Ministry of Communities, Territories and Infrastructure development of Ukraine

THE STATE RESEARCH INSTITUTE OF BUILDING CONSTRUCTIONS
(NIISK, www.niisk.com)

RECOVERY CONSTRUCTION FORUM 2.0!

Discussion panel Construction Market Peculiarities and First Recovery Experience

ON THE SYSTEM OF TECHNICAL REGULATION OF UKRAINE'S CONSTRUCTION INDUSTRY AND NIISK'S EXPERIENCE IN THE RECONSTRUCTION OF DAMAGED STRUCTURES

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Warszawa – 14.11.2023

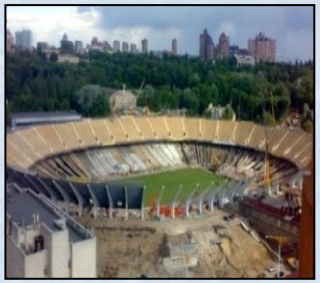
STATE RESEARCH INSTITUTE OF BUILDING CONSTRUCTIONS (NIISK)

State Enterprise «The State Research Institute of Building Constructions» (NIISK) is one of the oldest research centers of the Ukrainian building sector. It was established in November 1943. Its purpose was to contribute to the reconstruction of buildings and facilities destroyed in World War II in the short term and find the most efficient design methods and optimal use of building materials. Since then we have proved that we were a leading science and technology center in surveying, testing and reconstruction. We bring this valuable experience to the recovery projects that have already started in Ukraine.

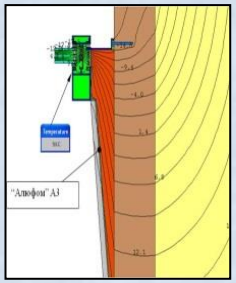
DIRECTIONS FOR INTERNATIONAL COOPERATION

- Reconstruction of damaged structures
- Research and testing of civil structures
- Earthquake engineering and vibration protection
- Energy performance of buildings
- Geotechnical aspects of construction
- Reliability, safety and protection of civil structures
- Development of regulatory framework and standardization
- Acoustical engineering and noise protection
- Economics of civil engineering and pricing of scientific and technological activities in construction

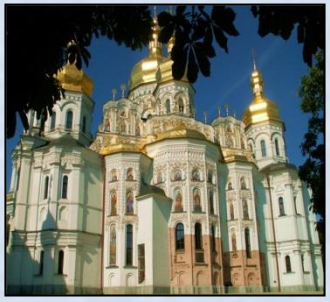
Construction projects



The NSC «Olympic», Kyiv



Energy effective retrofitting of the residential buildings



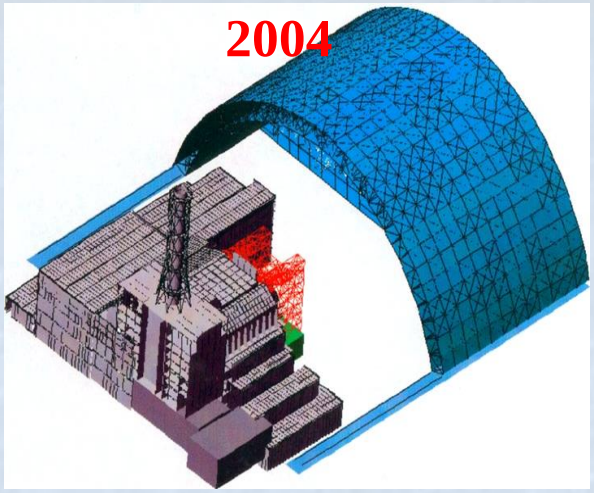
The Uspenskiy cathedral of the Kievan-Pechersk Lavra

