SISTEM POLUMONTAŽNE GRADNJE

SEMI-PRECAST BUILDING SYSTEM

MOBECO

MONTAŽNE
BETONSKE
KONSTRUKCIJE

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SISTEM POLUMONTAŽNE GRADNJE / SEMI-PRECAST BUILDING SYSTEM

Sistem polumontažne gradnje primenom duplih zidova i omnia ploča predstavlja već tri decenije poznatu tehnologiju izgradnje višespratnica u evropskim zemljama. Tehnologija se godinama menjala, razvijala i prilagođavala zahtevima kvalitetnijeg života i efikasnijeg korišćenja toplotne energije. Danas je to pouzdan, efikasan i pre svega kvalitetan način gradnje koji se primenjuje u celom svetu. Ovaj sistem izgradnje omogućava brzu i jednostavnu gradnju sa apsolutnom slobodom projektovanja, kao kod monolitnih betonskih konstrukcija. Sa željom da se pruži najkvalitetniji proizvod klijentima, a i potrebom da se osavremeni način gradnje na našim prostorima, 2023. godine je počela proizvodnja duplih betonskih zidova, OMNIA ploča i betonskog prefabrikovanog stepeništa. Savremen, visoko automatizovan proizvodni pogon se nalazi u Novoj Pazovi.

The semi-precast building system with double walls and omnia slabs has been a well-known technology for multi-storey building in European countries for three decades. Over the years, the technology has changed, developed, and adapted to the requirements of improved quality of life and more efficient use of thermal energy. Today, it is a reliable, highly efficient and, most importantly, high-quality construction method that is used all over the world. This construction system allows fast and easy construction with absolute freedom of design, just like monolithic concrete structures. With the desire to provide the highest quality product to customers and the need to modernize the way of construction methods in our region, in 2023 the production of double concrete walls, OMNIA slabs and concrete prefabricated stairs began. The modern, highly automated production facility is located in Nova Pazova.

Beton se kao osnovni građevinski materijal u stambenoj gradnji koristi zbog svoje trajnosti i otpornosti. Vremenom postaje sve stabilniji u smislu fizičko hemijskih karakteristika i ne zahteva skupo održavanje tokom eksploatacije. Sirovine za spravljanje betona su dostupne u lokalnom području pa su shodno tome transportne rute kratke, troškovi mali, a emisije zagađivača i balansa CO2 niske. Beton se može reciklirati i to je razlog što se naziva „zelenim“ građevinskim materijalom.

Concrete is used as the primary building material in residential construction because of its durability and strength. It becomes more stable over time in terms of physical chemical characteristics and does not require expensive maintenance during exploitation. Raw materials for concrete are available locally, so transportation routes are short, costs are low, and pollutant emissions and CO2 balances are low. Concrete is recyclable; therefore, it is referred to as a "green" building material.

Zbog visokog toplotnog kapaciteta beton nudi najbolje uslove za energetski efikasnu konstrukciju. Rezultat toga je sporo reagovanje na povećanje ili smanjenje toplotne energije. Beton ima veliku gustinu i težinu pa se javlja vrlo velika apsorpcija zvuka što ga svrstava u dobre zvučne izolatore. Upija buku i osigurava mir i tišinu.
U slučaju požara svojim odličnim karakteristikama štiti ljude, imovinu i okolinu. Na temperaturama do 1000˚C, koja se javlja u prirodnim požarima, beton ostaje uglavnom čvrst, ne širi vatru dalje, ne proizvodi dim, ne oslobađa otrovne gasove. Zbog relativno slabe provodljivosti toplote, temperatura unutar poprečnog preseka ne doseže 500˚C kod zidova koji su ispravno dimenzionisani u smislu zaštite od požara. Beton se može vrlo jednostavno sanirati posle požara. Zbog svih navedenih karakteristika, beton daleko nadmašuje sve ostale građevinske materijale.

Due to its high heat capacity, concrete offers the best conditions for energy-efficient construction. The result is a slow response to increases or decreases in thermal energy. Concrete has a high density and weight, so very high sound absorption occurs, making it a good sound insulator. It absorbs noise and provides peace and quiet.
In case of fire, it protects people, property, and the environment with its outstanding characteristics. Concrete remains mostly solid at temperatures up to 1000˚C, which occurs in natural fires, does not spread the fire further, does not produce smoke, and does not emit toxic gases. Because of its rather poor thermal conductivity, temperatures within the cross-section do not reach 500˚C in walls properly designed for fire protection. Concrete can be easily repaired after a fire. Due to all the above characteristics, concrete is far superior to all other building materials.

PREDNOSTI SISTEMA / BENEFITS OF THE SYSTEM

- Većina arhitektonskih zahteva može biti realizovana, pa čak i betonska fasada sa strukturalnom površinom, glatkom-natur ili farbanom betonskom površinom
- Proizvodnja u kontrolisanim uslovima putem najnovijih tehnologija obezbeđuje visok kvalitet svih elemenata konstrukcije
- Integrisana izolacija u samim prefabrikovanim elementima omogućava optimizovani energetski bilans građevinskog projekta
- Optimalna zvučna izolacija se postiže velikom masom građevinskih delova koji obezbeđuju nizak stepen prenosa zvuka
- Dokazana izvrsna protivpožarna izolacija
- Prefabrikovani elementi obezbeđuju veću preciznost i tačan raspored armature kada se poredi sa gradnjom „in situ“. Precizno postavljanje armature u prefabrikovanim elementima povećava nivo postojanosti što rezultira 5-10 mm manjim zaštitnim slojevima betona
- Prefabrikovani betonski proizvodi postojaniji su od ostalih građevinskih materijala

- Most architectural requirements can be achieved, even a concrete facade with a structural surface, smooth or painted concrete surface
- Production under controlled conditions using state-of-the-art technology ensures the high quality of all construction elements
- Integrated insulation in the precast elements themselves ensures an optimized energy balance of the construction project
- Optimal sound insulation is achieved by the high mass of the building components, ensuring a low sound transmission level
- Proven excellent fire insulation
- Precast elements provide greater accuracy and precise placement of reinforcement in compared with on-site assembly. Precise placement of reinforcement in precast elements increases strength levels, resulting in a 5-10 mm reduction in concrete protective layers
- Precast concrete products are more durable than other building materials

FINANSIJSKA PREDNOST

- Fabričkom proizvodnjom, uključujući ugradne komponente, kao i brzom montažom na gradilištu i izbegavanjem malterisanja, vreme izgradnje se skraćuje i do 50%
- Proizvodnja prefabrikovanih delova konstrukcije se može raditi paralelno sa pripremnim radovima ili čak pre bilo kakvih radova na gradilištu
- Smanjuje se broj nedostataka i grešaka na gradilištu
- Smanjeni su troškovi podupiranja, skela i oplata
- Brži prihodi zbog smanjenog vremena trajanja projekta
- Jasna i precizna kalkulacija troškova je moguća u ranoj fazi projekta
- Relativnom integracijom svih komponenti sistema u planiranje kao i tokom izvođenja radova postiže se optimizacija troškova izgradnje

FINANCIAL ADVANTAGE

- Thanks to factory production, including assembly components, as well as fast on-site assembly and avoidance of plastering, construction time is reduced by up to 50%
- Production of precast construction components can be carried out alongside preparation work or even before any work on the construction site

- The number of deficiencies and errors on the construction site is reduced
- Support, scaffolding, and formwork costs are reduced
- Faster revenue due to shorter project turnaround time
- Clear and accurate costing is possible at an early stage of the project
- Clear and precise cost calculation is possible at an early stage of the project
- Relative integration of all system components in planning as well as during execution of the work ensures optimized construction costs

NA GRADILIŠTU

- Smanjena količina armiračkih, tesarskih i elektro radova
- Smanjeno skladištenje alata i materijala pa je olakšana cirkulacija radnika
- Sigurnost radnika je znatno veća
- Manji broj radnika
- Nije prisutna horizontalna i vertikalna oplata
- Smanjena potreba za podupiranjem
- Montaža elemenata upotrebom savremenih veza i alata je moguća u gotovo svim vremenskim uslovima od strane profesionalaca
- Manje buke, šuta, zagađenja
- Većina prefabrikovanih elemenata se ne skladišti već montira sa kamiona

AT THE CONSTRUCTION SITE

- Reduced amount of reinforcing, carpentry, and electrical installation work
- Storage of tools and materials is reduced, making it easier for workers to circulate
- Safety of workers is significantly higher
- Fewer workers
- There is no horizontal and vertical formwork
- Reduced need for support
- Installation of elements using modern connections and tools is possible in almost all weather conditions by professionals
- Less noise, debris, pollution
- Most precast elements are not stored but assembled from the truck

EKOLOGIJA I ŽIVOTNA SREDINA

- Kontrolisana proizvodnja u fabrici sa tačno kontrolisanom upotrebom materijala bez ostataka znači i manje otpada
- Otpad koji se javi u proizvodnji se lako reciklira i ponovo upotrebljava za razliku od otpada na gradilištu
- Betonski elementi se proizvode u metalnim oplatama koje su predviđene za višegodišnju upotrebu

ECOLOGY AND ENVIRONMENT

- Controlled factory production with precisely controlled use of materials with no residues equals less waste
- Waste generated during production is easily recycled and reused, unlike waste on a construction site
- Concrete elements are produced in metal formwork designed for long-term use

STATIČKI PRORAČUN / STATIC CALCULATION

Konstruktivni sistem odgovara proračunima monolitnih armirano betonskih konstrukcija. Prilikom proizvodnje prefabrikovanih segmenata zida i omnia ploča vodi se računa o hrapavosti spoja koji zajedno sa rešetkastim nosačima obezbeđuje vezu između dva betona i predstavlja osnovu za tretman ovakvih konstrukcija kao monolitne. Teži se da se proračunska armatura ugradi u prefabrikovani deo elementa dok se preklopi armature i veza između elemenata ostvaruju u delu koji se naliva „in situ". Svi proračuni se rade u skladu sa važećim propisima:

SRPS EN 1990 Osnove projektovanja konstrukcija

SRPS EN 1991 Dejstva na konstrukcije

SRPS EN 1992 Projektovanje betonskih konstrukcija

SRPS EN 1998 Projektovanje seizmički otpornih konstrukcija

SRPS EN 14992 Prefabrikovani betonski proizvodi-Zidni elementi

SRPS EN 13747 Prefabrikovani betonski proizvodi- Ploče za međuspratne konstrukcije

Po usvajanju dizajna, objekat se crta u softweru Allplan BIM tehnologije odakle fabrika povlači sve podatke za automatsku proizvodnju uključujući podatke o armaturi, insertima, otvorima za prozore i vrata. Projekat električnih instalacija se radi u ranoj fazi tako da se u projektu nalaze i podaci o elektro instalacijama kako bi se u proizvodnji ubacili potrebni inserti (elektro kutije, bužiri...)
Na početku projektovanja treba obratiti pažnju na organizaciju gradilišta i nosivost kranova kojima će se ugrađivati svi prefabrikovani elementi kako težina elementa ne bi bila veća od nosivosti krana.

The structural system corresponds to the calculations of monolithic reinforced concrete structures. During prefabricated wall and omnia segments production, the joint's roughness is considered, providing the connection between the two concretes and the lattice girders. That represents the basis for referring to these structures as monolithic. When constructing the reinforced concrete, the goal is to install the reinforcement in the element's prefabricated part. In contrast, the reinforcement is folded, and the connection between the components is realized in the monolithic part. All calculations are done following applicable regulations:

SRPS EN 1990 Basis of structural design

SRPS EN 1991 Actions on structures

SRPS EN 1992 Design of concrete structures

SRPS EN 1998 Design of structures for earthquake resistance

SRPS EN 14992 Precast concrete products-Wall elements

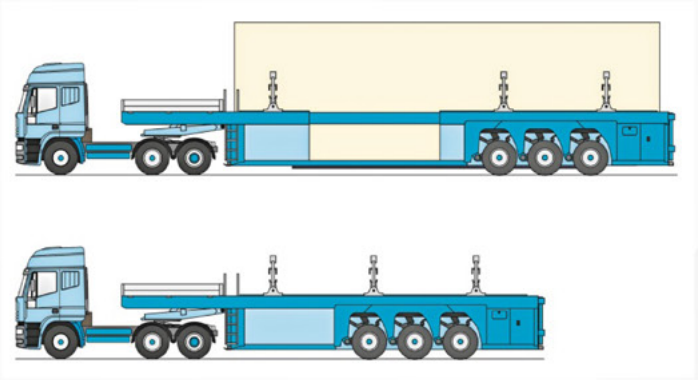
SRPS EN 13747 Precast concrete products- Floor plates for floor systems

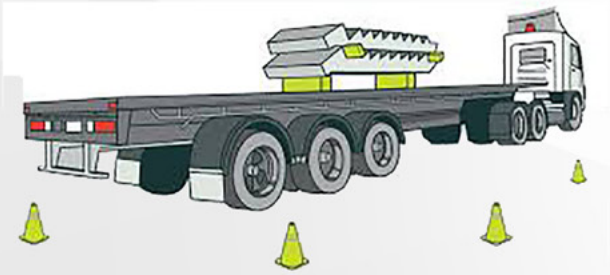
Once the design is accepted, the project is drawn in Allplan BIM software, from where the factory extracts all the data for automatic production, including information on reinforcement, inserts, window, and door frames. The electrical installation project is carried out at an early stage, so that the project also includes information about the electrical installations to make the necessary inserts (electrical boxes, flexible pipes...) At the very beginning of the design, it is necessary to pay attention to the organization of the construction site and the lifting capacity of the cranes on which all precast elements will be installed, so that the weight of the element does not exceed the capacity of the cran

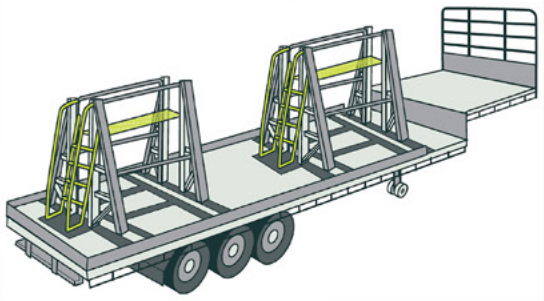
TRANSPORT I POSTAVLJANJE ELEMENATA / TRANSPORTATION AND PLACEMENT OF ELEMENTS

Dupli zidovi se dopremaju na gradilište specijalnim prikolicama ili klasičnim prikolicama sa posebnim regalima za skladištenje zidova. Omnia ploče i stepenice se transportuju klasičnim kamionskim prikolicama. Utovar omnia ploča se najčešće vrši velikim viljuškarima. U zavisnosti od tržišta isporuka betonskih elemanata je racionalna u radijusu do 700 km.

Double walls are delivered to the construction site by special trailers or classic trailers with special wall storage racks. Omnia slabs and stairs are transported by classic cargo trailers. Omnia slabs are most often loaded by large forklift trucks. Concrete elements can be delivered within a radius of up to 700 km depending on the market.







UGRADNJA ELEMENATA / INSTALLATION OF ELEMENTS

Ugradnja se vrši prema planovima montaže koji se isporučuju zajedno sa montažnim elementima, a izrađuje ih odeljenje za projektovanje u sklopu fabrike. Uz planove montaže se isporučuje i ostala dokumentacija u vidu nacrta prefabrikovanih elemenata, svih detalja horizontalnih i vertikalnih spojeva elemenata, planovi armature koja se dodatno ugrađuje na gradilištu. Većina prefabrikovanih elemenata je odmah prohodna po montaži tako da je olakšan i sigurniji pristup do sledećeg elementa ili mesta montaže na gradilištu. Ugradnja elemenata na gradilištu se vrši kranskom dizalicom ili autodizalicom. Za vreme montaže se koriste podupirači i kosnici za fiksiranje i pridržavanje elemenata dok beton naliven „in situ“ ne dobije određenu čvrstoću.

The assembly is carried out in accordance with the assembly plans, which are delivered together with the precast elements and produced by the design department at the factory. In addition to the assembly plans, other documentation is provided in the form of drawings of the precast elements, all details of the horizontal and vertical connections of the elements, and plans of the reinforcement, which is additionally installed at the construction site. Most precast elements are immediately accessible during assembly, which makes it easier and safer to access the next element or assembly location on the construction site. Elements are assembled at the construction site by crane or truck crane. During assembly, struts and anchors are used to fix and hold the elements until the concrete poured "on site" has gained.

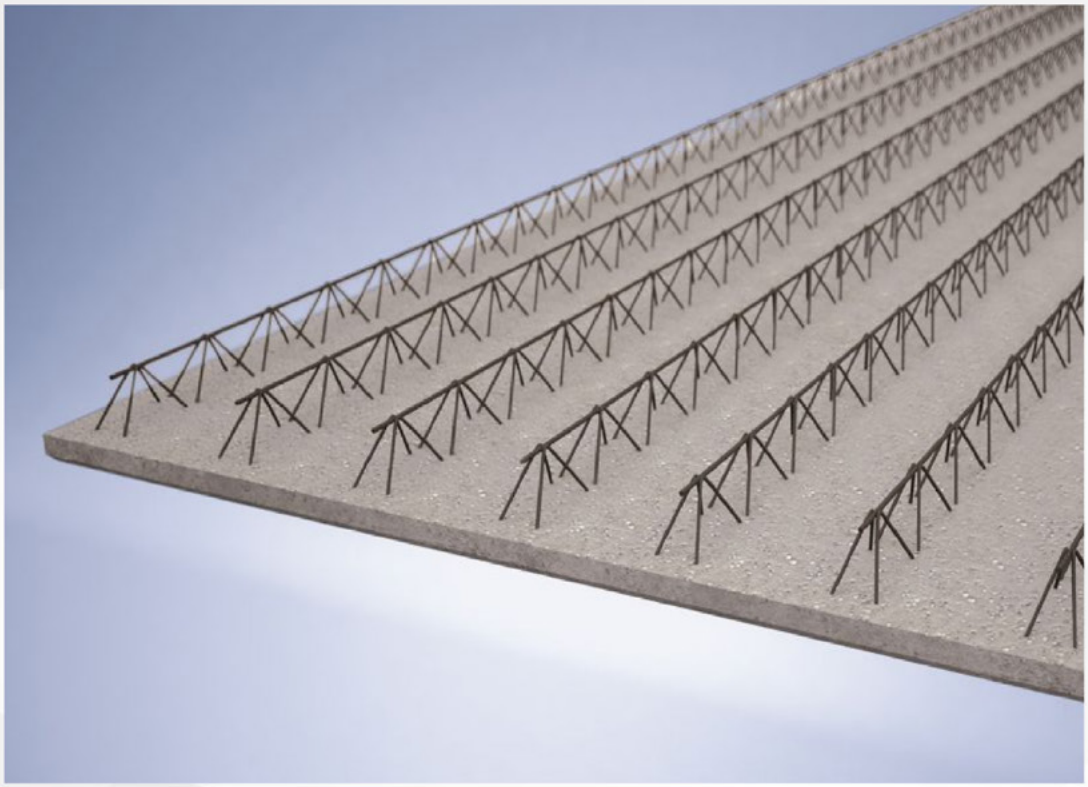
PROIZVODI U PONUDI:
AVAILABLE PRODUCTS:

DUPLI ZIDOVI

DOUBLE WALLS

DUPLI BETONSKI ZIDOVI SA IZOLACIJOM - TERMO ZID

DOUBLE CONCRETE WALLS WITH INSULATION - THERMAL WALL



OMNIA PLOČE

OMNIA SLABS

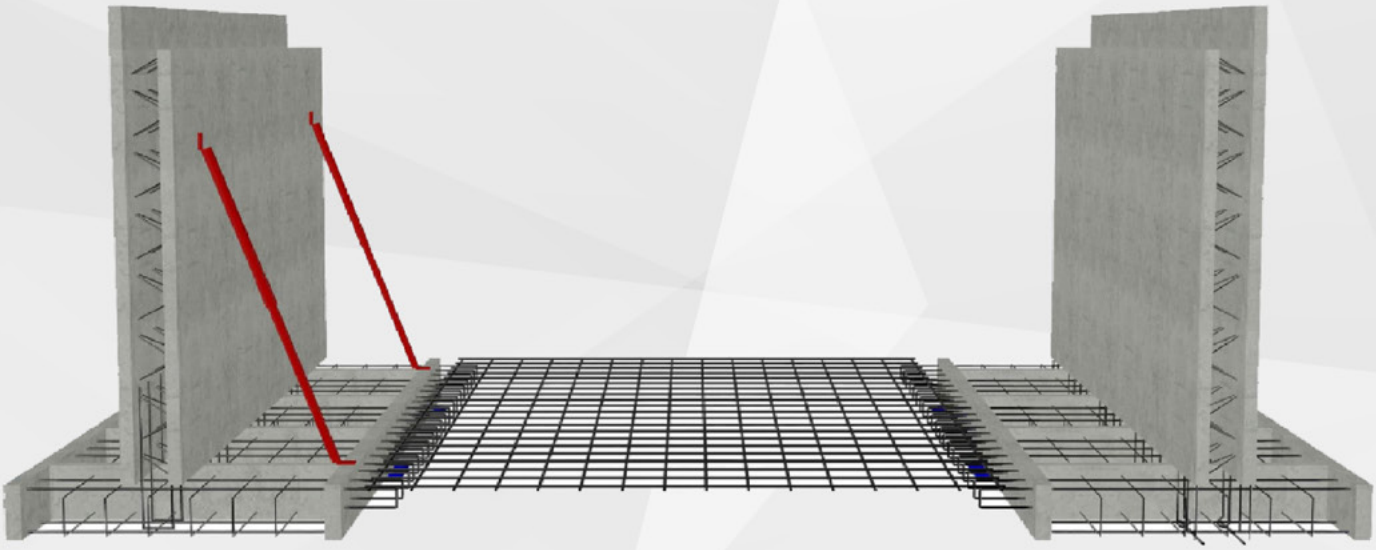
STEPENIŠTE

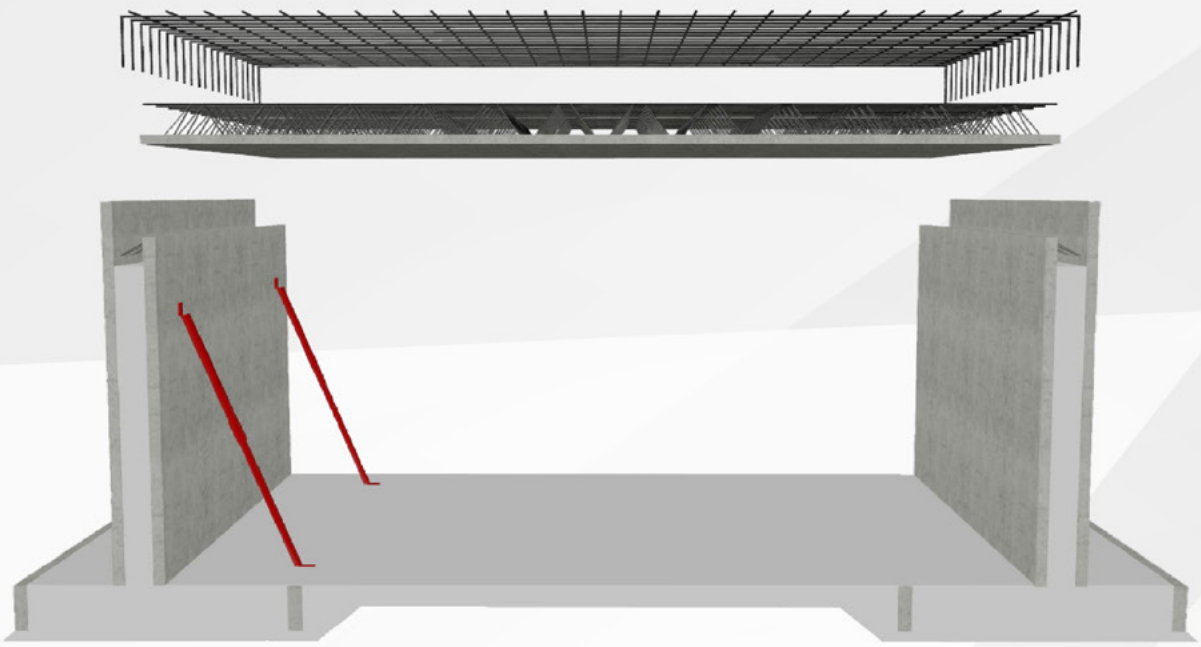
STAIRCASE

DUPLI ZID /
DOUBLE WALL

Dupli betonski zid ili skraćeno dupli zid je prefabrikovani zidni element, koji se sastoji od dva armirano betonska platna (segmenta), koja su međusobno povezana elektro-zavarenim rešetkastim nosačima (binorima). U segmentima je ugrađena konstruktivna armatura prema statičkom proračunu. Na gradilištu se ovaj gotovi deo montira, a prostor između segmenata naliva lokalno proizvedenim betonom (in situ). Nakon očvršćavanja betona nastaje monolitni statički zidni sistem. Izrada i primena vrše se prema važećim standardima. Brza montaža duplih zidova velikih površina eliminiše skupe oplate i značajno smanjuje vreme izrade, a pri tom se obim radova na gradilištu redukuje.

