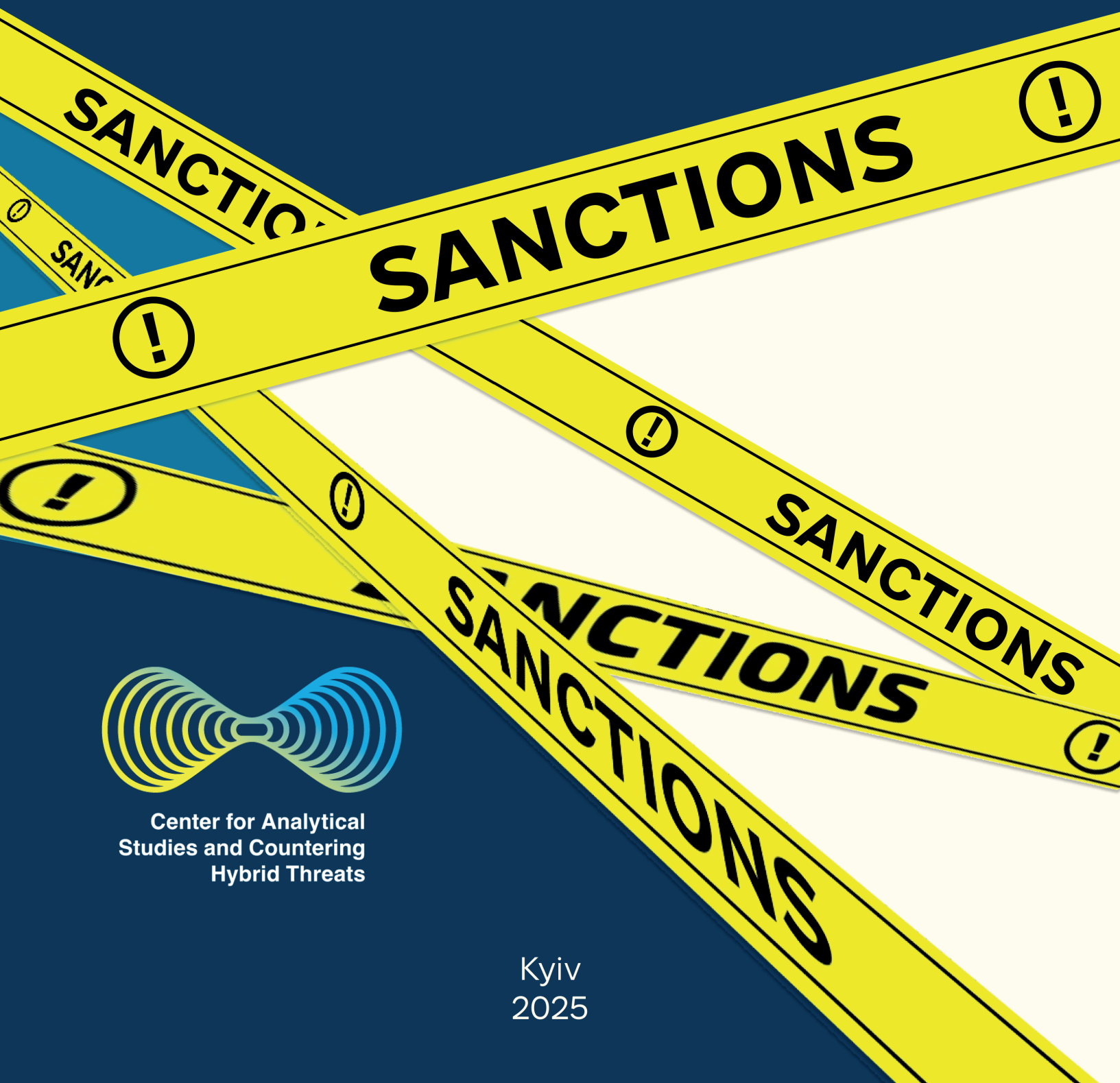


ANALYSIS OF THE EFFECTIVENESS AND COHERENCE OF UKRAINIAN AND INTERNATIONAL SANCTIONS POLICY

Analytical Report



Center for Analytical
Studies and Countering
Hybrid Threats

Kyiv
2025

Analysis of the Effectiveness and Coherence of Ukrainian and International Sanctions Policy

Analytical Report

With the support of the International Renaissance Foundation



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The analytical report by the NGO “Center for Analytical Study and Countering Hybrid Threats” is dedicated to assessing the effectiveness and coherence of Ukrainian and international sanctions policy toward the military-industrial complex (MIC) of the Russian Federation.

For the first time, the study conducts a systematic quantitative and qualitative analysis of more than 1,700 Russian enterprises involved in arms production, based on official data from Russian state registries.

The report reveals the patterns of development of Russia’s MIC, including the rapid increase in the production of unmanned aerial vehicles (UAVs) after 2022, and examines the critical dependencies of Russia’s defense industry on the import of strategic raw materials – manganese ore, cotton cellulose, and titanium.

Based on a comparison of the sanctions practices of Ukraine, the United States, the European Union, and the United Kingdom, the study finds a high level of alignment by Ukraine with its partners’ sanctions, but a low level of synchronization of partners’ actions with Ukrainian initiatives.

The authors propose a shift toward a targeted sanctions policy aimed at the “vulnerable points” of Russia’s MIC – key enterprises, supply chains, and strategic resources. Such an approach, reinforced by international coordination, can deliver a systemic blow to Russia’s war economy and enhance the effectiveness of sanctions as a tool to deter aggression.

This publication was compiled with the support of the International Renaissance Foundation. It’s content is the exclusive responsibility of the authors and does not necessarily reflect the views of the International Renaissance Foundation.

The research was conducted using Sayari Graph and YouControl software products.

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Introduction

Ukraine's state sanctions policy is defined by the Law of Ukraine «On Sanctions» No. 1644-VII of August 14, 2014 (hereinafter - the Law). The Law is aimed at protecting national interests, national security, sovereignty, and territorial integrity of Ukraine, as well as countering terrorist activities.

Article 4 of the Law lists 32 types of sanctions that may be applied against:

- natural persons - residents and non-residents of Ukraine (foreign nationals),
- stateless persons,
- legal entities - both Ukrainian and foreign.

In March 2014, by a decision of the National Security and Defense Council of Ukraine (NSDC), all military-technical cooperation, as well as collaboration in the defense and security sectors with the Russian Federation, was suspended.

The Cabinet of Ministers of Ukraine, the Ministry of Defense, the Security Service of Ukraine (SBU), and intelligence agencies denounced relevant agreements with Russian entities and ceased cooperation in these areas.

Ukraine also terminated the servicing of strategic missile systems, a key

component of Russia's Strategic Missile Forces, which had been manufactured at the Pivdenmash (State Enterprise «Production Association Yuzhny Machine-Building Plant named after O.M. Makarov,» Dnipro).

Military transit and the transit of dual-use goods through Ukraine's territory and airspace were also halted.

Starting from 2015, Ukraine gradually strengthened sanctions against Russian individuals and legal entities, including enterprises and organizations of the military-industrial complex (MIC).

In early October 2015, the Security Service of Ukraine blocked the participation of Ukrainian specialists in preparations for the launch of the Zenit rocket from the Baikonur Cosmodrome, which Russia's Roscosmos had purchased before sanctions were introduced and delivered to Kazakhstan. Another Zenit rocket, scheduled for launch in 2017, was also not launched due to the refusal of Ukrainian engineers from Pivdenmash to participate in preparations.

Thus, prior to the full-scale invasion, Ukraine's sanctions policy against Russia's defense and military sectors was limited to these measures.

Instead, the main sanctions pressure focused on protecting the information space, since the information operations line at that time was the key domain of Russia’s hybrid warfare against Ukraine.

By 2022, sanctions had been imposed on 2,755 information resources (subdomains) and 119 software products of

Russian origin. For comparison, before 2022, sanctions had been applied to only 91 enterprises of Russia’s MIC, while the official Register of the Russian Defense-Industrial Complex (2015) listed approximately 1,400 such enterprises.

Table 1. **Areas of Sanctions Impact in the Period 2015 – 2022**

Category of Sanctioned Entities	Number of Entities
Resource (subdomain)	2,755
Software product	119
Defense industry companies	91
Logos	68
Companies	11
Payment systems	17
Aircraft, vessels	4
Total	3,065

Sanctions were also aimed at Russian oligarchs who backed Putin in his hybrid war against Ukraine and financed it using their assets. Sanctions were imposed on a significant number of companies and enterprises owned by these oligarchs. The likely goal of these measures was to create – by threatening their economic interests – an incentive within the Russian Federation to form a “party of peace,” weaken their support for the regime, and influence Putin’s calculation about the futility of continuing the war against Ukraine.

Ukraine’s sanctions policy direction changed with the onset of Russia’s open

aggression. The intent of the attack was based on the doctrine of blitzkrieg: Russia expected to force Ukraine to capitulate within days. However, that plan failed. The invading forces were routed, some were pushed out of Ukraine; the Russian army suffered large losses of weapons and equipment, including modern systems whose stocks had been accumulated over a long period in preparation for the war. At the same time, Ukraine lacked the resources to finish off the invasion groupings in the south and east.

The war became protracted and turned into a war of attrition. In such a conflict, the economic and military-industrial potential of the parties and the ability to use it effectively play a decisive role. Russia faced the task not only of quickly restoring lost equipment and armaments but also of scaling up production to create new formations. In response, Moscow undertook a large-scale expansion of its military-industrial complex and increased the volume of military production.

Countering this buildup can be done in two ways: by physically destroying military-industrial targets using weapons and/or by reducing their production capacity through sanctions. The aim of this study is a quantitative and qualitative analysis of Russia's military-industrial complex, and the identification of directions and prospects for increasing the effectiveness of Ukraine's sanctions policy against the Russian MIC – both through the sanctions mechanism itself and by improving coordination of sanctions policy with partner countries.

Chapter 1

Structure and General Characteristics of the Russian Military-Industrial Complex (MIC)

This section describes the methodology used to determine the affiliation of legal entities with the military-industrial complex (MIC) based on **OKVED** («All-Russian Classifier of Types

of Economic Activity») and other data from **the Unified State Register of Legal Entities (EGRUL)**.

For reference:

*The Unified State Register of Legal Entities (EGRUL) contains registrations for over **3,200,000 legal entities** (for comparison, the Unified State Register of Enterprises and Organizations of Ukraine (EDRPOU) lists over **1,500,000 legal entities**), among which more than **2,800,000 are enterprises of various forms of ownership** (the majority being **open joint-stock companies – over 2,500,000**).*

Legislative Framework for the Formation of the Russian Military-Industrial Complex (MIC)

In order to centralize and improve control, the «**Consolidated Register of Organizations of the Defense-Industrial Complex of the Russian Federation**» (hereinafter – **the Defense Industry Register**) was established in **2004**.

Today, it is a fully **closed automated system**, with data accessible only through **official requests** or in **written form**.

The last publicly available list of military-industrial enterprises was contained in the **Order of the Ministry of Industry and Trade of the Russian Federation No. 1828 dated July 3, 2015** (hereinafter – the **2015 MIC Register**).

The Register consists of **14 sections** (original titles preserved):

- I. Organizations subordinate to and under the jurisdiction of the Ministry of Industry and Trade of Russia (982 organizations).
- II. Organizations subordinate to and under the jurisdiction of Roscosmos (81 organizations).
- III. Organizations subordinate to and under the jurisdiction of the State Corporation Rosatom (41 organizations).
- IV. Organizations subordinate to and under the jurisdiction of the Ministry of Defense of Russia

(166 organizations).

- V. Organizations subordinate to and under the jurisdiction of the Ministry of Education and Science of Russia (13 organizations).
- VI. Organizations subordinate to and under the jurisdiction of the Federal Agency for Scientific Organizations (FANO) of Russia (38 organizations).
- VII. Organizations subordinate to and under the jurisdiction of the Federal Service for Technical and Export Control (FSTEC) of Russia (5 organizations).
- VIII. Organizations subordinate to and under the jurisdiction of the Federal Security Service (FSB) of Russia (6 organizations).
- IX. Organizations subordinate to and under the jurisdiction of Rosstandart (2 organizations).
- X. Organizations subordinate to and under the jurisdiction of the Federal Medical-Biological Agency (FMBA) of Russia (11 organizations).

- XI. Organizations subordinate to and under the jurisdiction of the Ministry of Communications of Russia (5 organizations).
- XII. Organizations subordinate to and under the jurisdiction of the Ministry of Energy of Russia (1 organization).
- XIII. Organizations subordinate to and under the jurisdiction of Rossvyaz (1 organization).
- XIV. Organizations subordinate to and under the jurisdiction of Spetsstroy of Russia (1 organization).

The list contains data on **1,353 organizations (enterprises)**. They are systematized according to their **administrative subordination** to state bodies or corporations, **without disclosing the specific types of products** they manufacture.