The Kahovskaya hydroplant

The residential complex with multi-store parking in Kyiv

The Guy bridge across the Dnieper river

ACTING AS A CLIENT ENGINEER IN THE DESIGN AND CONSTRUCTION OF THE NEW SAFE CONFINEMENT



Span	257m
Length	150m
Height	110m
Weight	25,000t
Cranes	4 at 50t
Life	100yrs

DAMAGES TO INFRASTRUCTURE AND ECONOMIC IMPACT OF RUSSIAN INVASION

GOT DAMAGED AND DESTROYED*

Total damage 143.8 billion USD

153.8 thousand residential buildings, direct loss is 53.6 bln USD

DAMAGED BUILDING IN IRPIN, KYIV REGION, PUSHKINSKA STR 62

Of them:

- **Damage degree less than/equal to 10%**
  15.4 thousand buildings
- **Damage degree more than 10% - less than/equal to 40%**
  65.7 thousand buildings
- **Damage degree more than 40%**
  72.7 thousand buildings

View of the building before February 24, 2022

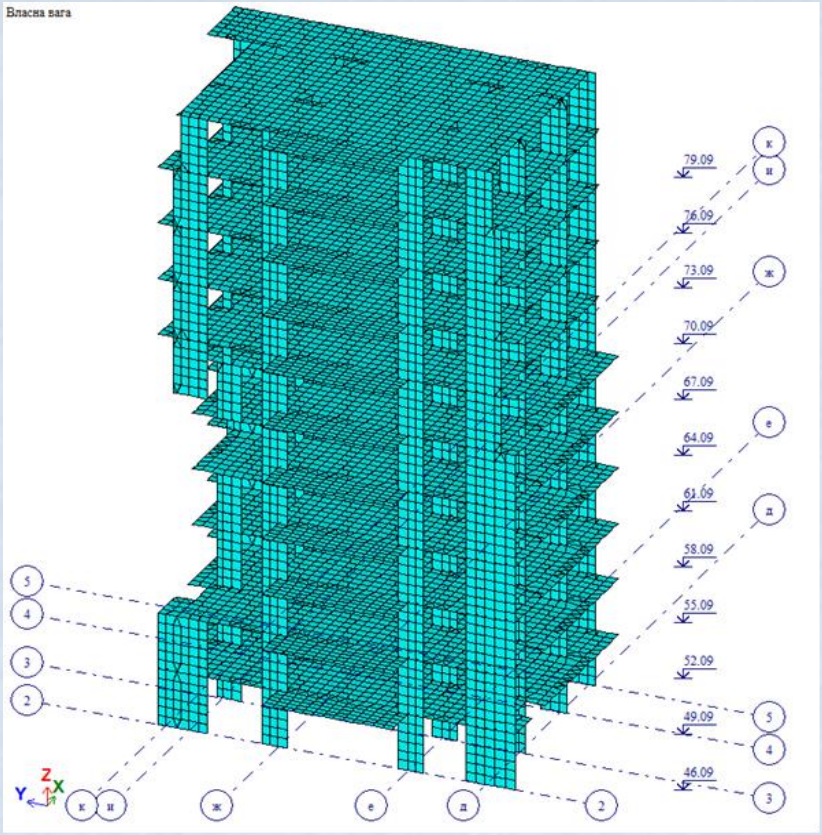
View after attacks of Russian troops in April 2022

Infrastructure
36.2 bln USD

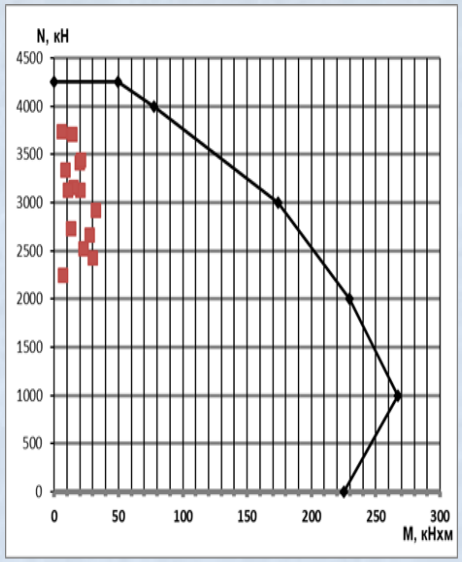
*** DAMAGES TO INFRASTRUCTURE AND ECONOMIC IMPACT OF RUSSIAN INVASION AS OF 28 FEBRUARY, 2023 based on the data taken from KSE (https://kse.ua)**