Double concrete wall or double wall for short is a precast wall element consisting of two reinforced concrete panels (segments), which are connected by electrically welded lattice supports (girders). Structural reinforcement is installed in the segments according to static calculation. At the construction site, this precast part is assembled and the space between the segments is poured with locally produced (on-site) concrete. After the concrete hardens, a monolithic static wall system is formed. Fabrication and application are carried out in accordance with current standards. Rapid assembly of double walls of large areas eliminates costly formwork and significantly reduces fabrication time, while the amount of work on site is reduced.





Glavne prednosti ovog sistema su kvalitet, ekonomičnost, estetski rezultat i povećana sigurnost na gradilištu. Elementi se projektuju i proizvode u skladu sa specifičnim projektnim zahtevima. Planiranje i visoko automatizovana proizvodnja vrši se u skladu sa strogim kriterijumima kvaliteta. Kako proizvodnja zidnih elemenata nije vezana za modularni sistem, moguće je mnoštvo različitih geometrijskih i arhitektonskih oblika.

The main advantages of this system are quality, cost-effectiveness, aesthetic results, and increased safety on the construction site. The elements are designed and manufactured according to the specific requirements of the project. Planning and highly automated production is carried out according to strict quality criteria. As the production of wall elements is not linked to a modular system, many different geometric and architectural shapes are possible.

Dupli zidovi se primenjuju za:

- Poslovne i industrijske zgrade
- Stambene zgrade
- Hotele
- Poljoprivredne objekte
- Strukture u niskogradnji (tuneli, mostovi, galerije, potporni zidovi...)
- Podrumske prostorije za stambene zgrade (spoljašni zidovi, unutrašnji pregradni zidovi)
- Podzemne garaže
- Vodootporne građevinske objekte

Double walls are used for:

-Business and Industrial Buildings
- Residential buildings
- Hotels
- Agricultural buildings
- Structures in civil engineering (tunnels, bridges, galleries, retaining walls...)
- Basements for residential buildings (external walls, internal partitions)
- Underground garages
- Waterproof construction projects

Debljine segmenata su 5-7 cm. Beton koji se naliva „in situ“ je najmanje 8 cm debljine. Spajanje segmenata se vrši binorima koji učvršćuju zidni element u fazi montaže i obezbeđuju otpornost na pritisak segmenata prilikom usipanja betona na gradilištu. Pored toga, zagarantovana je trajna veza između montažnog betonskog elementa i betonskog jezgra, kao i apsorpcija smičućih napona od strane rešetkastih nosača. Planirana statička armatura se ugrađuje tokom proizvodnje u fabrici, čime se drastično smanjuje količina dodatnih radova na gradilištu. Potpuno automatizovana proizvodnja omogućava racionalniju proizvodnju elemenata različitih formata zbog velikih dimenzija stolova (max 3,3 m x 12,3 m) čije iskorišćenje može biti do 90%. Standardne debljine zidnih elemenata su 20; 25; 30; 35; 40 cm, dok je za ostale dimenzije potrebno poslati upit. Zidni elementi izvode se sa eventualnim insertima, kao što su kontinuirane PVC cevi, armaturne veze, otvori bilo kog oblika i veličine, termički prozori i električne instalacije (električne kutije i vodovi).

The thickness of the segments is 5-7 cm. Concrete poured "on site" is at least 8 cm thick. The segments are connected using girders, which fix the wall element at the assembly stage and provide resistance to the pressure of the segments when the concrete is poured on site. In addition, a strong bond between the precast concrete element and the concrete core is guaranteed, as well as the absorption of shear stresses by the girders supports. The planned static reinforcement is installed during production in the factory, drastically reducing the amount of additional work on the construction site. Fully automated production allows more rational production of elements of different formats due to the large table sizes (max 3,3 m x 12,3 m), the utilization of which can reach 90%. The standard thickness of wall elements is 20; 25; 30; 35; 40 cm, while for other sizes it is necessary to send a request. The wall elements are made with possible inserts such as continuous PVC pipes, reinforcement connections, ventilation openings of any shape and size, thermal windows, and electrical installations (electrical boxes and lines).

TERMO ZID (dupli betonski zidovi sa izolacijom) / THERMAL WALL (double concrete walls with insulation)

Dupli zid sa izolacijom je prefabrikovani zidni element, koji se sastoji od dva armirano betonska platna (segmenta) i unutrašnjom izolacijom. Segmenti su međusobno povezani na poseban način tako da se ne javljaju tzv. hladni mostovi. Kod ovog zidnog elementa spoljašnji segment je nenoseća armirano betonska ploča koja ima ulogu mehaničke zaštite termo izolacije. Statička armatura koja odgovara individualnim zahtevima se ugrađuje u unutrašnji segment i u jezgru betona koji se lije na licu mesta. Nakon postavljanja elemenata na gradilištu i očvršćavanja betona koji se lije na licu mesta, nastaje statički monolitni zidni sistem. Karakteristike proizvoda i brza montaža ovih elemenata velikih površina eliminišu skupe oplate i značajno smanjuju vreme izgradnje pri čemu se redukuje obim radova na gradilištu. Glavne prednosti ovog sistema su kvalitet, ekonomičnost sistema, estetski rezultat i povećana sigurnost na gradilištu. Elementi se dizajniraju i izrađuju u skladu sa specifičnim projektnim zahtevima. Planiranje i visoko automatizovana proizvodnja vrši se u skladu sa strogim kriterijumima kvaliteta. Kako proizvodnja zidnih elemenata nije vezana za modularni sistem, moguće je mnoštvo različitih geometrijskih i arhitektonskih oblika.

Termo zidovi se primenjuju za:

- Poslovne i industrijske zgrade
- Stambene zgrade
- Hotele
- Poljoprivredne objekte

Debljine segmenata su 5-7 cm. Za proizvodnju se koristi beton projektovane klase čvrstoćei klase izloženosti. Spajanje armirano-betonskih ploča vrši se šipkama od staklenih vlakana, što sprečava nastanak toplotnog mosta između segmenata. U prvom segmentu se ugrađuje elektrozavareni rešetkasti nosači (binori) koji učvršćuju zidni element u fazi montaže i obezbeđuju otpornost na pritisak prilikom livenja betona na licu mesta. Pored toga, zagarantovana je trajna veza između unutrašnjeg segmenta prefabrikovanog betonskog elementa i jezgra betona koji se lije na licu mesta, kao i apsorpcija smičućih napona od strane rešetaka. Debljina toplotne izolacije varira od 5-20 cm u zavisnosti od potrebnog koeficijenta prenosa toplote. Planirana statička armatura biće u potpunosti ugrađena tokom proizvodnje u fabrici, čime se eliminišu svi dodatni radovi na gradilištu. Potpuno industrijalizovana i automatizovana proizvodnja omogućava, zbog velikih dimenzija stolova, realizaciju elemenata velikog formata (max 3,3 m x 12,3 m) koji nisu vezani za modularni sistem. Standardne debljine zidnih elemenata su 20; 25; 30; 35; 40 cm, dok je za ostale dimenzije potrebno poslati upit.
Zidni elementi izvode se sa eventualnim dodacima, kao što su kontinuirane PVC cevi, armaturne veze, otvori bilo kog oblika i veličine, termički prozori i električne instalacije (električne kutije i vodovi).

A double wall with insulation is a precast wall element consisting of two reinforced concrete panels (segments) and internal insulation. The segments are connected to each other in a special way so that so-called cold bridge segments do not occur. In this wall element, the outer segment is a non-load bearing reinforced concrete slab that acts as a mechanical protection for the thermal insulation. Customized static reinforcement is installed in the inner segment and in the core of the concrete, which is poured on site. Once the elements are installed at the construction site and the concrete poured on site has set, a static monolithic wall system is created. The product characteristics and quick assembly of these large area elements eliminates costly formwork and significantly reduces construction time by reducing the amount of on-site work. The main advantages of this system are quality, system economy, aesthetic results, and increased safety on the construction site. Elements are designed and manufactured to meet specific project requirements. Planning and highly automated production is carried out according to strict quality criteria. As the production of wall elements is not linked to a modular system, many different geometric and architectural shapes are possible.

Thermal walls are used for:

- Business and Industrial Buildings
- Residential Buildings
- Hotels
- Agricultural Buildings

The thickness of the segments is 5-7 cm. Concrete of the design strength class and exposure class is used for manufacturing. Reinforced concrete slabs are connected by fiberglass rods, which prevents the formation of thermal bridging between segments. In the first segment, electro-welded lattice girders are installed which fix the wall element during the assembly phase and provide pressure resistance during on-site concrete pouring. In addition, a permanent bond between the inner segment of the precast reinforced concrete element and the main concrete poured on site is guaranteed, as well as the absorption of shear stresses by the trusses. The thickness of the thermal insulation varies from 5-20 cm depending on the required heat transfer coefficient. The planned static reinforcement will be fully installed during production at the factory, eliminating all additional work on site. Fully industrialized and automated production allows, thanks to the large table sizes, the realization of large format elements (max 3,3 m x 12,3 m) that are not tied to a modular system. The standard thickness of the wall elements is 20; 25; 30; 35; 40 cm, while for other sizes it is necessary to send a request. Wall elements are made with possible additions such as continuous PVC pipes, reinforcement connections, vents of any shape and size, thermal windows, and electrical installations (electrical boxes and lines).

OMNIA PLOČE /
OMNIA SLABS

OMNIA ploče su tanke prefabrikovane armirano betonske ploče minimalne debljine 5 cm. Proizvode se u fabričkim uslovima, a potom transportuju i montiraju na gradilištu. Omnie seređaju jedna do druge, postavlja se dodatna armatura duž spoja, armatura u gornjoj zoni, pa se beton izliva do projektovane visine. Taj proces se naziva monolitizacija omnia ploča. U krajnjem stanju nakon očvršćavanja izlivenog betona na gradilištu, gotova ploča se zajedno sa slojem monolitizacije ponaša kao armirano betonska ploča koja je od početka izgrađena monolitno. Samim tim važe isti zahtevi u vezi protivpožarne, toplotne i zaštite od buke. Statički konstruktivno vezivanje elemenata prefabrikovanih delova i izlivenog betona na gradilištu osigurano je ciljano hrapavom površinom i spoljašnom armaturom– binorima.

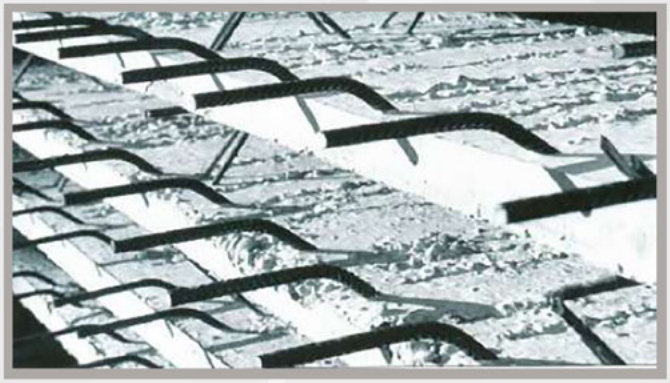
Omnia tavanica može da se upotrebljava u svim uobičajenim slučajevima i vrstama armirano betonske gradnje. Pored optimalnih rešenja ovaj sistem nudi visoku ekonomičnost i dobitak na vremenu kod izgradnje objekata.

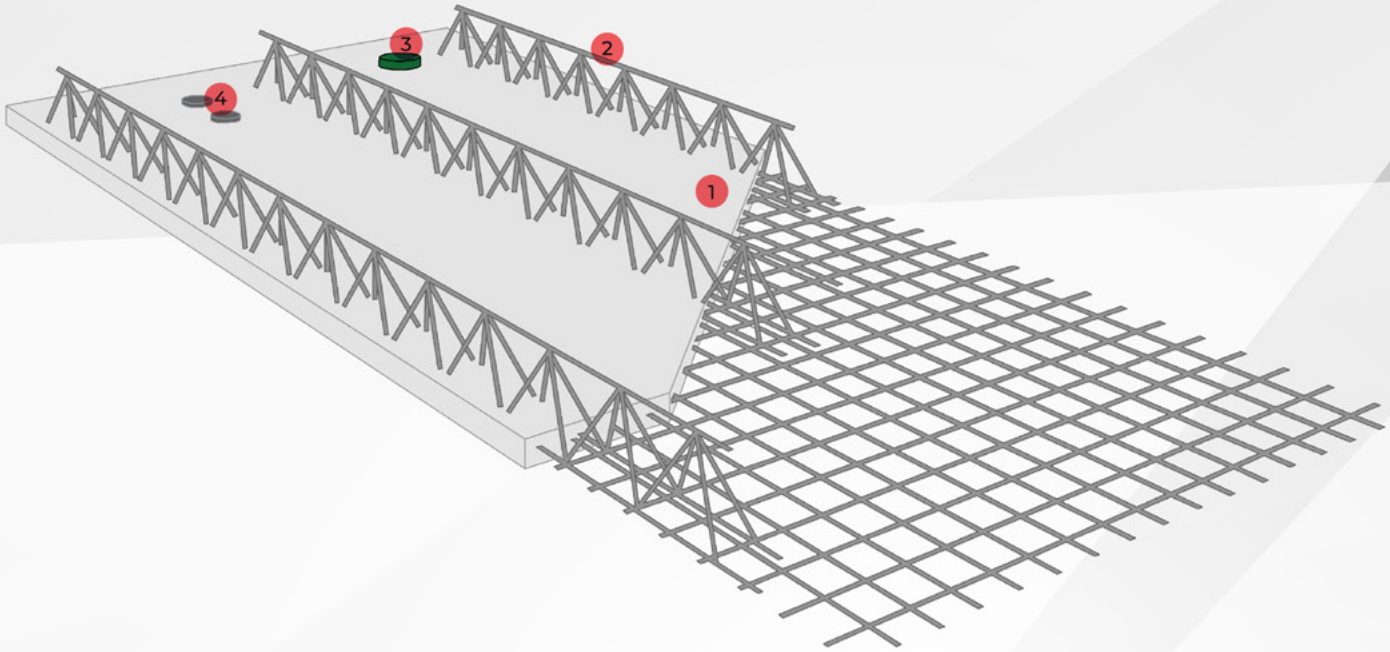
Opremanje omnia tavanica sa elementima instalacija je postala uobičajena praksa. Inovativno područje za postavljanje raznoraznih instalacija, kablova, sistema za grejanje i hlađenje. Svi neophodni otvori, električne kutije ili drugi inserti se ugrađuju u fabrici ili na gradilištu pre monolitizacije.

Omnia slabs are thin precast reinforced concrete slabs with a minimum thickness of 5 cm. They are produced in factory conditions and then transported and assembled on the construction site. Omnia slabs are lined up next to each other, additional reinforcement is placed at the joint, and reinforcement is placed in the upper zone, so the concrete is poured to the design height. This process is called monolithization of omnia slabs. In the final state after the poured concrete has hardened on the construction site, the finished slab together with the monolithization layer behaves like a reinforced concrete slab built monolithically from the beginning. Thus, the same goes for fire, thermal and noise protection. The static structural connection of precast elements and poured concrete on the construction site is ensured by the rough surface and external reinforcement girders.

Omnia slabs can be used in all common cases and types of reinforced concrete construction. Besides the optimal solutions, this system provides high cost-efficiency and time advantage in the construction of projects.

Equipping omnia slabs with installation elements has become common practice. An innovative area to accommodate various installations, cables, heating and cooling systems. All necessary openings, electrical boxes or other inserts are installed in the factory or on the construction site before monolithization.





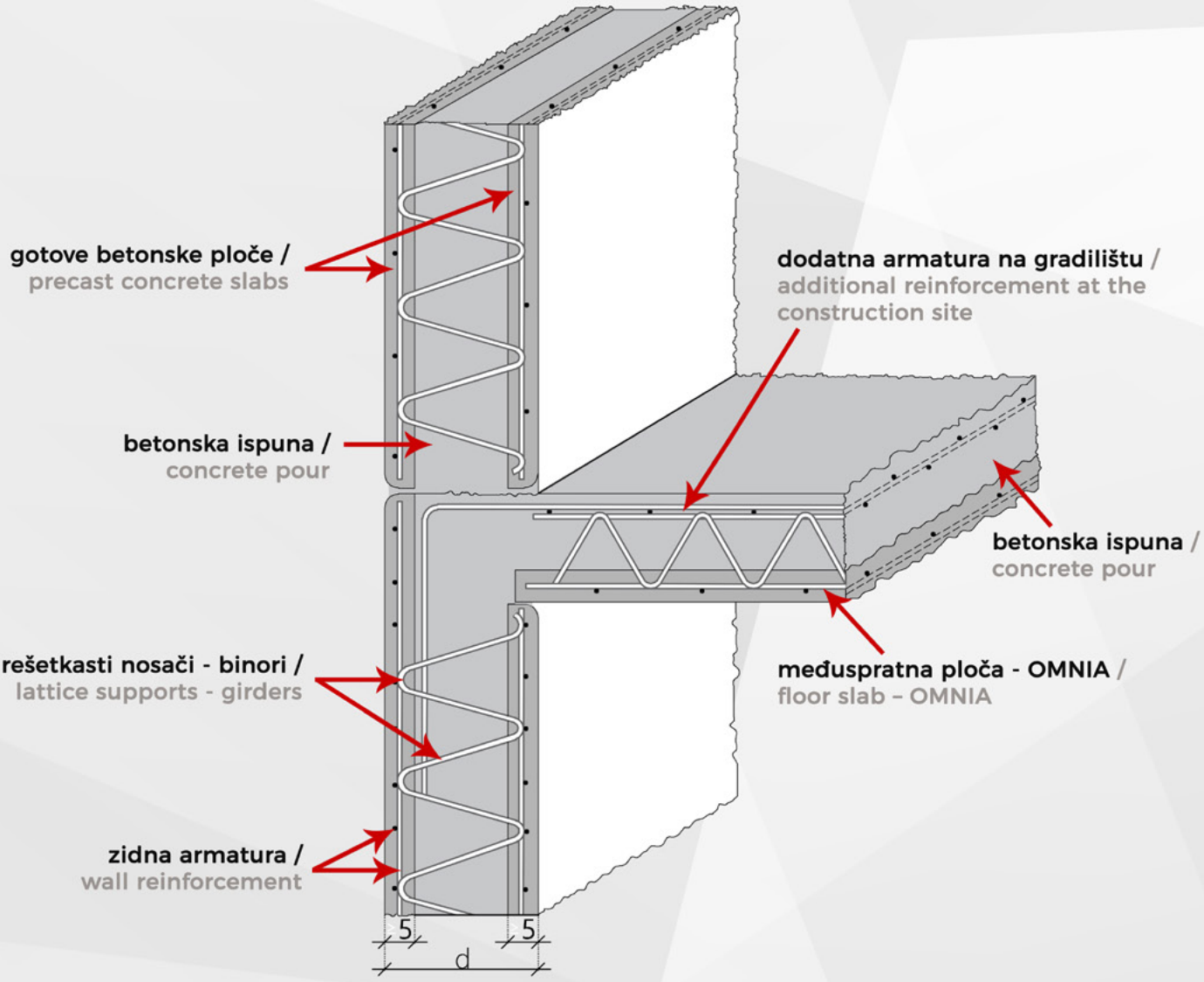
1. **armirano betonska ploča fleksibilnih dimenzija /** reinforced concrete slab of flexible dimensions
2. **binori se koriste kao distanceri za gornju zonu armature u ploči i kao moždanici za sprezanje betona nalivenog „in situ" i omnia ploče /** girders are used as spacers for the upper zone of reinforcement in the slab and as dowels to connect the concrete poured on site and the omnia slab
3. **ugrađeni otvor za mehaničku ventilaciju /** built-in vent opening for mechanical ventilation
4. **centralne kutije za električne vodove /** electrical boxes for power lines

OMNIA ploče su skroz fleksibilne u pogledu dimenzija i izrađuju se po projektu.

OMNIA panels are fully flexible in terms of dimensions and are manufactured according to the design.

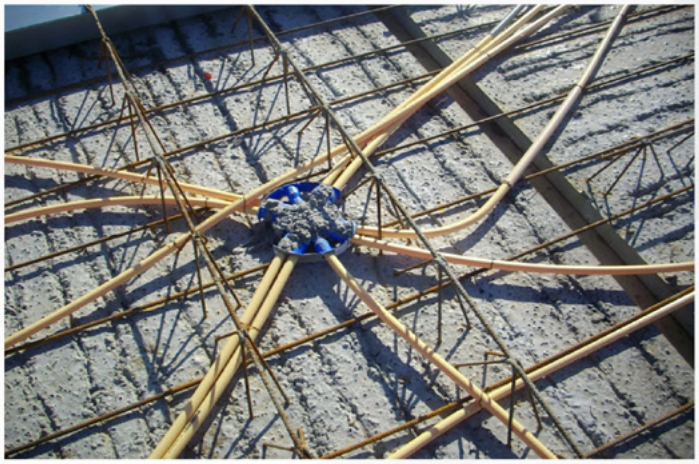
DIMENZIJE OMNIA PLOČA / DIMENSIONS OF OMNIA SLABS	
širina elementa do 3,3 m / element width up to 3,3 m	**najčešća širina 2,4 m /** most common width 2,4 m
dužina elementa do 10,0 m / element length up to 10,0 m	**najčešća dužina do 6,0 m /** most common length up to 6.0 m

tipična veza omnia ploče i duplog zida / typical connection of an Omnia slab and double wall



Ugradnja instalacija u OMNIA ploče je postala uobičajena praksa. Mogu se ugrađivati razne vrste instalacija poput kablova, sistema za grejanje i hlađenje, elektro opreme itd.

Installing installations in OMNIA slabs has become a common practice. Different types of installations can be installed, such as cables, heating and cooling systems, electrical equipment etc.

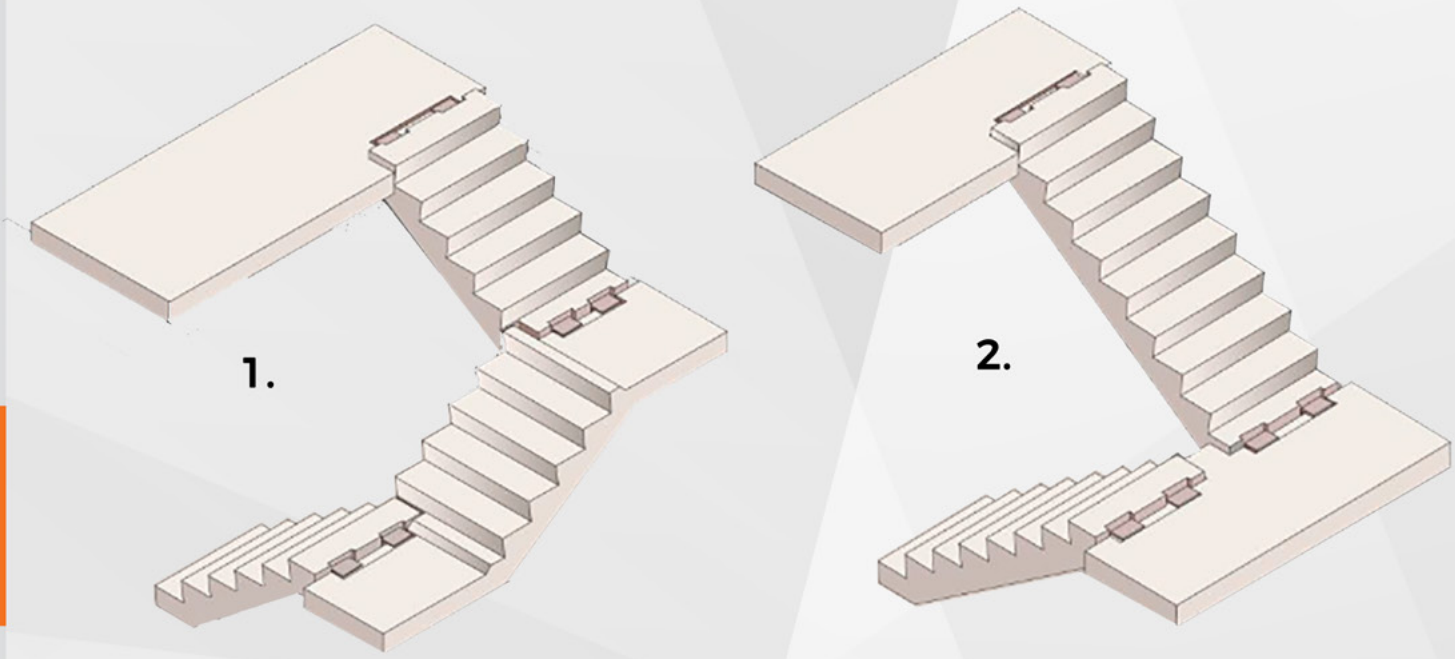


BETONSKO PREFABRIKOVANO STEPENIŠTE / PRECAST CONCRETE STAIRS

Prefabrikovano betonsko stepenište jedna je od najboljih opcija za eliminisanje problema koji se javlja prilikom klasične izgradnje stepeništa (podešavanje broja stepenika, uspona, visine i širine stepenika). Pružaju sigurnu vertikalnu komunikaciju između etaža, pa su samim tim pogodne i kod objekata veće spratnosti. Odličan su izbor za protivpožarne stepenice.

