

Question: We operate a Perlite exfoliating plant in South Africa which trades under the name Sun Silicates and have recently started a sister company, CemteQ, to focus on the construction industry with a range of beneficiated products. We are, however, struggling with the results of our concrete compression tests which give us varying data. Is there a best practice standard which is applied to either cube or prism tests of Perlite and cement composites? Our feeling is that the use of the standard method, particularly the use of a curing tank, cannot be best practice when using Perlite as an aggregate replacement and that this may well be negatively influencing the results. If possible, please advise us on an industry standard.

Answer: The Perlite Institute does not have such standards. I did, however, send your inquiry on to some of our PI members who do a lot of LWC to see if they might have something that may help you. I hope to have something by mid-week. Your organization may want to consider joining the Perlite Institute. We have members that are involved with all kinds of applications around the world. One of the great things about this group is that they share ideas and experiences about the many uses of perlite as well as processing. You may want to check out our directory hyperlink on our web page, www.perlite.org, to see a listing of our many members and the type of information available as well as the many different subjects that are discussed at our annual meetings.

Question: I have a Hotel project (7 stories) in Madeira Beach Florida. We are on the West Coast of Florida on the Gulf of Mexico. On our roof (7th floor), we have a flat 8" thick post tension slab that we would like to pour a 5" concrete slab over pour on for our conditioned space and then a pitch slab that we would cover with an acrylic base decorative decking and allow our pitch to be the surface drainage system. We need something that weighs less than 90 lbs per cubic foot and that can be poured over concrete. In the conditioned space we will install porcelain tile, and again on the outside deck area we will use an acrylic base decorative coating.

Answer: I have included some of the Perlite Institute's bulletins that will help you answer your question.

Bulletins: Perlite-Concrete; Perlite-Insulating_Roofdeck; Transit-Mix-Perlite

Question: I am trying to find out what the angle of repose is for mined perlite ore, which I believe is the same as processed crude perlite suitable for shipping, but in any case pre-expansion.

Answer: The angle of repose differs a bit with each size of the grade. I recall about 60 degree, but it has been a while. It is recommended that one simply pour a bit into a small pile to see just what the angle will be for your material. Use conical cones, no flat sides coming together to form an angle.

Question: We are contemplating using perlite as insulation between two 18 ga. steel panels which could be exposed to flame of 1,300 degrees. We want absolute minimal expansion of the panels when they are subjected to the heat for a period of no more than 11 minutes. Can you advise me what to expect?

Answer: Expanded perlite is used as an insulator under quite a range of conditions. The raw sized ore is expanded into glass bubbles at about 1,800 F after which its melting point goes even higher, so the

1,300 F concern should not be an issue. In addition, where expanded perlite is used to fill the core of cement blocks, the fire rating goes from 2 to 4 hours so 1,300 F for 11 minutes should not be much of a concern – of course the thickness of the insulation will have an impact. Not knowing how much a gap would be the point. Some people add a light weight perlite cement fill between walls, roofs and doors to ensure they get a super fire rating. The LWC provides a good barrier but is obviously heavier. I have attached one of our bulletins showing how expanded perlite is used in high temperature applications such as ovens and rocket stoves. Another bulletin is on loose fill where open cores are filled with expanded perlite. It shows the impact of fire ratings. The last one is on a LWC sound wall showing the impact of perlite on its properties.

Q2: Chuck, do you happen to know of a way we would be able to fill a cavity with perlite without the dust hazard of it? We filled a 1-1/2" wall cavity and the dust was pretty rough. We ran a few heat related tests and the perlite seemed to work remarkably well. The installation of it is what we are concerned with. Is there a less dusty perlite that can be used or a way to install it that would contain the excess dust?

A2: Normally producers will add a small quantity of water to reduce the dusting. Check with your supplier to be sure they will do this for you. Another alternative might be to put a fine mist water spray near the dumping site. The type used to cool people in hot weather. We always recommend people use a respirator since it does make people cough even though it is classified as a nuisance material.