Despite the Russian Federation's own explicit classification of these enterprises as part of the defense-industrial complex, **45% of those still active after ten years remain unsanctioned.**

Table 2. **Coverage of Sanctions Against Enterprises Listed in the 2015 Defense Industry Register as of February 2025**

Category	Number of Enterprises	Share
Total enterprises	1,353	100%
Active	1,188	88%
Liquidated (in liquidation)	165	12%
Under sanctions	767	65% (of active)
Not under sanctions (active)	421	45% (of active)

It should be noted separately that 45% of the 165 enterprises liquidated after 2015 have legal successors, meaning they were dissolved for production optimization, not due to bankruptcy or cessation of operations.

Some major legal entities within the MIC have become successors of several related enterprises at once. There has been no reduction in production capacity – the liquidated enterprises have not ceased production, not dismissed personnel, and continue operating within new corporate structures, even though the total number of enterprises in the MIC appears to have decreased.

For example:

- AO “Severo-Zapadny Regionalny Tsentri Kontserna VKO ‘Almaz-Antey’ – Obukhovskiy Zavod” is the successor of five related enterprises (manufacturers of radar and radionavigation equipment);
- AO “Krasnaya Zvezda” is the successor of four cartographic and printing enterprises;
- PAO “Aviation Complex named after S.V. Ilyushin” is the successor of three enterprises producing spare parts for aircraft.

The Regulations on the Defense Industry Register do not explicitly specify which OKVED codes enterprises must have to be included in the register, but they must meet at least one of

the following three criteria:

- Possess equipment, production facilities, and qualified personnel for the development, production, repair, and disposal of weapons, military, and special equipment. An enterprise may also have production capacities for property classified under OKVED classes 13 (Textile Production), 14 (Clothing Production), and 15 (Leather and Leather Products Production).
- Be part of the assets of an organization engaged in the production of weapons and military equipment (as a subsidiary or under management).
- Participate in the implementation of state defense orders, maintaining a separate account in accordance with the law on state defense procurement and/or having a mobilization assignment.

Thus, a formalized list of enterprises officially classified as part of the MIC was established – one that remains relevant to this day.

General Information on the Classifier of Types of Economic Activity of Legal Entities

The classification of enterprises and institutions in the Russian economy is based on a division into 17 sectors, each designated by a letter of the Latin alphabet.

Each sector is further subdivided into several subsectors, with a total of 99 categories.

Each legal entity, depending on the nature of its activities, registers a corre-

sponding OKVED (All-Russian Classifier of Types of Economic Activity).

A legal entity may register one primary OKVED and an unlimited number of additional OKVEDs.

Because of this, the same entity may appear in the lists of legal entities across different sectors or subsectors of the economy.

Table 3. **Classification of Types of Economic Activity of Legal Entities in the Russian Federation**

Industry Identifier	Subsector Identifiers	Number of sanctioned Enterprises (Primary and Additional Codes)	Industry Name
A	(01-03)	[1,678]	Agriculture, forestry, hunting, fishing, and fish farming
B	(05-09)	[1,792]	Mining and quarrying
C	(10-33)	[28,869]	Manufacturing
D	(35)	[2,874]	Electricity, gas, steam, and air conditioning supply
E	(36-39)	[2,672]	Water supply; sewerage; waste management and remediation activities
F	(41-43)	[12,599]	Construction
G	(45-47)	[26,316]	Wholesale and retail trade; repair of motor vehicles and motorcycles
H	(49-53)	[11,459]	Transportation and storage
I	(55-56)	[3,872]	Accommodation and food service activities
J	(58-63)	[13,564]	Information and communication
K	(64-66)	[3,083]	Financial and insurance activities
L	(68)	[5,673]	Real estate activities
M	(69-75)	[20,607]	Professional, scientific, and technical activities
N	(77-82)	[7,487]	Administrative and support service activities
O	(84)	[678]	Public administration and defense; compulsory social security
P	(85)	[3,574]	Education
Q	(86-88)	[1,771]	Human health and social work activities
R	(90-93)	[2,558]	Arts, entertainment, and recreation
S	(94-96)	[2,159]	Other service activities
T	(97-98)	[7]	Activities of households as employers; undifferentiated goods- and service-producing activities of households for own use
U	(99)	[3]	Activities of extraterritorial organizations and bodies
Total	-	153,295	-

Further, a more detailed systematization involves several levels of sequential division of legal entities belonging to the same subsector into smaller groups according to the nature of their activities. Each group has its own narrowly defined specialization, indicated by a corresponding code.

Methodology for Identifying Legal Entities Belonging to the Military-Industrial Complex (MIC) Based on Data from Russian Registers

Given that the Russian MIC Registers have been closed to public access since 2015, the subsequent research was conducted using data from the **Classifier of Types of Economic Activity of Legal Entities and the Unified State Register of Legal Entities of the Russian Federation (EGRUL RF)**.

A total of **13 OKVED codes** were selected, whose titles indicate a **potential affiliation of legal entities with the military-industrial complex (MIC)** (hereinafter referred to as **MIC OKVEDs**).

The OKVEDs were chosen based on their **clear association with four key sectors** of the military-industrial complex.

Table 4. **Selected OKVED Codes Related to the Military-Industrial Complex (MIC) by Industrial Sectors of the Russian Federation**

Nº	Sector of the Military-Industrial Complex (MIC) ¹	OKVED Codes Related to the MIC
1	Авіаційна промисловість	30.30.32 – Manufacture of airplanes 30.30.39 – Manufacture of other aircraft 30.30.6 – Manufacture of unmanned aerial systems
2	Ammunition and Special Chemicals Industry	20.51 – Manufacture of explosives 25.4 – Manufacture of weapons and ammunition
3	Rocket and Space Industry	30.30.44 – Manufacture of intercontinental ballistic missiles 30.30.5 – Manufacture of parts and accessories for aircraft and spacecraft
4	Conventional Weapons Industry	26.70.5 – Manufacture of lenses, optical microscopes, binoculars, and telescopes 26.70.6 – Manufacture of optical sights and target coordinate determination devices 30.40 – Manufacture of military fighting vehicles

¹ This division of military-industrial complex (MIC) enterprises by industry was adopted by the Ministry of Industry and Trade of the Russian Federation.

At the initial stage of the research, analysts did not include enterprises from the electronics industry, radio industry, communications equipment industry, or shipbuilding industry, whose primary OKVED codes did not directly indicate involvement in the production of military goods.

However, during the course of the study, due to the complex nature of military production and the interconnect-

edness of enterprises within Russia's military-industrial complex, a number of such enterprises were identified – as they possessed one or more MIC-related OKVED codes as additional activities.

The first selection (February 2025) was made only based on the primary OKVED of legal entities, without considering additional OKVEDs.

Among 1,010 such entities, only 20% are under sanctions.

Table 5. **Results of the Selection of Military-Industrial Complex (MIC) Legal Entities Based on Primary OKVED**

OKVED Code	Name	Total in RF (Primary)	Under Sanctions	Active	Liquidated
20.51	Manufacture of explosives	162	11	103	59
25.4	Manufacture of weapons and ammunition	418	123	274	144
26.70.4	Manufacture of optical land-positioning equipment	1	1	1	0
26.70.5	Manufacture of lenses, optical microscopes, binoculars, and telescopes	5	0	5	0
26.70.6	Manufacture of optical sights and target coordinate determination devices	5	1	5	0
30.30.3	Manufacture of helicopters, airplanes, and other aircraft	172	27	95	77
30.30.5	Manufacture of parts and accessories for aircraft and spacecraft	144	21	93	51
30.30.6	Manufacture of unmanned aerial systems	37	1	37	0
30.30.32	Manufacture of airplanes	5	2	3	2
30.30.39	Manufacture of other aircraft	35	2	32	3
30.40	Manufacture of military fighting vehicles	24	12	21	3
30.30.43	Manufacture of launch vehicles	1	0	1	0
30.30.44	Manufacture of intercontinental ballistic missiles	1	1	1	0
Total:		1,010	202	671	339

At the next stage of the study, a selection was made of **legal entities (LEs)** for which **one or more MIC-related OKVED codes** were listed as **primary or additional**. To narrow the research scope, only **active legal entities** were extracted from the registers.

As of **February 2025**, this selection

identified **6,004 legal entities**.

In addition, it should be noted that an **indirect indicator** of a legal entity’s possible involvement in the MIC is its **participation in state procurement as a supplier of goods**.

This aspect was taken into account in the subsequent selection.¹

Table 6. **Number of Russian MIC Legal Entities That Have MIC-Related OKVED Codes as Primary or Additional and Participate in State Procurement as Suppliers**

	Enterprises with MIC-related OKVED Codes	Under Sanctions	Not Under Sanctions	Percentage Under Sanctions
Total:	1,701	585	1,116	34%
From the 2015 Defense Industry Register:	412	337	75	82%

When assessing the number of legal entities under each OKVED code, it should be taken into account that some of them have **several additional**

MIC-related OKVED codes, and therefore **appear multiple times** across different categories of manufacturers.

Table 7. **Results of the Selection of Legal Entities Having MIC-Related OKVED Codes as Primary or Additional**

OKVED Code	OKVED Name	Have OKVED as Primary or Additional	Under Sanctions
25.4	Manufacture of weapons and ammunition	1,029	508
20.51	Manufacture of explosives	306	68
26.70.4	Manufacture of optical land-positioning equipment	32	7
26.70.5	Manufacture of lenses, optical microscopes, binoculars, and telescopes	38	4
26.70.6	Manufacture of optical sights and target coordinate determination devices	32	12
30.30.3	Manufacture of helicopters, airplanes, and other aircraft	246	93

¹ Data as of February 2025.

OKVED Code	OKVED Name	Have OKVED as Primary or Additional	Under Sanctions
30.30.5	Manufacture of parts and accessories for aircraft and spacecraft	534	194
30.30.6	Manufacture of unmanned aerial systems	37	1
30.30.32	Manufacture of airplanes	11	2
30.30.39	Manufacture of other aircraft	52	8
30.40	Manufacture of military fighting vehicles	102	41
30.30.43	Manufacture of launch vehicles	21	7
30.30.44	Manufacture of intercontinental ballistic missiles	3	2

Thus, enterprises of the military-industrial complex (MIC) possess a set of characteristics by which their affiliation with the MIC can be identified. Each successive indicator increases the likelihood that an enterprise belongs to the defense sector.

The first indicator is the **OKVED code**, which specifies the enterprise’s connection to a certain branch of the MIC.

For example, **Uralvagonzavod**, despite its seemingly “civilian” name, lists **OKVED 30.40 – Manufacture of military fighting vehicles** as its primary activity.

Such an OKVED does not necessarily have to be primary – it may appear as an **additional code**, and there may be **several such additional codes**.

The second indicator is the **enterprise’s participation in the public procurement system** as a supplier of goods.

The third indicator is the **scale of public procurement contracts** in combination with the presence of MIC-related OKVED codes, either primary or additional. **The larger the total value of contracts**, the higher the likelihood that the enterprise is supplying

weapons, ammunition, military equipment, or components to the state.

Of the **412 legal entities** identified in the **2015 Defense Industry Register**, **187 (45%)** supply their products to the state under contracts worth **over 1 billion rubles**.

The fourth indicator is the **presence of licenses** issued by Russian regulatory authorities for the **production of weapons, ammunition, or military equipment**. Manufacturing such products is considered hazardous and therefore requires appropriate licenses – the enterprise must have trained personnel, proper equipment, and secure storage conditions. The presence of a MIC-related OKVED alone does **not automatically grant the right to manufacture military products**.

An additional indicator of an enterprise’s affiliation with the MIC (if the above indicators are present) may be the **existence of registered trademarks**.

Having a trademark clearly indicates that the enterprise **operates not only in the domestic market but also produces goods for export**.

Identified Quantitative Composition of the Russian Military-Industrial Complex (MIC).

Of the 1,701 identified legal entities, 412 belong to the 2015 Defense Industry Register, which represents 31% of the total number (1,353) of entities in that Register. This means their affiliation with the Russian military-industrial complex (MIC) is

confirmed by an official document. In addition to these entities, among the 1,701 selected legal entities, there remain 1,289 others, each having from 1 to 12 MIC-related OKVED codes as additional, and 145 of them have an MIC-related OKVED as their primary code.

Table 8. Identified Legal Entities with MIC-Related Primary OKVED Codes Participating in State Procurement as Suppliers

Nº	Primary OKVED	Number of Enterprises
1	20.51 – Manufacture of explosives	29
2	25.4 – Manufacture of weapons and ammunition	65
3	26.70.5 – Manufacture of lenses, optical microscopes, binoculars, and telescopes	2
4	30.30.3 – Manufacture of helicopters, airplanes, and other aircraft	15
5	30.30.5 – Manufacture of parts and accessories for aircraft and spacecraft	26
6	30.30.6 – Manufacture of unmanned aerial systems	3
7	30.4 – Manufacture of military fighting vehicles	5

These 145 enterprises exhibit two main indicators of belonging to the military-industrial complex (MIC): the first - a primary MIC-related OKVED code, and the second – participation in the state procurement system as suppliers. They are active, possess the necessary licenses, produce military goods, and their products are purchased by the state.