Dostupni tipovi stepeništa:

1. **Stepenište sa gornjim i/ili donjim podestom**
2. **Stepenište bez podesta**



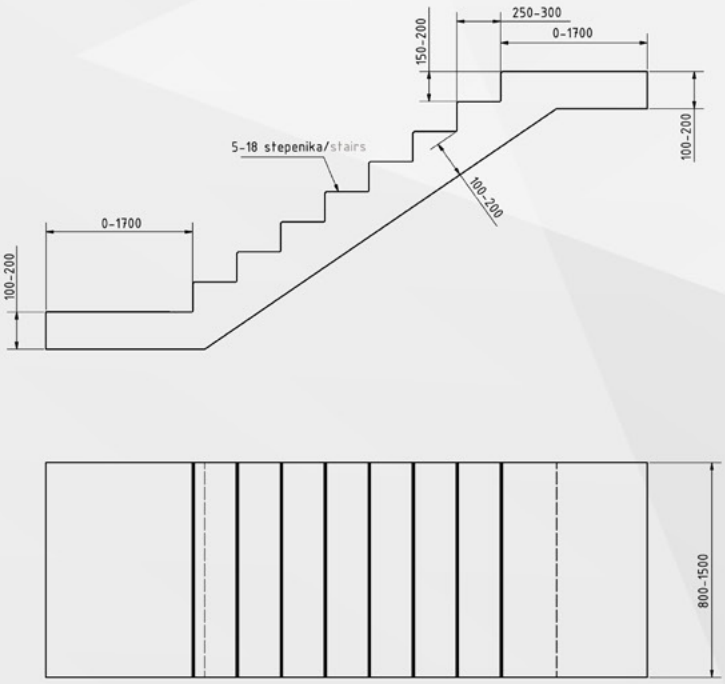
Precast concrete staircases are one of the best options for eliminating the problems that arise with classic staircase construction (adjusting the number of stairs, treads, height, and width of the stairs). They provide a safe vertical connection between floors and are therefore also suitable for buildings with higher storeys. They are an excellent choice for fire escape stairs.

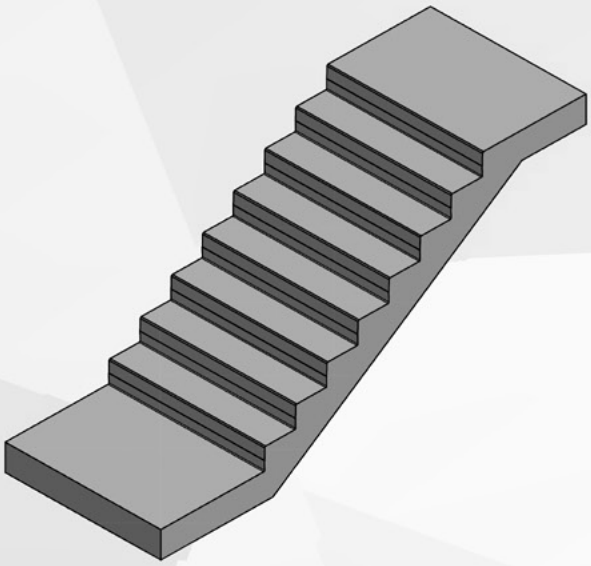
Available types of stairs:

1. Stairs with upper and / or lower landing
2. Stairs without a landing

Moguće dimenzije stepeništa koje proizvodimo u našem pogonu date su na sledećem crtežu:

The possible dimensions of the stairs we produce in our factory are shown in the following drawing:





Kalupi u kojima izlivamo stepenište /
Molds in which we pour the stairs

PREDNOSTI / ADVANTAGES

- **BRZINA/** SPEED

Potrebno je samo da se transportuju i postave na objekat. Napredna mehanička veza ubrzava proces instalacije i eliminiše potrebu za podupiranjem.

They only need to be transported and placed on site. Advanced mechanical connection speeds up installation and eliminates the need for support.

- **BEZBEDNOST /** SAFETY

Posle postavljanja su odmah prohodne i obezbeđuju sigurniji pristup različitim etažama tokom izgradnje nego drugi privremeni sistemi za manipulaciju.

Once installed, they are immediately passable and provide safer access to various floors during construction than other temporary handling systems.

- **ESTETIKA/** AESTHETICS

Stepenice se izrađuju u kalupu od visokokvalitetnog čelika, dobija se elegantna glatka završna obrada elementa. Sigurnosne šine i rukohvati se mogu ugraditi pre postavljanja.

The stairs are manufactured in stainless steel molds, giving an elegant smooth finish to the element. Safety grab bars and handrails can be installed prior to installation.

- **FLEKSIBILNA VELIČINA /** FLEXIBLE SIZE

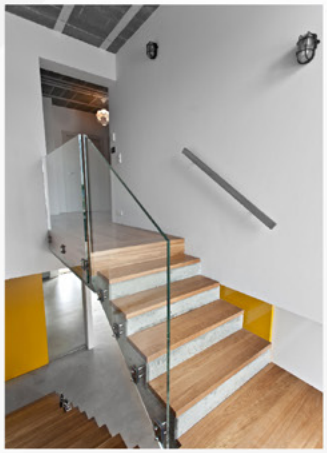
Moguće je korigovati dimenzije stepenišnog kraka u svim pravcima.

You can adjust the size of the stair treads in all directions.

- **OTPORNOST NA POŽAR /** FIRE RESISTANCE

Kao i drugi betonski prefabrikovani elementi tako i stepenice imaju visok stepen vatrootpornosti.

Like other concrete precast elements, staircases have a high degree of fire resistance.



PROJEKTI / PROJECTS

STAMBENI OBJEKTI/ RESIDENTIAL BUILDINGS

Porodična kuća - Ulm, Nemačka / Family house - Ulm, Germany

Stambena zgrada - Bolcano, Italija / Residential building - Bolzano, Italy




Stambena zgrada - Freising, Nemačka / Residential building - Freising, Germany




Porodična kuća - Palatinat, Nemačka / Family house - Palatinate, Germany




Porodična kuća - Minhen, Nemačka / Family house - Munich, Germany

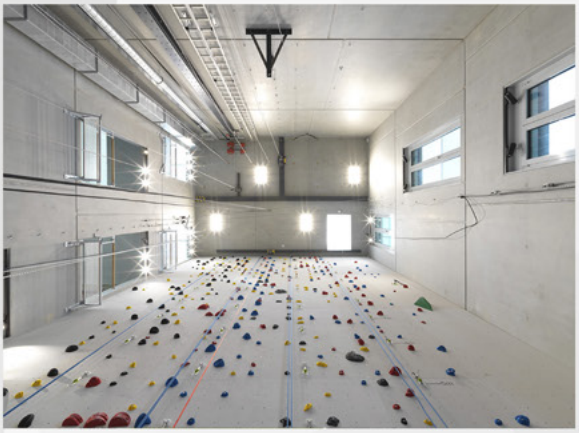



Stambena zgrada - Vipiteno, Italija / Residential building - Vipiteno, italy

Porodična kuća - Dieoildsau, Švajcarska / Family house - Diepoldsau, Switzerland

KOMERCIJALNI OBJEKTI / COMMERCIAL BUILDINGS

Sedište firme sa izložbenim prostorom - Isni im Algoj, Nemacka /
Company headquarters with exhibition space - Isny im Allgäu, Germany



Sedište firme - Vajherhamer, Nemačka /
Company headquarters- Weiherhammer, Germany

Sedište, skladište i market - Bolzano, Italija /
Headquarters, warehouse and market - Bolzano, Italy

Volksbank - Ehingen, Nemačka / Volksbank - Ehingen, Germany

Sedište firme - Inzing, Austrija / Head office - Inzing, Austria

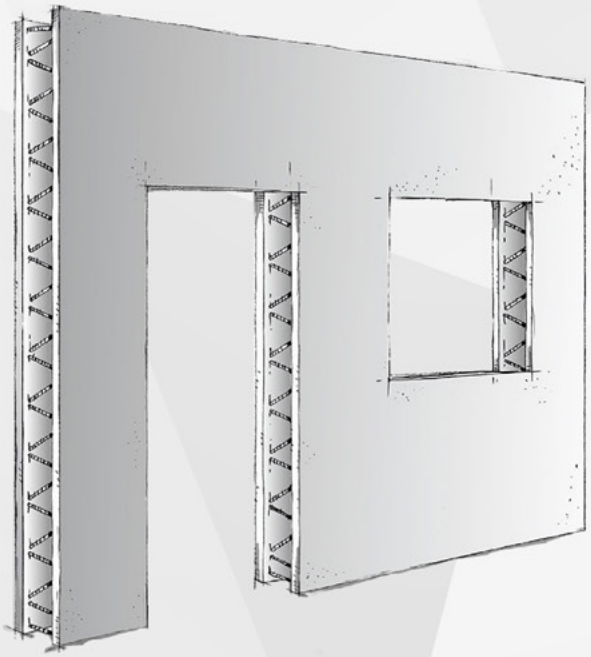
JAVNI OBJEKTI / PUBLIC BUILDINGS

Stambena zgrada - Vipiteno, Italija / Residential building - Vipiteno, italy

Porodična kuća - Dieoildsau, Švajcarska / Family house - Diepoldsau, Switzerland

TEHNIČKI KATALOG / TECHNICAL CATALOG

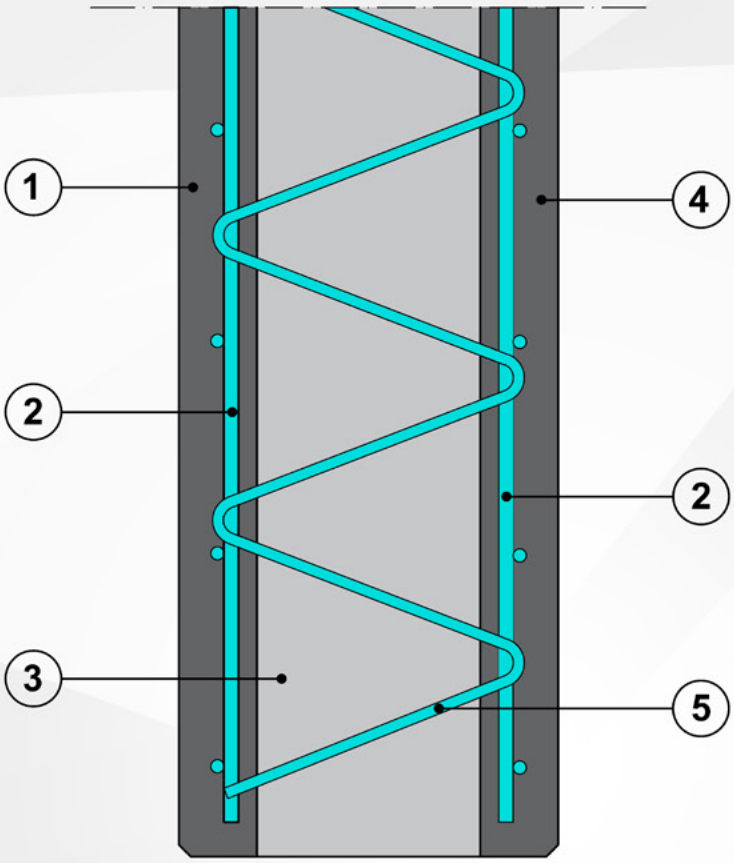
TEHNIČKI PODACI DUPLI ZID/ SPECIFICATION DOUBLE WALL



TEHNIČKI PODACI / SPECIFICATIONS	
Maksimalna dimenzija / Maximum dimension	12,30 m x 3,30 m
Debljina zidnog elementa / The thickness of the wall element	20 / 25 / 30 / 35 / 40
Debljina betonske ploče / The thickness of concrete slab	5 - 7 cm
Težina zidnog elementa (6+6 cm) / The weight of the wall element (6+6 cm)	ca. 300 kg/m²
Armatura zidnog elemetna / The reinforcement of the wall element	sadržana u pločama / contained in the slab
Oplate postavljene na otvorima / Formwork placed on the openings	fabrički ugrađene / factory built-in
Površina / Surface	glatka (zbog metalne oplate) / smooth (because of metal formwork)
Čvrstoća betona zidnog elementa / The strength of the concrete wall element	C25/30 (dodatne na upit / additional on request)
Klasa ekspozicije / Class of exposure	XC1/XC2 (dodatne na upit / additional on request)
Armatura / Reinforcement	B500B (dodatne na upit / additional on request)

BETON KOJI SE LIJE NA LICU MESTA (in-situ) / CONCRETE CASTING	
Čvrstoća betona koji se lije na licu mesta / The strength of concrete to be cast *in-situ*	Prema statičkom proračunu (najmanje C25/30) / According to static calculation (at least C25 / 30)
Klasa ekspozicije / Class of exposure	Prema statičkom proračunu / According to static calculation
Brzina betoniranja / Concreting speed	0,8 m/h

STRUKTURA ZIDA / WALL STRUCTURE



1 - spoljašnji segment 5 - 7 cm / outer segment 5 - 7 cm

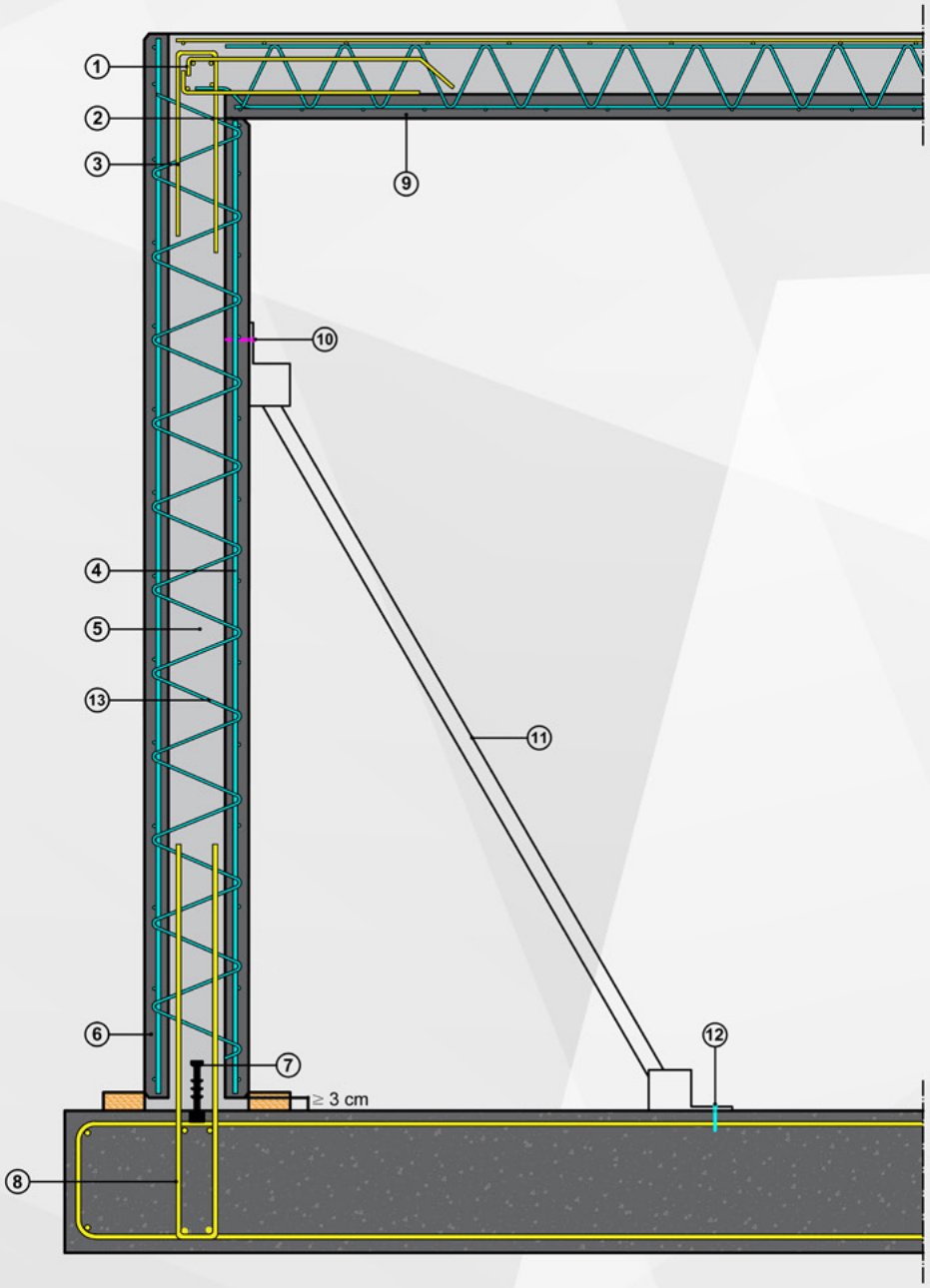
2 - ugrađena armatura / built-in reinforcement

3 - beton koji se lije na licu mesta / concrete that is cast on the spot

4- unutrašnji segment 5 - 7 cm / inner segment 5 - 7 cm

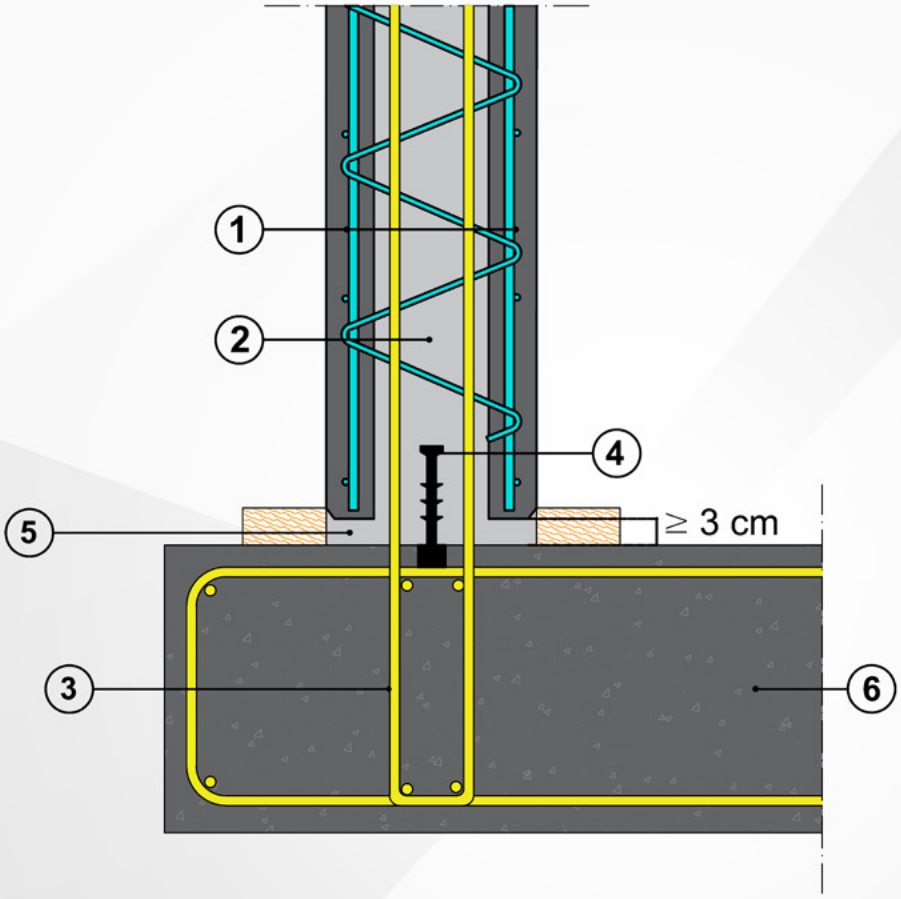
5 - rešetkasti nosač (BINOR) / lattice girder

POPREČNI PRESEK / CROSS SECTION



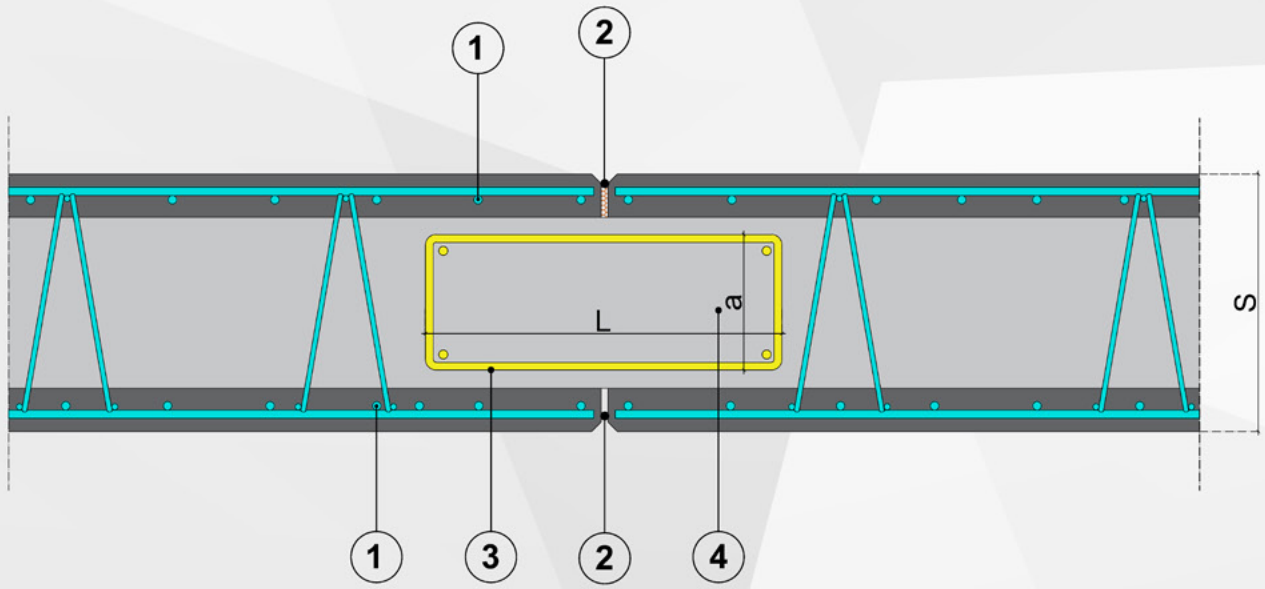
1 - dodatna armatura na ploči (in situ) /
additional reinforcement to the panel (in situ)
2 - oslonac za omnia ploču / support for omnia slab
3 - armaturna veza zid-plafon (in situ) / the connecting reinforcement wall to ceiling (in situ)
4 - ugrađena armatura / built-in reinforcement
5 - beton koji se lije na licu mesta / concrete that is cast on the spot
6 - spoljašnji segment / outer segment
7 - zaptivna traka / the sealing tape
built-in reinforcement in the concrete core of the cast in situ
8 - armaturna veza temelj - zid (in situ) / the connecting reinforcement foundation to wall (in situ)
9 - plafon od elementa omnia / ceiling made of omnia
10 - anker za kosu potporu / anchor for oblique support
11 - kosa potpora / the oblique support
12 - fiksirajući šraf / fixing screw
13 - rešetkasti nosač / lattice girder

MONTAŽNI SPOJ IZMEĐU TEMELJA I ZIDNOG ELEMENTA / PREFABRICATED CONNECTION BETWEEN FOUNDATION AND WALL ELEMENT



1 - ugrađena armatura / built-in reinforcement
2 - beton koji se lije na licu mesta / concrete that is cast on the spot
3 - armaturna veza temelj - zid (in situ) /
the connecting reinforcement foundation to wall (in situ)
4 - zaptivna traka / the sealing tape
5- horizontalni spoj u podnožju zida ≥ 3 cm (može da se redukuje sa odgovarajućim tečnim betonom) /
horizontal connection at the base of the wall ≥ 3 cm (can be reduced with an appropriatee liquid concrete)
6 - temelj / foundation

VEZA IZMEĐU ZIDNIH ELEMENATA (ravna veza) / CONNECTION BETWEEN WALL ELEMENTS (straight connection)

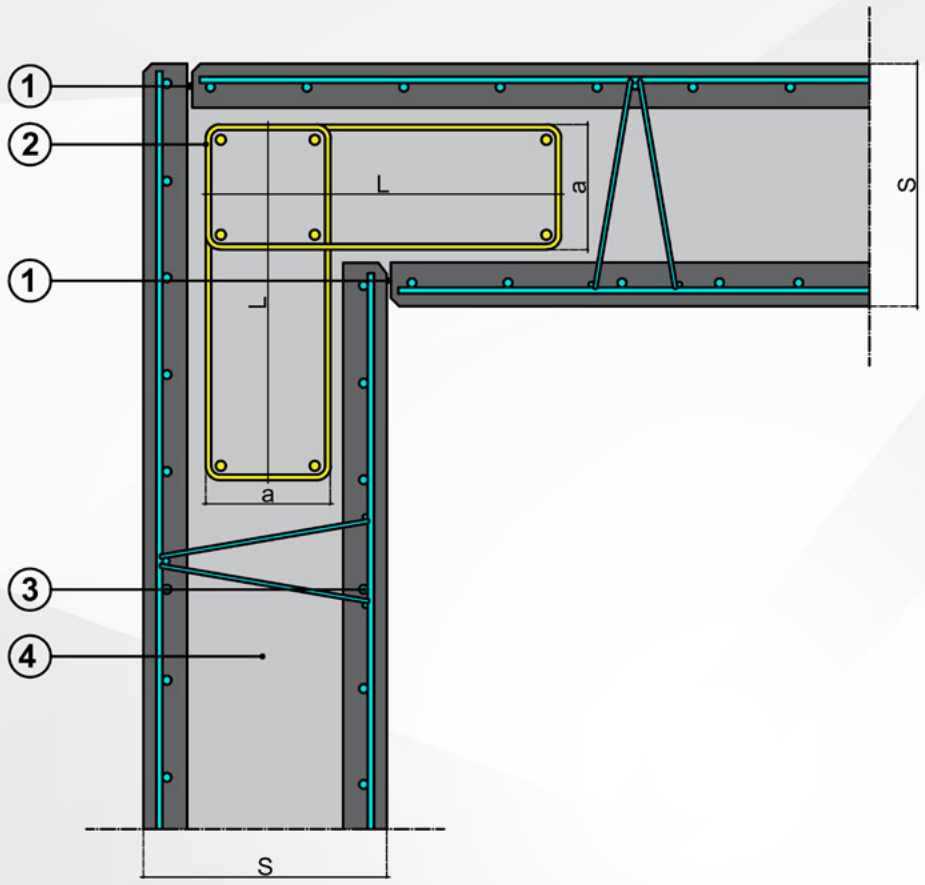


1 - **ugrađena armatura /** built-in reinforcement
2 - **montažni spoj 0,5 cm /** mounting connection 0,5 cm
3 - **armaturna veza (in situ) /** the connecting reinforcement (in situ)
4 - **beton koji se lije na licu mesta /** concrete that is cast on the spot

Debljina zida "S"/ Wall thickness "S"	Dimenzije vezane armature / Dimensions of bonded reinforcment	
	Dužina "L"/ Lenght "L"	Širina "A"/ Width "A"
25 cm	40 cm	9 cm
30 cm	40 cm	14 cm
35 cm	40 cm	19 cm
40 cm	40 cm	24 cm
Standardna armatura: Standard reinforcement:	uzengije ø8/20 cm - 10ø8 vertikalno gvožđe stirrus ø8/20 cm - 10ø8 vertical iron	

Napomena: za debljinu zida od 20 cm ugraditi čeličnu mrežu.
Note: for a wall thickness of 20 cm install a steel mesh.