Question: We are peat substrate packing company located in Estonia. Right now we are using perlite packed in big-bags. We would like to start using loose perlite transported with walking floor trucks. My question is, can you name me few companies (in Europe) who have experience in perlite handling? We need:

1. Truck unloading system
2. 190m³ silo for storage
3. System that transports perlite from silo to dosator.

Answer: Normally, one would ask their local perlite supplier since they most likely are already experienced in conveying expanded perlite and may also be doing it in bulk. One could also check with other expanded perlite producers in the area. Our web site, www.perlite.org, has a directory search at the top of the home page. One can search by location as well as product to see who is in the area. Coarse expanded perlite is fragile and has to be handled accordingly. Some do use enclosed conveyors, like cambelts or drag conveyors and elevators to minimize any particle breakdown as well as dusting. Many equipment suppliers have local testing facilities to determine how their equipment performs on various materials for system design criteria for sizing and transport rates. If one is going to pneumatically convey the material, it is critical **not** to use a venturi – you have to use a pressure pot. In addition, one has to avoid using 90 degree elbows – you need to have long sweeping elbows of about 1.5 M in diameter. As to the size of the silo, I have found that it is normal to have at least 2.5 times the volume storage of whatever size incoming load is. The other element to consider is how fast one goes

through a load of perlite as well as the transit time from their supplier. These are critical parameters for sizing a silo. The Perlite Institute does not have a listing of companies who have experience since each user has their own specific requirements and designs accordingly.

Question: It is my hope that you can help me or point me in the right direction. Let me give you a brief background. The UCLA Anderson School of Management Addition (ASMA) project consists of a new building that will be built on top of an existing parking structure. In order to strengthen the existing parking structure we will be applying a Carbon Fiber Reinforced Polymer (FRP) throughout the structure. There is a specific area where the FRP will be placed on top of the slab. The FRP in this area will need to be covered by a 2.5" thick slab. In the RFI 0021.3 Response it has been suggested to use a Perlite concrete mix. In a separate attachment you will find the mix ratios that we have been suggested to use as well. Do you know of a company that has used this product for a slab? Do you have a mix design with historical data?

Answer: I have not heard back yet from our CA perlite producer but I did get some information from one of our members who does a great deal of light weight cements. I have attached his bulletin in hopes it might answer some of your questions. I will give you a call later today.

Bulletin: GulfPerliteFloorScreedsTDS

Question: I'm an engineer working on a project requiring a lightweight concrete floor slab to be placed over insulation board. I'm looking for details such as minimum compressive strength, minimum slab thickness, slab reinforcing to prevent shrinkage cracking, etc. Can you give any advice or direct me to a source of information.

Answer: Attached is our PI bulletin on light weight cement mixes which show the compressive strength at various levels of perlite. There is also a bulletin on how to transport and mix light weight cements. In addition are 2 bulletins on light weight roof decks at various thicknesses and perlite content. Most of the time, roof decks are in the 1 to 6 level – cement to perlite. Higher levels will work but are not as forgiving under various conditions. In addition, there is a bulletin from one of our members who does extensive work with light weight cements that maybe of interest to you. I would recommend that you talk with your local cement provider as to what additives they would recommend for your environment. He may also recommend the use of a fiber additive to reinforce the mix and minimize cracking. You can locate local perlite producers on our home page under directory at www.perlite.org.

Bulletins: Perlite-Concrete; Transit-Mix-Perlite; Perlite-Insulating-Concrete_Roofdeck; Perlite-Insulating-Concrete_Roofdeck-specs; GulfPerliteFloorScreedsTDS

Question: I am working with a brewer which is using perlite as a filter aide for filtering their beers. When they backwash the filter they lose a significant amount of perlite to the backwash (wastewater) stream. What type of capture systems would you recommend for us to consider/evaluate to remove the perlite from the backwash stream?

