

# GeoClips®

(U-Bend Pipe Separators)

*By Geothermal Bore Technologies, Inc.*

---

## PRODUCT COMPONENT SUBMITTALS



GHP Systems, Inc.  
1000 32<sup>nd</sup> Avenue  
Brookings, SD 57006  
[www.ghpsystems.com](http://www.ghpsystems.com)

(605) 697-7867 tel  
(605) 697- 9118 fax  
888-447-7757 toll-free

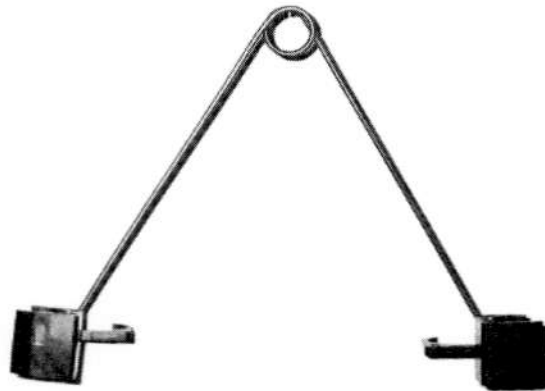


**GEOHERMAL  
BORE  
TECHNOLOGIES, INC.**

---

# GEOCLIP

*Patented*



## The Most Advanced Technology in Geothermal Vertical Heat Exchangers

The GEOCLIP reduces design lengths by:

- Optimizing u-bend pipe placement within the borehole
- Eliminating negative effects of low thermal conductivity bentonite based grouts
- Providing maximum pipe separation within the borehole



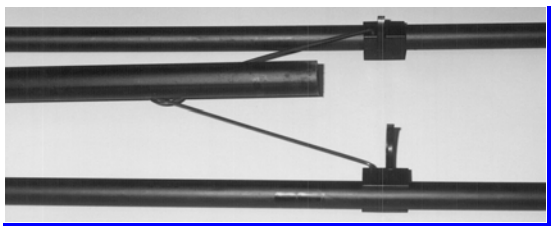
# GEOTHERMAL BORE TECHNOLOGIES, INC.

## INSTALLATION

The GEOCLIP easily snaps onto the u-bend and tremie pipes locking the assembly into the smallest configuration possible for ease in borehole insertion. GEOCLIPS are fastened to the u-bend assembly at 10' intervals and can be attached either before or during u-bend insertion.



Once the u-bend and tremie assembly is inserted to its desired depth, grout is pumped through the tremie pipe. During the grouting procedure, the tremie pipe is pulled out of the borehole which then releases the spring activated GEOCLIPS. The GEOCLIP pushes the u-bend pipes to the borehole wall positioning the pipes directly across from one another.

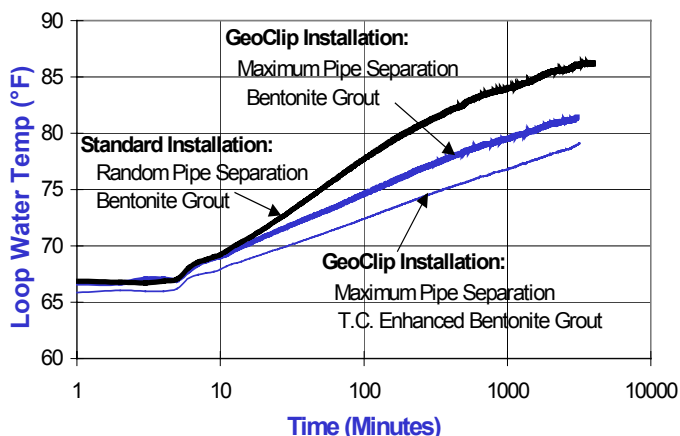


## FIELD PROVEN & INDEPENDENTLY TESTED

Research performed by GBT, Inc. and independent testing facilities indicates that positioning u-bend pipes at the borehole wall directly across from one another, significantly increases the heat transfer rate of the vertical heat exchanger over a standard installation, regardless of the backfill or grouting material used.

### BORE THERMAL CONDUCTIVITY COMPARISON

Oklahoma State University Research Results



The graph above illustrates the results from a thermal conductivity test performed by Oklahoma State University. This test verifies that there is a substantial increase in the heat transfer rate with GEOCLIP installations when compared to standard installations.





