































































# TIPS FOR PAIRING THE RIGHT TOOLING AND MUD MIXTURES



		VERMEER BITS								
		Standard Ace™ bit	Pro Ace™ bit	Premium Ace™ bit	Standard hardfaced bit	Shark bit	Gladiator saber bit	Gladiator spear bit	Gladiator mallet bit	Gladiator club bit
										
SOIL CONDITION	Sandy									
	Clay/loam									
	Dry/compacted									
	Cobble/broken formation									
	Soft rock									

KEY	 <b>Not recommended</b> Not recommended for the listed soil condition.	 <b>Good</b> Helps to achieve conducive results within listed soil condition.	 <b>Better</b> Helps to achieve efficient productivity within listed soil condition.	 <b>Best</b> Helps to achieve maximum viability within listed soil condition.
-----	--	---	--	---

Soil condition:							
	<b>Sandy</b> — Sand, sandy loam, any soil where sand is a major component	<b>Clay/loam</b> — Clay, loam, silt, soft-to-medium soils that have some moisture	<b>Dry/compacted</b> — Hard pan, any dry clay, any compacted soil	<b>Cobble/broken formation</b> — Cobble, gravel, glacial till, chunk rock, any non-consistent type of rock	<b>Soft rock up to 4,500 psi (31 MPa)</b> — Sand stone, shale, soft limestone, caliche, some coral between 1,000 psi and 4,500 psi (6.9 MPa and 31 MPa)	<b>Medium rock</b> — Some limestone, shale, coral between 5,000 psi and 9,500 psi (34.5 MPa and 65.5 MPa)	<b>Hard rock</b> — Hard limestone, granite, skirt, anything above 10,000 psi (68.9 MPa)
Drilling fluid additives to consider:	<ul style="list-style-type: none"> <li>• Bentonite</li> <li>• PAC polymer</li> <li>• Large molecular weight polymer</li> </ul>	<ul style="list-style-type: none"> <li>• Bentonite</li> <li>• PHPA polymer</li> <li>• Thinner</li> <li>• Soap/detergent</li> </ul>	<ul style="list-style-type: none"> <li>• Bentonite</li> <li>• PHPA polymer</li> <li>• Soap/detergent</li> </ul>	<ul style="list-style-type: none"> <li>• Bentonite</li> <li>• Large molecular weight polymer</li> <li>• Loss-of-circulation material (LCM) (in some ground conditions)</li> </ul>	<ul style="list-style-type: none"> <li>• Bentonite</li> <li>• Large molecular weight polymer</li> </ul>	<ul style="list-style-type: none"> <li>• Bentonite</li> <li>• Large molecular weight polymer</li> </ul>	<ul style="list-style-type: none"> <li>• Bentonite</li> <li>• Large molecular weight polymer</li> </ul>