







QUESTION #13: How often do I need to compact the fill soils?

- ▶ Compacting backfill material in 8" to 12" (200mm-300mm) lifts allows you to effectively compact the entire area behind the wall without putting unnecessary pressure on the units. Thick lifts of soil require more compaction effort and create a greater force at the back of the wall which may cause potential alignment and rotation problems. Consult with a geotechnical engineer for further compaction criteria based on specific site soil.

QUESTION #14: How often should the wall's alignment be checked?

- ▶ Wall alignment should be checked at least every third course by visually looking down the wall or using a string line along the pin holes or tail positions. The wall should also be checked every 15-20' (4.6m-6.1m) to make sure the units are level from front to back. If the bubble on the level is high to the back, this means the wall is building to negative batter (leaning forward) and needs corrective measures.

QUESTION #15: How can I fix units that are out of level?

- ▶ If the units are leaning back towards the embankment, due to geogrid thickness or units being thicker in front than back, this is generally not a problem in that the batter is increased. However, if space is limited on top of the wall, this could be a problem because the wall is setting back faster than expected. To correct this problem, you may uniformly insert shims under the tails to bring the units back to level. The best material for this would be excess geogrid, pieces of asphalt shingles or other appropriate non-deteriorating materials. Avoid using wood or materials that will deteriorate over time. Care should be taken to make adjustment in small increments. If the units are rotating outward and higher toward the back of the unit, the problem should be addressed immediately. If the tails are higher than the fronts by more than 3/4" (20mm), disassembling and portion of the wall should be considered. The same guidelines and materials for shimming the back of units may be used for the fronts as well. For minor adjustment, tapping down the back of the units with a maul or dead blow hammer may also help.

QUESTION #16: How can units that are out of alignment be fixed?

- ▶ To determine which units are out of alignment, run a stringline across the pin holes before the pins are placed. Adjust the misaligned units by sliding back and forth until the pin holes are in alignment with the stringline. If when looking down at the kidney shaped holes you see that these units are not in full contact with the pins below due to the adjustment, don't be alarmed. The gravel fill should adequately fill in around this area to secure the unit against the pin. If the unit type you are using has the dual pin option, either position may be used if it helps the alignment process.

QUESTION #17: When building gravity walls with terraces, what is the recommended distance between the terraced walls where the upper wall does not affect the loading condition on the lower wall?

- ▶ The distance between terraces (face of wall to face of wall) should be greater than or equal to two times the lower wall height. Typically this can also work for lower height soil reinforced walls. With higher reinforced walls or walls built on a slope, the issue of global stability must be considered by a qualified engineer in analyzing the terrace situation.

QUESTION #18: What are the recommended methods to avoid settlement when building a wall that has terraces converging into a single wall?

- ▶ If at all possible, build on bench cut virgin soil conditions. If this is difficult to achieve, the next best solution is to build the base course of the terrace as it approaches the single wall, to a deeper elevation (either stepping down to the same level as the single wall or to virgin soil at a higher elevation). This provides for a deeper and

more stable base condition.

QUESTION #19: When building around a structure or culvert, how do I know if the courses will match on top?

- ▶ Make sure that your Keystone units on either side of the culvert are at the same elevation and in an increment of 18" (457mm) apart. Depending on the distance, you may want to allow a 1/4" (6mm) or more for adjustments. When you get to the top, you may need to use mortar or grout on top of the culvert structure to continue the course of units across at the proper elevation. Also, it is important to create a cold joint at each side of the culvert to allow for differential settlement possibilities from the culvert on a rigid foundation to the Keystone on a flexible foundation.

QUESTION #20: When cutting for a round culvert or multi-plate arch, is it necessary for the whole Keystone unit to remain intact, and what is the best way to secure the unit?

- ▶ On many cuts, it is nearly impossible to keep the whole unit intact (i.e. having small pieces of units). After the cut has been made, pin the unit if possible and apply a liberal amount of Keystone Kapseal adhesive to secure. It is also important to use additional clean rock fill behind these units to ease compaction efforts, provide additional drainage, and to prevent fine material from migrating through any existing gaps. An additional solution is to design in a collar for the front edge of the culvert or multi-plate in order to conceal visually the construction joint where the Keystone units are cut to fit the curved structure.