Answer: Filtration is a tough subject since every application is virtually a unique set of conditions. There is no single approach that works. I would recommend that you assemble a listing of the expected operating conditions that would be expected in a filtration application. This would include the liquid flow rate, the temperature and acidity of the liquid, the concentration of particulate and the particle size of the perlite. The filter manufacturers would use this type of information to decide which of their systems would be applicable.

Question: We are an industrial mineral company in Turkey and we export minerals world wide. Recently, we dispatched some expanded perlite to one of our clients in Middle East and we have been told that they need ASTM C549 Standard Specification for Perlite Loose Fill Insulation for our product. You see the technical data sheet of our product in the attachment. I would ask you kindly if you could supply this ASTM C549 analysis for our product or direct us those who could supply them. Could you also let me know the leading time and price if we send you the sample by post?

Answer: The Perlite Institute does not provide such services. These need to be tested at facilities that will use the ASTM method referenced. The Perlite Institute developed the standards with ASTM years ago. Virtually all block fill produced during the time the method was developed would pass these tests since they are very generic in nature. Unfortunately, the test methods have been considered ASTM property not PI property. Consequently, the PI cannot provide the method detail. One has to obtain this directly from ASTM and then provide that to their Lab for testing. I have included the source information for the method below along with the abstract on the method.

Question: Thanks for the info. Could you advise us on some laboratories supplying this ASTM C549 test please?

Answer: The facility [in Turkey] shown below has performed a number of different tests on various perlites. I do not know if they do the ASTM 549 test. I would suggest contacting them to see if they perform such tests. In addition, you may want to contract with ASTM to get their exact procedure from which they could proceed. We, the Perlite Institute, do not have any experience with these guys so we cannot provide any endorsement of them. Hopefully, this will help you or at least be able to give you a possible source for doing such tests.

Question: I got an inquiry asking if expanded perlite has the OMRI certification. I could not find anything on this in our PI library or bulletins. Do you have any info on this?

Answer: OMRI is one of the worst types of certifications. Worse than UL. There are perlite manufacturers that are OMRI certified. Thermorock west was the first to get it as far as I know. OMRI wants to get money from every individual operation. You may have only have 50% of your business

being horticultural & only 10% of that may require OMRI certification, but your payment level is based on the total sales of the business. You also have to continue to pay more every year. I suggest trying to get a certification for all perlites through the PI. Katheryn said they want to inspect each facility individually. Of course, Sungro has facilities with all kinds of fertilizers and other chemicals on site.

Question: Chuck from Force Corps wants to pour a base pad for the Qatar Petrochemical Company (attached). He did not give us a specification for the base pad and at first he tells us that he wants a perlite concrete of 3,000 PSI. After asking for further information he changed his mind to perlite insulating concrete fill of 300 PSI on top of the pad. In the referenced literature (attached) is it possible to determine what he actually needs just want to make sure we supply the correct PSI. I really do appreciate you looking into this for MRI and give us your opinion as to what he needs. Please call if you have time for a further conversation.

Answer: It appears as though these guys want to put down a light weight insulating cement base. This would normally be light weight perlite cement since there is virtually no weight on the base. Then there is a ring of heavy strength cement which holds up the walls of the vessel. This is probably why there are 2 specified cements for the project. I would suggest that you contact the vendor to ask them to clarify exactly what they want. I have attached our PI bulletin on light weight cements so that you have an idea as to what various mixes will yield. Most perlite suppliers produce grades that can be used in this environment. In addition, there is a bulletin on how to handle LWC. Expanded perlite is light weight glass bubbles and can be easily broken down so care must be taken.

Bulletins: Perlite-Concrete; Transit-Mix-Perlite

Question: We are going to send in our perlite to test for the crystalline silica. I was given 2 different labs to have it tested.