The presence of additional MIC-related OKVED codes may indicate that an enterprise is involved in the supply chain for military production, manufacturing components, assemblies, or equipment for the development and assembly of final military products. Such enterprises should not be overlooked in the implementation of sanctions policy.

Production of Unmanned Aerial Vehicles (UAVs)

Since the start of the full-scale invasion of Ukraine, the Russian Federation has managed to significantly increase the production of weapons and military equipment. Yet, even against the backdrop of this broader expansion, **the growth in the production of various types of unmanned aerial vehicles (UAVs) is particularly striking.**

Production of reconnaissance, strike, and other types of drones has increased dozens of times. This section examines how Russia has achieved such results in UAV manufacturing.

UAVs are classified according to several characteristics:

- **By design type:** fixed-wing, helicopter-type, multicopter (multicopters), or hybrid;
- **By purpose:** reconnaissance, strike, loitering munitions (kamikaze drones), medical, etc.;
- **By takeoff weight:** micro, mini, light, medium, medium-heavy, heavy;
- **By range:** short, medium, or long range.

They also differ in terms of **flight altitude and duration, engine type, and control system.**

Given the complexity and scale of production, the takeoff weight is a key characteristic for classifying UAV manufacturers.

Micro, mini, light, and medium UAVs can be produced by micro, small, and medium-sized enterprises, while medium-heavy and heavy UAVs are primarily produced by large enterprises.

Open-source data identified 231 UAV manufacturing enterprises.

Of these, 59 are large enterprises that do not belong to the register of small and medium-sized businesses (MSP) - representing 27% of all UAV manufacturers. It is highly likely that these companies produce medium, medium-heavy, and heavy UAVs of various types.

The expansion of these categories is being driven by centralized state funding and government programs aimed at increasing UAV production volumes.

The situation is different for micro, mini, light, and medium UAV producers - there are 172 such enterprises, or 73% of the total. All of them are listed in the MSP register.

Under Russian law, the MSP register is maintained automatically by the tax authorities, updated on the 10th day of each month.

Companies are added automatically based on their tax reports and are removed if they no longer meet the criteria.

At registration, an enterprise automatically receives the status of a microenterprise, as its income is not yet known.

Enterprises benefit from being in the MSP register, as the state provides support for small and medium-sized businesses - including tax benefits, grants, preferential loans, and favorable lease terms for state property.

Enterprises in the register may have one of three statuses:

- Microenterprise: 0 – 15 employees, annual revenue up to 120 million rubles.

- Small enterprise: 16 – 100 employees, annual revenue up to 800 million rubles.
- Medium enterprise: 101 – 250 employees, annual revenue up to 2 billion rubles.

Only employees under official labor contracts are counted.

If a company reports income above its category threshold, its status is automatically upgraded.

The drastic increase in UAV production after 2022 is explained by the surge in the number of UAV manufacturers:

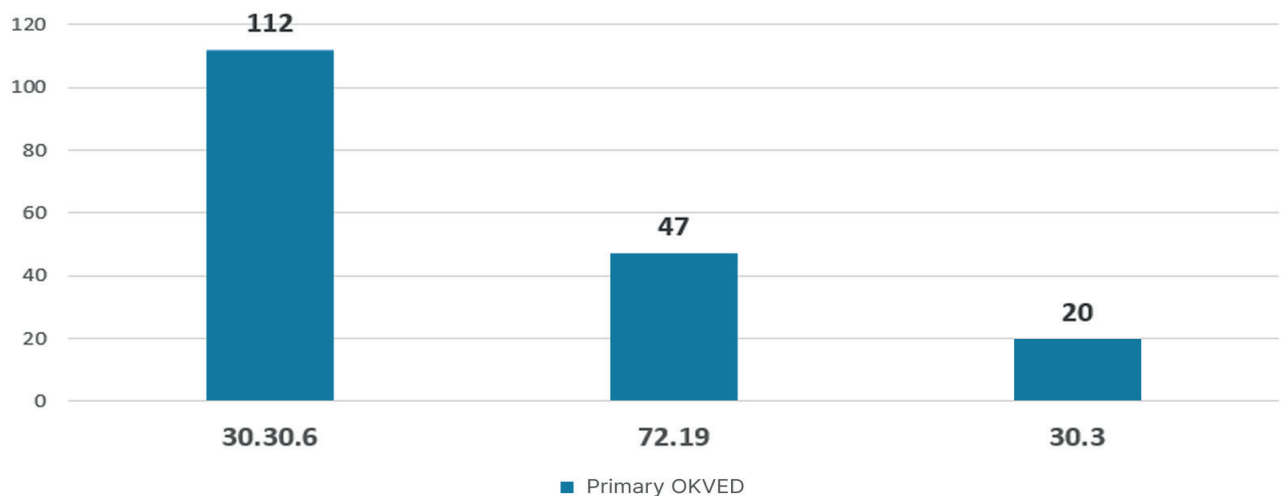
From 1992 to 2021 (30 years), 122 enterprises were established or reprofiled – 51% of the total identified.

From 2022 to 2025, 115 enterprises were founded – 49% of the total.

On average, from 1992 - 2022, 4 enterprises per year were established or reprofiled for UAV production.

From 2022 – 2025, that number jumped to 32 per year – an eightfold increase, which has led to a corresponding sharp rise in the production of UAVs of all types.

Diagram 1. **Top 3 Primary OKVED Codes of UAV Manufacturing Enterprises**



The top three primary OKVED codes of UAV manufacturers account for 75% of all UAV-producing enterprises:

- 30.30.6 – Manufacture of unmanned aerial systems
- 72.19 – Other research and experimental development in natural and technical sciences
- 30.3 – Manufacture of aircraft, including spacecraft, and related equipment

Of these top three OKVEDs, two belong to the military-industrial complex (MIC) category (30.30.6 and 30.3).

A significant number of legal entities in this list have the primary OKVED 72.19 – Research and development in the field of natural and technical sciences, which demonstrates how systematically Russia approaches the UAV problem, which emerged suddenly during the war.

The aggressor seeks to achieve mass production of UAVs and ensure high quality by leveraging scientific capacity at the stages of technical development and design.

Among the identified UAV manufacturing enterprises, 69 are under sanctions – 30% of the total, while 162 remain unsanctioned, making up 70%.

Preliminary conclusions:

- The emergence of new UAV manufacturers and their transition to large-enterprise status should be monitored closely. Once this transition occurs, such enterprises must come under scrutiny and be subject to sanctions.
- Micro and small enterprises participating in the state procurement system warrant special attention. Their participation implies additional reporting requirements, which represent a heavy administrative burden – meaning there must be a serious reason for their

involvement, most likely state interest in their production.

- None of the enterprises from the MSP register are listed in the official 2015 Defense Industry Register, meaning they are not officially part of Russia's MIC. However, these companies may produce critical components for the MIC while using their MSP status to conceal this affiliation, including from sanctions. Participation of an MSP-registered enterprise in state procurement can thus serve as an indicator of its connection to the MIC.

Conclusions

Summing up the material in the previous section, the following conclusions can be drawn.

The Russian military-industrial complex (MIC) consists of:

- enterprises that produce final military products and are registered in the MIC Register;
- enterprises that produce final military products but are not registered in the Russian MIC Register;
- enterprises that produce components, equipment, devices, etc. for final military products and are not registered in the MIC Register.

Thus, **the Russian MIC is not limited to the official MIC Register** – it is substantially broader. The implementation of sanctions policy cannot rely solely on

the MIC Register because a large number of enterprises directly involved in military production would remain outside its scope.

In addition to the legal entities identified by the methodology described above, there is a significant number of supplier enterprises for final military manufacturers. In most cases, such suppliers do not have military OKVED codes, are not included in the MIC Register, and do not participate in the public procurement system as suppliers. Typically, these enterprises interact directly with military producers in the supply chains of components or raw materials.

As an example, consider the limited liability company “[Scientific-Production Enterprise ‘Antares’](#)”, EDRN:

1026402660250, located in Saratov. Its primary OKVED is 72.19 – Other research and experimental development in natural and technical sciences. Its three additional OKVEDs do not include any of the 13 MIC OKVED codes and do not indicate that Antares engages in space activities. Nevertheless, the enterprise develops engines for satellites, positioning and satellite control systems. Its revenue for 2024 was 251.9 million rubles.

The enterprise is not a participant in the public procurement system as a supplier; its products are supplied directly to partners. Antares's main partners are JSC Rocket-Space Center "Progress" and JSC NPK "Monitoring Space Systems, Information-Control Systems and Electromechanical Complexes" named after Iosifyan, both of which belong to the MIC and were identified according to the methodology described above.

Although Antares does not have MIC OKVED codes, it holds licenses from Russian authorities for the production, development, repair, testing, disposal, and storage of weapons, military equipment, and ammunition. The company also holds a license from the state

corporation Roscosmos for conducting space activities.

Antares is subject only to US sanctions; as of February 2025, other countries – including Ukraine – have not imposed sanctions on Antares.

This example demonstrates that identified end-product manufacturers of weapons, military equipment, and ammunition have suppliers of key components whose production activities Russia attempts to conceal and to make as difficult as possible to detect and sanction. One element of an effective sanctions policy must therefore be the identification and exposure of suppliers of key components to final weapons and military equipment producers, in order to maximally constrain their production capabilities.

Chapter 2

Ukraine's Sanctions Policy Toward the Military-Industrial Complex (MIC) of the Russian Federation

This section analyzes how sanctions affect military-industrial complex (MIC) enterprises and reviews Ukraine's sanctions policy across two periods — **2015–2021** and **2022–2024** — taking into account both its quantitative and qualitative aspects.

General Overview of Sanctions Policy

Of the **1,701 identified legal entities** with signs of affiliation to the MIC, **585 enterprises (or 34%)** have been sanctioned — a relatively low coverage rate.

In total, **8,543 individual sanctions** have been imposed against these 585 enterprises through presidential decrees issued over various years.

By time period, the sanctions are divided into two main phases:

- **2015 — 2021:** sanctions with terms of 1 or 3 years,
- **from 2022 onward:** sanctions with terms of 3, 5, 10 years, or indefinite duration.

The **1,701 legal entities** with MIC-related indicators can be grouped as follows:

- **Group 1:** Legal entities included in the **2015 Defense Industry Register** — 412 entities.
- **Group 2:** Legal entities **not**

included in the 2015 Register but producing **final military products** (one of the 13 MIC OKVEDs as primary) — 145 entities.

- **Group 3:** Legal entities **not included** in the 2015 Register but producing **components** (with several additional MIC OKVEDs) — 218 entities.
- **Group 4:** Legal entities with **indirect signs** of belonging to the MIC (only one additional MIC OKVED) — 926 entities.

Group 1. Entities Included in the 2015 Defense Industry Register.

The **highest priority** in sanctions policy should be given to **Group 1** — the **412 enterprises** with confirmed MIC affiliation.

All enterprises in this group should be under sanctions.

According to the processed data,

341 entities (83%) in this group are under sanctions, while **71 entities (17%)** remain **unsanctioned**, despite their affiliation being **officially documented by Russia** in a register that has been publicly available for 10 years.

Within Group 1, a **subgroup of large enterprises** was identified, totaling **197 entities**, each supplying products to the state worth **over 1 billion rubles**.

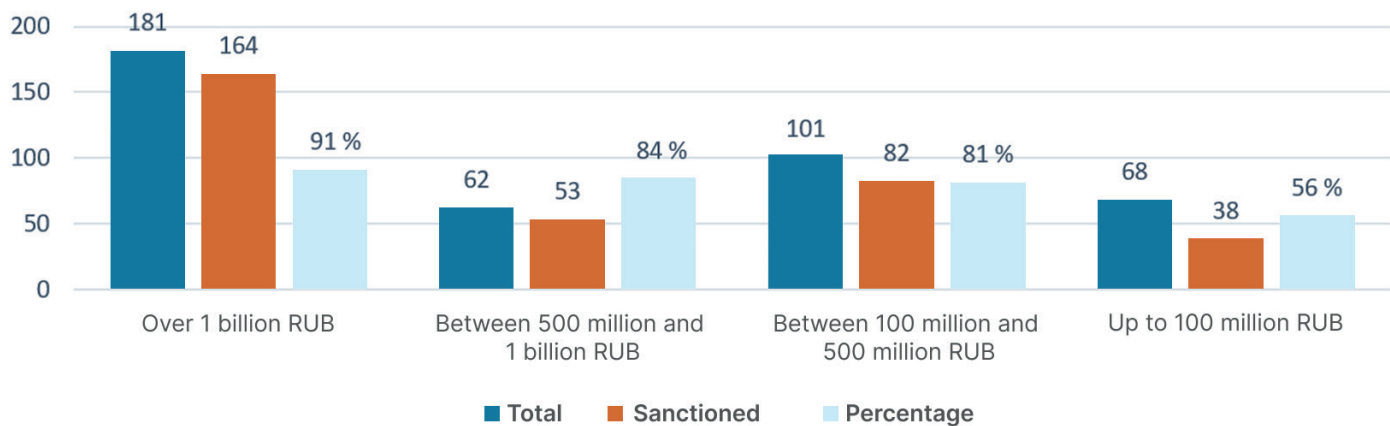
Of these, **180 (91%)** are under sanctions, yet **continue active operations**, demonstrating the **ineffectiveness of current sanctions**.

