

GROUTING

Why?

- Protect the valuable ground water resource and aquifer
- Prevent migration of contaminants down hole after boring completed or well installed (protect sample integrity and quality)
- Avoid possibility of monetary fines or loss of drilling license or both

How?

- Re-entry grouting - especially for single tube soil sampling activities
- Pressure grouting through primary rod string - SP15 or SP16 sampler, expendable dipole used in electrical logging. Injection of materials for remediation, etc.
- Bottom-up tremie grouting - following dual tube soil sampling or monitoring well installation, may also be used with SP15 and SP16.

Grout Mixes: Some advantages and limitations.

Bentonite Slurries

- Relatively inexpensive and easy to mix
- Generally mixed at 20% to 30% solids by weight
- Can provide grout seals with hydraulic conductivity $< 1 \times 10^{-7}$ cm/sec
- Recommend use of powdered bentonite to prepare slurries for use through small diameter tremie tubes
- Bentonite may be susceptible to desiccation by NAPLs, especially chlorinated VOCs
- In dry climates bentonite above the saturated zone may dry out and crack providing voids and pathways for rapid movement of fluids down hole.

Neat Cement

- Widely available
- Does not dry out in unsaturated soil like bentonite
- Shrinks on setting and may form pathways for movement of fluids due to this behavior under some conditions.
- If large volumes of cement used the heat of reaction may actually damage well casing.
- High chloride/sulfate content in ground water may result in poor setting of cement

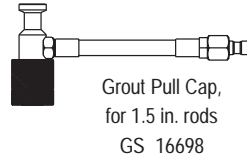
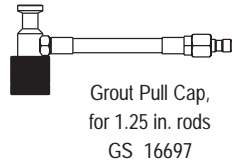
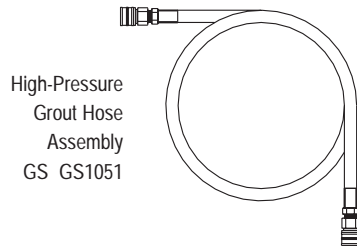
Cement + Bentonite

- Used to minimize shrinkage of neat cement grouts
- Usually added in proportions of 3% to 7% bentonite by weight.
- Often considered to compromise the quality of the cement grout.

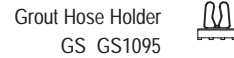
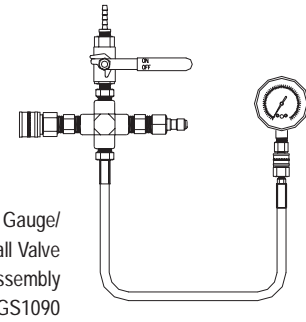
Specialty Cements - e.g. sulfate tolerant for high sulfate waters