UGAONA VEZA IZMEĐU DVA ZIDNA ELEMENTA /
ANGLE CONNECTION BETWEEN TWO WALL ELEMENTS

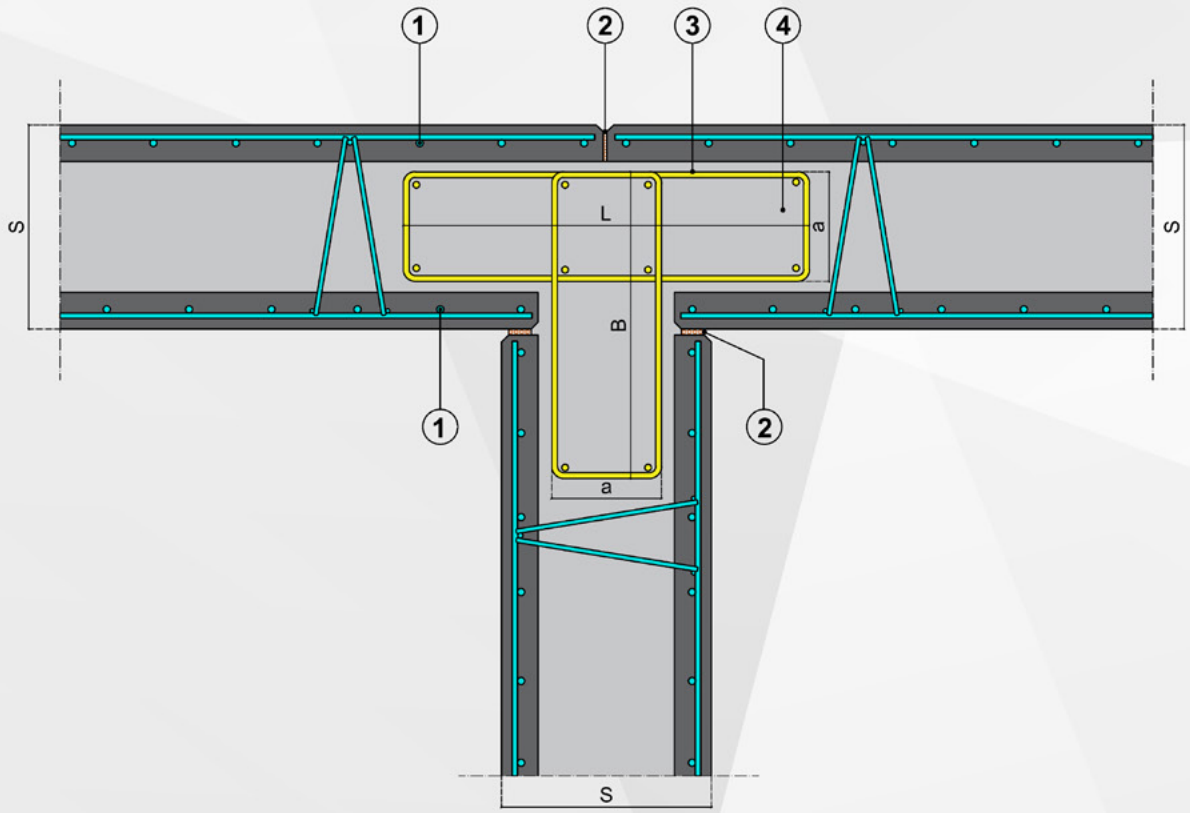


1 - montažni spoj 0,5 cm / mounting connection 0,5 cm
2 - armaturna veza (in situ) / the connecting reinforcement (in situ)
3 - ugrađena armatura u segmente/ built-in reinforcement in segments
4 - beton koji se lije na licu mesta / concrete that is cast on the spot

Debljina zida "S"/ Wall thickness "S"	Dimenzije vezane armature / Dimensions of bonded reinforcment	
	Dužina "L"/ Lenght "L"	Širina "A"/ Width "A"
25 cm	30 cm	9 cm
30 cm	35 cm	14 cm
35 cm	40 cm	19 cm
40 cm	45 cm	24 cm
Standardna armatura: Standard reinforcement:	uzengije ø8/20 cm - 10ø8 vertikalno gvožđe stirrus ø8/20 cm - 10ø8 vertical iron	

Napomena: za debljinu zida od 20 cm ugraditi čeličnu mrežu.
Note: for a wall thickness of 20 cm install a steel mesh.

T- VEZA IZMEĐU ZIDNIH ELEMENATA /
T-CONNECTION BETWEEN WALL ELEMENTS

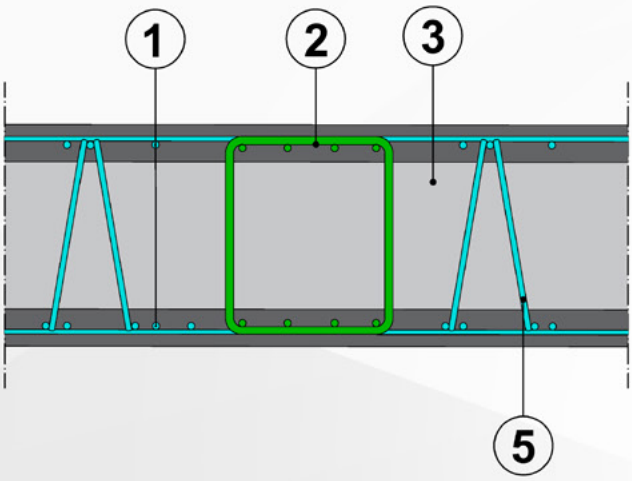


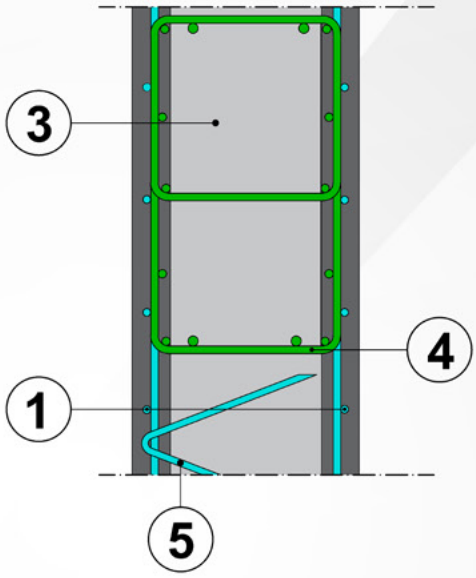
1 - ugrađena armatura / built-in reinforcement
2 - montažni spoj 0,5 cm / mounting connection 0,5 cm
3 - armaturna veza (in situ) / the connecting reinforcement (in situ)
4 - beton koji se lije na licu mesta / concrete that is cast on the spot

Debljina zida "S"/ Wall thickness "S"	Dimenzije vezane armature / Dimensions of bonded reinforcment		
	Dužina "L"/ Lenght "L"	Širina "A"/ Width "A"	Širina "B"/ Width "B"
25 cm	40 cm	11 cm	45 cm
30 cm	40 cm	14 cm	45 cm
35 cm	40 cm	19 cm	45 cm
40 cm	40 cm	24 cm	45 cm
Standardna armatura: Standard reinforcement:	uzengije ø8/20 cm - 10ø8 vertikalno gvožđe stirrus ø8 / 20 cm - 10ø8 vertical iron		

Napomena:
Za debljinu zida od 20 cm ugraditi čeličnu mrežu.
Za debljine zidova 45/50/55/60 cm ugraditi horizontalnu vezanu armaturu u skladu sa statikom.
Note:
For a wall thickness of 20 cm, install a steel mesh.
For wall thicknesses of 45/50/55/60 cm, install horizontal bonded reinforcement in accordance with statics.

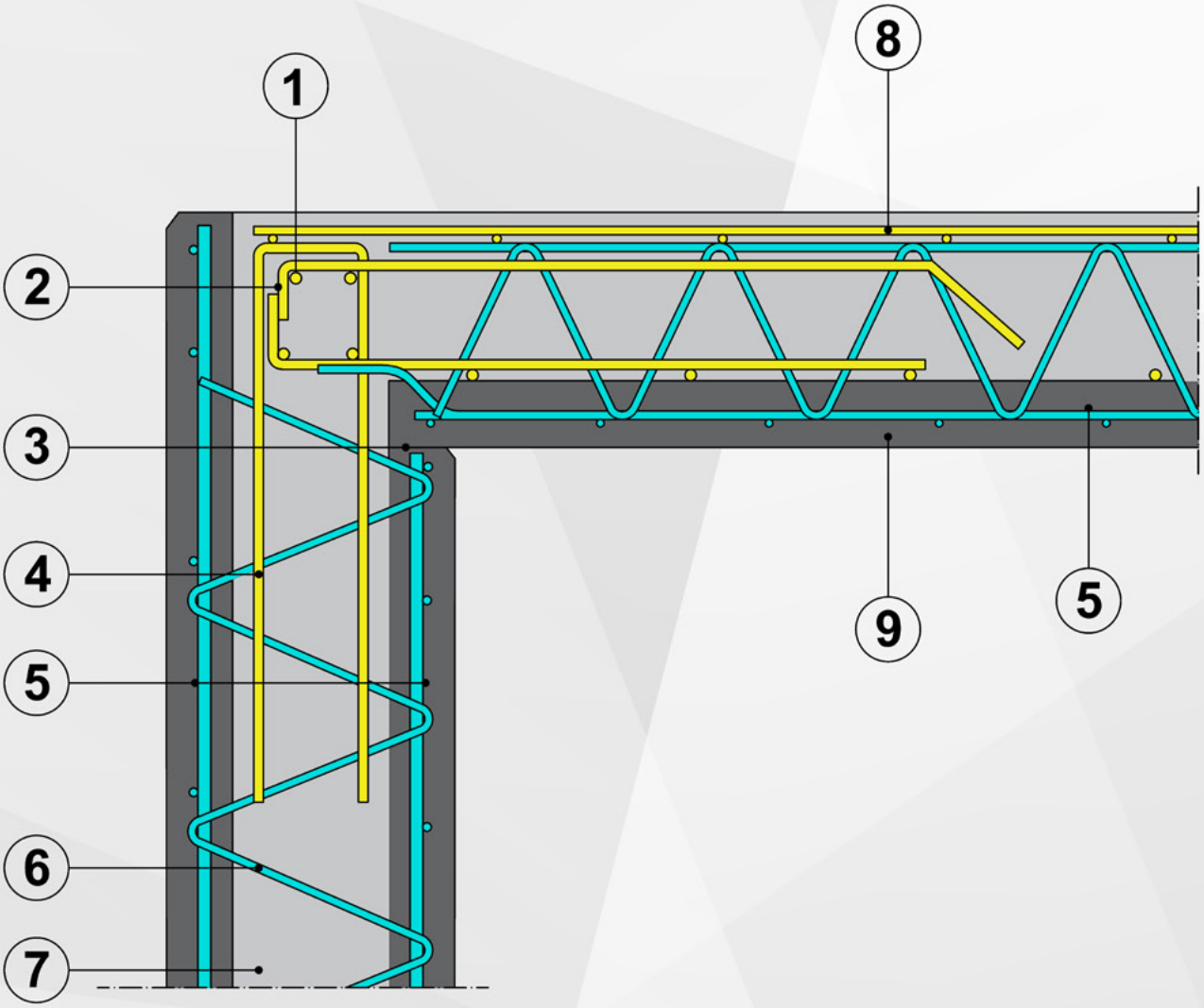
ZIDNI ELEMENT SA INTEGRISANOM POTPOROM ILI NOSAČEM /
WALL ELEMENT WITH INTEGRATED SUPPORT OR GIRDER





1 - **ugrađena armatura /** built-in reinforcement
2 - **integrisani oslonac (skriveni stub) /** integrated support (hidden column)
3 - **beton koji se lije na licu mesta /** concrete that is cast on the spot
4 - **integrisani nosač (skrivena greda) /** an integrated girder (hidden beam)
5 - **rešetkasti nosač (BINOR) /** lattice girder

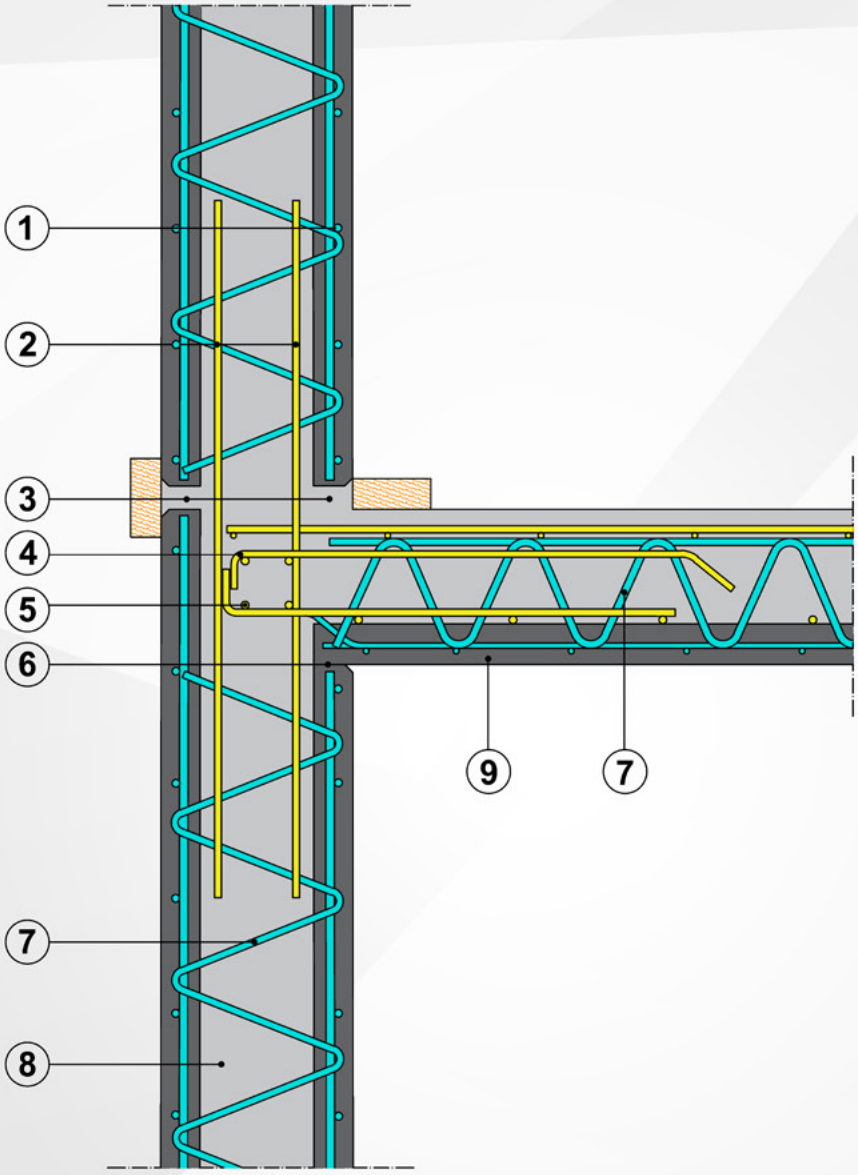
VEZA DUPLOG ZIDA I OMNIA PLOČE / CONNECTION BETWEEN DOUBLE WALL AND OMNIA SLAB



1 - **poprečna armatura povezana uzengijama (in situ) /** transverse reinforcement connected by stirrups (in situ)
2 - **dodatna armatura na ploči (in situ) /** additional reinforcement to the panel (in situ)
3 - **oslonac za omnia ploču /** support for omnia slab
4 - **armaturna veza zid-plafon (in situ) /** the connecting reinforcement wall to ceiling (in situ)
5 - **ugrađena armatura /** built-in reinforcement
6 - **rešetkasti nosač (BINOR) /** lattice girder
7 - **beton koji se lije na licu mesta /** concrete that is cast on the spot
8 - **gornja zona armature (in situ) /** upper reinforcement zone (in situ)
9 - **plafon od elementa omnia /** ceiling made of omnia

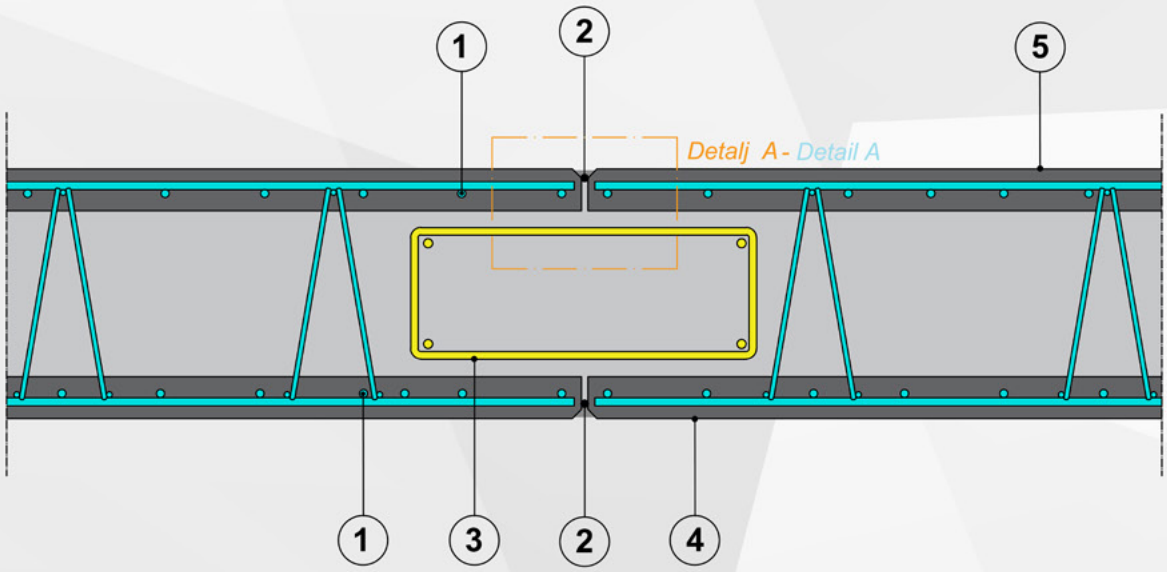
VEZA IZMEĐU DVA DUPLA ZIDA, JEDAN IZNAD DRUGOG, SA PLAFONSKIM ELEMENTIMA /

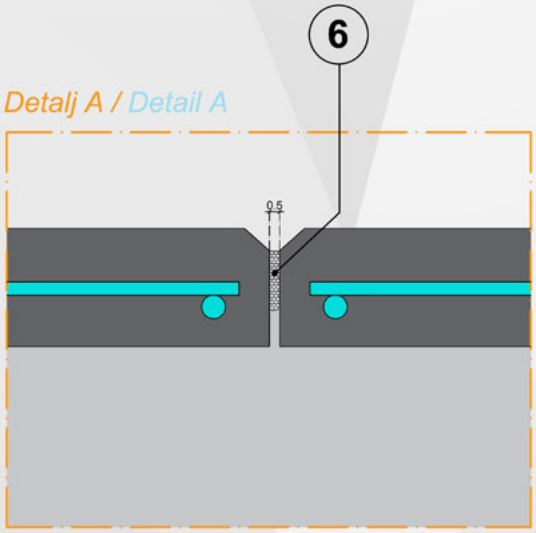
CONNECTION BETWEEN TWO DOUBLE WALLS, ONE ABOVE THE OTHER, WITH THE CEILING ELEMENTS



1 - ugrađena armatura / built-in reinforcement
2 - armaturna veza zid - zid (in situ) / the connecting reinforcement wall to wall (in situ)
3 - horizontalni spoj u podnožju zida ≥ 3 cm (može da se redukuje sa odgovarajućim tečnim betonom) / horizontal connection at the base of the wall ≥ 3 cm (can be reduced with an appropriatee liquid concrete)
4 - dodatna armatura na ploči (in situ) / additional reinforcement to the panel (in situ)
5 - poprečna armatura povezana uzengijama (in situ) / transverse reinforcement connected by stirrups (in situ)
6 - oslonac za omnia ploču / support for omnia slab
7 - rešetkasti nosač (BINOR) / lattice girder
8 - beton koji se lije na licu mesta / concrete that is cast on the spot
9 - plafon od elementa omnia / ceiling made of omnia

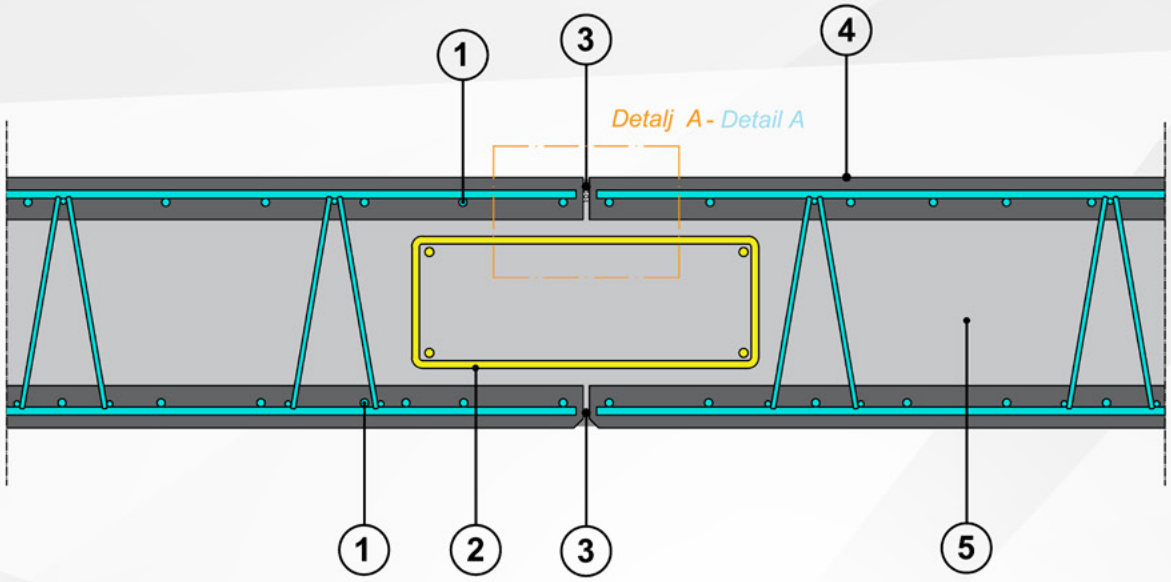
ZAPTIVANJE IZMEĐU DVA RAVNA ZIDNA ELEMENTA - STANDARDNA IVICA / SEALING BETWEEN TWO FLAT WALL ELEMENTS - STANDARD EDGE