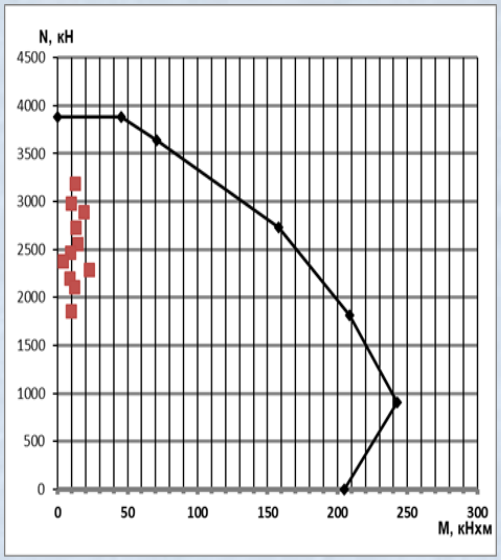
METHODS AND STRUCTURAL SOLUTIONS FOR THE RECONSTRUCTION AND STRENGTHENING OF DAMAGED STRUCTURES IN FRAME-MONOLITHIC BUILDINGS

Residential building on Lobanovsky Prospekt, 6-A, Kiev



Fragment of the calculation model of the building in a state of emergency





Efforts in existing pylons (areas of strength N-M correspond to pylon P-41 with concrete strength C16/20, respectively)

- in pylons in axes Zh/2, Zh/3 at the level of 17-20 floors in emergency;
- in pylons in axes Z/2, Z/3, I/3 at the level of 17-19 floors in operational condition after reconstruction

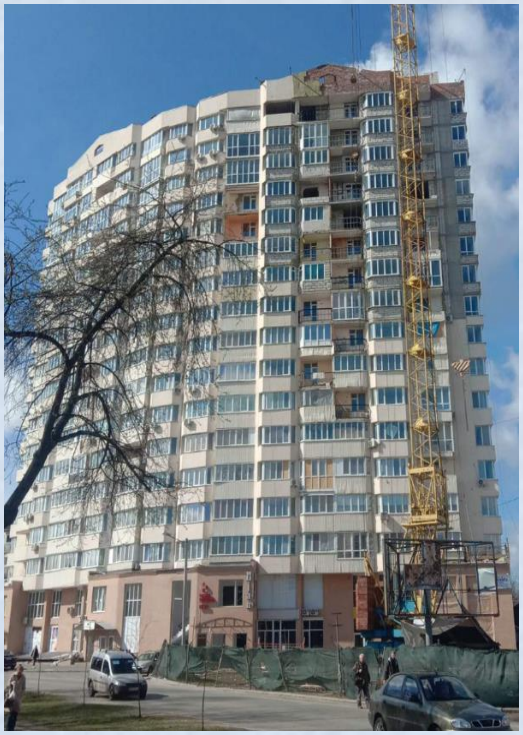
Residential building on Lobanovsky Prospekt, 6-A, in Kiev
View of the building in reconstruction

August 19, 2022
(dismantling during temporary unfastening)

September 08, 2022
(concreting of poles and floor slabs)

October 27, 2022
(reconstruction of walls and windows)

THE MOST WIDESPREAD TYPES OF DAMAGE TO BUILDINGS. STRUCTURAL SOLUTIONS FOR RECONSTRUCTION AND STRENGTHENING



Frame-monolithic residential building in Chernigiv, Chornovola street, 15A - General view before and after reconstruction

Installation of reinforcement to wall panels

IMPLEMENTATION OF REGULATION (EU) No 305/2011 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL IN UKRAINE