1. R.J. Lee Group <http://www.rjlg.com/laboratory-services/environmental-health-safety/respirable-crystalline-silica-analysis/>
2. Scientific Analytical Group <http://www.sailab.com/services/silica-analysis/>

Have you worked either one? If so, who do you recommend?

Answer: I have not dealt with either of these but as long as they use a standard, they should be OK. You may want to contact your ore suppliers and ask them if they have the crystalline silica for their ores and expanded products from them. This would be a good reference to have if they will give it out. Most ores end up crystalline silica free but it is always good to have some "data" to demonstrate the point.

Question: I called the Perlite Institute and they were kind enough to give me your email address for technical questions. I need to get some information on the R-value of Perlite-filled partially grouted 8" lightweight concrete masonry units. Currently, I am in receipt of a submittal from perlite calling out the

resulting R Value as 6.95 (see table below), but it looks like this is based on filling both cells of the CMU entirely with perlite and does not account for some cells in a real exterior wall that would require that they be filled with grout and rebar. Please advise on what the correct R-value should be for the real-life case where the cells would be partially grouted (and why this might differ from the ASHRAE tables), and please verify whether or not the method of calculating the R-value in the table is based on the case I stated above. Thank you for your time!

Answer: Boy was I lucky to find some historic R & D work done on just this subject. I have attached the Perlite Institute bulletin on thermal conductivity work done on different density and sized block walls. It is quite detailed but should provide you with the information you were looking for.

Question 2: Thanks for sending the documents, but I had both of these documents already and neither one of them answers my question about whether the grouting of other cells was taken into account. Without this information, I will have to recommend against the use of Perlite in future projects as the benefits of using it are inconclusive. Please see if you can dig a little deeper.

Answer 2: I thought the one bulletin which included grouted block walls basically covered your one concern. The issue of rebar impact was not included since the quantity and size of rebar changes from environment to environment. Each local is different. We can only say that perlite insulation will provide a given R in areas where it is filled. Perlite does flow like water and will fill any area available which is why it is used in such applications – it get everywhere. This is why we always recommend that any opening be sealed before pouring in the perlite. We do have a Perlite Institute member not far from you that has a tremendous amount of experience in this area. There are many different codes in various areas around the US and the world so we, the PI, do not have information on all the variables one encounters. Perhaps it would be helpful for him to give you a call if you would like. He will be back in on Tuesday. Just let me know and I will make the arrangements.

Bulletins: Thermal-Performance_Perlite-Insulated-Masonry; Perlite-looseFill-insulation

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Answer: Looks like you are in luck! Expanded perlite is used as an insulator under quite a range of conditions. The raw sized ore is expanded into glass bubbles at about 1,800 F. Afterwards, its melting point goes even higher so the 1,300 F concern should not be an issue. In addition, where expanded perlite is used to fill the core of cement blocks, the fire rating goes from 2 to 4 hours so 1,300 F for 11 minutes should not be much of a concern – of course the thickness of the insulation will have an impact. Not knowing how much a gap would be the point, some people add a light weight perlite cement fill between walls, roofs and doors to ensure they get a super fire rating. The LWC provides a good barrier but is obviously heavier. I have attached one of our bulletins which shows how expanded perlite is used in high temperature applications such as ovens and rocket stoves. Another bulletin I have

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Bulletins: Perlite-HighTempApplications; Perlite-looseFill-insulation; Whittemore Sound Wall

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Question: We are exploring the use of Perlite topping slab over a vibration isolation system for a roof top restaurant in a project in Miami. Can you provide any test results that would indicate the STC rating for 4" of topping?

Answer: The majority of information the Institute has on roof toping has to do with temperature insulation not sound. I have reached out to a number of our members who do roofing to see if they have some data on various mixes that may be of help to you. I recall some old data that indicated the STC went from 42 to 50, but I am having difficulty locating it. It will obviously be a bit different dependent on the LWC mix but it at least provide a starting point.