# MATERIAL SAFETY DATA SHEETS

## SECTION I

### SUPPLIER

NAME/ADDRESS: GBT, Inc. EMERGENCY PHONE: (763) 432-4019  
 6450 Pioneer Trail  
 Loretto, MN 55357

TRADE NAME: GeoClip

CHEMICAL NAME: Acrylonitrile-butadiene-styrene

### HAZARD SUMMARY:

Physical Hazards None  
 Health Hazards None

## SECTION II

### HAZARDOUS INGREDIENTS

SUBSTANCE NAME: Styrene %: Not Available

HAZARDOUS PROPERTY: Not Available TLV: Not Available

These materials are high-molecular-weight polymers not expected to be chemically active under recommended conditions of use. Trace amounts of residual monomers, including acrylonitrile and styrene, suspected carcinogens, are present and may be released under suggested processing temperature range. For Hazard Communications purposes under OSHA Standard 29 CFR 1910.1200, styrene monomer is listed as a possible carcinogen under the Hazard Communication Standard. Acrylonitrile is not listed under hazardous ingredients because it is present at levels of less than 0.1% which is the reporting guideline for carcinogens under the Hazard Communication Standard.

## SECTION III

### PHYSICAL DATA

BOILING POINT (°C):	N/A	SPECIFIC GRAVITY:	1.02- 1.17
MELTING POINT (°C):	103-128	SOLUBILITY IN WATER:	Insoluble
VAPOR PRESSURE (mmHg):	N/A	VOLATILE MATERIAL (VOL %):	N/A

VAPOR DENSITY: N/A EVAPORATION RATE (Water=1): N/A  
 APPEARANCE & ODOR: Solid pellets with faint or no odor

## **SECTION IV: FIRE AND EXPOLOSION DATA**

FLASH POINT (°C): 349 LIMITS: LEL-Unknown  
 UEL-Unknown  
 AUTO IGNITION TEMP: 505

EXTINGUISHING MEDIA: Dry, chemical, water spray, carbon dioxide, foam.

SPECIAL FIRE FIGHTING PROCEDURES: Pressure demand self contained breathing apparatus in any closed space. Dense smoke emitted when burned without sufficient oxygen.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Fumes and vapors emitted from the hot plastic during converting operations may condense on cool overhead metal surfaces or structures. That condensate, usually in the form of a soft, grease like, semi-solid, may contain substances that can be irritating and toxic. Wear rubber or other impermeable gloves when cleaning contaminated surfaces. Typical volatile emissions from polymers under recommended process conditions, in addition to the materials previously discussed, may include water vapor and trace amounts of such materials as ethyl benzene, phenol, acrolein, acetophenone, alpha methyl styrene, 4-vinyl cyclohexene, and cumene. Wash hands with soap and water before eating or smoking and at the end of each work day.

## **SECTION V: HEALTH HAZARD**

THRESHOLD LIMIT VALUE: Not Determined EFFECTS OF OVER-EXPOSURE: Acutely take care of mechanical injury

## **EMERGENCY & FIRST AID PROCEDURES**

INHALATION: If affected by mists or vapors, remove to fresh air. Refer to a physician for treatment.

EYES: Flush eyes with plenty of water. Seek medical attention if irritation persists.

SKIN: Wash off in flowing water. Molten plastic causes severe burns. Cool rapidly with water and immediately seek medical attention to remove the cooled plastic.

INGESTION: Not probable. Keep person warm and at rest. Seek medical attention.

## **SECTION VI: REACTIVITY DATA**

PRODUCTS STABILITY: Stable x

CONDITIONS TO AVOID: Do not exceed 288° C. Purgings should be collected only as small, flat

thin shapes or in thin strands to allow for rapid cooling. Precautions should be taken against auto-ignition of hot, thick masses of the plastic. Quench in water. Grinder dust is an explosion hazard.

**HAZARDOUS DECOMPOSITION PRODUCTS:** Styrene monomer, ammonia, hydrogen cyanide, acrylamide, aromatic and aliphatic hydrocarbon fractions, and carbon monoxide may be present. Carbon dioxide, an asphyxiant, is also produced.

## **SECTION VII: SPILLS & WASTE DISPOSAL**

**IN CASE OF SPILL :** Non-hazardous solid in pellet form which can be easily controlled in case of a spill. Remove from all floor areas to allow for stable footing and prevent slips by personnel. For water release, notification of government agency may be appropriate.

**WASTE DISPOSAL METHOD:** Disposal must be in accordance with applicable Federal, State or Local regulations. Incineration equipment should be capable of handling large volumes of dense, black smoke and withstand the corrosive effects of acid gases. These pellet materials are not considered hazardous waste under Title 40, CFR Part 261 (Hazardous Wastes Under the Conservation Recovery Act), Reference Sections 261.31, .32, .33(E) and .33(F). They do not have the characteristics of a hazardous material as defined under Sections 261.21, .22, .23, and .24.

## **SECTION VIII: SPECIAL PROTECTION**

**VENTILATION:** Provide sufficient ventilation to control vapors and odors.

**PROTECTIVE EQUIPMENT:** Respiratory, eye, etc. not normally necessary at the handling of pellet form, but when emitting excessive fume using this material; a NIOSH approved respiratory mask should be worn.

## **SECTION IX: OTHER INFORMATION**

**PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:** Practice reasonable care and caution in handling.