TECHNICAL REGULATION OF CONSTRUCTION PRODUCTS ⟷ **LAW OF UKRAINE "ON MARKETING OF CONSTRUCTION PRODUCTS"**

Provide mechanism
Of marketing of construction products

APPROVED by Decision No. 1764 of the Cabinet of Ministers of Ukraine of December 20, 2006

implements PROVISIONS of Directive 89/106/EEC

MODIFICATIONS of Technical Regulation adopted on March 22, 2022 provide:

- **APPROXIMATION of provisions of valid Technical Regulation to Regulation (EU) No 305/2011;**
- **During martial law and within the next 90 days IT IS ALLOWED** to place to market and market construction products delivered to the territory of Ukraine from EU countries on the base of **DECLARATION OF PERFORMANCE** drawn up by a foreign manufacturer with a copy of the declaration in Ukrainian what demonstrates the conformity of construction products to the requirements of Regulation (EU) No 305/2011

ADOPTED by the Ukrainian Parliament on September 2, 2020 and WILL BECOME EFFECTIVE on January 1, 2023

Implements PROVISIONS of Regulation (EU) No 305/2011 of the European Parliament and of the Council of March 9, 2011

is the legal and organizational basis for the **PLACING TO MARKET or MARKETING** of construction products by laying down rules for expressing **PERFORMANCE FOR ESSENTIAL CHARACTERISTICS** of construction products and use of **UKRAINIAN** conformity sign of Technical Regulation

SYSTEMATIC DEVELOPMENT APPROACH OF THE NATIONAL LEGISLATION OF UKRAINE BASED ON THE LEGISLATION OF THE EUROPEAN UNION

TECHNICAL REGULATIONS FOR CONSTRUCTION PRODUCTS (Products)

LAW OF UKRAINE "ON THE PROVISION OF CONSTRUCTION PRODUCTS ON THE MARKET"

REGULATORY LEGAL ACTS (LAWS, RESOLUTIONS, DIRECTIVES, ORDERS)