Among the **71 unsanctioned enterprises, 17 (23%)** are large suppliers (contracts worth **1 billion rubles or more**).

Group 1 can be **nominally divided into four subgroups based on the volume of state defense procurement contracts**:

- Suppliers with contracts **over 1 billion rubles**;
- Suppliers with contracts **from 500 million to 1 billion rubles**;
- Suppliers with contracts **from 100 million to 500 million rubles**;
- Suppliers with contracts **under 100 million rubles**.

Diagram 2. **Nominal Distribution by Subgroups of Legal Entities Included in the 2015 Defense Industry Register**



Group 2. Legal Entities Not Included in the 2015 Defense Industry Register but Producing Military Products.

Out of 145 entities in this group, only **54 (37%)** are under sanctions, while **91 (63%)** remain unaffected.

Based on the available data, **Group 2 – manufacturers of military products – largely remains outside the focus of sanctions policy.**

Group 3. Legal Entities Not Included in the 2015 Defense Industry Register but Producing Components.

Out of 218 entities in this group,

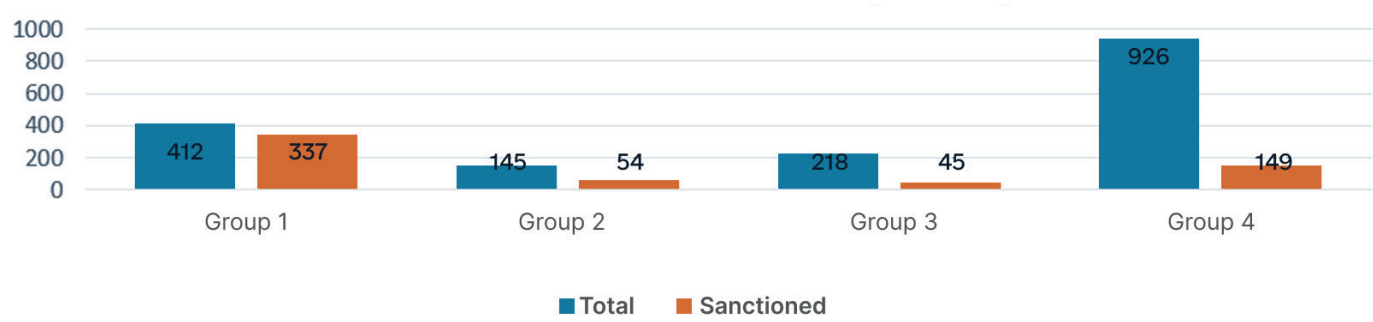
45 (21%) are under sanctions, while **173 (79%)** are not.

The list of 218 enterprises requires **further analysis** to determine grounds for imposing sanctions on these entities.

Group 4. Legal Entities with Indirect Signs of Affiliation with the MIC.

Among 926 entities in this group, **149 (16%)** are under sanctions and **777 (84%)** are not.

Diagram 3. **Intensity of Sanctions Impact Across Identified MIC Groups**



The presented data indicate **insufficient sanctions coverage** of enterprises that belong or are likely to belong to the **military-industrial complex (MIC)**.

Enterprises in **Groups 1 and 2** should be **fully covered by sanctions**, as they are **direct producers of weapons and military equipment**.

Regarding **Groups 3 and 4**, it is necessary to **conduct a detailed analysis** of their activities to determine whether they **supply components** to enterprises from Groups 1 and 2. Identified **key nodes within their corporate structures** should become the **targets of focused sanctions measures**.

To assess sanctions coverage of MIC-related legal entities by **economic sectors**, an analysis was conducted of the **number of sanctioned enterprises**

that have **MIC-related OKVED codes** as either **primary or additional**. The analysis showed that the **number of entities with additional MIC-related OKVEDs** exceeds those with the same code as the primary one by a factor of **7–8**. At the same time, the **percentage of sanctioned entities** with additional OKVEDs is **two to three times lower** than among those with the same OKVED as primary.

As an example, data are provided for the three main OKVED codes:

- **25.4 – Manufacture of weapons and ammunition;**
- **30.40 – Manufacture of military fighting vehicles;**
- **20.51 – Manufacture of explosives.**

Table 9. **Comparison of Sanctions Coverage for Legal Entities with Primary and Additional MIC-Related OKVEDs**

	Total	Under Sanctions	Percentage
Primary 25.4:	152	109	72%
Additional 25.4:	877	399	45%
Primary 30.40:	10	10	100%
Additional 30.40:	89	29	33%
Primary 20.51:	38	12	32%
Additional 20.51:	268	58	21%

It is natural that enterprises are sanctioned primarily based on their primary OKVED.

Enterprises with additional MIC-related OKVED codes are sanctioned on a residual basis, most likely without considering the presence of military-related OKVEDs as secondary activities.

Corporate connections between

groups of legal entities sharing the same OKVED - whether listed as primary or additional - have not yet been analyzed.

Conducting such an analysis would make it possible to identify key nodes within corporate structures, which in turn would help determine priority areas for sanctions targeting and maximize their effectiveness.

Table 10. **Summary data of the study on the coverage of sanctioned legal entities (LEs) with defense-related OKVED codes:**

Category	Total		Under sanctions		Not under sanctions	
	quantity	%	quantity	%	quantity	%
Enterprises that have one or more defense-related OKVED codes (primary or secondary) and are participants in the public procurement system	1,701	100	585	34	1,116	66

Sanctions Policy of Ukraine Regarding the Russian Federation’s Military-Industrial Complex, 2015 – 2021

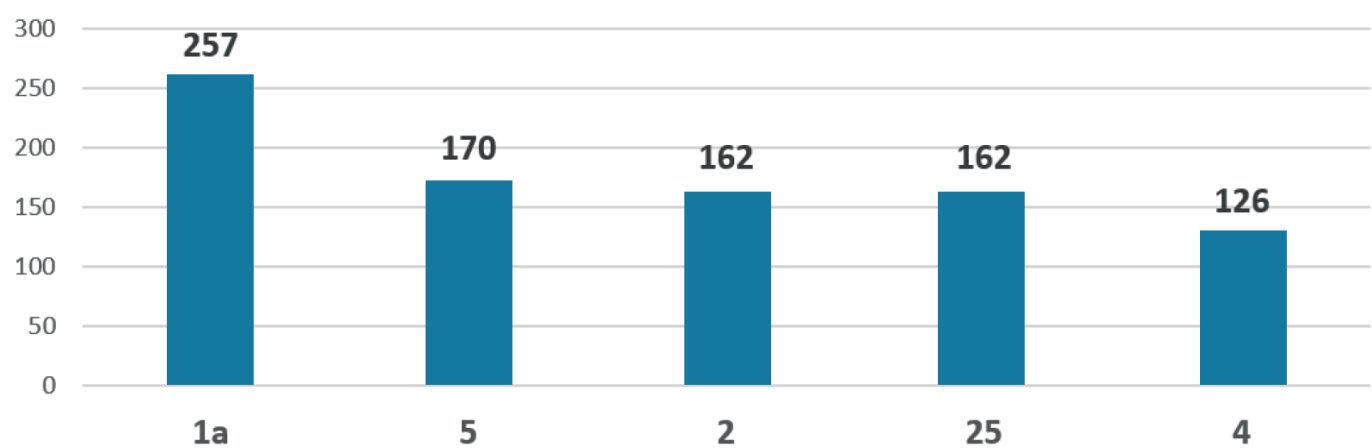
Between 2015 and 2021, **22 types of sanctions out of the 32** defined by the current law were applied. During this period, **1,368 sanctions** were imposed against **91 defense industry enterprises** (out of 585 identified), representing **15% sanctions coverage**.

Of these 91 entities, only **59 were included in the 2015 Defense Industry Register**, which contained a total of **1,353 enterprises** that the aggres-

sor itself had recognized as part of its military-industrial complex by including them in the register.

Out of the 1,368 sanctions imposed, **185 were introduced for a one-year term**, while all others were **for a three-year term**. Such short durations, unlinked to the condition of ending the aggression, appear at the very least **questionable and hardly justified**.

Diagram 4. **Top 5 types of sanctions applied against Russian defense industry enterprises (2015–2021), accounting for over 60% of the total number**

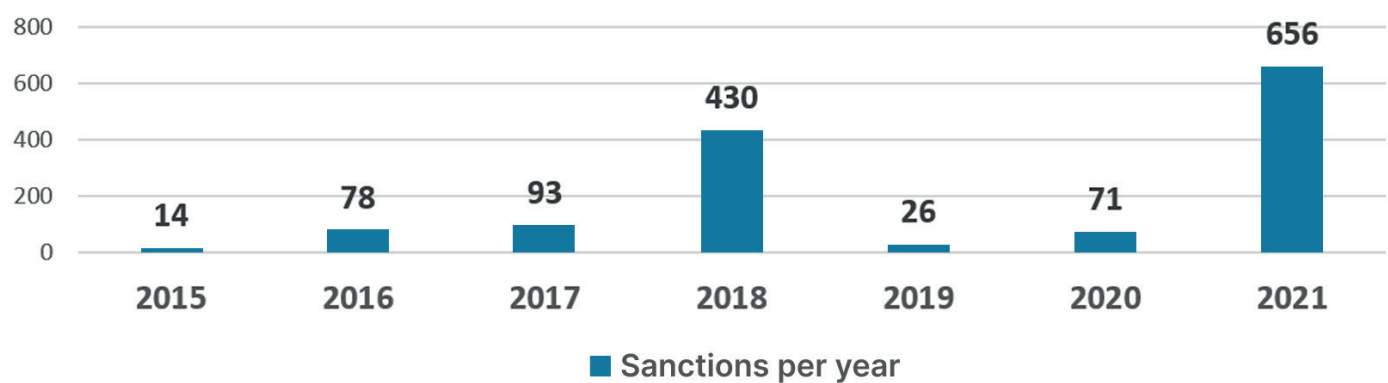


- **1a:** Asset blocking – temporary restriction of a person’s right to use and dispose of their property;
- **5:** Suspension of the fulfillment of economic and financial obligations;
- **2:** Restriction of trade operations;
- **25:** Other sanctions consistent with the principles of their application as established by this Law;
- **4:** Prevention of capital withdrawal beyond Ukraine’s borders.

A large number of sanctions of the same type – exceeding the total number of enterprises against which they were imposed – is explained by the fact that a single enterprise could be subjected to the same type of sanction multiple times under different decrees over a certain period.

The analysis of the available data does not indicate the presence of a **systematic approach** in sanctions policy toward the defense-industrial complex. It appears that enterprises were selected on the principle of being “large and visible” and were included in general sanction lists alongside other organizations not related to the defense sector.

Diagram 5. **Number of sanctions imposed against Russian defense industry enterprises by year**



The increase in the number of sanctions against the defense industry complex was likely driven by the realization that the war was becoming protracted and turning into a war of attrition. Under such conditions, sanctions effectively become a weapon.

At the same time, the growth in the number of sanctions does not indicate a systemic sanctions policy toward the defense industry. A telling example is the sharp decline in sanctions pressure in 2019, which occurred after the change of government in Ukraine following the presidential elections. This points to instability and inconsistency in sanctions policy. It may also reflect attempts by the new administration to reduce tensions in relations. However, these efforts yielded no results, and the trend toward escalation not only persisted but

intensified, leading to an increase in sanctions.

In the year preceding Russia’s full-scale invasion of Ukraine, the level of tension – and consequently, the number of sanctions against the defense industry – reached its peak.

Based on the data presented, Ukraine’s sanctions policy during **2015 – 2021** did not demonstrate a systematic approach to sanctioning Russian defense industry enterprises. These entities were not categorized separately by their affiliation with Russia’s defense sector; instead, sanctions were imposed within general lists that also included enterprises from other industries. As a result, over seven years, only a very small number of defense industry enterprises – **just 91 legal entities** – were subjected to sanctions.