Other

Grouting/ Injection through Probe Rod String



Probe Rod

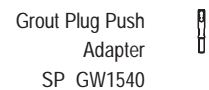
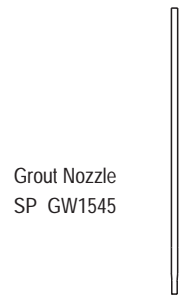
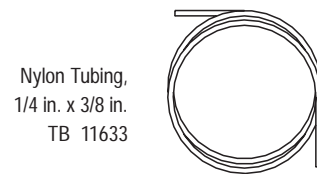
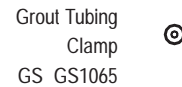
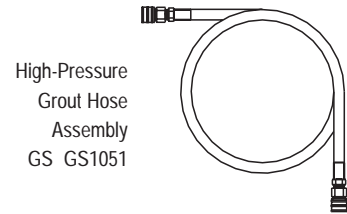
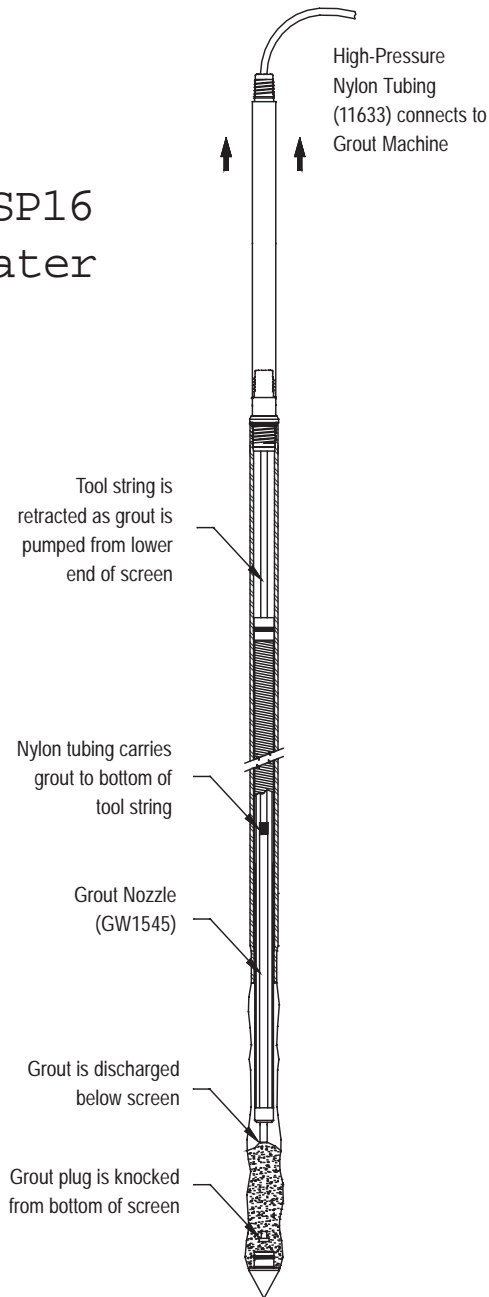


O-Ring for Expendable Drive
Point



GROUTING/INJECTION TOOLS (FOR USE THROUGH ROD STRING)		P C	PART No.
High-Pressure Grout Hose Assembly, 10 ft. (3 m)	.....	G S	GS1051
Injection Pull Cap, for 1.5 in. probe rods	.....	G S	16698
Injection Pull Cap, for 1.25 in. probe rods	.....	G S	16697
Grout Pressure Gauge/Ball Valve Assembly	.....	G S	GS1090
Grout Hose Holder, magnetic	.....	G S	GS1095