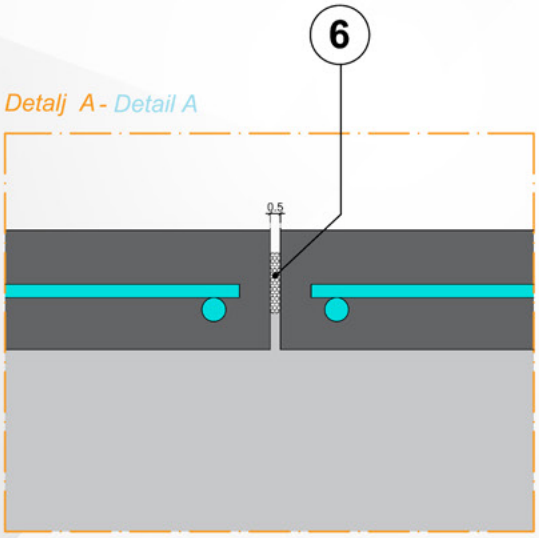




1 - **ugrađena armatura /** built-in reinforcement
2 - **montažni spoj 0,5 cm /** mounting connection 0,5 cm
3 - **armaturna veza (in situ) /** the connecting reinforcement (in situ)
4 - **unutrašnji segment /** the inner segment
5 - **spoljašnji segment /** the outer segment
6 - **opciono zatvaranje spoja cementnim malterom /** optional sealing of the connection with cement plaster

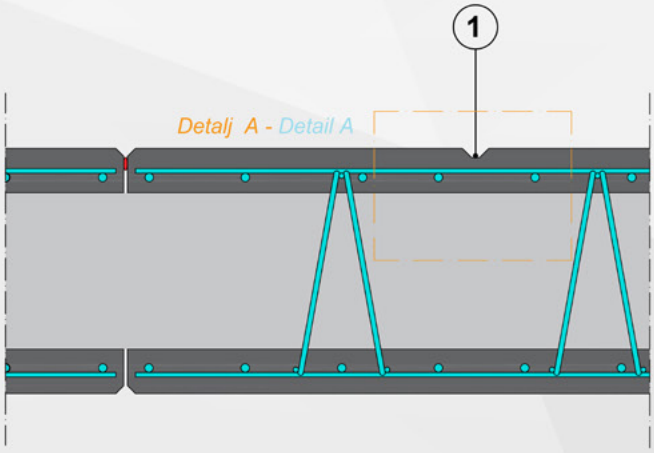
ZAPTIVANJE IZMEĐU DVA RAVNA ZIDNA ELEMENTA - OŠTRA IVICA /
SEALING BETWEEN TWO FLAT WALL ELEMENTS - SHARP EDGE

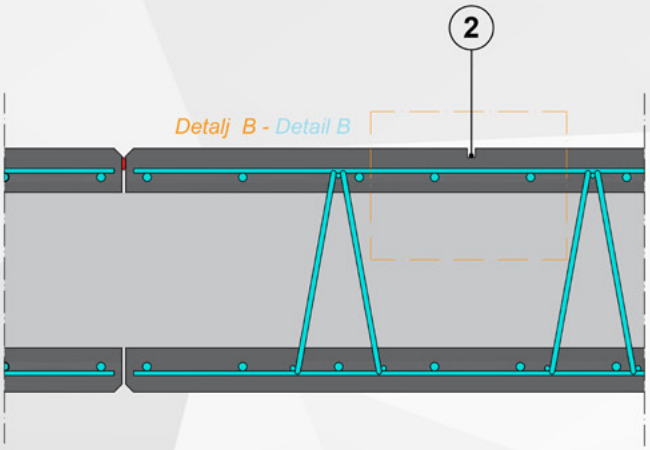


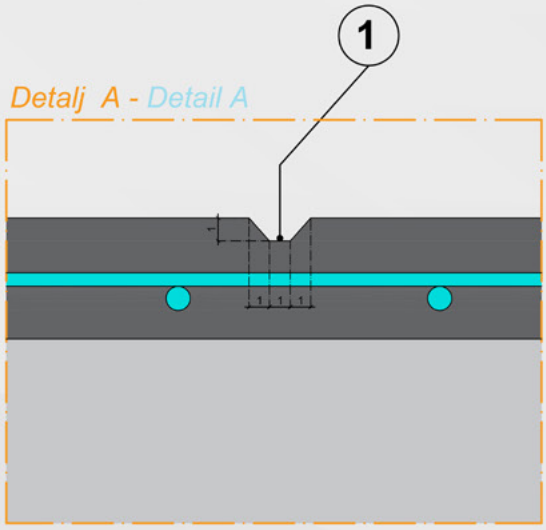


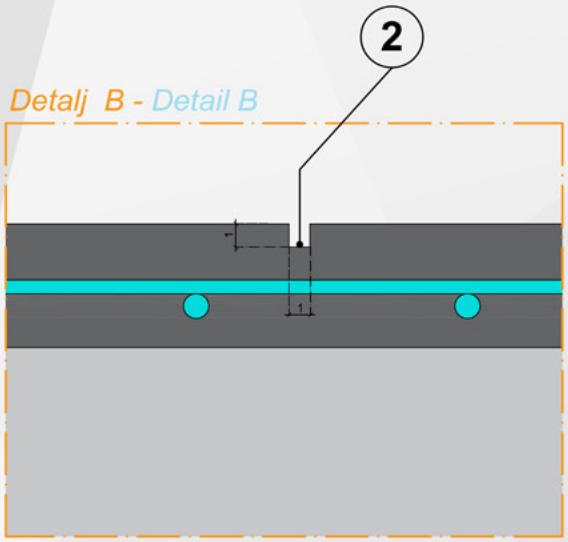
1 - **ugrađena armatura /** built-in reinforcement
2 - **armaturna veza (in situ) /** the connecting reinforcement (in situ)
3 - **montažni spoj 0,5 cm /** mounting connection 0,5 cm
4 - **spoljašnji segment /** the outer segment
5 - **beton koji se lije na licu mesta /** concrete that is cast on the spot
6 - **opciono zatvaranje spoja cementnim malterom /** optional sealing of the connection with cement

POVRŠINSKI LAŽNI SPOJ - POPREČNI PRESEK
SURFACE FALSE CONNECTION - CROSS-SECTION





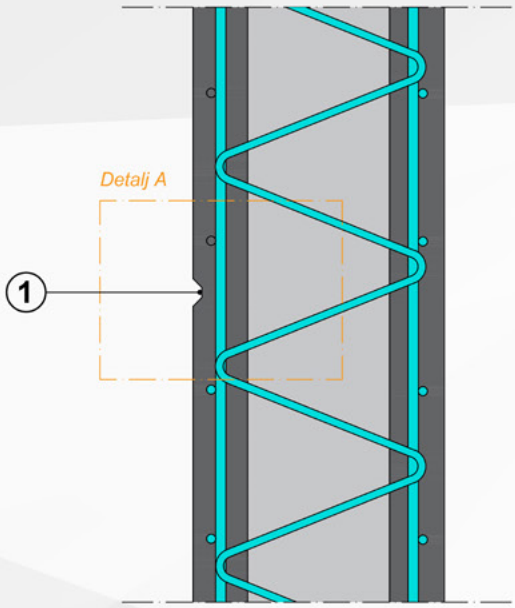


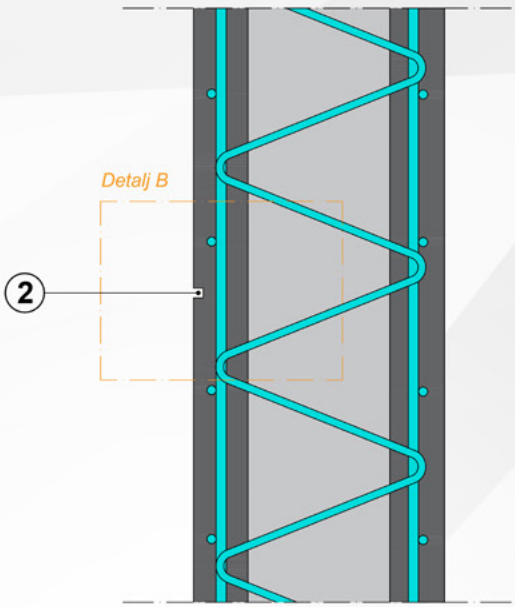


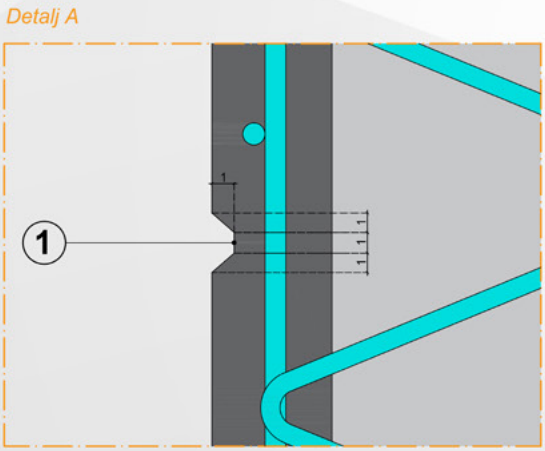
1 - površinski spoj - standardna ivica / surface connection - standard edge

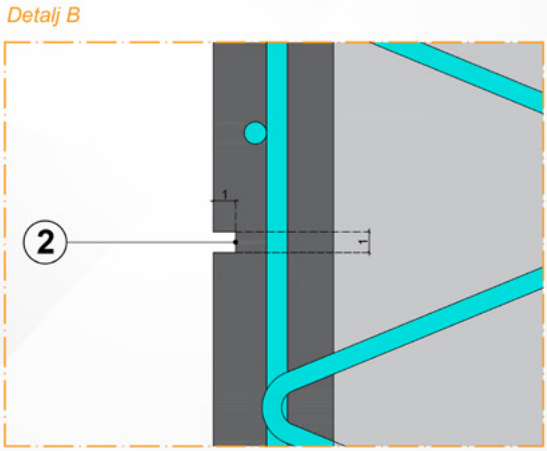
2 - površinski spoj - oštra ivica / surface connection - sharp edge

POVRŠINSKI LAŽNI SPOJ - UZDUŽNI PRESEK /
SURFACE FALSE CONNECTION - LONGITUDINAL SECTION







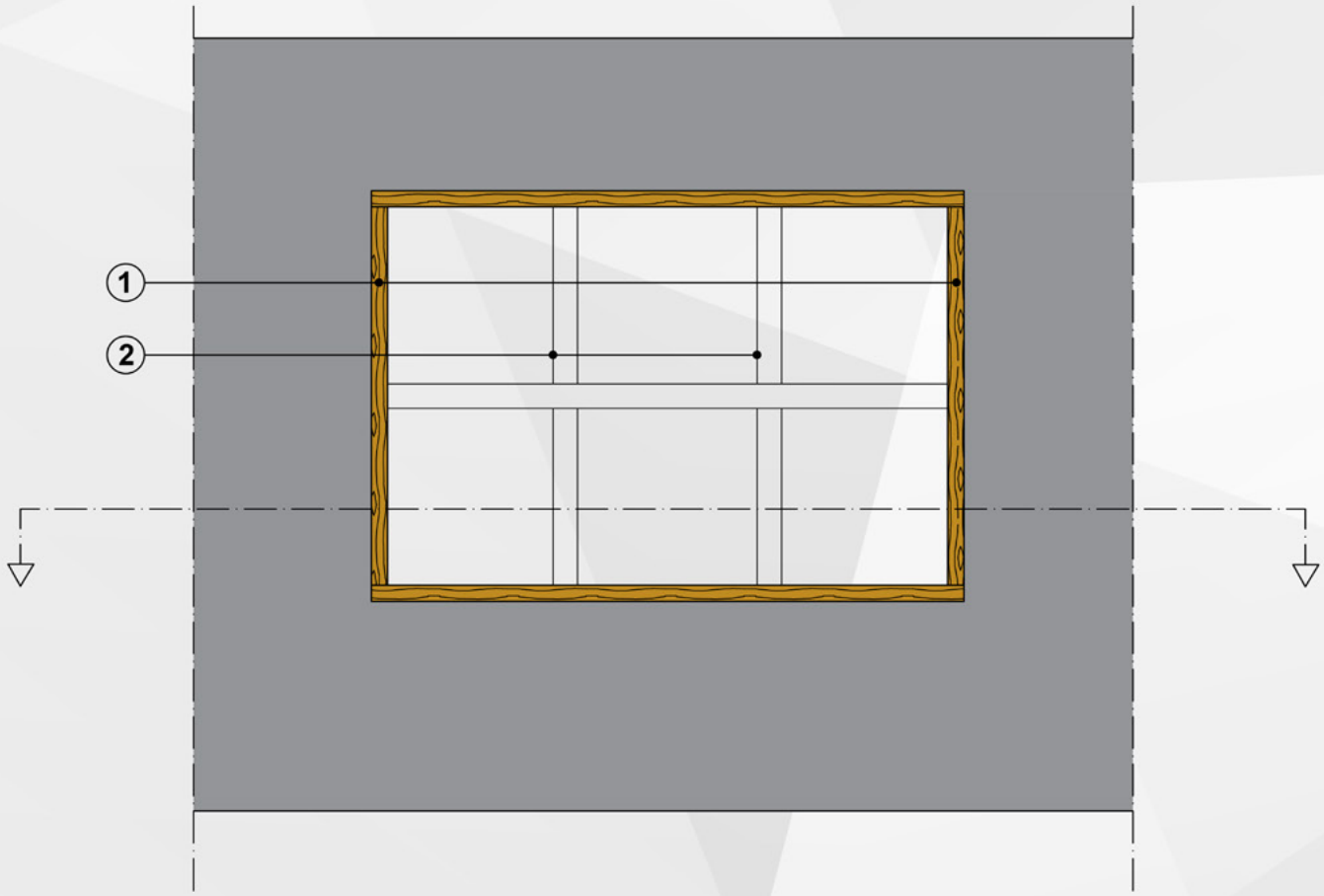


1 - površinski spoj - standardna ivica / surface connection - standard edge

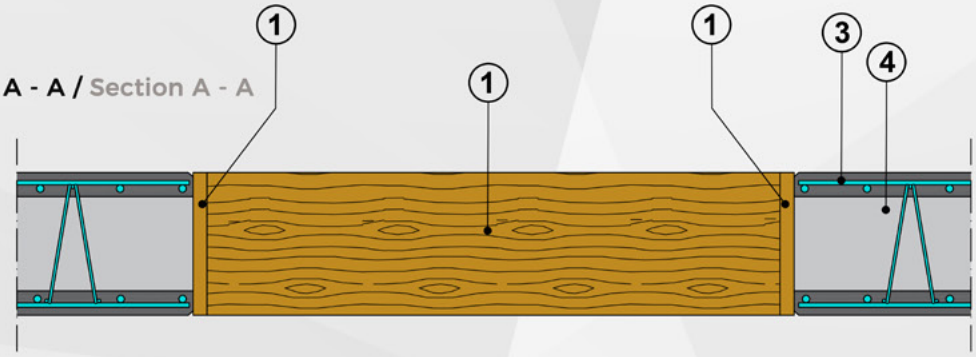
2 - površinski spoj - oštra ivica / surface connection - sharp edge

OTVOR SA DRVENOM OPLATOM / OPENING WITH WOODEN FORMWORK

Prikaz / View



Presek A - A / Section A - A



1 - drvena oplata / wooden formwork

2 - ukrućenje drvene oplate / stiffening of wooden formwork

3 - ugrađena armatura / built-in reinforcement

4 - beton koji se lije na licu mesta / concrete that is cast on the spot

PROTIVPOŽARNA KLASIFIKACIJA /
FIRE PROTECTION CLASSIFICATION

Da bi se postigla klasa zaštite od požara navedena u projektu, vrednosti date u tabeli definišu minimalne dimenzije preseka elementa.

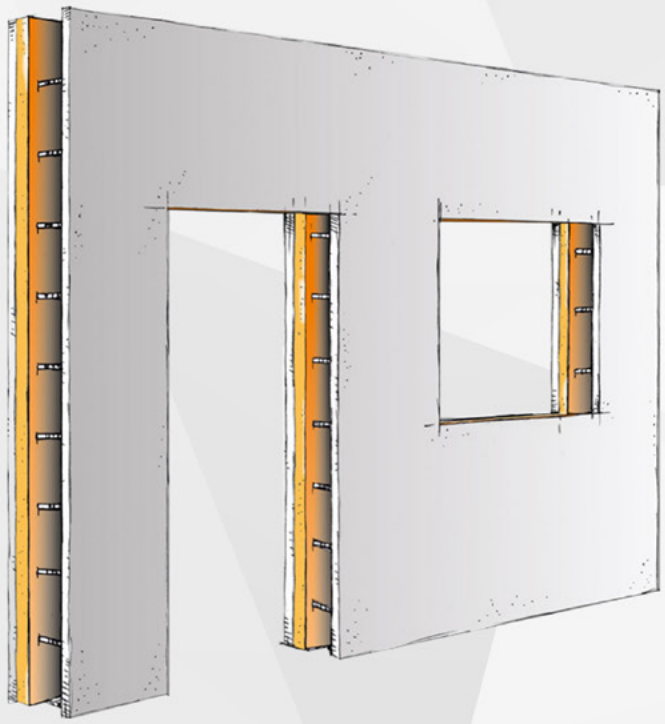
To achieve the fire protection class specified in the design, the values given in the table determine the minimum cross-sectional dimensions of the element.

Trajanje vatrootpornosti u minutima (R) / The duration of fire resistance in minutes (R)	Uticaj vatre sa obe strane / The impact of the fire on both sides		Uticaj vatre sa jedne strane / The impact of fire on one side	
	Minimalna debljina zidnog elementa "s" The minimum thickness of the wall element "s"	Prekrivka od betona "a" Overlay of concrete "a"	Minimalna debljina zidnog elementa "s" The minimum thickness of the wall element "s"	Prekrivka od betona "a" Overlay of concrete "a"
30 minuta/minutes	120 mm	10 mm	120 mm	10 mm
60 minuta/minutes	140 mm	10 mm	130 mm	10 mm
90 minuta/minutes	170 mm	25 mm	140 mm	25 mm
120 minuta/minutes	220 mm	35 mm	160 mm	35 mm
180 minuta/minutes	270 mm	55 mm	210 mm	50 mm
240 minuta/minutes	350 mm	60 mm	270 mm	60 mm

Napomena 1: Trajanje vatrootpornosti R i minimalna debljina zida "s" odnose se na debljinu statičkog poprečnog preseka (unutrašnji segment i jezgro betona koji se lije na licu mesta na gradilištu).

Note 1: The fire resistance duration R and the minimum wall thickness S refer to the thickness of the static cross-section (inner segment and core of the concrete cast at the construction site).

TERMO ZID / THERMO WALL

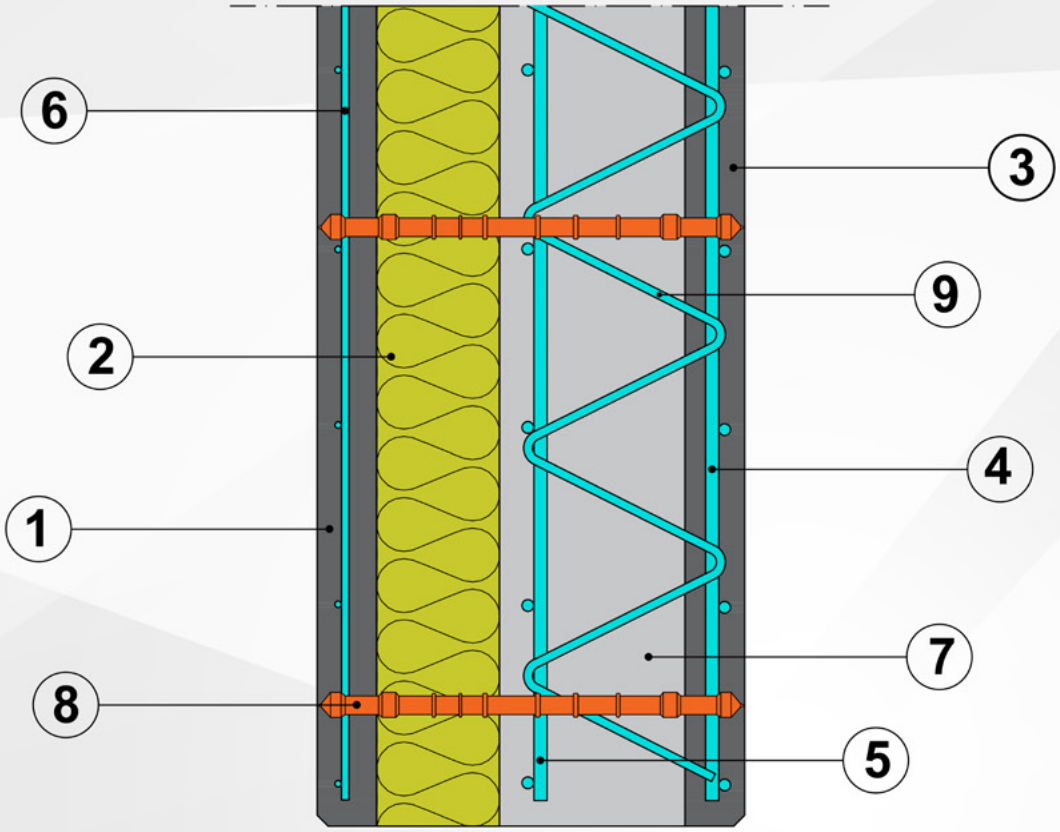


TEHNIČKI PODACI / SPECIFICATIONS	
Maksimalna dimenzija / Maximum dimension	*** 12,30 m x 3,30 m**
Debljina zidnog elementa / The thickness of the wall element	**25 / 30 / 35 / 40 cm**
Debljina betonske ploče / The thickness of concrete slabs	5 - 7 cm
Težina zidnog elementa (6+6 cm) / The weight of the wall element (6+6 cm)	ca. 305 kg/m²
Armatura zidnog elemetna / The reinforcement of the wall element	sadržana u pločama / contained in the slabs
Oplate postavljene na otvorima / Formwork placed on the openings	fabrički ugrađene / factory built-in
Površina / Surface area	glatka (zbog metalne oplate) / smooth (because of metal formwork)
Čvrstoća betona zidnog elementa / The strength of the concrete wall element	C25/30 (dodatne na upit / additional on request)
Klasa ekspozicije / Class of exposure	XC1/XC2 (dodatne na upit / additional on request)
Armatura / Reinforcement	B500B (dodatne na upit / additional on request)

BETON KOJI SE LIJE NA LICU MESTA (in-situ) / CONCRETE CASTING *IN-SITU*	
Čvrstoća betona koji se lije na licu mesta / The strength of concrete to be cast *in-situ*	**Prema statičkom proračunu (najmanje C25/30) /** According to static calculation (at least C25 / 30)
Klasa ekspozicije / Class of exposure	**Prema statičkom proračunu /** According to static calculation
Brzina betoniranja / Concreting speed	**0,8 m/h**

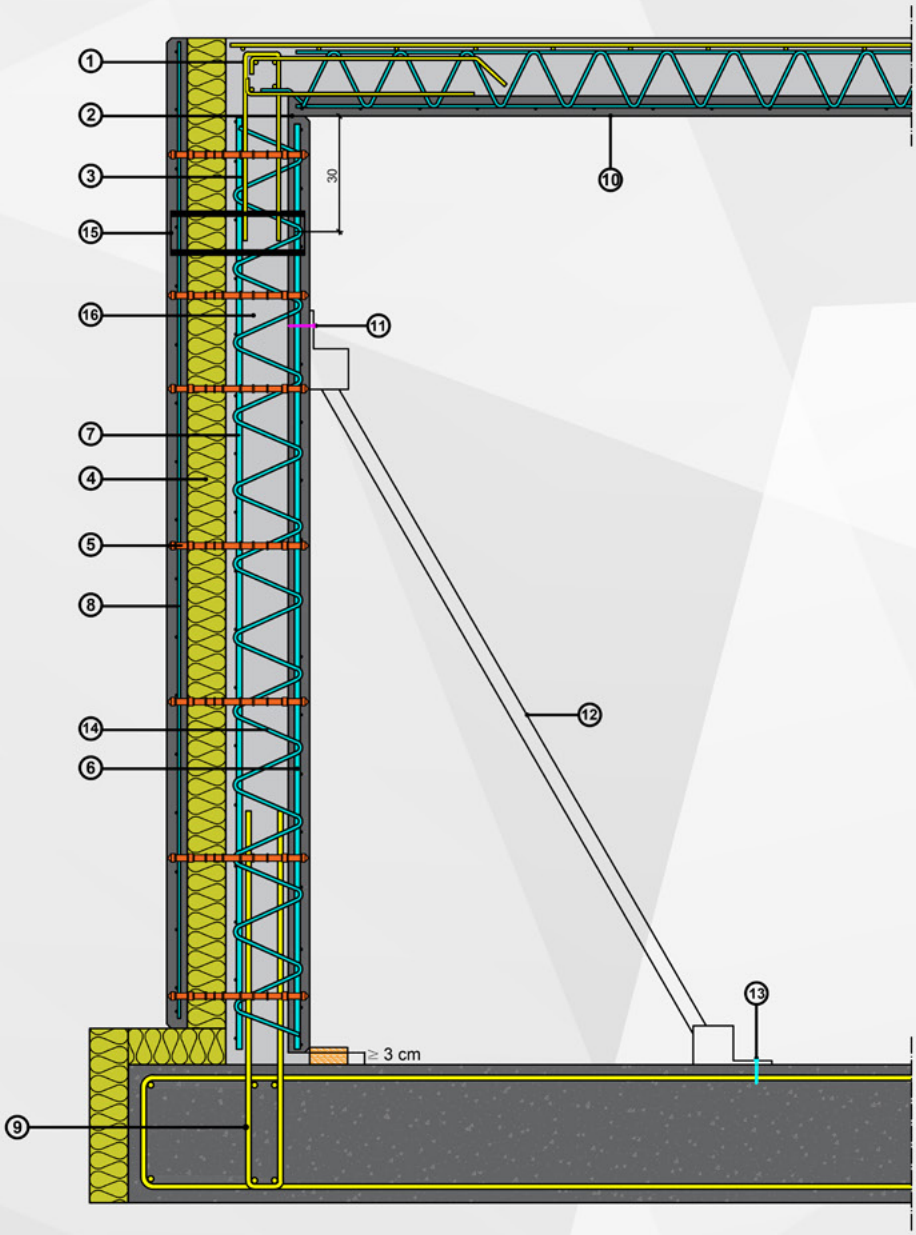
*** od 7 m termički ekspanzioni spoj neophodan u spoljašnjoj ploči /**
from 7 m thermal expansion connection is necessary in the outer slab

