour ENVIROPLUG<sup>®</sup> COARSE slowly into the hole (1½ - 2 minutes per bag). In wet hole conditions add enough ENVIROPLUG<sup>®</sup> COARSE to fill up to the static water level. In a dry hole, add 2 to 4 bags directly over the charge. Where auger drills are used or where water is injected, pour 2 bags per 50 feet of hole depth.

### TYPICAL E.P. TOXICITY ANALYSIS

	Standard (ppm)	Set Grout (ppm)
Arsenic	5.0	<0.10
Barium	100.0	0.50
Cadmium	1.0	<0.05
Chromium	5.0	<0.10
Lead	5.0	<0.10
Mercury	0.2	<0.02
Selenium	1.0	<0.05
Silver	5.0	<0.10

### TYPICAL CHEMICAL ANALYSIS %

SiO <sub>2</sub>	61.40	MgO	1.70
Al <sub>2</sub> O <sub>3</sub>	18.10	CaO <sub>3</sub>	0.40
Fe <sub>2</sub> O <sub>3</sub>	3.50	TiO <sub>2</sub>	0.20
K <sub>2</sub> O	0.10	Na <sub>2</sub> O	2.30
H <sub>2</sub> O	7.80	Other	0.07
L.O.I. *	4.40		

\*Loss on Ignition

ENVIROPLUG<sup>®</sup> MEDIUM and COARSE are available in 50 pound bags and 3,000 pound bulk bags.