FUNDAMENTAL REGULATIONS

SUPPORTING NATIONAL STANDARDS

NATIONAL MANDATES FOR CERTAIN CATEGORIES OF CONSTRUCTION PRODUCTS

GENERAL AND SUBJECT REGULATIONS

SUPPORTING NATIONAL STANDARDS

REGULATORY TECHNICAL SPECIFICATIONS

CONCLUSIONS ON TECHNICAL ACCEPTABILITY

NATIONAL STANDARDS IMPLEMENTING EUROCODE PROVISIONS

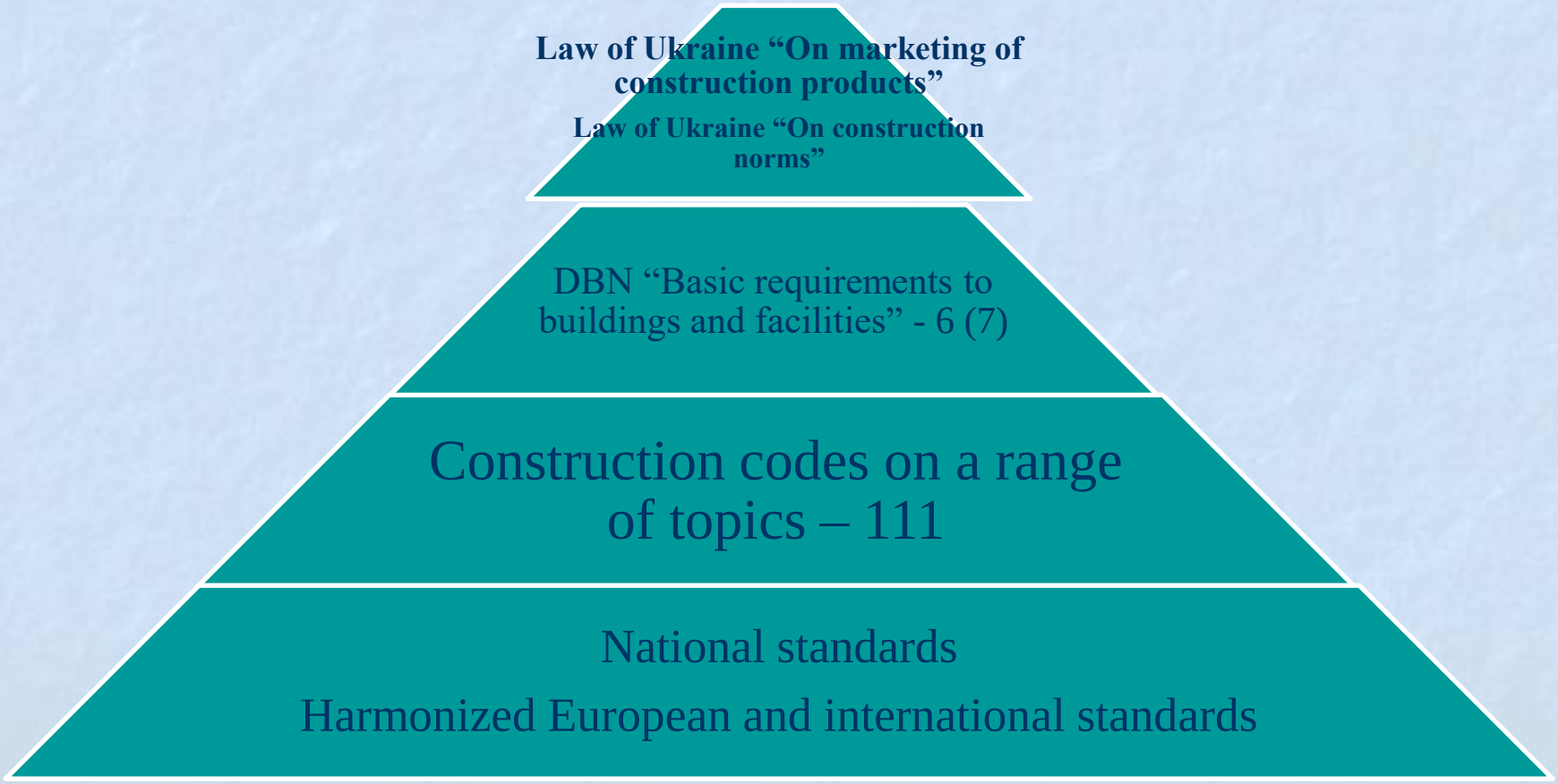
SUPPORTING NATIONAL STANDARDS

DECLARATION OF PERFORMANCE OF CONSTRUCTION PRODUCTS

REGULATORY DOCUMENTS THAT ESTABLISH TECHNICAL REQUIREMENTS AND TEST METHODS FOR RELEVANT CONSTRUCTION PRODUCTS: NATIONAL STANDARDS, INCLUDING THOSE THAT IMPLEMENT THE PROVISIONS OF INTERNATIONAL AND REGIONAL STANDARDS, AS WELL AS TECHNICAL SPECIFICATIONS AND ENTERPRISE STANDARDS

PROCEDURES AND MANUALS

Structure of the legislative and regulatory framework



STATE CONSTRUCTION NORMS (DBN) FOR THE PURPOSES OF ESTABLISHING BASIC REQUIREMENTS FOR CONSTRUCTION WORKS IN UKRAINE

BASIC REQUIREMENTS FOR CONSTRUCTION WORKS

Mechanical resistance and stability	**DBN V.1.2-6:2021** Basic requirements for construction works. Mechanical resistance and stability – **developed by NIISK**
Safety in case of fire	**DBN V.1.2-7:2021** Basic requirements for construction works. Fire safety – **developed by NIISK**
Hygiene, health and the environment	**DBN V.1.2-8:2021** Basic requirements for construction works. Hygiene, health and environmental protection – **developed by NIISK**
Safety and accessibility in use	**DBN V.1.2-9:2021** Basic requirements for construction works. Safety and accessibility in use – **developed by NIISK**
Protection against noise	**DBN V.1.2-10:2021** Basic requirements for construction works. Protection against noise – **developed by NIISK**
Energy economy and heat retention	**DBN V.1.2-11:2021** Basic requirements for construction works. Energy saving and energy efficiency – **developed by NIISK**
Sustainable use of natural resources	

