

## GIPS YOKI FOSFOGIPS TOSHQOLLARNING BOG'LOVCHILIK XUSUSIYATLARINI QO'ZG'ATUVCHI QO'SHILMA SIFATIDA.

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### Annotatsiya

*Sulfat toshqol sement yuzaga keltirishda gidravlik bog'lovchi bo'lib u maydalangan domna toshqoli va gips yoki angidrid hamda qotish jarayonini tezlashtiruvchi ishqor moddasining birgalikdagi aralashmasidan tayyorlanadi. P. P. Budnikov va uning shogirdlari toshqollarni sulfat yordamida aktivlashtirish maqsadida tadqiqod ishlari ilib brogan. Odatda sulfat-toshqol sementi 80-85 foiz toshqol, 10-15 foiz angidrid yoki ikki suvli gips, 5 foizgacha portlandsement klinkeri yoki 2 foizgacha ohakdan iborat bo'ladi. Shu jumladan fosfogipsdan olingan gips va angidridan foydalansa ham bo'ladi. Angidridan foydalangan paytda uni 800°C daraja haroratda kuydirgan ma'qul. Bu esa sulfat-toshkol sementi xossalarining barqarorligini oshiradi va uning uzoq saqlanishi uchun imkon beradi. Undan olingan sement +10° dan yuqori haroratda qota boshlaydi va mustahkamligi oshadi. Bunday sementni odatda aralash holatda suvga chidamliligi oshadi.*

### Tayanch so'zlar

*Gips, toshqol, angidrid, portlandsement, gips-toshqol, ammoniy sulfat, magniy sulfat, alyuminiy sulfat, zig'ir moyi.*

Sulfat- toshqol sementi - gidravlik bog'lovchi modda bo'lib, u maydalangan domna toshqoli va gips yoki angidrid hamda qotish jarayonini tezlashtiruvchi ishqor moddasining birgalikdagi aralashmasidan tayyorlanadi. Chet el olimi Kyulning (1908-yil) maydalangan domna toshqollarining bog'lovchilik xususiyatlarini gips yordamida aktivlashtirish haqidagi tavsiyasi sulfat-toshkol sementi ishlab chiqarish uchun asosiy sabab bo'ldi. Sobiq ittifoq olimi P. P. Budnikov va uning shogirdlari toshqollarni sulfat yordamida aktivlashtirish borasida katta tadqiqotlar olib borishdi. Odatda sulfat-toshqol sementi 80-85 foiz toshqol, 10-15 foiz angidrid yoki ikki suvli gips, 5 foizgacha portlandsement klinkeri yoki 2 foizgacha ohakdan iborat bo'ladi. Bu yerda fosfogipsdan olingan gips va angidridan foydalansa ham bo'ladi.

Kuydirish yo'li bilan olingan angidrid aktiv sulfat qo'zg'atuvchisi hisoblanadi, gipsning aktivligi esa kamroq. Shuning uchun gips toshini ishlatishdan ilgari 600-

800°C daraja haroratda kuydirgan ma'qul. Angidridni qo'llash o'ta kukunlashtirilgan sulfat-toshkol sementi xossalarning barqarorligini oshiradi va uning uzoq saqlanishi uchun imkon beradi. Sulfat-toshkol sementini 008 nomerli elakda 1-3 foiz qolguniga qadar maydalansa, uning aktivligi keskin oshadi.

Bir qism sulfat-toshkol sementi va uch qism qumdan iborat quyruq qorishmadan tayyorlangan namunaning siqilishga chidamliligi tajriba yo'sinida aniqlanganiga ko'ra 28 kunda 300-400 kgk/sm<sup>2</sup> ni tashkil qiladi. Sulfat-toshqol sementi 20-30 daraja haroratda g'oyat tez qotadi. Atrof muhitning past musbat haroratlarida (10 darajadan past) mustahkamlikning ortishi ancha susayadi, ba'zan to'xtab qolishi ham mumkin.

Sulfat-toshkol sementi portlandsement va toshqol portlandsementidan yumshoq (chuchuk) va sulfatli suvlar ta'siriga o'ta bardoshlilik bilan farqlanadi. Mazkur sementdan tayyorlangan betonning sut kislotasi, zig'ir yog'i, magniy va aluminiy sulfatning (2 foizga qadar), shuningdek, ammoniy sulfatning (0,5 foizgacha) suvdagi eritmaları ta'siriga go'yat chidamliligi haqida ma'lumotlar mavjud. Shunday sementdan tayyorlangan, suv tegmaydigan betonlarda armatura zanglamaydi. Agar namlik ortib ketsa, armatura zanglaydi.