STRUKTURA ZIDA / WALL STRUCTURE



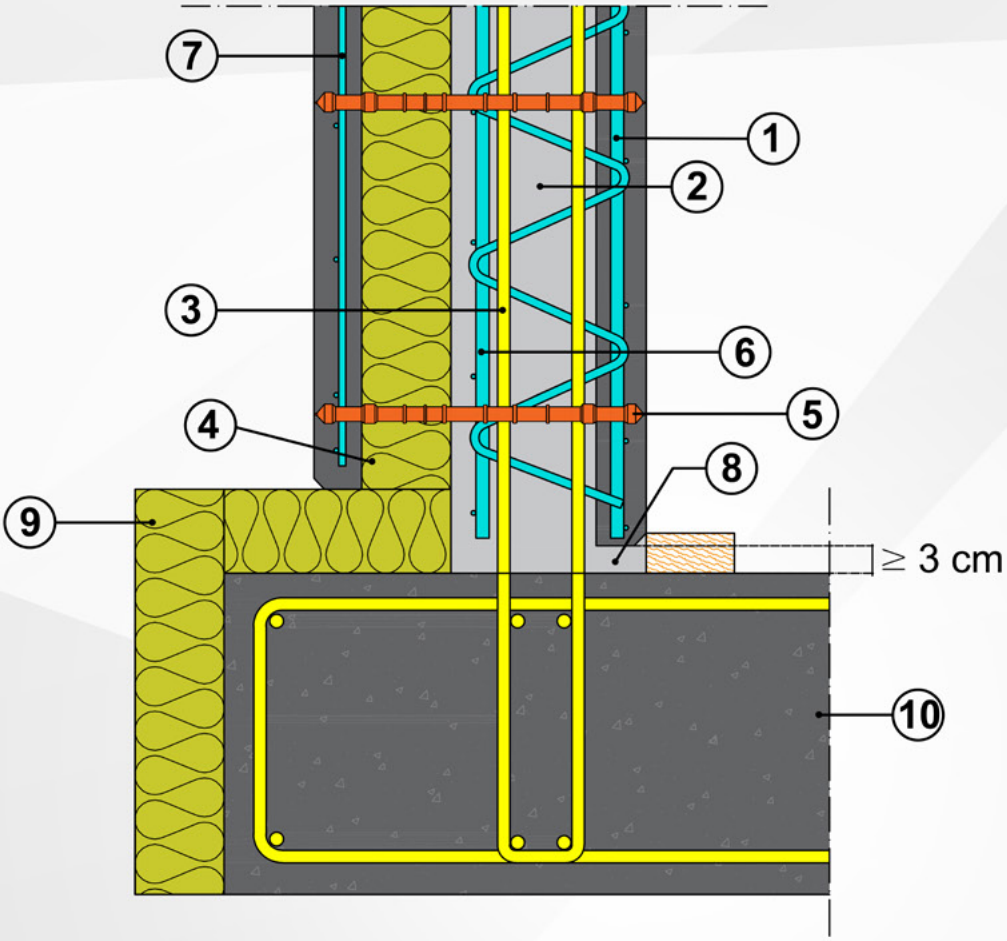
1 - spoljašnji segment 5-7 cm / outer segment 5-7 cm
2 - toplotna izolacija (poliuretan) u debljinama 8/10/12 cm - dodatne na upit /
thermal insulation (polyurethane) in thicknesses 8/10/12 cm - additional on request
3 - unutrašnji segment 5-7 cm / inner segment 5-7 cm
4 - ugrađena armatura u segment zida/ built-in reinforcement in the wall segment
5 - ugrađena armatura u jezgru betona koji se lije na licu mesta /
built-in reinforcement in the concrete core of the cast in situ
6 - ugrađena armatura (nije noseća) / built-in reinforcement (it's not bearing)
7 - beton koji se lije na licu mesta / concrete that is cast on the spot
8 - termo pin (vezna šipka izrađena od plastike ojačane staklenim vlaknima) /
thermo-pin (connecting rod made of fiberglass-reinforced plastic)
9 - rešetkasti nosač (BINOR) / lattice girder

POPREČNI PRESEK / CROSS SECTION



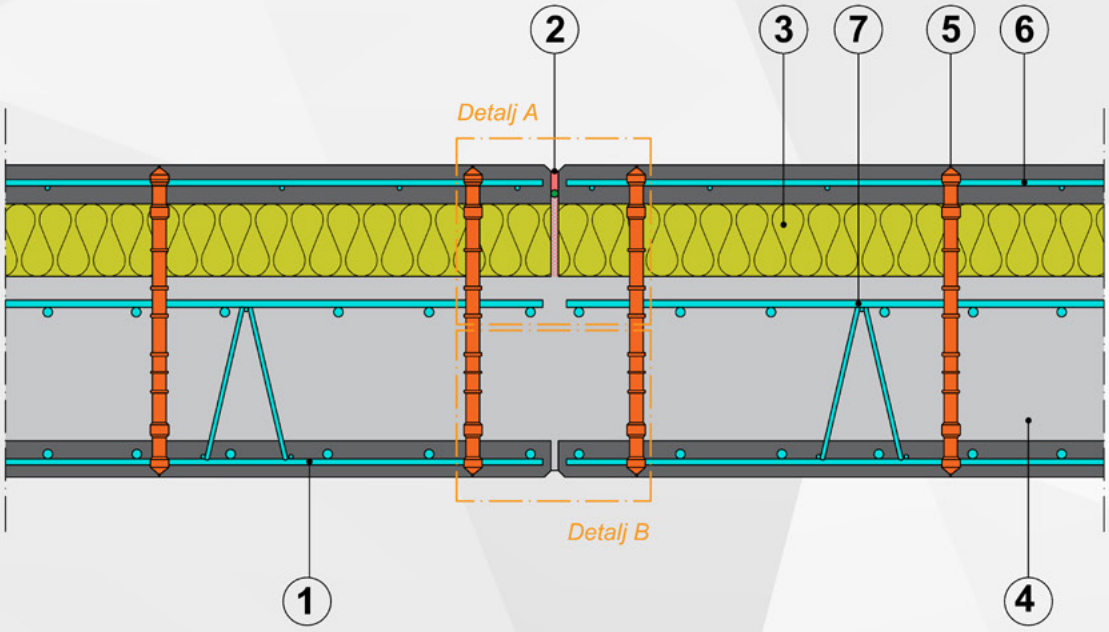
1 - dodatna armatura na ploči (in situ) /
additional reinforcement to the panel (in situ)
2 - oslonac za omnia ploču / support for omnia slab
3 - armaturna veza zid-plafon (in situ) / the connecting reinforcement wall to ceiling (in situ)
4 - toplotna izolacija / thermal insulation
5 - termo pin (vezna šipka izrađena od plastike ojačane staklenim vlaknima) /
thermo-pin (connecting rod made of fiberglass-reinforced plastic))
6 - ugrađena armatura / built-in reinforcement
7 - ugrađena armatura u jezgru betona koji se lije na licu mesta /
built-in reinforcement in the concrete core of the cast in situ
8 - ugrađena armatura (nije noseća) / built-in reinforcement (it's not bearing)
9 - armaturna veza temelj - zid (in situ) / the connecting reinforcement foundation to wall (in situ)
10 - plafon od elementa omnia / ceiling made of omnia
11 - anker za kosu potporu / anchor for oblique support
12 - kosa potpora / the oblique support
13 - fiksirajući šraf / fixing screw
14 - rešetkasti nosač (BINOR) / lattice girde
15 - transportni anker od staklenih vlakana / transport anchor made of fiberglass
16 - beton koji se lije na licu mesta / concrete that is cast on the spot

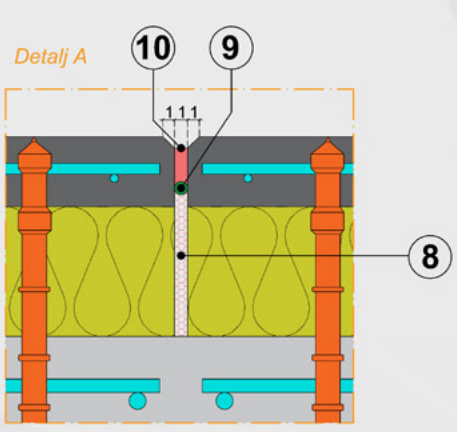
MONTAŽNI SPOJ IZMEĐU TEMELJA I ZIDNOG ELEMENTA / CONNECTION BETWEEN FOUNDATION AND WALL ELEMENT

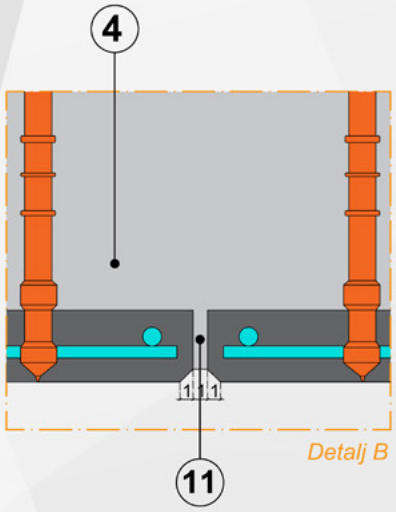


1 - **ugrađena armatura /** built-in reinforcement
2 - **beton koji se lije na licu mesta /** concrete that is cast on the spot
3 - **armaturna veza temelj - zid (in situ) /** the connecting reinforcement foundation to wall (in situ)
4 - **toplotna izolacija /** thermal insulation
5 - **termo pin (vezna šipka izrađena od plastike ojačane staklenim vlaknima) /**
thermo-pin (connecting rod made of fiberglass-reinforced plastic)
6 - **ugrađena armatura u jezgru betona koji se lije na licu mesta /**
built-in reinforcement in the concrete core of the cast in situ
7 - **ugrađena armatura (nije noseća) /** built-in reinforcement (it's not bearing)
8- **horizontalni spoj u podnožju zida ≥ 3 cm (može da se redukuje sa odgovarajućim tečnim betonom) /**
horizontal connection at the base of the wall ≥ 3 cm (can be reduced with an appropriatee liquid concrete)
9 - **toplotna izolacija ploče temelja /** thermal insulation of the foundation slab
10 - **temelj /** foundation

VEZE I ZAPTIVANJE ZIDNIH ELEMENATA: RAVNA VEZA STANDARDNA IVICA / CONNECTIONS AND SEALING OF WALL ELEMENTS: STRAIGHT CONNECTION STANDARD EDGE

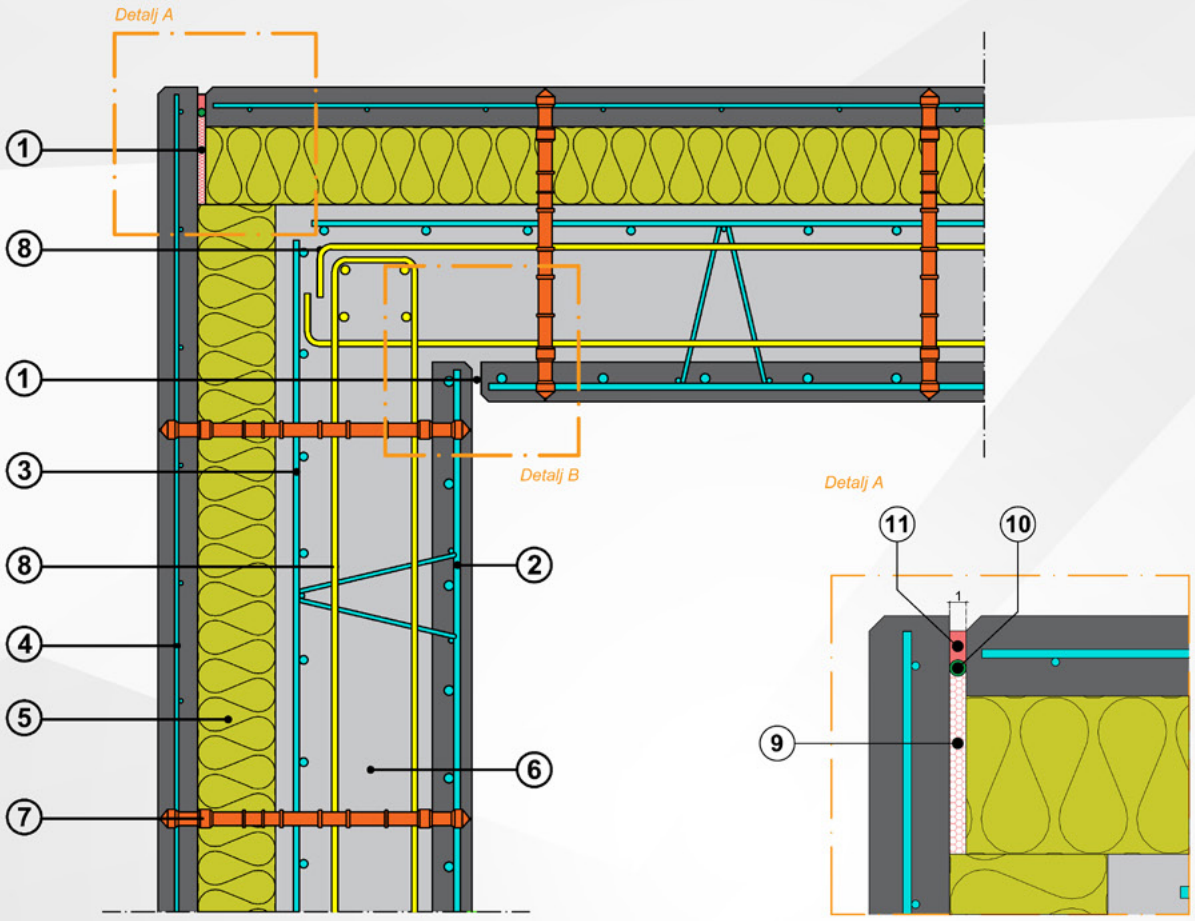


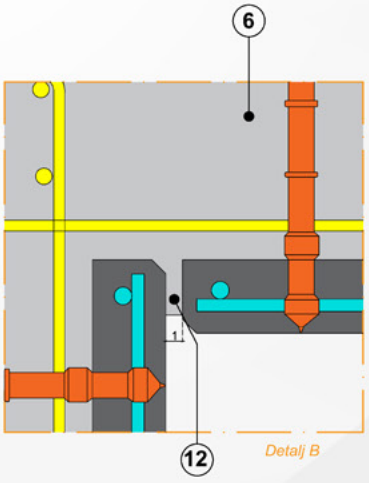




1 - **ugrađena armatura /** built-in reinforcement
2 - **montažni spoj 1 cm /** mounting connection 1 cm
3 - **toplotna izolacija /** thermal insulation
4 - **beton koji se lije na licu mesta /** concrete that is cast on the spot
5 - **termo pin (vezna šipka izrađena od plastike ojačane staklenim vlaknima) /** thermo-pin (connecting rod made of fiberglass-reinforced plastic)
6 - **ugrađena armatura (nije noseća) /** built-in reinforcement (it's not bearing)
7- **ugrađena armatura u jezgru betona koji se lije na licu mesta /** built-in reinforcement in the concrete core of the cast in situ
8- **Poliuretanska pena /** polyurethane foam
9 - **gumeni kanap /** rubber rope
10 - **spoj (trajno elastični materijal) /** connection (permanently elastic material)
11 - **opciono zatvaranje spoja cementnim malterom /** optional sealing of the connection with cement plaster

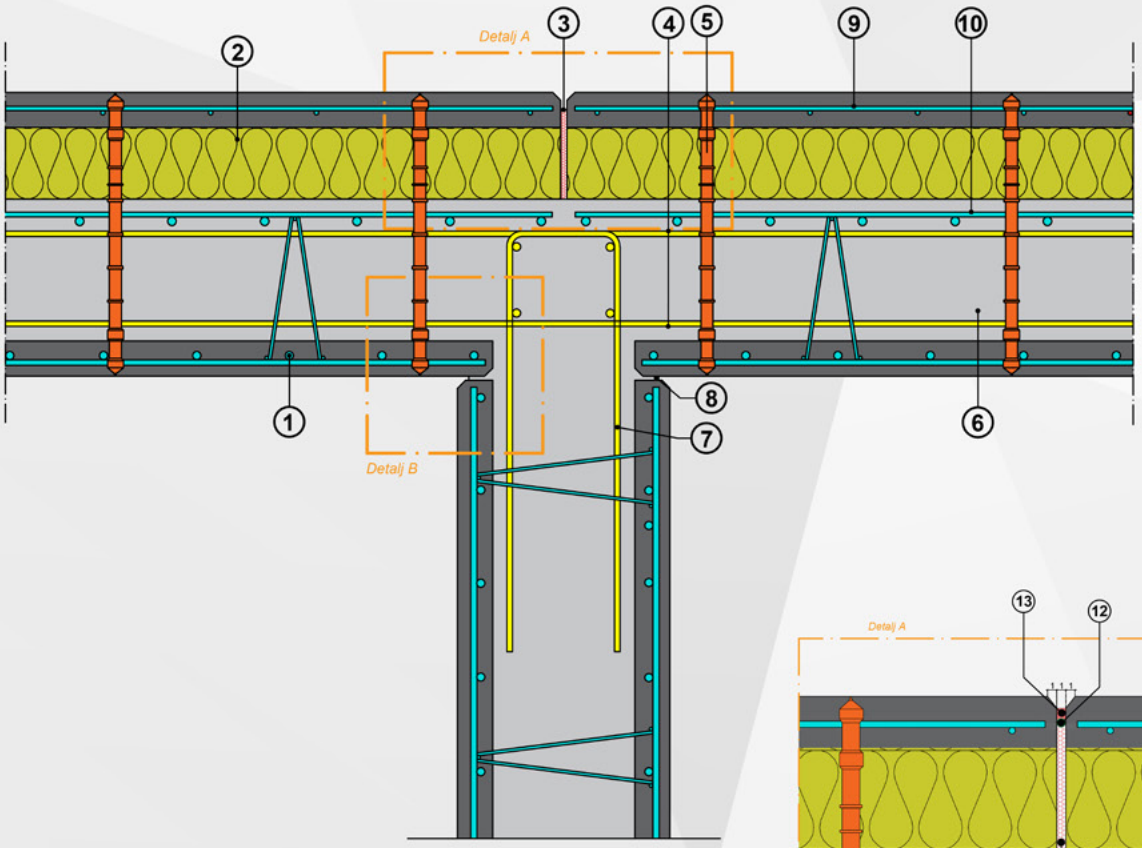
VEZA I ZAPTIVANJE ZIDNIH ELEMENATA: SPOLJAŠNJI UGAO /
CONNECTION AND SEALING OF WALL ELEMENTS: OUTER CORNER

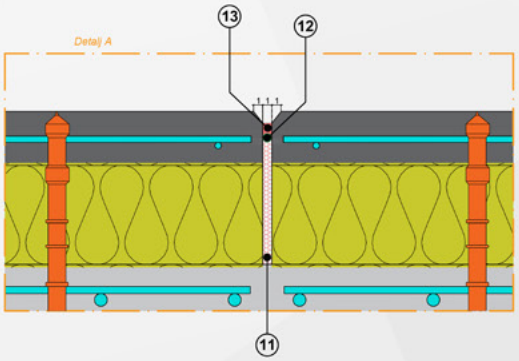


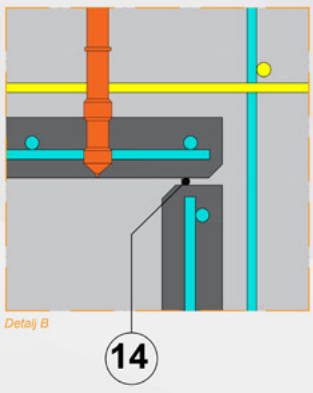


1 - montažni spoj 1 cm / mounting connection 1 cm
2 - ugrađena armatura / built-in reinforcement
3- ugrađena armatura u jezgru betona koji se lije na licu mesta / built-in reinforcement in the concrete core of the cast in situ
4 - ugrađena armatura (nije noseća) / built-in reinforcemen (it's not bearing)
5 - toplotna izolacija / thermal insulation
6 - beton koji se lije na licu mesta / concrete that is cast on the spot
7 - termo pin (vezna šipka izrađena od plastike ojačane staklenim vlaknima) /
thermo-pin (connecting rod made of fiberglass-reinforced plastict)
8 - horizontalna armatura (in situ) / horizontal reinforcement (in situ)
9 - Poliuretanska pena / polyurethane foam
10- gumeni kanap / rubber rope
11- spoj (trajno elastični materijal) / connection (permanently elastic material)
12 - opciono zatvaranje spoja cementnim malterom /
optional sealing of the connection with cement plaster

VEZE I ZAPTIVANJE ZIDNIH ELEMENATA: “T” SPOJ - STANDARDNA IVICA / CONNECTIONS AND SEALING OF WALL ELEMENTS: "T" CONNECTION - STANDARD EDGE