PRIORITY OF ADOPTING EUROPEAN STANDARDS AS NATIONAL STANDARDS

LAW OF UKRAINE
"On Standardization"
No. 1315-VII dated June 5, 2014

Section V

INTERNATIONAL COOPERATION AND FINANCING OF STANDARDIZATION ACTIVITIES

Article 27. International cooperation in standardization

1. The central executive authority that ensures formation of state policy in the field of standardization, shall take measures about **adaptation of Ukrainian legislation** in the field of standardization **to the legislation of the European Union.**

PRIORITY OF ADOPTING EUROPEAN STANDARDS AS NATIONAL STANDARDS

ASSOCIATION AGREEMENT
between Ukraine, on the one hand, and the European Union, The European Atomic Energy Community and its member states, on the other hand

Article 56

Convergence of technical regulation, standards, and conformity assessment

1. Ukraine shall take the necessary measures to gradually achieve compliance with EU technical regulations and systems of standardization, metrology, accreditation, conformity assessment activities and market supervision of the EU. It shall comply with the principles and practices set out in current EU decisions and regulations[1].

2. In order to achieve the objectives defined in Paragraph 1, Ukraine must, in accordance with the schedule of Annex III to this Agreement:

i) **implement the relevant EU provisions** in its legislation;

…

8. **Ukraine shall gradually implement a set of European standards (EN) as national standards,** in particular **harmonized European standards,** voluntary application of which is considered to meet the requirements of the legislation specified in Annex III hereto. Simultaneously with this implementation Ukraine shall cancel conflicting national standards, in particular, the application of interstate standards (GOSTs) developed by 1992. In addition, Ukraine shall gradually take other necessary measures to meet the terms and conditions for obtaining membership in accordance with the requirements applicable to full members of European standardization organizations.

NATIONAL AND HARMONIZED BRANCHES OF THE NATIONAL REGULATORY FRAMEWORK FOR THE CONSTRUCTION INDUSTRY OF UKRAINE

NATIONAL BRANCH

More than 2,000 regulations and regulatory documents *developed on the basis of national technological traditions*

- Fundamental state building codes 6 DBN
- General and subject state building codes 99 DBN
- More than 1,000 national standards, including supporting national standards (DSTU)
- Other national regulations (technical terms and conditions (TU), standards of organizations of Ukraine (SOU), guidelines and manuals

HARMONIZED BRANCH

More than 3,000 regulatory documents, *developed on the basis of regulatory documents of the European Union*

- 58 adopted national standards that implement the provisions of Eurocodes (DSTU-N B EN), and establish requirements for the design of building structures
  - Adopted National annexes
  - Adopted European amendments and technical amendments
  - Adopted supporting national standards (DSTU EN, DSTU ISO)
- 444 adopted national standards that implement the provisions of the harmonized European standards (DSTU hEN), and establish the operational characteristics of construction products
- More than 2,500 adopted national standards that implement the provisions of European standards (DSTU EN) and establish requirements and testing methods for construction products

SYSTEM OF EUROPEAN CODES IMPLEMENTED IN UKRAINIAN REGULATORY FRAMEWORK

Today there are 58 European Codes (category A standards) and their publication is completed in 2007

EN Bases of structural design 1

EN 1991 Loads and actions 10

- **EN 1992** 4 — Reinforced concrete structures
- **EN 1994** 3 — Steel-reinforced concrete structures
- **EN 1996** 4 — Masonry structures
- **EN 1993** 20 — Metal structures
- **EN 1995** 3 — Timber structures
- **EN 1999** 5 — Aluminum structures
- **EN 1997** 2 — Geotechnical design
- **EN 1998** 6 — Design of aseismic structures