Ayniqsa, agressiv (dengiz suvi, sulfatli suvlar va boshqalar) suvlar va ishqorlar ta'siri mavjud rayonlarda yer osti hamda suv ostida yaxlit beton va temir-beton inshootlar barpo etishda sulfat-toshkol sementdan foydalanish juda katta samara beradi. Sulfat-toshqol sementning tarkibiy qismida gips fosfogipsdan olingan bo'lsa, albatta fosfor kislotasidan tozalangan bo'lishi kerak.

Bunday sementni yer usti qurilishlarida, beton va qorishma holda qo'llashda, ularni 2-3 hafta mobaynida namlab turish kerak, bunda mo'rt, parchalanib ketadigan yuza qatlam hosil bo'lishiga barham beriladi. O'n darajadan past haroratda bunday sementlardan foydalanganda beton qorishmasi isitilishi kerak. Vaqti-vaqti bilan muttasil muzlaydigan va eriydigan yoki namlanadigan va quriydigan yerlardagi qurilishlarda sulfat-toshqol sementdan foydalanish tavsiya etilmaydi.

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## GYPSUM OR PHOSPHOGYPSUM AS AN ADMIXTURE THAT STIMULATES THE BONDING PROPERTIES OF ROCKS.

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### Abstract

*Sulfate is a hydraulic binder in the production of stone cement, it is made from a joint mixture of crushed blast stone and gypsum or anhydride and an alkali substance that accelerates the hardening process. P. P. Budnikov and his students carried out research in order to activate rocks using sulfate. Usually, sulfate-rock cement consists of 80-85 percent rock, 10-15 percent anhydride or two-water gypsum, up to 5 percent portland cement clinker or up to 2 percent lime. Including gypsum and anhydride obtained from phosphogypsum can be used. When using anhydride, it is better to burn it at a temperature of 8000C. This increases the stability of the properties of sulfate-stone cement and allows it to be stored for a long time. The cement obtained from it begins to harden at a temperature above +100 and increases in strength. Such cement usually increases water resistance in the mixed state.*

### Key words

*Gypsum, stone, anhydride, Portland cement, gypsum-stone, ammonium sulfate, magnesium sulfate, aluminum sulfate, linseed oil.*

Sulfate-rock cement is a hydraulic binder, which is made from a joint mixture of crushed blast-stone and gypsum or anhydride and an alkali that accelerates the hardening process. The recommendation of the foreign scientist Kuhl (1908) to activate the binding properties of crushed blast furnace stones with the help of gypsum was the main reason for the production of sulfate-stone cement. The former Soviet scientist P. P. Budnikov and his students conducted extensive research on the activation of rocks using sulfate. Usually, sulfate-rock cement consists of 80-85 percent rock, 10-15 percent anhydride or two-water gypsum, up to 5 percent portland cement clinker or up to 2 percent lime. Gypsum and anhydride obtained from phosphogypsum can also be used here.

Anhydride obtained by burning is an active sulfate activator, and gypsum is less active. Therefore, before using gypsum stone, it is better to burn it at a temperature of 600-8000C. The use of anhydride increases the stability of ultra-pulverized sulfate-stone cement properties and allows for its long-term storage. If the sulfate-stone cement is crushed in a 008 sieve until 1-3 percent remains, its activity will increase dramatically.

The compressive strength of a sample made of a thick mixture consisting of one part of sulfate-stone cement and three parts of sand is 300-400 kgk/cm<sup>2</sup> in 28 days, according to experimental results. Sulfate-stone cement hardens very quickly at a temperature of 20-30 degrees. At low positive temperatures of the environment (below 10 degrees), the increase in strength slows down a lot, and sometimes it can even stop.

Sulfate-rock cement differs from portland cement and rock portland cement by its high resistance to the effects of soft (fresh) and sulfate waters. There is information about the resistance of concrete made from this cement to the effects of lactic acid, linseed oil, magnesium and aluminum sulfate (up to 2 percent), as well as ammonium sulfate (up to 0.5 percent) solutions in water. Reinforcements do not rust in waterproof concrete made of such cement. If the humidity increases, the fittings will rust.

The use of sulfate-stone cement is very effective in the construction of underground and underwater integrated concrete and reinforced concrete structures, especially in areas affected by aggressive (sea water, sulfate waters, etc.) waters and alkalis. If gypsum in the component of sulfate-rock cement is obtained from phosphogypsum, it must be purified from phosphoric acid.

When using this type of cement in surface constructions, in the form of concrete and mixture, it is necessary to keep them wet for 2-3 weeks in the oven, in

which case the formation of a brittle, disintegrating surface layer is eliminated. When using such cements at a temperature below ten degrees the concrete mixture must be heated. It is not recommended to use sulfate-stone cement in constructions on lands that freeze and thaw from time to time, or on wet and dry lands.

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