Grouting with the SP15 & SP16 Groundwater Sampler

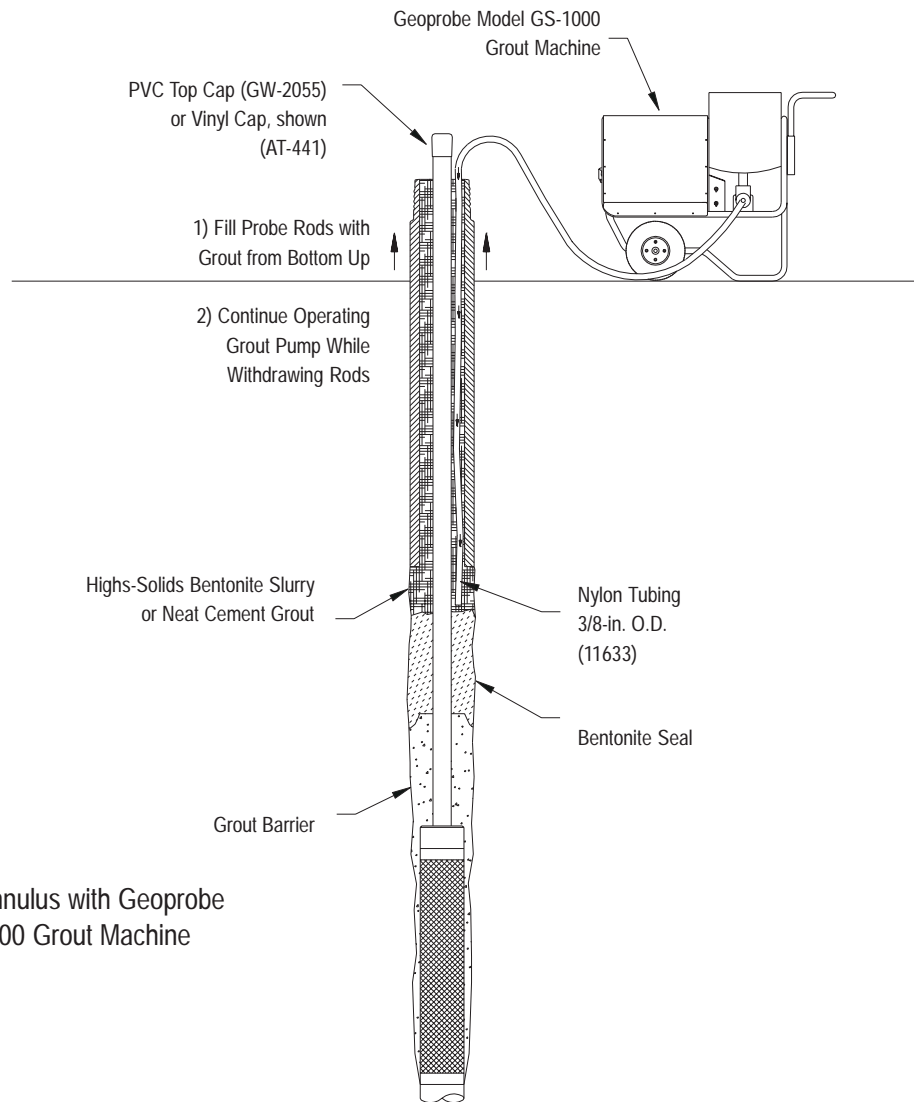


Grouting the SP15 / SP16 Sampler With GW1520 or GW1530 Screen

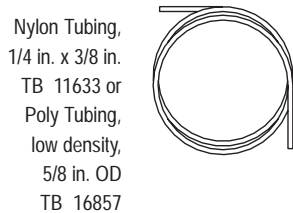
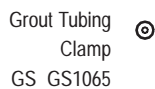
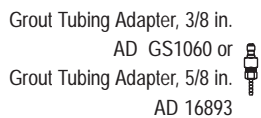
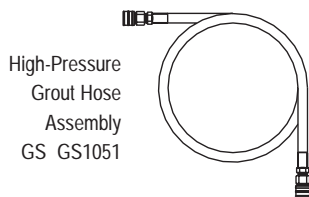
GROUTING TOOLS (FOR USE WITH THE SP15 & SP16 GW SAMPLER) PC PART No.

High-Pressure Grout Hose Assembly, 10 ft. (3 m)	GS	GS1051
Grout Tubing Adapter, for 3/8 in. OD tubing	AD	GS1060
Grout Tubing Clamp, 3/8 in.	GS	GS1065
Nylon Tubing, high pressure, 3/8 in. OD, 100 ft. (30 m) roll	TB	11633
Grout Nozzle	SP	GW1545
Grout Plug Push Adapter	SP	GW1540
Bentonite, powdered, 200 mesh, 50 lb. (23 kg) bag	ATC	AT92

Grouting Prepack Screen Monitoring Wells



Grouting Well Annulus with Geoprobe
Model GS-1000 Grout Machine



GROUTING TOOLS (FOR PREPACKED SCREEN MONITORING WELLS)

	P C	PART No .
High-Pressure Grout Hose Assembly, 10 ft. (3 m)	GS	GS1051
Grout Tubing Adapter, for 3/8 in. OD tubing	AD	GS1060
Grout Tubing Adapter, 5/8 in.	AD	16893
Grout Tubing Clamp, 3/8 in.	GS	GS1065
Polyethylene Tubing, low density, 5/8 in. OD, 100 ft. (152 m) roll	TB	16857
Nylon Tubing, high pressure, 3/8 in. OD, 100 ft. (30 m) roll	TB	11633
Bentonite, powdered, 200 mesh, 50 lb. (23 kg) bag	ATC	AT92