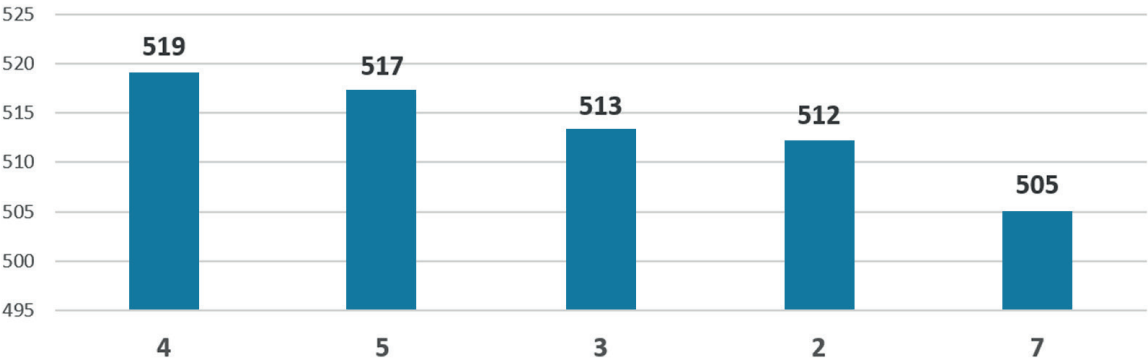
Sanctions Policy of Ukraine Regarding the Russian Federation’s Military-Industrial Complex in 2022 – 2024

Between 2022 and 2024, **27 types of sanctions** out of the **32** defined by current law were applied. Out of a total of **7,056 sanctions**,

- **29** were imposed for a **3-year term**,

- **1,232** for **5 years**,
- **5,728** for **10 years**,
- **54** for **50 years**, and
- **12** were **lifetime sanctions**.

Diagram 6. **Top 5 types of sanctions applied against defense industry enterprises during 2022 – 2024**

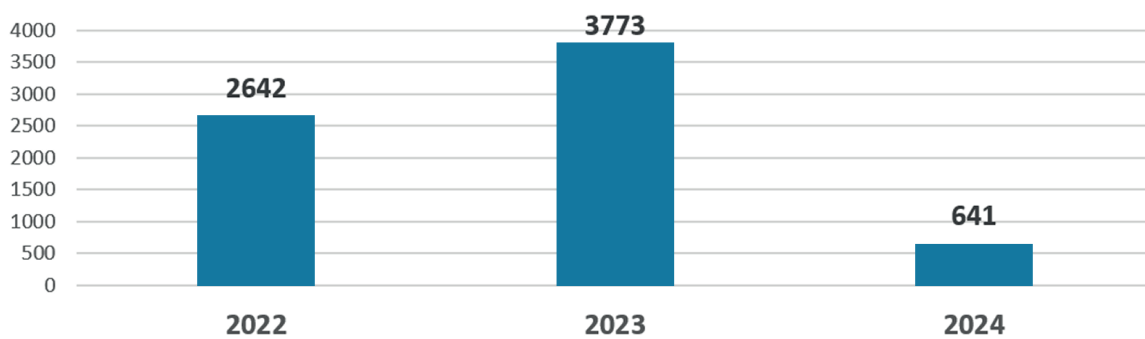


- **4:** Prevention of capital withdrawal beyond Ukraine's borders;
- **5:** Suspension of the fulfillment of economic and financial obligations;
- **3:** Restriction or partial/full suspension of the transit of resources, flights, and transportation through Ukraine's territory;
- **2:** Restriction of trade operations;
- **7:** Prohibition on participation in privatization or leasing of state property by residents of a foreign state, as well as by persons directly or indirectly controlled by such residents or acting in their interests.

Compared with the **Top 5 sanctions** of the **2015 – 2021** period, only **two types** changed: sanctions **3** and **7** appeared in 2022 – 2024, replacing **1a** and **25** that were present in the earlier period.

The duration of sanctions has **increased significantly but not decisively**; they still remain **unlinked to the unconditional requirement of ending aggression and the liberation of occupied territories**.

Diagram 7. **Imposition of sanctions against Russian defense industry enterprises by year**



The decrease in the number of sanctions imposed against defense industry enterprises can be partially explained by the long duration of sanctions introduced in previous years. However, given the overall low level of sanctions coverage among defense industry legal entities, such a decline indicates the absence of a systematic approach to sanctions policy. A significant portion of defense enterprises remains outside sanctions pressure.

The lack of systematization is also evident from the fact that, out of **91 enterprises** sanctioned in **2015 – 2021**, whose sanctions expired before 2022, **14 were not re-sanctioned** even after Russia's full-scale invasion. Among these are **five enterprises** included in the **Defense Industry Register since 2015**.

Table 11. **Defense industry enterprises listed in the 2015 Defense Industry Register that were not sanctioned in 2022 – 2024**

Nº	Enterprise	Supplier value (billion rubles)
1	AO “Electromechanical Plant ‘Lepse’”	1.5
2	AO “Solikamsk Plant ‘Ural’”	1.2
3	OOO “Kazan Plant ‘Elektropribor’”	1
4	AO “Elektroavtomat”	0.185
5	AO “KB Elektropribor”	0.112

It might be assumed that these five enterprises were excluded due to their insignificance or small production scale. However, **three of them supply military products under state defense contracts totaling over 1 billion rubles,** which challenges that assumption.

Current state of the Russian military-industrial complex (based on open sources)

Since the start of the full-scale invasion, media reports have described an expansion of military production in the Russian Federation, the conversion of its economy to military rails, and the strengthening and enlargement of the military-industrial complex (MIC). Media accounts – especially Russian outlets – report increases in production of combat vehicles, ammunition, missiles, and other weapons.

According to the Kiel Institute for the World Economy¹ (Germany), in 2024 the Russian MIC succeeded in multiplying its output of combat equipment despite Western sanctions. The table below shows output of main types of weaponry from Q4 2022 through 2024 compared with pre-2022 levels.

Table 12. **Volumes of production of main types of weapons and military equipment (open-source data)**

Type of equipment	Pre-2022 / 2022–2024 (per quarter)	Pre-2022 / 2022–2024 (per month)	Increase (times)
Tanks	123/387	41/129	3.0
Armored fighting vehicles (AFVs)	585/1509	195/503	2.5

¹https://www.ifw-kiel.de/fileadmin/Dateiverwaltung/IfW-Publications/fis-import/1f9c7f5f-15d2-45c4-8b85-9bb550cd449d-Kiel_Report_no1.pdf

Type of equipment	Pre-2022 / 2022–2024 (per quarter)	Pre-2022 / 2022–2024 (per month)	Increase (times)
Artillery systems	45/112	15/37	2.5
Short-range air defence (SHORAD)	9/38	3/12	4.0
Medium & long-range air defence	6/12	2/4	2.0

About 80% of tanks and AFVs produced by the Russian MIC are refurbished vehicles taken from storage depots. On average, the Russian MIC manufactures 25 new tanks and 100 new AFVs per month. Thus, production volumes for these categories depend directly on the availability of suitable hulls and units in storage.

Open-source reports estimate up to **4,000 tanks** of various modifications (T-55A, T-62M/MV, T-72/A/B, T-80B/BV/U, T-90/A) in storage. At the current pace of production and refurbishment (roughly **1,500 tanks per year**), Russia has enough tanks in storage for about **2.5 years** of refurbishment. After storage stocks are exhausted, annual tank production would fall to around **300 per year**.

There are about **5,100 AFVs** of various types in storage (BMP-1/2, MT-LB, BTR-60/70). At current production and refurbishment rates (approximately **6,000 AFVs per year** – note: this figure appears inconsistent with the storage total and may reflect combined output and refurbishment), storage stocks of AFVs would be depleted by the end of **2025** – i.e., in less than a year. After depletion, AFV production could fall to **1,000 per year**.

Therefore, Russian leadership already faces an urgent question of expanding

tank-building capacity.

More than **10,000 artillery systems** are in storage: roughly **3,600 self-propelled artillery (SPGs)** and about **6,800 towed guns**. Given current annual production rates, these artillery reserves appear sufficient.

Russia’s access to Western high-technology components for weapons has not effectively ceased despite sanctions. Components from the U.S., European countries, and Taiwan have been found among parts recovered from downed drones and missiles – evidence of effective sanction-evasion channels. In addition, Russia actively purchases dual-use goods that are formally not sanctioned but can be used to manufacture weaponry.

Russian media report that the MIC is not only refurbishing stored equipment but also producing entirely new advanced weapon systems (strategic bombers, interceptors, short- and medium-range missiles, etc.). Examples reported include:

- Deep modernization of the strategic bomber Tu-160 to Tu-160M and the start of production of the new Tu-160M2. Russian media claim that by 2027 the Aerospace Forces will receive 15 Tu-160M and 10 Tu-160M2 aircraft.

- The first flight of the next-generation high-altitude interceptor MiG-41 (6th generation) is expected in 2025 to replace the MiG-31. The MiG-41 is reportedly to be equipped with laser and advanced electromagnetic weapons intended to counter swarms of UAVs.
- The tactical rocket armaments enterprise is developing 3-ton and 5-ton free-fall bombs (FAB). The 3-ton FAB will be a gliding, guided munition with improved guidance.
- The same enterprise is preparing serial production of the Grom E1 – a rocket/air-bomb hybrid with satellite guidance. Tested in Syria and in Ukraine (Kharkiv), it reportedly has a range of 120 km and is intended for Su-57 and MiG-35 fighter-bombers.

Rostec corporation presented several new systems:

- 57-mm air-defence/artillery system “Derivation-PVO” to replace older systems such as the Shilka and Tunguska;
- 2S42 “Lotus” SPG for airborne forces to replace older models;
- TOC-3 “Dragon”, a heavy flame-thrower MLRS with extended range up to 18 km.

A small missile ship “Karakurt” (capable of striking with Oniks and Kalibr missiles) is being prepared; 27 Karakurt-class ships are planned for the Russian Navy.

In 2024 a new hypersonic missile “Oreshnik” (non-nuclear variant) was tested (used to strike the Pivdenmash enterprise in Dnipro). It is reported to have **six warheads** that separate in the terminal phase and cannot be intercepted by existing air-defence systems.

From the above, one can conclude that sanctions imposed by Ukraine and partners are insufficient or ineffective. The Russian MIC is growing both quantitatively and qualitatively, solves shortages of critical components via sanction-evasion, and receives increased state financing. Despite active combat operations in Ukraine, the Russian MIC has capacity not only to restore lost equipment but also to pursue advanced development of new weapon types.

Chapter 3

Sanctions Policy of Ukraine's Partners Toward Russia's Military-Industrial Complex

This section briefly reviews the **United Kingdom** toward Russian defense industry entities. **sanctions policies of the United States, the European Union, and the**

U.S. Sanctions Policy Toward Russia's Military-Industrial Complex

The U.S. sanctions mechanism is structured around **sanctions programs**, which consist primarily of **Executive Orders** issued by the President. Each program begins with an initial Executive Order establishing the framework, followed by subsequent orders expanding its scope as needed.

The lists of sanctioned persons under each program are **not static** — individuals and legal entities are added or removed as they meet or cease to meet the program's criteria. Maintenance and updates of these lists are carried out by the **designated federal authority**, typically specified in the initial Executive Order of the program.

As of now, two main U.S. sanctions programs target Russia in connection with its war against Ukraine:

- **"Ukraine–Russia"** program;
- **"Harmful Foreign Activities of the Russian Federation"** program.

Together, these programs sanction **3,876 Russian legal entities**.

As of **February 2025**, the "Ukraine–Russia" program includes **seven Executive Orders**, while the "Harmful Foreign Activities" program includes **six**. For practical purposes, the U.S. Department of the Treasury has consolidated the sanction lists from **E.O. 13662** and **E.O. 14024** into a unified **Sectoral Sanctions list**.

Out of the **1,701 Russian defense industry enterprises** identified using the research methodology described earlier, **350** are under U.S. sanctions. Some entities fall under multiple Executive Orders simultaneously. However, the overall coverage of the defense-industrial complex by U.S. sanctions — **only 21%** of all sanctioned legal entities — remains **lower than in Ukraine**.

Table 13. **Distribution of sanctioned Russian defense-industry legal entities (LEs) across U.S. Executive Orders**

Sanctions program	U.S. Executive Orders (E.O.)	Number of Russian defense LEs under U.S. sanctions
Harmful Foreign Activities of the Russian Federation	RUSSIA – E.O. 14024	344
Ukraine – Russia	UKRAINE – E.O. 13661	9
Ukraine – Russia	UKRAINE – E.O. 13662	9
Ukraine – Russia	UKRAINE – E.O. 13685	1

Of the **350** Russian defense LEs sanctioned by the United States, **340** were also sanctioned (or maintained) by **Ukraine**, which represents a high level of synchronization of Ukraine’s sanctions policy with the U.S. (**≈97%**).