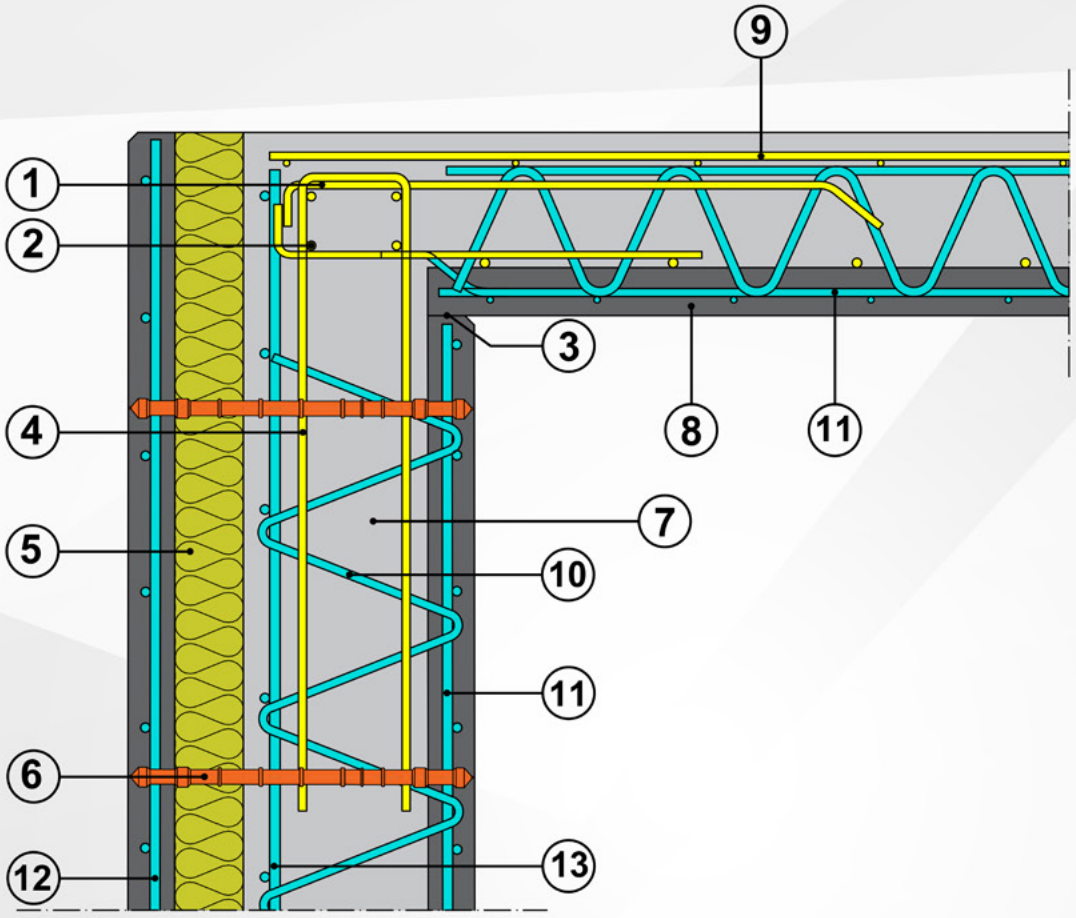






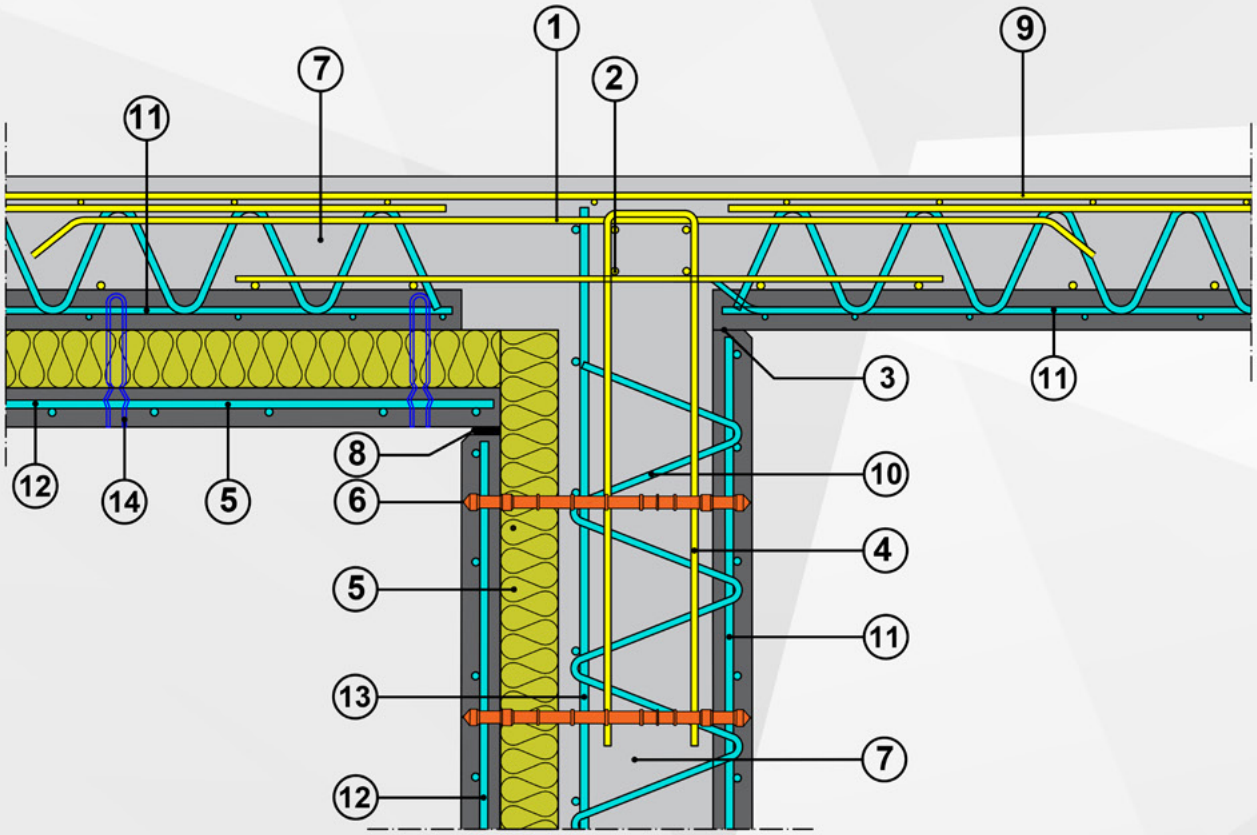
1 - ugrađena armatura / built-in reinforcement
2 - toplotna izolacija / thermal insulation
3 - montažni spoj 1 cm / mounting connection 1 cm
4 - horizontalna armatura (in situ) / horizontal reinforcement (in situ)
5 - termo pin (vezna šipka izrađena od plastike ojačane staklenim vlaknima) / thermo-pin (connecting rod made of fiberglass-reinforced plastic)
6 - beton koji se lije na licu mesta / concrete that is cast on the spot
7 - horizontalne uzengije (in situ) / horizontal stirrups (in situ)
8- montažni spoj 0,5 cm / mounting connection 0,5 cm
9 - ugrađena armatura (nije noseća) / built-in reinforcement(it's not bearing)
10 - ugrađena armatura u jezgru betona koji se lije na licu mesta / built-in reinforcement in the concrete core of the cast in situ
11 - Poliuretanska pena / polyurethane foam
12 - gumeni kanap / rubber rope
13 - spoj (trajno elastični materijal) / connection (permanently elastic material)
14 - opciono zatvaranje spoja cementnim malterom / optional sealing of the connection with cement plaster

VEZA TERMIČKOG ZIDA SA PLAFONSKIM ELEMENTOM /
CONNECTION OF THERMAL WALL WITH CEILING ELEMENT



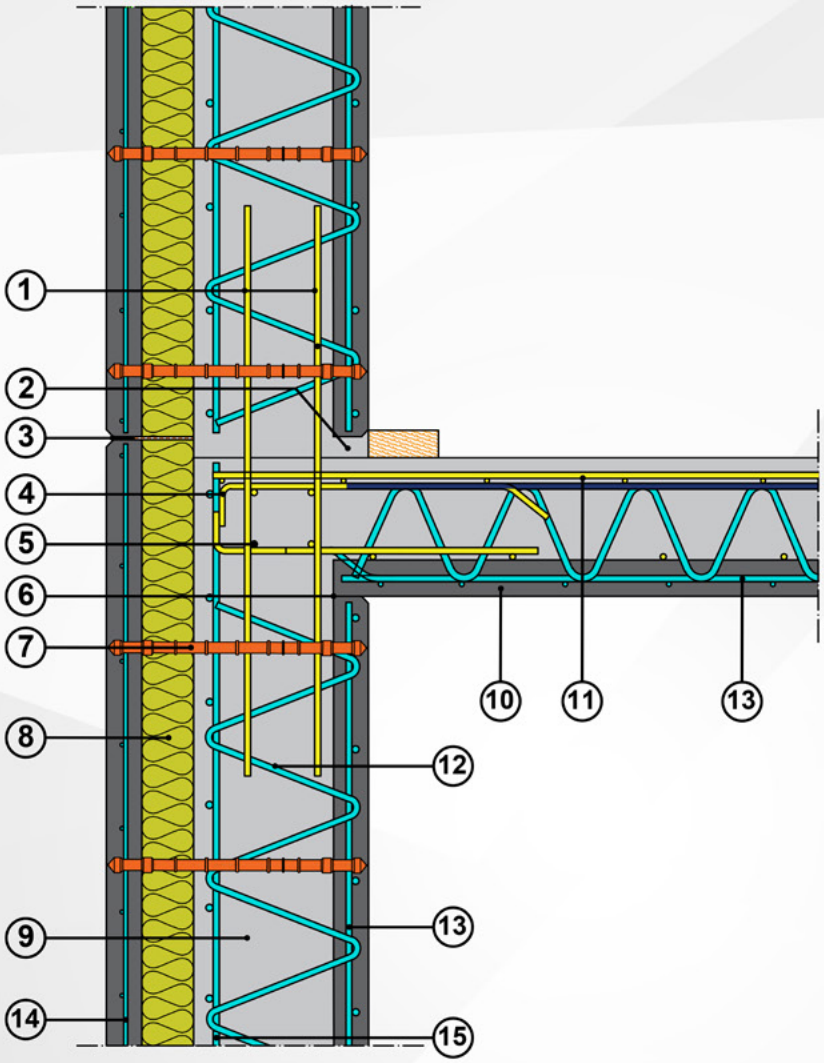
1 - dodatna armatura na ploči (in situ) /
additional reinforcement to the panel (in situ)
2 - poprečna armatura povezana uzengijama (in situ) /
transverse reinforcement connected by stirrups (in situ)
3 - oslonac za omnia ploču / support for omnia plate
4 - armaturna veza zid-plafon (in situ) /
the connecting reinforcement wall to ceiling (in situ)
5 - toplotna izolacija / thermal insulation
6 - termo pin (vezna šipka izrađena od plastike ojačane staklenim vlaknima) /
thermo-pin (connecting rod made of fiberglass-reinforced plastic)
7 - beton koji se lije na licu mesta / concrete that is cast on the spot
8 - plafon od elementa omnia / ceiling made of omnia
9 - gornja zona armature (in situ) / upper reinforcement zone(in situ)
10 - rešetkasti nosač (BINOR) / lattice girder
11 - ugrađena armatura / built-in reinforcement
12 - ugrađena armatura (nije noseća) / built-in reinforcement (it's not bearing)
13 - ugrađena armatura u jezgru betona koji se lije na licu mesta /
built-in reinforcement in the concrete core of the cast in situ

VEZE TERMIČKOG ZIDA SA PLAFONSKIM ELEMENTOM SA / BEZ TERMIČKE IZOLACIJE / THERMAL WALL CONNECTIONS WITH CEILING ELEMENT WITH / WITHOUT THERMAL INSULATION



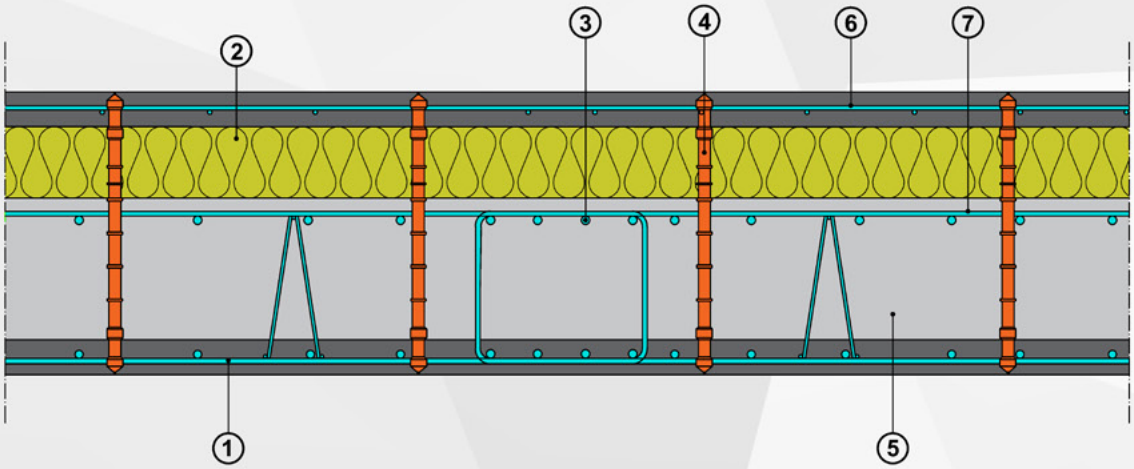
1 - dodatna armatura na ploči (in situ) /
additional reinforcement to the panel (in situ)
2 - poprečna armatura povezana uzengijama (in situ) /
transverse reinforcement connected by stirrups (in situ)
3 - oslonac za omnia ploču / support for omnia slab
4 - armaturna veza zid-plafon (in situ) /
the connecting reinforcement wall to ceiling (in situ)
5 - toplotna izolacija / thermal insulation
6 - termo pin (vezna šipka izrađena od plastike ojačane staklenim vlaknima) /
thermo-pin (connecting rod made of fiberglass-reinforced plastic)
7 - beton koji se lije na licu mesta / concrete that is cast on the spot
8 -montažni spoj 1 cm / mounting connection 1 cm
9 - gornja zona armature (in situ) / upper reinforcement zone (in situ)
10 - rešetkasti nosač (BINOR) / lattice girder
11 - ugrađena armatura / built-in reinforcement
12 - ugrađena armatura (nije noseća) / built-in reinforcement (it's not bearing)
13 - ugrađena armatura u jezgru betona koji se lije na licu mesta /
built-in reinforcement in the concrete core of the cast in situ
14 - anker za vezu - "ukosnica" / anchor for the link - "hairpin"

VEZA IZMEĐU TERMIČKIH ZIDOVA JEDAN NAD DRUGIM SA PLAFONOM / CONNECTION BETWEEN THERMAL WALLS ON EACH OTHER WITH THE CEILING



1 - **vezna armatura zid-zid (in situ) /** the connecting reinforcement wall to wall (in situ)
2 - **horizontalni spoj u podnožju zida ≥ 3 cm (može da se redukuje sa odgovarajućim tečnim betonom) /** horizontal connection at the base of the wall ≥ 3 cm (can be reduced with an appropriatee liquid concrete)
3 - **montažni spoj 1 cm /** mounting connection 1 cm
4 - **dodatna armatura na ploči (in situ) /** additional reinforcement to the panel (in situ)
5 - **poprečna armatura povezana uzengijama (in situ) /** transverse reinforcement connected by stirrups (in situ)
6 - **oslonac za omnia ploču /** support for omnia slab
7 - **termo pin (vezna šipka izrađena od plastike ojačane staklenim vlaknima) /** thermo-pin (connecting rod made of fiberglass-reinforced plastic)
8 - **toplotna izolacija betona koji se lije na licu mesta /** thermal insulation of concrete that is cast on the spot
9 - **beton koji se lije na licu mesta /** concrete that is cast on the spot
10 - **plafon od elementa omnia /** ceiling made of omnia
11 - **gornja zona armature (in situ) /** upper reinforcement zone(in situ)
12 - **rešetkasti nosač (BINOR) /** lattice girder
13 - **ugrađena armatura /** built-in reinforcement
14 - **ugrađena armatura (nije noseća) /** built-in reinforcement (it's not bearing)
15 - **ugrađena armatura u jezgru betona koji se lije na licu mesta /** built-in reinforcement in the concrete core of the cast in situ

ZIDNI ELEMENT SA INTEGRISANIM OSLONCEM ILI NOSAČEM / WALL ELEMENT WITH INTEGRATED SUPPORT OR GIRDER



1 - **ugrađena armatura /** built-in reinforcement

2 - **toplotna izolacija /** thermal insulation

3 - **integrisani oslonac (skriveni stub) /** integrated support (hidden column)

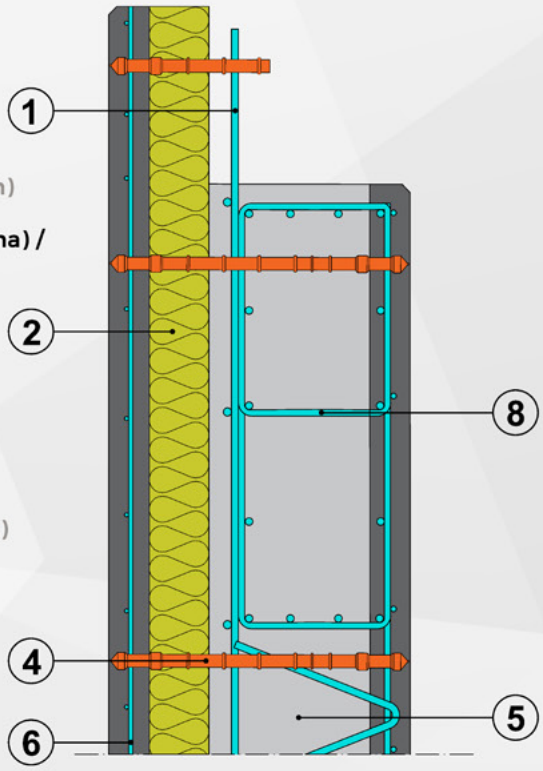
4 - **termo pin (vezna šipka izrađena od plastike ojačane staklenim vlaknima) /** thermo-pin (connecting rod made of fiberglass-reinforced plastic)

5 - **beton koji se lije na licu mesta /** concrete that is cast on the spot

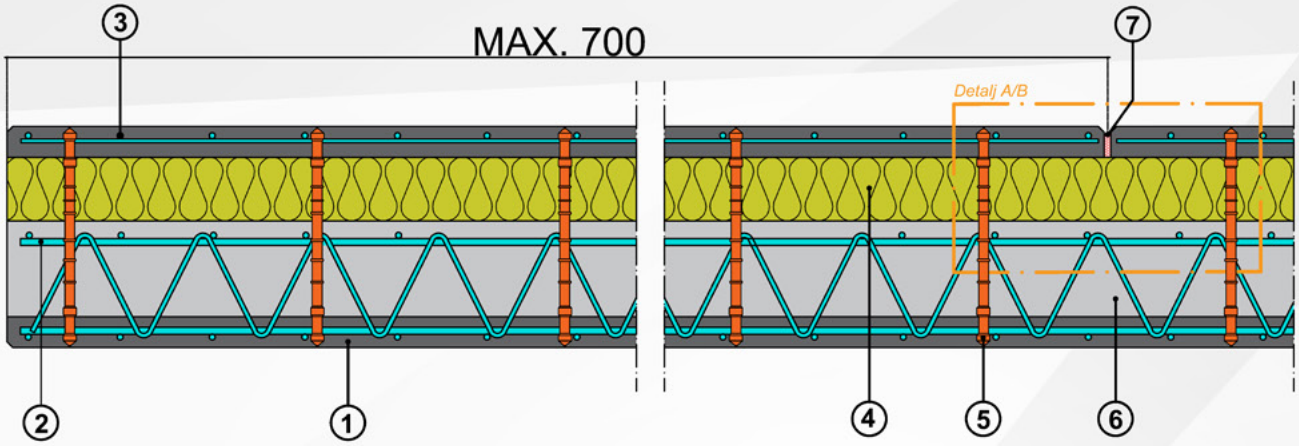
6 - **ugrađena armatura (nije noseća) /** built-in reinforcement (it's not bearing)

7 - **ugrađena armatura u jezgru betona koji se lije na licu mesta /** built-in reinforcement in the concrete core of the cast in situ

8 - **integrisani nosač (skrivena greda) /** an integrated girder (hidden beam)



TERMIČKI EKSPANZIONI SPOJ /
THERMAL EXPANSION CONNECTION



1 - ugrađena armatura / built-in reinforcement

2 - ugrađena armatura u jezgru betona koji se lije na licu mesta /
built-in reinforcement in the concrete core of the cast in situ

3 - ugrađena armatura (nije noseća) / built-in reinforcement (it's not bearing)

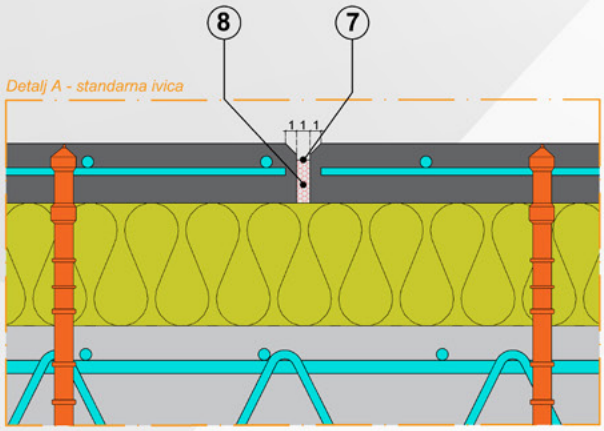
4 - toplotna izolacija / thermal insulation

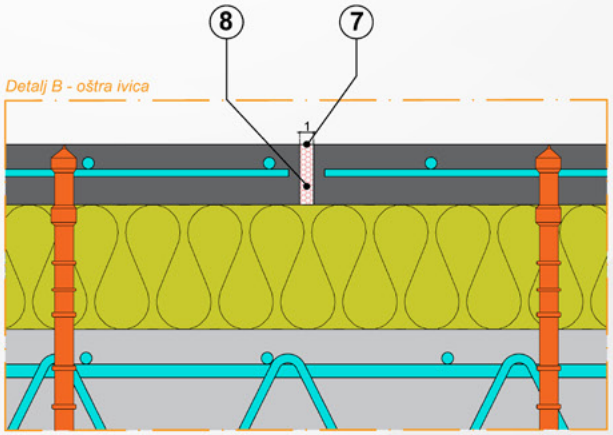
5 - termo pin (vezna šipka izrađena od plastike ojačane staklenim vlaknima) /
thermo-pin (connecting rod made of fiberglass-reinforced plastic)

6 - beton koji se lije na licu mesta / concrete that is cast on the spot

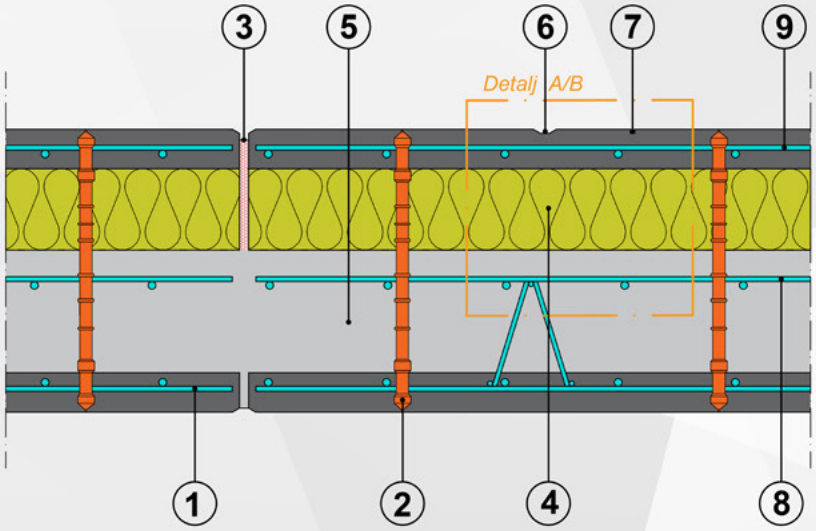
7 - termički ekspandiran spoj / thermal expansion connection

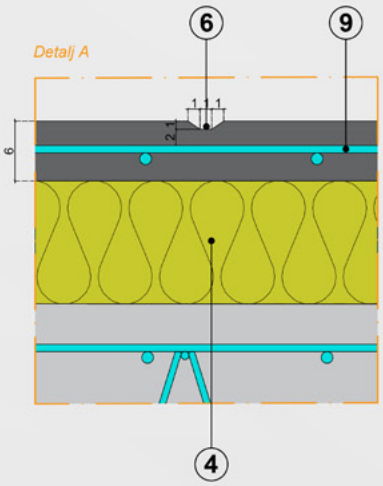
8 - fabrički spoj (zaptivna traka ili trajno elastični materijal) /
factory connection (sealing tape or a permanently elastic material)

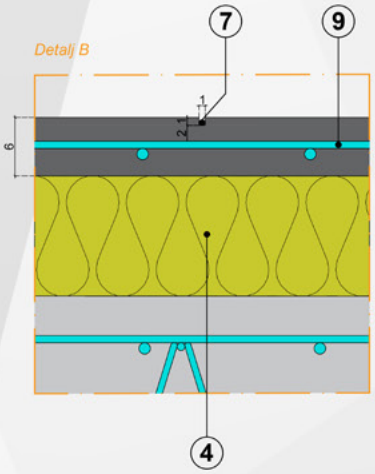




POVRŠINSKI LAŽNI SPOJ - POPREČNI PRESEK / SURFACE FALSE CONNECTION - CROSS-SECTION







1 - ugrađena armatura / built-in reinforcement

2 - termo pin (vezna šipka izrađena od plastike ojačane staklenim vlaknima / thermo-pin (connecting rod made of fiberglass-reinforced plastic)

3 - montažni spoj 1 cm / mounting connection 1 cm

4 - toplotna izolacija / thermal insulation

5 - beton koji se lije na licu mesta / concrete that is cast on the spot

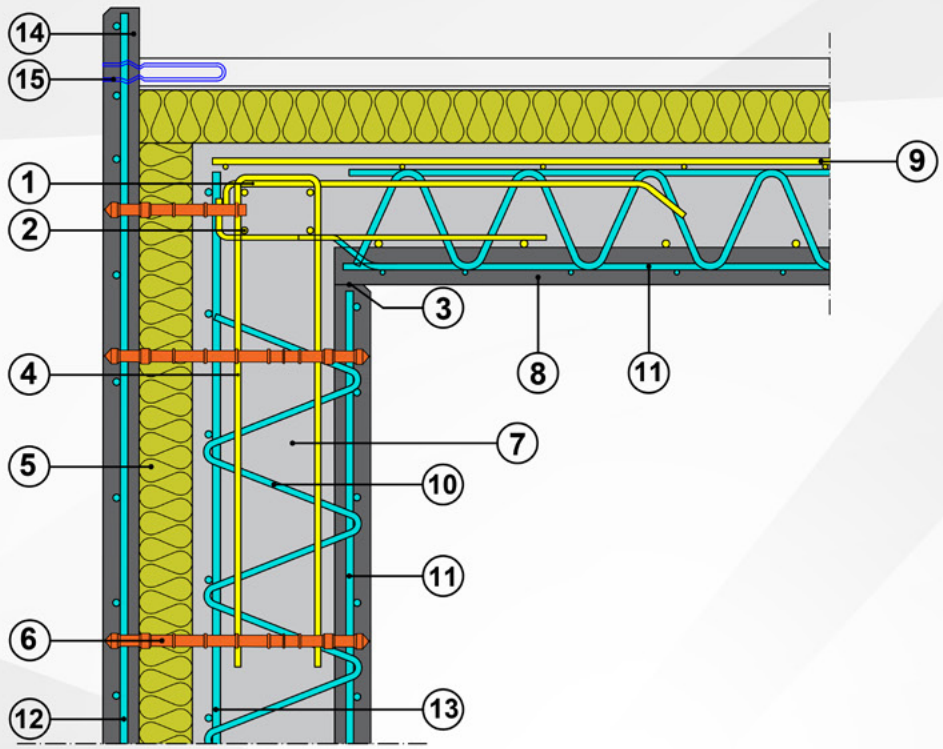
6 - lažni spoj - standardna ivica / false connection - standard edge