Total: 58 standards of European Codes

2 – number of separate standards

ADOPTED NATIONAL ANNEXES TO NATIONAL STANDARDS THAT IMPLEMENT THE PROVISIONS OF EUROCODES (DSTU-N B EN)

NATIONAL ANNEXES TO NATIONAL STANDARDS THAT IMPLEMENT THE PROVISIONS OF EUROCODES (DSTU-N B EN) CONTAIN:

PARAMETERS LEFT OPEN FOR NATIONAL CHOICE

→ A BRIEF DESCRIPTION OF THE PARAMETER IS PROVIDED AS TO WHAT IS ALLOWED TO BE DETERMINED AT THE NATIONAL LEVEL

→ THE CLAUSE NUMBER AND PARAMETER NAME ARE PROVIDED AS TO WHAT IS ALLOWED TO BE DETERMINED AT THE NATIONAL LEVEL

PARAMETERS DEFINED AT THE NATIONAL LEVEL

→ INFORMATION ABOUT CERTAIN PARAMETERS AND THEIR APPLICATION IS PROVIDED

→ THE SPECIFIED PARAMETER RANGE IS PROVIDED

or

→ THE PROVISIONS OF THE CLAUSE IS ADOPTED WITHOUT CHANGES

DECISION ON STATUS OF INFORMATIVE ANNEXES

→ SOLUTIONS FOR THE USE OF INFORMATIVE ANNEXES ON THE TERRITORY OF UKRAINE ARE MADE AVAILABLE

→ CAN BE APPLIED WITHOUT CHANGES IN UKRAINE

FURTHER IMPLEMENTATION OF NATIONAL STANDARDS THAT IMPLEMENT THE PROVISIONS OF THE RELEVANT PARTS OF EUROCODES (DSTU-N B EN)

13 NEW VERSIONS OF THE RELEVANT PARTS OF EUROCODES THAT NEED TO BE ADOPTED AS NATIONAL STANDARDS HAVE BEEN ESTABLISHED

8 new versions of the relevant parts of Eurocodes published in the EU

- EN 1990:2023 Eurocode - Basis of structural and geotechnical design
- EN 1993-1-1:2022 Eurocode 3 - Design of steel structures - Part 1-1: General rules and rules for buildings
- EN 1996-1-1:2022 Eurocode 6 - Design of masonry structures - Part 1-1: General rules for reinforced and unreinforced masonry structures
- EN 1999-1-1:2023 Eurocode 9 - Design of aluminium structures - Part 1-1: General rules
- EN 1999-1-2:2023 Eurocode 9 - Design of aluminium structures - Part 1-2: Structural fire design
- EN 1999-1-3:2023 Eurocode 9 - Design of aluminium structures - Part 1-3: Structures susceptible to fatigue
- EN 1999-1-4:2023 Eurocode 9 - Design of aluminium structures - Part 1-4: Cold-formed structural sheeting
- EN 1999-1-5:2023 Eurocode 9 - Design of aluminium structures - Part 1-5: Shell structures

5 new versions of the relevant parts of Eurocodes that are at the stage of approval in the EU

- EN 1991-2:2023 Eurocode 1 - Actions on structures - Part 2: Traffic loads on bridges and other civil engineering works
- EN 1992-1-1:2023 Eurocode 2 - Design of concrete structures - Part 1-1: General rules and rules for buildings, bridges and civil engineering structures
- EN 1992-1-2:2023 Eurocode 2 - Design of concrete structures – Part 1-2: Structural fire design
- EN 1996-3:2023 Eurocode 6 - Design of masonry structures - Part 3: Simplified calculation methods for unreinforced masonry structures
- prEN 1997-1 Eurocode 7: Geotechnical design - Part 1: General rules

FURTHER INTEGRATION OF THE NATIONAL REGULATORY FRAMEWORK INTO THE INTERNATIONAL REGULATORY ENVIRONMENT FOR TECHNICAL REGULATION OF THE CONSTRUCTION INDUSTRY