Conversely, because **Ukraine** has sanctioned **597** legal entities in total, the **340** “shared sanctions” indicate a considerably lower synchronization rate on the U.S. side – roughly **57%**.

Analysis of U.S.-sanctioned Russian legal entities by primary and secondary

OKVED codes (defense industry activity codes) shows the following priorities in U.S. targeting (share of all LEs with the given OKVED as primary or secondary):

- **30.30.43 – Production of launch vehicles (rockets): 48%;**
- **30.30.32 – Aircraft manufacture: 45%;**
- **30.30.3 – Manufacture of helicopters, airplanes and other flying vehicles: 28%;**
- **25.4 – Manufacture of weapons and ammunition: 27%.**

EU Sanctions Policy Toward Russia’s Military-Industrial Complex

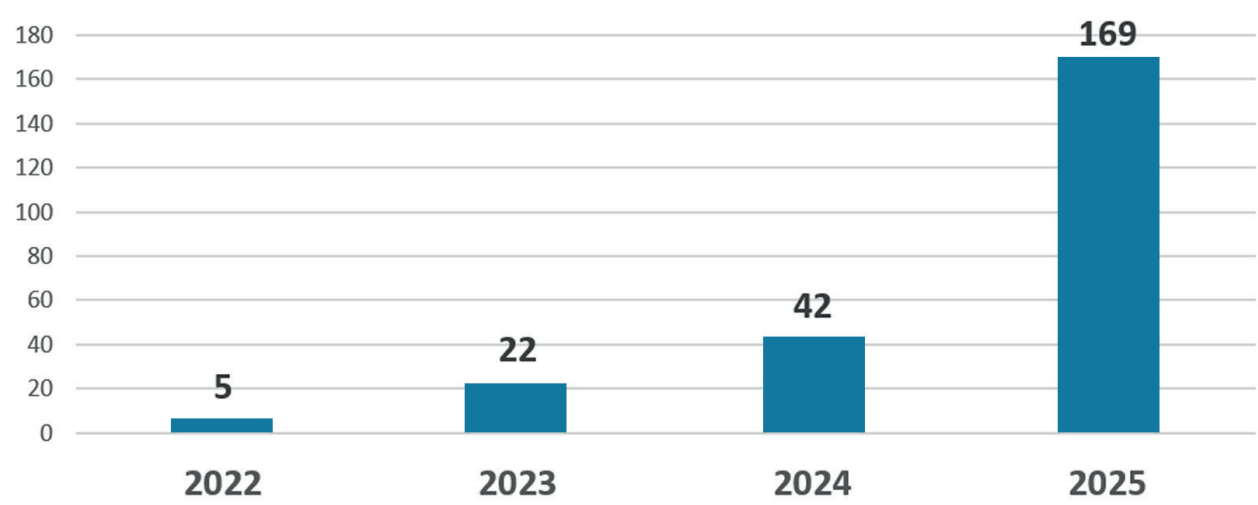
The **European Union** imposes sanctions on Russian individuals and legal entities through **sanctions packages** approved by the **Council of the EU**, based on the consensus of all EU Member States. EU sanctions are **dynamic** – their scope and content may change depending on the evolving situation and Member States’ positions.

The mechanism for imposing sanctions packages against Russian indi-

viduals and entities operates through **sanctions regulations**, which are adopted throughout the year. Under these regulations, a total of **1,076 Russian legal entities** have been sanctioned.

Sanctions specifically targeting the **Russian military-industrial complex (MIC)** began to be introduced in **2022**, following the start of Russia’s full-scale invasion of Ukraine.

Diagram 8. **Number of sanctioned Russian defense industry legal entities by year**



The diagram clearly shows that the **EU sanctions policy** is aimed at **continuously increasing pressure** on Russia’s military-industrial complex (MIC).

Out of **1,701 identified Russian defense industry legal entities**, **238** are under **EU sanctions**, representing only **14%** coverage.

Of these **238 entities**, **235** are also sanctioned by **Ukraine** (“joint sanctions”), indicating a **very high synchronization** rate of **99%** from Ukraine’s side.

However, considering that **Ukraine has sanctioned 585 Russian defense enterprises**, the **235 joint sanctions** represent only **39%** overlap – meaning that synchronization from the **EU side** remains relatively **low**.

Analysis of EU-sanctioned Russian legal entities by **primary and secondary defense-related OKVED codes** highlights the main focus areas of sanctions (as a percentage of all entities with these OKVEDs as primary or secondary):

- **30.30.43 – Production of launch vehicles: 48%**
- **30.30.32 – Production of aircraft: 45%**

- **25.4 – Manufacture of weapons and ammunition: 23%**
- **30.30.3 – Manufacture of helicopters, airplanes, and other aircraft: 22%**

When comparing the orientation of EU and U.S. sanctions policies, there is an **almost complete alignment**, suggesting a **shared strategic vision** between **the United States and the European Union** regarding the key directions of sanctions pressure on Russia’s defense industry.

UK Sanctions Policy Toward Russia's Military-Industrial Complex

The United Kingdom imposes its own sanctions on Russian individuals and legal entities in response to Russia's aggression against Ukraine.

The lists of sanctioned persons and entities are published in the document titled *The Russia (Sanctions) (EU Exit) Regulations 2019*.

A total of **487 Russian legal entities** are included in the UK sanctions list.

Out of **1,701 identified Russian defense industry entities**, **56** are under UK sanctions – representing **11%** coverage.

Unlike the U.S. and EU sanctions lists, the UK list includes **only large defense enterprises**, which appears to be one of the main criteria for sanction inclusion.

Of these **56 enterprises**, **53** are also sanctioned by **Ukraine** (“joint sanctions”),

indicating a **high synchronization rate** of **95%** from Ukraine's side.

However, since Ukraine has sanctioned **585 Russian defense enterprises**, the **joint sanctions** represent only **9%** overlap – meaning the synchronization rate from the **UK side** is **very low**.

Analysis of UK-sanctioned entities by **primary and secondary defense-related OKVED codes** shows that the main focus of sanctions is directed at enterprises classified under:

- **30.30.32 – Aircraft manufacturing, covering 27%** of all entities with this code as a primary or secondary activity.

Conclusions

Ukraine's partner countries impose sanctions against Russian defense-industry legal entities based on their own **criteria, national legislation, and implementation mechanisms**.

There are clear signs of coordination in sanctions policies both among the partners themselves and between partners and Ukraine, particularly:

- Coordination between **the U.S. and the EU**;
- **A high level of Ukrainian alignment** with partner-imposed sanctions.

However, there is **low or very low reciprocal support** for Ukrainian sanctions from partners, which significantly reduces the overall effectiveness of the restrictive measures.

The lack of full synchronization in sanctions policy against Russia's defense-industrial complex creates **loop-holes for circumvention**. For instance, a company sanctioned in Ukraine but not in the EU can still conduct trade through EU countries.

In practice, **Ukrainian sanctions without partner support cannot be**

considered fully effective in most cases.

At the same time, **Ukraine remains the leader** among all partner countries

in the **number of sanctions imposed** against enterprises of the Russian military-industrial complex.

Table 14.

Comparison of the intensity of sanctions impact by Ukraine and its partners on Russia’s military-industrial complex (MIC)

Country	Number of sanctioned Russian defense-industry legal entities	Share compared to Ukraine
Ukraine	585	100%
United States	350	60%
European Union	238	41%
United Kingdom	56	10%

It is evident that interstate communication between Ukraine and its partner countries regarding sanctions policy against Russia’s defense-industrial complex has been highly ineffective.

Sanctions targeting Russia’s MIC have not occupied – and still do not occupy – a central place within the overall sanctions policies of Ukraine and its partners.

Table 15.

Level of priority of Russia’s military-industrial complex (MIC) in the sanctions policy of Ukraine and partner countries (as of August 2025)

Country	Total Russian legal entities under sanctions	Sanctioned MIC entities	Percentage
Ukraine	7,082	585	8%
United States	3,876	350	9%
European Union	1,076	238	22%
United Kingdom	487	56	11%

The types of sanctions imposed by Ukraine and its partner countries against Russian legal entities are broadly similar. They include:

- Asset freezes within the sanctioning country’s jurisdiction;
- Prohibitions for residents on conducting business or trade with sanctioned entities;

- Bans on financial transfers from residents to sanctioned entities, among others.

It is crucial to maintain and intensify sanctions pressure on Russia’s military-industrial complex.

The inclusion of enterprises in Ukraine’s and partner countries’ sanction lists forces the Russian leadership

to respond. When MIC entities fall under sanctions, it creates risks for their Russian and foreign partners of being subjected to secondary sanctions, which is particularly relevant for foreign companies. As a result, Russian authorities are compelled to conceal supply chains and provide additional assurances of “safe cooperation.”

For instance, to hide the conclusion of military contracts after the full-scale invasion of Ukraine, the Russian government decided to classify information about state defense orders for MIC entities. Previously, this data had been publicly available in registries, allowing businesses to navigate the defense procurement market and secure contracts with state defense enterprises.

Another key reason to maintain pressure on Russian defense enterprises is

the impact on Russia’s arms export potential. Before 2022, Russia was the second-largest arms exporter in the world, accounting for about 30% of the global arms market. Arms exports represented a major source of foreign currency revenue for Russia and served as a tool of political influence over partner states.

Sanctions pressure on Russian defense entities plays a significant role in reducing Russia’s export potential. The introduction of sanctions creates secondary sanction risks for Russia’s trade partners and importing companies, leading to cancellations of arms purchases. This, in turn, diminishes Russia’s foreign currency earnings and weakens its political leverage in several regions of the world.

Chapter 4

Ways to Increase the Effectiveness of Sanctions Policy

The Russian MIC includes **over 6,000 legal entities** directly or indirectly involved in the production of military products (by primary or secondary OKVED codes). A large share of these enterprises participates in public procurement. While the figures in this study are not absolutely exact, they are close to reality and correctly reflect general trends in sanctions policy.

To increase the effectiveness of pressure on the Russian MIC, two approaches are possible:

1. Universal sanctions

Impose restrictions on **all** still-unsanctioned legal entities of the MIC.

Cons of this approach:

- Because of the large number of enterprises (and other important sectors that also require sanctions – Rosatom, Rostec, the banking sector, etc.), the total number of subjects would increase critically.
- It is unlikely partners would support the simultaneous imposition of such a massive set of sanctions.
- Monitoring and preventing circumvention schemes would become significantly more difficult.
- Some enterprises are little sensitive to sanctions because their opera-

tions are sustained by Russia's internal resources or support from allies.

Conclusion: A rapid, substantial effect from this approach is unlikely.

2. Precise targeting critical vulnerabilities

Identify **critically vulnerable nodes** in Russia's strategic industries and coordinate targeted sanctions with partners.

Vulnerability is determined by Russia's **critical dependence on imported supplies**. Special attention should be paid to the MIC's dependence on raw materials:

- Large raw-material shipments are harder to conceal than small components.
- For large-scale supplies, logistics itself becomes an additional mechanism for sanctions pressure.

Priority directions for targeted sanctions include:

- **Manganese ore and concentrates** – affects metallurgy broadly and nearly all branches of machine-building; for the MIC, this impacts production of armored vehicles and artillery.
- **Cotton and nitric acid** – influence the production of nitrocellulose (propellants, artillery powders,

explosives) and thus affect manufacture of rockets and all types of ammunition.

- **Raw materials for titanium production** — comprehensive sanctions are difficult because of Western economic dependence on titanium products from Russia. Nevertheless:
 - First, **stop / prevent** the flow of raw materials from Ukraine.

- Second, analyze and identify **critical nodes** in the corporate network of the titanium sector that serve the MIC (for example: ISETSKY FORGE-MECHANICAL PLANT and other metal-working enterprises), and target those points.

Manganese Ores and Concentrates

Russia is critically — almost 100% — dependent on imports of manganese ore, which is essential for smelting special steel grades used in the production of armored vehicles and gun barrels.

According to Russian market analysts, pre-war manganese ore consumption by Russian factories (excluding the COVID-19 pandemic period) amounted to 1.1–1.3 million tons per year, showing a moderate upward trend.

Table 16. **Consumption of manganese ore by the Russian economy**

EXPORT VOLUMES OF MANGANESE ORES TO RUSSIA IN 2017 - 2022						
YEARS	2017	2018	2019	2020	2021	2022
WEIGHT, T	1,067,387	1,318,420	1,081,259	1,189,381	1,394,150	1,500,000

Starting in 2023, Russia classified all statistical data on manganese ore consumption.

The main exporters of manganese ore to Russia have traditionally been countries of the Global South — South Africa, Gabon, and Brazil. Recently, Côte d'Ivoire and Mexico have joined this group. Exports from Kazakhstan (which has direct rail connections to Russia via broad-gauge lines), Georgia, and Turkey are estimated to be insignificant.