7 - lažni spoj - oštra ivica / false connection - sharp edge

8 - ugrađena aramtura u jezgru betona koji se lije na licu mesta / built-in reinforcement in the concrete core of the cast in situ

9 - ugrađena armatura (nije noseća) / built-in reinforcement (it's not bearing)

SPOLJAŠNJI SEGMENT ZIDA SA IVICOM ZA IZGRADNJU PODA / OUTER SEGMENT OF THE WALL WITH EDGE FOR FLOOR CONSTRUCTION



1 - **dodatna armatura na ploči (in situ) /** additional reinforcement to the panel (in situ)

2 - **poprečna armatura povezana uzengijama (in situ) /** transverse reinforcement connected by stirrups (in situ)

3 - **oslonac za OMNIA ploču /** support for omnia plate

4 - **armaturna veza zid-plafon (in situ) /** the connecting reinforcement wall to ceiling (in situ)

5 - **toplotna izolacija /** thermal insulation

6 - **termo pin (vezna šipka izrađena od plastike ojačane staklenim vlaknima) /** thermo-pin (connecting rod made of fiberglass-reinforced plastic)

7 - **beton koji se lije na licu mesta /** concrete that is cast on the spot

8 - **plafon od elementa OMNIA /** ceiling made of OMNIA

9 - **gornja zona armature (in situ) /** upper reinforcement zone (in situ)

10 - **rešetkasti nosač (BINOR) /** lattice girder

11 - **ugrađena armatura /** built-in reinforcement

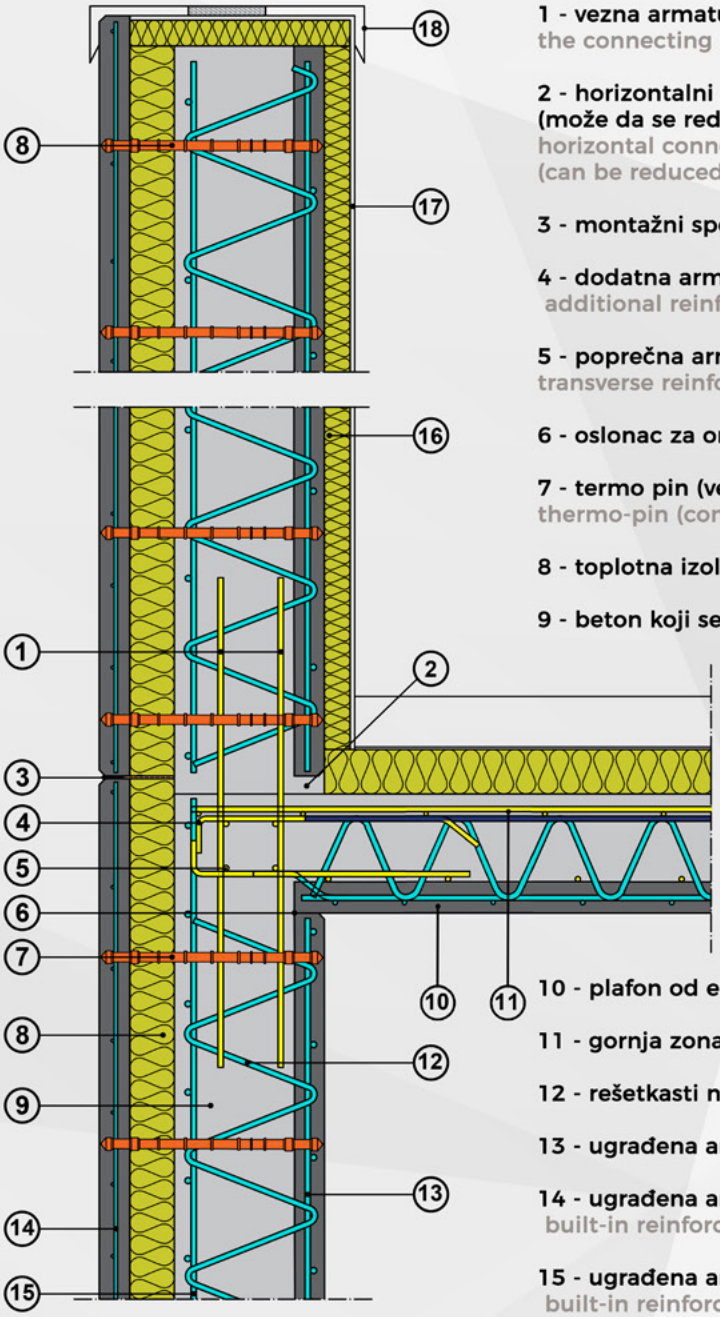
12 - **ugrađena armatura (nije noseća) /** built-in reinforcement (it's not bearing)

13 - **ugrađena armatura u jezgru betona koji se lije na licu mesta /** built-in reinforcement in the concrete core of the cast in situ

14 - **spoljašnji segment kao ivica za izgradnju poda /** outer segment as an edge for floor construction

15 - **anker za vezu - "ukosnica" /** anchor for the link - "hairpin"

PARAPET SA TERMIČKIM ZIDOM I SPOLJAŠNJOM IZOLACIJOM / PARAPET WITH THERMAL WALL AND EXTERIOR INSULATION



1 - vezna armatura zid-zid (in situ) /
the connecting reinforcement wall to wall (in situ)

2 - horizontalni spoj u podnožju zida ≥ 3 cm
(može da se redukuje sa odgovarajućim tečnim betonom) /
horizontal connection at the foot of the wall ≥ 3 cm
(can be reduced with an appropriate liquid concrete)

3 - montažni spoj 1 cm / mounting joint 1 cm

4 - dodatna armatura na ploči (in situ) /
additional reinforcement to the panel (in situ)

5 - poprečna armatura povezana uzengijama (in situ) /
transverse reinforcement connected by stirrups (in situ)

6 - oslonac za omnia ploču / support for omnia plate

7 - termo pin (vezna šipka izrađena od plastike ojačane staklenim vlaknima)
thermo-pin (connecting rod made of fiberglass-reinforced plastic)

8 - toplotna izolacija / thermal insulation

9 - beton koji se lije na licu mesta / concrete that is cast on the spot

10 - plafon od elementa OMNIA / ceiling made of OMNIA

11 - gornja zona armature (in situ) / upper reinforcement zone (in situ)

12 - rešetkasti nosač (BINOR) / lattice girder

13 - ugrađena armatura / built-in reinforcement

14 - ugrađena armatura (nije noseća) /
built-in reinforcement (it's not bearing)

15 - ugrađena armatura u jezgru betona koji se lije na licu mesta /
built-in reinforcement in the concrete core of the cast in situ

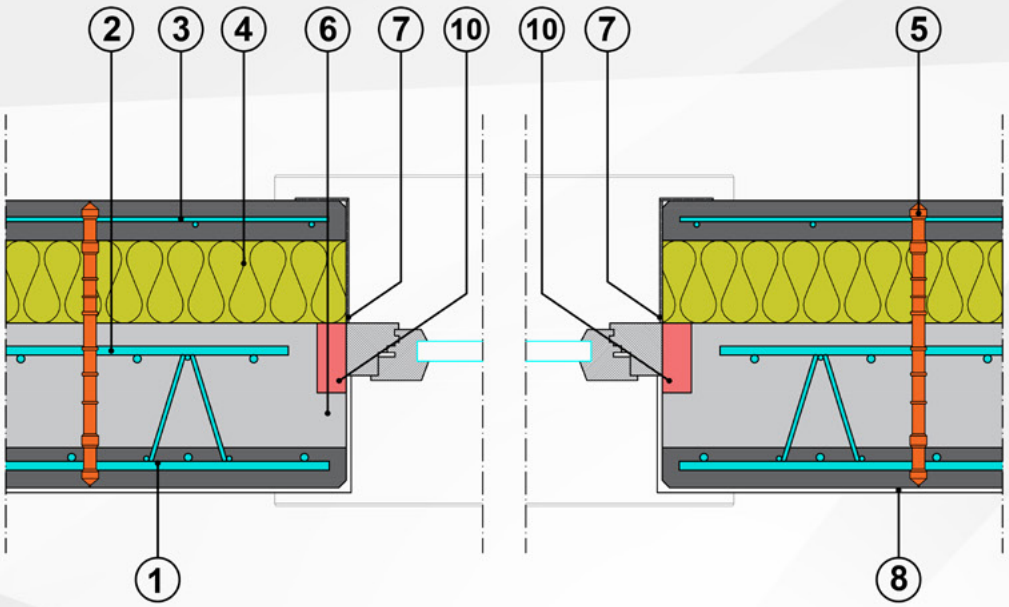
16 - spoljašnja izolacija / external insulation

17 - fini malter / fine plaster

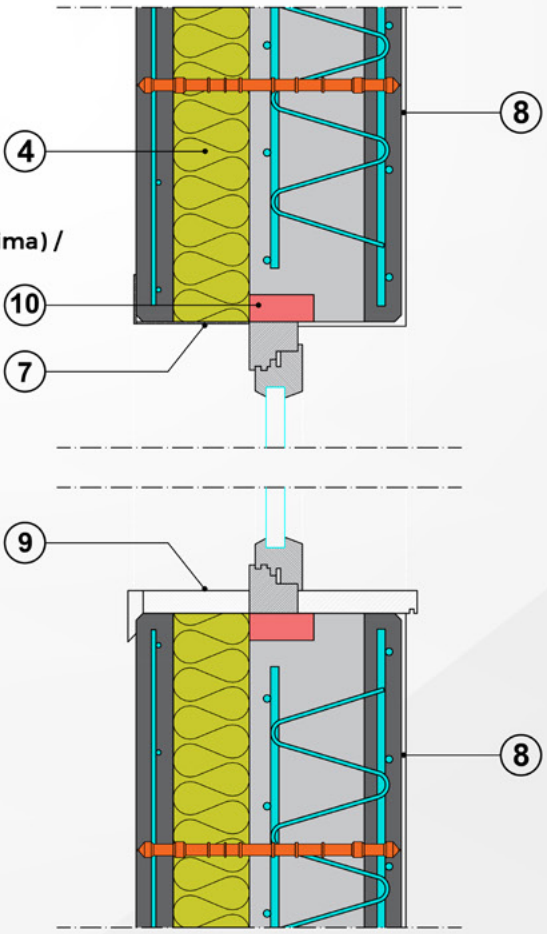
18 - zaštita od lima / sheet metal protection

PROZORSKI OTVOR - STANDARD /
THE WINDOW OPENINGS - STANDARD

Horizontalni presek / Horizontal cross section



Vertikalni presek / Vertical cross section



1 - ugrađena armatura / built-in reinforcement

2 - ugrađena armatura u jezgru betona koji se lije na licu mesta /
built-in reinforcement in the concrete core of the cast in situ

3 - ugrađena armatura (nije noseća) /
built-in reinforcement (it's not bearing)

4 - toplotna izolacija / thermal insulation

5 - termo pin (vezna šipka izrađena od plastike ojačane staklenim vlaknima) /
thermo-pin (connecting rod made of fiberglass-reinforced plastic)

6 - beton koji se lije na licu mesta / concrete that is cast on the spot

7 - opšivanje niše / niche hemming

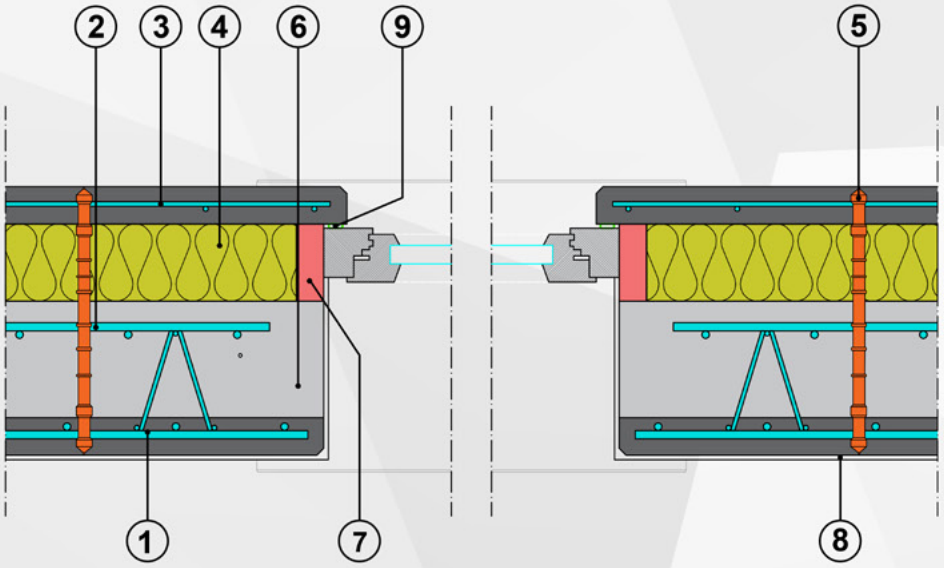
8 - malter i farba / plaster and paint

9 - prozorska daska (od lima ili prirodnog kamena) /
window sill (made of sheet metal or natural stone)

10 - osnova za vijke / basis for the screws

OTVOR SA PREKRIVENIM PROZORSKIM RAMOM U NIVOU IZOLACIJE / OPENING WITH COVERED WINDOW FRAME IN INSULATION LEVEL

Horizontalni presek / Horizontal cross section



1 - ugrađena armatura / built-in reinforcement

2 - ugrađena armatura u jezgru betona koji se lije na licu mesta / built-in reinforcement in the concrete core of the cast in situ

3 - ugrađena armatura (nije noseća) / built-in reinforcement (it's not bearing)

4 - toplotna izolacija / thermal insulation

5 - termo pin (vezna šipka izrađena od plastike ojačane staklenim vlaknima) / thermo-pin (connecting rod made of fiberglass-reinforced plastic)

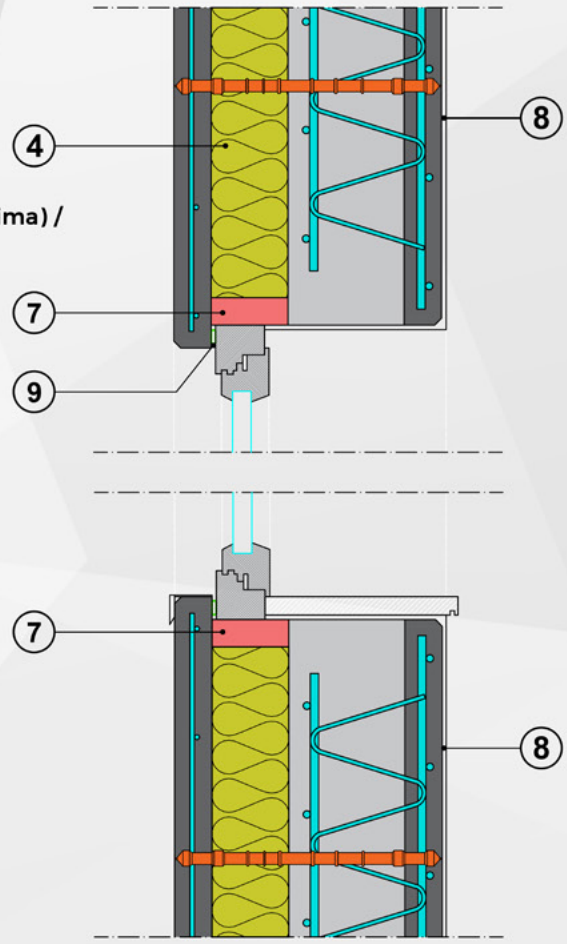
6 - beton koji se lije na licu mesta / concrete that is cast on the spot

7 - osnova za vijke / basis for the screws

8 - malter i farba / plaster and paint

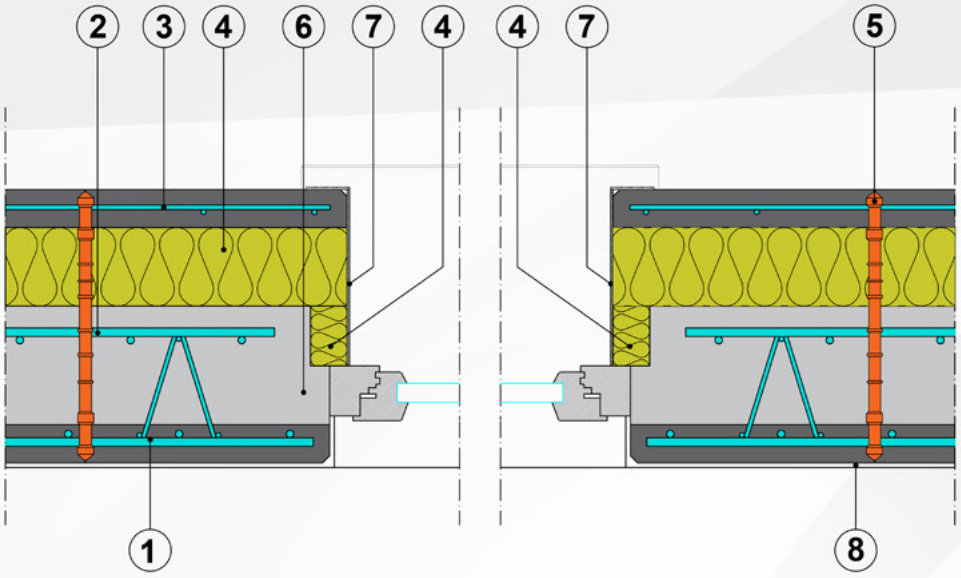
9 - zatvaranje spoja sa zaptivnom trakom / closing the compund with sealing tape

Vertikalni presek / Vertical cross section



PROZORSKI DETALJ SA IZOLOVANIM PROZORSKIM RAMOM / WINDOW DETAIL WITH INSULATED WINDOW FRAME

Horizontalni presek / Horizontal cross section



1 - ugrađena armatura / built-in reinforcement

2 - ugrađena armatura u jezgru betona koji se lije na licu mesta /
built-in reinforcement in the concrete core of the cast in situ

3 - ugrađena armatura (nije noseća) /
built-in reinforcement (it's not bearing)

4 - toplotna izolacija / thermal insulation

5 - termo pin (vezna šipka izrađena od plastike ojačane staklenim vlaknima) /
thermo-pin (connecting rod made of fiberglass-reinforced plastic)

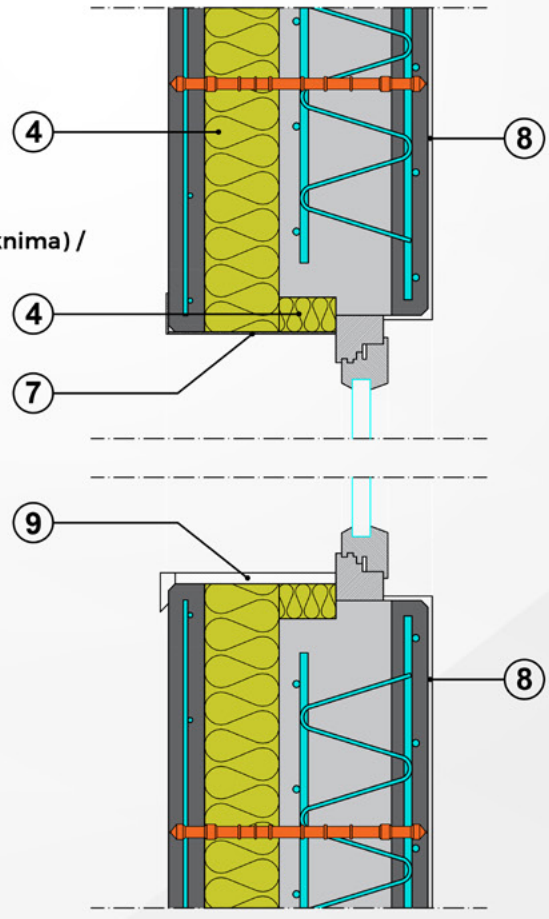
6 - beton koji se lije na licu mesta / concrete that is cast on the spot

7 - opšivanje niše / niche hemming

8 - malter i farba / plaster and paint

9 - prozorska daska (od lima ili prirodnog kamena) /
window sill (made of sheet metal or natural stone)

Vertikalni presek / Vertical cross section



U - VREDNOSTI / U - VALUES

Koeficijent prenosa toplote U opisuje količinu toplotne energije koja prolazi kroz element koji se sastoji od jednog ili više slojeva kada se temperatura u unutrašnjosti razlikuje od one u spoljašnosti. Detaljno pokazuje koliko energije prođe kroz površinu od 1 m² u jednoj sekundi, kada se temperatura razlikuje za 1k.

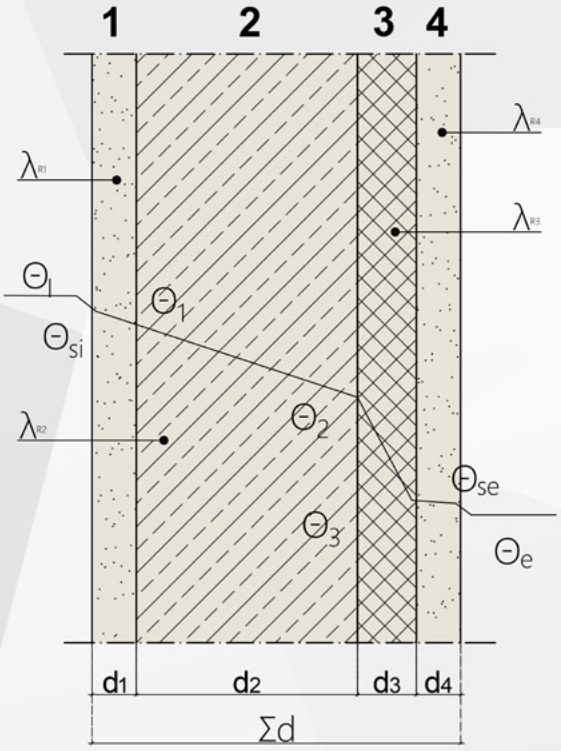
Merna jedinica izražava se u [W/m²K]. U-vrednost je specifičan parametar jednog elementa i funkcija termičke provodljivosti i debljine upotrebljenih materijala. Što je U-vrednost niža, to je učinak izolacije bolji.

U-vrednost termičkog zida izračunava se posebnim programom, koji je sertifikovan prema normi UNI EN ISO 6946.

The heat transfer coefficient U describes the amount of thermal energy that passes through an element consisting of one or more layers when the temperature inside differs from the temperature outside. It shows in detail how much energy passes through an area of 1 m² in one second when the temperature changes by 1k.

The unit of measurement is expressed in [W/m2K]. The U-value is a specific parameter of a single element and is a function of the thermal conductivity and thickness of the materials used. The lower the U-value, the better the insulation effect.

The U-value of the thermal wall is calculated by a special program certified according to the UNI EN ISO 6946 standard.



U - VREDNOSTI ZA TERMIČKI ZID / U - VALUES FOR THERMAL WALL

Debljina zidnog elementa / The thickness of the wall element	λ vrednost PUR / λ value of PUR	8 cm PUR	10 cm PUR	12 cm PUR
20/25/30/35/40 cm	0,027 W/mK	0,30 W/m²K	0,25 W/m²K	0,20 W/m²K

Napomena 1: Vrednosti se odnose na zidne elemente sa ankerima od staklenih vlakana.
Note 1: The values refer to the wall with anchors elements of glass fibers.

Napomena 2: Na upit postoje i dodatne debljine toplotne izolacije.
Note 2: There are additional thicknesses of thermal insulation on request.

PROTIVPOŽARNA KLASIFIKACIJA /
FIRE PROTECTION CLASSIFICATION

U narednoj tabeli se prikazuju minimalne vrednosti debljine zidova i zaštitinih slojeva termo zida radi postizanja protivpožarne klase koja je predviđena projektom.

The following table summarizes the minimal wall thicknesses and protective layers of the thermal walls to achieve the fire resistance class that the project foresees.

Trajanje vatrootpornosti u minutima (R) / The duration of fire resistance in minutes (R)	Uticaj vatre sa obe strane / The impact of the fire on both sides		Uticaj vatre sa jedne strane / The impact of fire on one side	
	Minimalna debljina zidnog elementa "s" The minimum thickness of the wall element "s"	Prekrivka od betona "a" Overlay of concrete "a"	Minimalna debljina zidnog elementa "s" The minimum thickness of the wall element "s"	Prekrivka od betona "a" Overlay of concrete "a"
30 minuta/minutes	120 mm	10 mm	120 mm	10 mm
60 minuta/minutes	140 mm	10 mm	130 mm	10 mm
90 minuta/minutes	170 mm	25 mm	140 mm	25 mm
120 minuta/minutes	220 mm	35 mm	160 mm	35 mm
180 minuta/minutes	270 mm	55 mm	210 mm	50 mm
240 minuta/minutes	350 mm	60 mm	270 mm	60 mm

Napomena 1: Trajanje vatrootpornosti R i minimalna debljina zida S odnose se na debljinu statičkog poprečnog preseka (unutrašnji segment i jezgro betona koji se lije na licu mesta na gradilištu).

Note 1: The fire resistance duration R and the minimum wall thickness S refer to the thickness of the static cross-section (inner segment and core of the concrete cast at the construction site).

Napomena 2: Prekrivka od betona "a" se odnosi na osovinu noseće armature.

Note 2: Concrete cover "a" refers to the shaft of the supporting reinforcement.

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