544 ENs AND ISOs REFERENCED TO IN THE RELEVANT PARTS OF EUROCODES

ENSURE THAT THE RELEVANT REQUIREMENTS OF EUROCODE PROVISIONS ARE MET

ENs AND ISOs ARE ADOPTED AS NATIONAL STANDARDS

444 hENs (HARMONIZED EUROPEAN STANDARDS)

ESTABLISH THE OPERATIONAL CHARACTERISTICS OF CONSTRUCTION PRODUCTS

444 hENs ADOPTED AS NATIONAL STANDARDS

OVER 2,500 OTHER ENs IN THE CONSTRUCTION INDUSTRY BY CLASSES 91 AND 93 ACCORDING TO NC 004:2020

ESTABLISH REQUIREMENTS AND METHODS FOR TESTING CONSTRUCTION PRODUCTS

OVER 2,500 ENs ARE ADOPTED AS NATIONAL STANDARDS

WORK CONTINUES TO ESTABLISH NEW EN AND ISO EDITIONS, including hENs, THAT NEED TO BE ADOPTED AS NATIONAL STANDARDS

ORDERS ISSUED IN 2022 TO SUPPORT LAW OF UKRAINE “ON MARKETING OF CONSTRUCTION PRODUCTS”

Order No. 54 of the Ministry of Development of Communities and Territories of **February 18, 2022** “**List of national standards for the purposes of implementing Law of Ukraine “On marketing of construction products”**

Corresponds to the List of standards published in Official Journal of the European Union

533 national standards of Ukraine which are identical to harmonized European standards (DSTU EN)

Order No. 87 of the Ministry of Development of Communities and Territories of **May 30, 2022** **“List of European Assessment Documents”**

Corresponds to the EADs and ETAGs List published in Official Journal of the European Union

274 European Assessment Documents and European Technical Approval Guidelines (EAD, ETAG)

EUROPEAN TECHNICAL APPROVAL GUIDELINES ADOPTED AS NATIONAL STANDARDS OF UKRAINE

For the purposes of

TECHNICAL REGULATION OF CONSTRUCTION PRODUCTS

AND

LAW OF UKRAINE "ON MARKETING OF CONSTRUCTION PRODUCTS"

NIISK prepared

DSTU ETAG 004:2021 (ETAG 004:2013, IDT)
Guideline for European technical approval. External Thermal Insulation Composite Systems (ETICS) with rendering

DSTU N B ETAG 007:2013
Guideline for European technical approval. Timber frame building kits **(ETAG 007:2001, IDT)**

DSTU N B ETAG 017:2013
Guideline for European technical approval of VETURE kits - Prefabricated units for external wall insulation. **(ETAG 017:2005, IDT)**

DSTU N B ETAG 023:2013
Guideline for European technical approval of prefabricated building units. **(ETAG 023:2006, IDT)**

DSTU N B ETAG 024:2013
Guideline for European technical approval of concrete frame building kits **(ETAG 024:2006, IDT)**

DSTU N B ETAG 025:2013
Guideline for European technical approval of metal frame building kits **(ETAG 025:2006, IDT)**

LEGISLATIVE BASE OF UKRAINE ON ENERGY EFFICIENCY

RELATIONSHIP OF THE SET OF EPB STANDARDS WITH THE NATIONAL REGULATORY FRAMEWORK

Directive 2021/31/ЄС on the energy performance of building EPBD

The Law of Ukraine “On energy efficiency of buildings”

Set of EPB standards

DBN V.2.6-11:2021
BASIC REQUIREMENTS FOR BUILDINGS AND STRUCTURES
ENERGY SAVING AND ENERGY EFFICIENCY

DBN V .2.6-31:2021
THERMAL INSULATION AND ENERGY EFFICIENCY OF BUILDINGS

DSTU 9190:2022
ENERGY PERFORMANCE OF BUILDINGS.
METHOD FOR CALCULATION OF ENERGY USE

DSTU 9191:2022
METHODS FOR CHOOSING OF INSULATION MATERIAL FOR INSULATION OF BUILDINGS

Thank you for your attention!