In 2023, Russia's total manganese ore imports from all sources were estimat-

ed at 2.05–2.1 million tons — an absolute historical record.

Paradoxically, the vast majority of this strategic raw material was imported through the ports of Ukraine's friendly Baltic countries.

In 2023, imports of manganese ore via this route totaled around 2.0 million tons (over 90%, also a record high).

The suppliers of manganese ore to Russia through Baltic ports were well-known mining companies from African countries and forwarding companies from Latvia and Estonia.

Mining Companies

Deliveries of manganese ore to through Latvian ports by mining Russian consumers were made directly companies.

Table 17. Direct supplies of manganese ore by mining companies to the Russian Federation

VOLUME OF TRANSMISSION OF MANGANESE ORE IN LATVIA PORTS, T						
Period	United Manganese of Kalahari Ltd. (South Africa)	Kudumane Manganese Resources Ltd. (South Africa)	Nouvelle Gabon Mining S.A. (Gabon)	Tiger Plant Mining Ltd. (South Africa)	Ore & Metal Company Ltd. (South Africa)	Total
24.02.2022 - 31.12.2022	162,173	49,673	47,658	0	0	259,505
01.01.2023 - 27.11.2023	243,689	40,848	834	18,635	4,478	308,484
Total 24.02.2022 - 27.11.2023	405,862	90,522	48,492	18,635	4,478	567,989

The largest supplier among the mining companies – by a wide margin – is the United Manganese of Kalahari Ltd., a South African company co-owned by sanctioned Russian oligarch Viktor Vekselberg and the ruling party of South Africa, the African National Congress (ANC).

In less than 11 months of 2023, this

company supplied 243,689 tons of manganese ore to the Russian Federation, and since the start of the full-scale invasion – a total of 405,862 tons.

This occurred despite Vekselberg being under sanctions imposed by the United States, the European Union, the United Kingdom, and Ukraine.

Freight Forwarding Companies of the Baltic States

The study identified six Latvian and one Estonian freight forwarding companies involved in the transportation of manganese ore to Russia:

- **ALPHA SHIPPING COMPANY SIA** – No. 40003231610, Skanstes iela 12, Vidzemes priekšpilsēta, Rīga, LV-1013, Latvia
- **BLC, SIA** – No. 40003695992, Audēju iela 15-4, Rīga, LV-1050, Latvia
- **VENTSPILS TIRDZNIECĪBAS OSTA,**

AS – No. 40003236622, Dzintaru iela 22, Ventspils, LV-3602, Latvia

- **LDZ Loģistika SIA** – No. 40003988480, Dzirnavu iela 147 k-2, Rīga, LV-1050, Latvia (subsidiary of the state-owned company “Latvijas dzelzceļš”)
- **RĪGAS OGĻU TERMINĀLS, SIA** – No. 40103543661, Eksporta iela 15 k-1, Rīga, LV-1045, Latvia
- **SRR LOGISTICS, SIA** – No.

40103317883, Andrejostas iela 29, Rīga, LV-1045, Latvia

- **SILSTEVE AS** – No. 11130332, Kesktn 2, Sillamäe, Ida-Viru County, 40231, Estonia

Statistical data obtained from the international 52WMB database confirmed

the import, handling, and rail shipment of manganese ore to the Russian Federation exclusively by these Baltic forwarding companies.

The corresponding figures are presented in Table 18.

Table 18. **Supplies of manganese ore imported, processed, and transported by rail to the Russian Federation by freight forwarding companies of the Baltic States**

	THE COUNTRY	LATVIA							ESTONIA	LATVIA+ ESTONIA
	THE COMPANY	VENT SPILS TIRDZNIE CĪB AS OSTA. AS	SRR Logistics, SIA	ALPHA SHIPPING COMPANY, SIA	BLC, SIA	LDZ Loģistika SIA	RĪGAS OGLU TERMINALS, SIA	TOTAL	SILSTEVE AS	
	REGISTRATION NUMBER	Nº 40003236622	Nº 40103317883	Nº 40003231610	Nº 40003695992	Nº 40003988480	Nº 40103543661		Nº 11130332	
WEIGHT, T	PORT	VENT SPILS	RIGA	VENT SPILS	RIGA	RIGA	RIGA		SILLAMAE	
	2022 (324.02)	189,823	155,926	95,955	0	331,571	0	773,274	0	773,274
	2023 (по 27.11)	276,787	0	225,065	398,618	80,972	22,149	1,003,591	375,622	1,379,213
	TOTAL (24.02.2022 - 27.11.2023)	466,610	155,926	321,020	398,618	412,543	22,149	1,776,866	375,622	2,152,487

The export of the largest volumes of manganese ore to Russian metallurgical plants through the ports of Latvia and Estonia during the full-scale Russian aggression against Ukraine was carried out by three Latvian freight forwarding companies:

- VENTSPILS TIRDZNIECĪBAS OSTA, AS (Ventspils Port) – 466,610 tons;
- State-owned LDZ LOGISTIKA SIA (Riga Port) – 412,543 tons;
- BLC, SIA (Riga Port) – 398,618 tons.

In addition, the South African mining company UNITED MANGANESE OF KALAHARI, LTD supplied 405,862 tons of manganese ore to Russia over the same period.

Apart from the “Baltic Corridor,” the supply of manganese ore to the Russian

Federation also took place through Russian ports (including Murmansk), as well as through Georgia and Turkey, which in December 2023 increased exports of manganese ore to Russia to 20,223 tons.

The total volume of manganese ore exported to Russia from these routes in 2023 amounted to only 200–250 thousand tons.

The analysis explains the sharp increase in manganese ore exports to Russia through the ports of the **Baltic States**:

- Long distances and large trans-oceanic volumes of manganese ore shipments from **Africa and South America** to Russia require

the use of **large-capacity PANA-MAX-class vessels** (with a dead-weight of about **50,000 tons** and a draft of around **12 meters**).

- This, in turn, requires **deep-water, ice-free ports** with developed rail infrastructure, available storage areas, and heavy cargo-handling equipment.
- Under the growing pressure of sanctions, few bulk carrier operators were willing to send their vessels directly to Russian ports. Moreover, Russia's deep-water terminals that had previously handled manganese ore (Murmansk, Novorossiysk, Ust-Luga) were largely occupied with **coal exports and other bulk commodities**.
- Under these circumstances, the **only economically viable route** that allowed a sharp increase in manganese ore supplies to Russia – critical for its metallurgy and military-industrial complex – was the **Baltic Corridor**, specifically the ports of **Latvia (Riga, Ventspils, Liepaja)** and **Estonia (Sillamäe)**.
- These ports have long-established logistics chains for handling manganese ore and had recently experienced significant **underutilization**.
- The **railway routes** from Baltic ports to metallurgical plants in central Russia and the Urals also remained **largely unoccupied**.
- A significant share of additional manganese ore transshipment was provided by the **Estonian port of Sillamäe**, which handled **375,622 tons** in less than 11 months of 2023 – **27% of the total volume**.

Research revealed that this port is 50% owned and controlled by Russian businessmen close to Vladimir Putin.

Russia's extensive use of manganese-based steel grades in the production and repair of armored vehicles and artillery systems – combined with the unprecedented growth of manganese ore imports via the Baltic Corridor, on which Russia depends 100% – posed a strategic threat to both Ukraine and the Baltic States.

This situation required an immediate response from Ukraine's leadership and the governments of friendly Baltic nations.

The state of Russia's manganese supply – and the resulting enrichment of the Russian budget and gold reserves through the involvement of Baltic forwarding companies and ports – was assessed as critically dangerous, demanding urgent countermeasures by Ukrainian authorities, Latvian and Estonian governments, as well as media and civil society.

Based on analytical assessment, and considering that blocking the manganese ore flow to Russia through Baltic ports could not be quickly or efficiently compensated via alternative routes, a decision was made to deliver a strategic blow to Russia's metallurgical industry – reducing its military-industrial capacity for producing and repairing heavy combat equipment.

Between December 2023 and March 2024, a set of coordinated measures was developed and implemented to encourage the European Union to adopt a special sanctions package banning the transit of manganese ore through EU territory.

As a result, the European Union, at Latvia's initiative, adopted the 14th sanctions package, which included this ban (Council Regulation (EU) No. 833/2014 of 31 July 2014 on restrictive measures in view of Russia's actions destabilizing the situation in Ukraine).

Given that in 2023 Russia completely classified its customs statistics, it is difficult to accurately determine the current export routes of manganese ore originating from South Africa and South America to the Russian Federation.

However, Russian experts suggest that the new alternative supply routes, bypassing European sanctions, have likely been reoriented toward Chinese ports, followed by rail transport through Kazakhstan, as well as toward Turkey and Iran, with subsequent shipment across the Caspian Sea¹.

The shift to these alternative routes has led to a significant lengthening and increased cost of logistics for

Russian ferroalloy enterprises — adding thousands of kilometers to one-way routes. This has also required the accumulation of larger stockpiles of ore, diverting additional financial resources amid longer cargo turnover times.

The overall estimated increase in logistics costs amounts to hundreds of millions of U.S. dollars annually.

As a result of EU sanctions pressure, Russia suffered a tangible blow; however, over time, its impact began to diminish. The mining and logistics sectors that support the export of manganese ores and concentrates to Russia remain outside the scope of sanctions.

A comprehensive and coordinated sanctions strike by international partners in this area could have enormous negative consequences for the aggressor's metallurgy in general and for the Russian military-industrial complex in particular.

Cotton as an Important Component in the Explosives-Manufacturing Cycle in the Russian Federation

Cotton cellulose and its derivatives (cotton wool and cotton-production waste) are the primary feedstock for producing nitrocellulose and, from that base, solid rocket propellant, propellants for artillery charges, and small-arms ammunition. **Russia cultivates almost no cotton domestically, so the import supply of these raw materials to defense-industry enterprises is of critical importance.** The principal

exporter of these components to Russia is Uzbekistan.

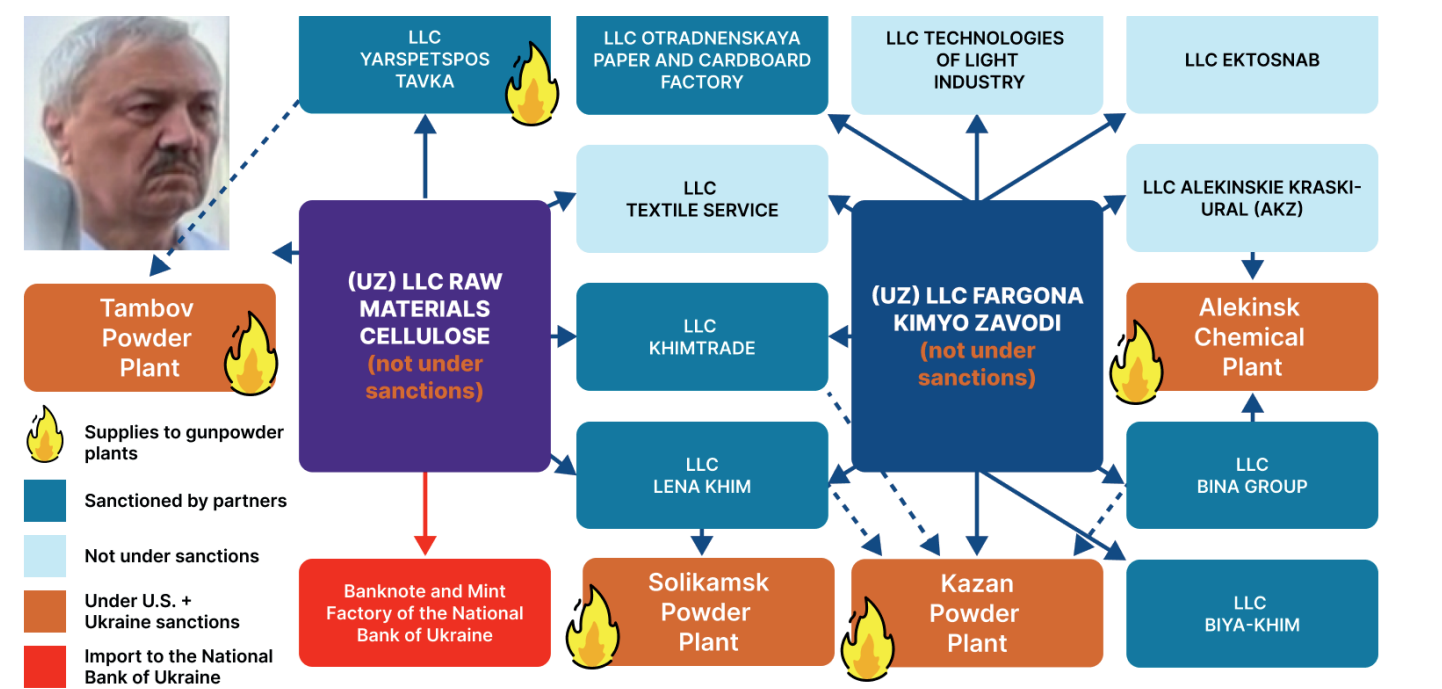
International investigations have disclosed in considerable detail numerous supply schemes delivering cotton cellulose to Russian propellant factories and the decisive role in these schemes played by the Uzbek- and Russian-national Rustam Muminov (there is information that he holds British and Israeli citizenships), together

¹ Source: https://www.prometall.info/analitika/es_zapretil_postavki_margantsevoy_rudy_v_rossiy

with his partner Mykhailo (Mikhail) Hlukhov, who control the production of sheet, loose and rolled cellulose at the Fergana chemical plant (LLC “FARG’ONA KIMYO ZAVODI”) and the Jizzakh chemical plant (LLC “Raw Materials Cellulose”), both producing cotton cellulose.

As a result of analysis of this material using international customs databases, an export scheme of cellulose to Russia by structures associated with R. Muminov for 2022–2024 was compiled.

Figure 1. Documented Export of Cellulose Products by R. Muminov’s Structures to the Russian Federation (2022–2024)



A coordinated sanctions campaign by Ukraine – and, above all, by its partners – targeting Uzbek legal entities that supply cellulose to Russia, as well as direct measures against the key individuals whose companies organize both overt and covert deliveries of this strategic raw material to the Russian MIC, would critically undermine Russia’s ability to continue its aggression.

The vulnerability of these supply schemes is increased by the fact that the individuals behind them hold assets in Western countries.

To succeed, sanctions pressure must be reinforced by diplomatic efforts in this direction – as is appropriate in every case of sanctions implementation.

Dependence of the Military-Industrial Complex on Titanium as a Strategic Resource

The need for a thorough review and reassessment of the current sanctions policy regarding Russia's titanium industry stems from the widespread use of titanium alloy products in Russian military equipment – missiles, aircraft, helicopters, surface ships, submarines, and in nuclear energy, which remains one of the key sources of the Russian Federation's budget and foreign currency revenues.

Russia possesses one of the world's largest titanium ore reserves, accounting for about **14.5% of global deposits**. At the same time, its share in global titanium concentrate production is only **0.03%**. Despite its industrial specialization in titanium manufacturing, Russia is **critically dependent on imported raw materials**, as its own deposits are difficult to access due to complex geological conditions.

Since **2022**, Russia has been trying to address this problem, recognizing its

dependency on external supplies of this strategic material.

In **2023**, consumption of titanium in Russia's aerospace market accounted for **59%** of total national use. Specifically, **over 40%** of titanium products were used in engine production, and **more than 19%** in the construction of aircraft, helicopters, and spacecraft. These figures were presented by **Dmitry Kurochkin**, Head of the Marketing Department of the Russian titanium giant **PJSC VSM-PO-AVISMA Corporation**, during the Titan-2024 conference.

According to customs statistics, between **January and July 2024**, Russia imported titanium and titanium products worth **125,776,725 USD**. The import breakdown was as follows:

- **Synthetic rutile** – 57.34%
- **Titanium ore** – 15.53%
- **Titanium slag** – 10.37%
- **Titanium plates** – 7.15%

Structure of the Russian Titanium Industry

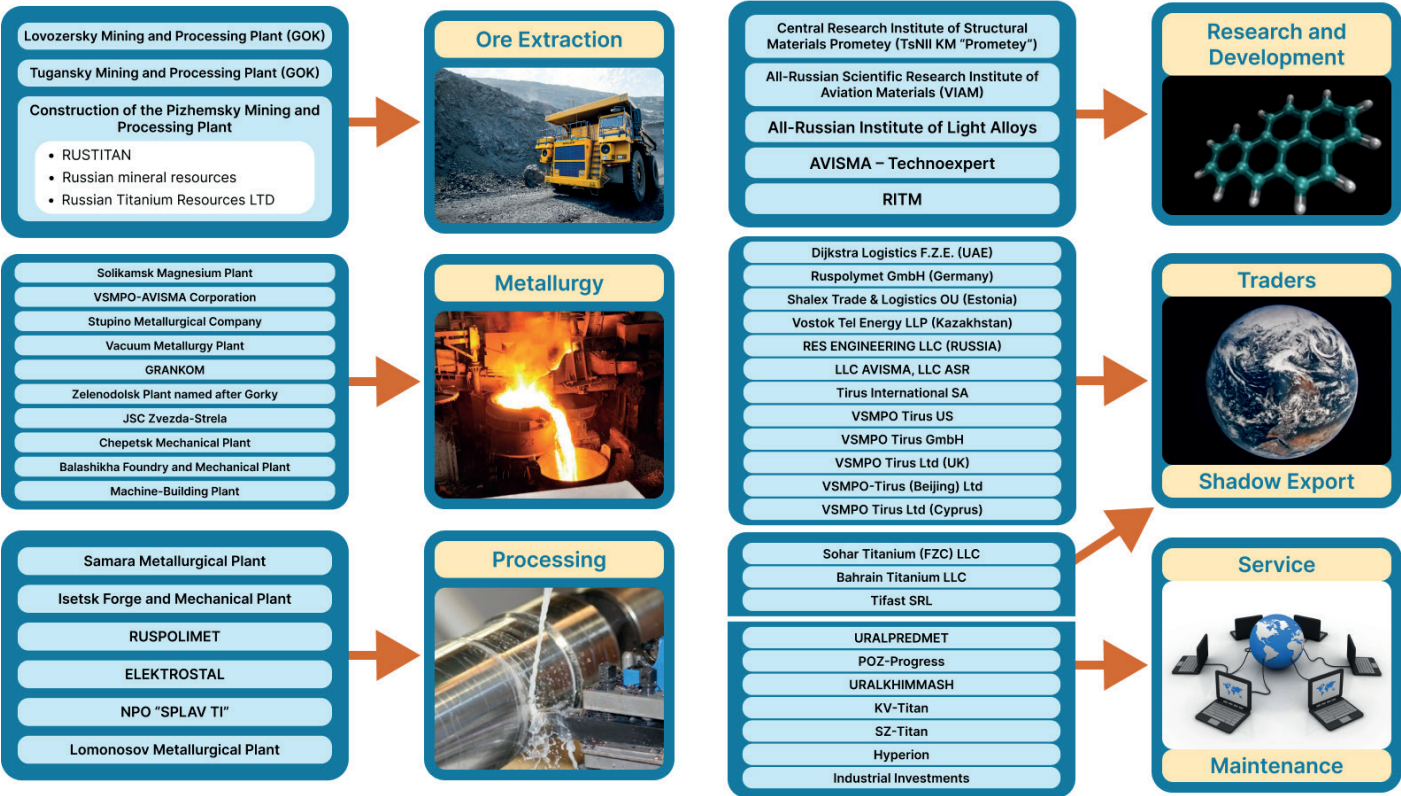
Figure 2 presents the established structure of Russia's titanium sector, comprising 48 identified companies that together cover the full production chain – from raw material extraction and supply to the sale of finished products.

These include both companies specializing primarily in the manufacture of

titanium and titanium-alloy products, as well as large industrial enterprises (mostly defense-oriented) that contain dedicated, well-equipped titanium production units within their structures.

For analytical clarity, the listed companies are grouped into six conditional categories.

Figure 2. **Structure of the Russian Titanium Industry**



Titanium is a critically important resource for the MIC of any advanced country, primarily for the aerospace and missile segments. This is also true for the Russian MIC. As shown above, the Russian titanium sector contains a vulnerable node – a critical dependence on imported raw materials. However, striking the Russian titanium industry by imposing restrictions on raw-material supplies is problematic today.

Decades of deep integration have created a structural dependence of

Western manufacturers of high-technology titanium-alloy products on components and semi-finished goods produced by PJSC VSMPO-AVISMA. That dependence substantially constrains Western partners' willingness to sanction Russian titanium industry enterprises.

It is therefore necessary to look for vulnerable points in the titanium processing chain. One example of a potential leverage point is Isetskiy Forge-Mechanical Plant JSC.

ISETSKIY FORGE-MECHANICAL PLANT (JSC IKMZ)

(OGRN 1176658011298; 624006, Sverdlovsk Region, Sysertsky District, Bolshoy Istok settlement, Kalinina St., 1).

The principal activity of JSC IKMZ is the manufacture of high-value titanium semi-finished products. Its feedstock comprises titanium blanks produced by Stupino Metallurgical Plant JSC and Chepetsk Mechanical Plant JSC. In 2020 IKMZ passed the Interdepartmental

Commission (IVC) accreditation and was accredited by the Kurchatov Institute's Research Center (TsNII KM "Prometey") to produce items made of titanium alloys.

IKMZ supplies products to major Russian defense enterprises such as

the United Shipbuilding Corporation, Russian Helicopters, State Corporation Rosatom, the Turai Machine-Building Design Bureau “Soyuz” (one of Russia’s principal developers of engines for space and defense applications), and the federal state unitary enterprise Production Association “Mayak” – the first industrial facility in Russia’s nuclear sector and a leading enterprise of the country’s nuclear weapons complex.

The plant’s partners also include well-known defense firms such as PJSC Tactical Missile Armament Corporation, PJSC Mechanical Plant named after I. Rumyantsev (MVO), and the Design Bureau of Chemical Automation (KBHA).

After the Russian invasion of Ukraine, the volume of orders for titanium products at IKMZ increased seven to eight-fold. To meet demand, the plant is maximizing use of existing equipment by adding shifts – nights and weekends.

IKMZ is currently completing the first phase of a new factory on the territory of the “Titanium Valley” special economic zone; the second phase is scheduled for completion by the end of 2026. Commissioning the new production facilities will enable the enterprise to multiply output of titanium parts for the defense sector – notably, rolled rings for aircraft engines and cruise-missile engines.

In 2024 the company’s financial indicators rose sharply: revenue increased by **109%** to **1.6 billion rubles**, and net profit rose by **234%** to **101.5 million rubles**.

No sanctions have been imposed by Ukraine or partner countries.

Given IKMZ’s near-monopoly position in producing a narrow but irreplaceable product used by Russian missile and aerospace manufacturers, an effective targeted measure against this plant would inflict a significant blow on those industries and could be expected to halt some of their operations.

The case of Isetskiy Forge-Mechanical Plant illustrates the approach proposed in this study: move from broad, mass sanctions against many legal entities of the MIC toward a model that identifies **critical nodes** in corporate structures and concentrates sanctions pressure precisely on those vulnerable points.

Conclusions

1. Two stages can be distinguished in Ukraine's sanctions policy.

- **Stage 1 (2015–2022 – the period of hybrid aggression):** sanctions policy was largely aimed at countering the aggressor's information influence as part of its information war. Of **3,065** sanctions imposed on legal entities, **2,755** targeted information resources (subdomains), **119** targeted software products, and **68** targeted logos. This policy produced results and helped Ukraine gain the upper hand in the information confrontation. However, the aggressor's military-industrial complex (MIC) remained almost outside sanctions pressure.
- **Stage 2 (February 2022 – September 2025):** **4,017** legal entities were sanctioned, of which **506 (12.8%)** belong to Russia's MIC. Sanctions pressure on the MIC increased but did not achieve decisive effect. Of the **1,701** MIC legal entities identified at the start of the study (February 2025), only **585 (34%)** were under sanctions, while **1,116 (66%)**

remained outside them. **The Russian MIC not only preserved its capacity but expanded its production capabilities.**

2. Ukraine almost fully (≈93–98%) supports sanctions introduced by its partners. Reciprocal support by partners for sanctions initiated by Ukraine remains low **(8% to 56%)**.

3. The share of MIC legal entities among all sanctioned legal entities remains low. As of July 2025, Ukraine had sanctioned 7,082 Russian legal entities in total (some of which were outside the scope of this study, since the study began in February). Only 597 (8%) of these relate to Russia's MIC.

4. Imposing sanctions on all MIC legal entities without prior assessment, combined with blanket sanctioning of other key sectors of Russia's economy, would potentially raise the number of sanctioned entities to tens of thousands. Such scale is unlikely to receive partners' support, and without that support sanctions will not be effective.

Moreover, it would be practically impossible to monitor and block circumvention of such a volume of measures. In effect, this would amount to a trade embargo – feasible only with a broad international coalition or a U.N. decision, which is unlikely in the current geopolitical environment.

5. A decisive increase in the effectiveness of sanctions – one able to compel Russia to cease aggression – lies in coordinated sanctions policy by Ukraine and its partners, focused on those components of Russia's MIC that are critically dependent on strategic imports and cannot be sufficiently substituted by Russia's allies.

6. When implementing such a policy, the following approaches are advisable:

- Designate sanctions on Russia's MIC as a separate sanctions policy stream. Goal: systematic, concentrated sanctions pressure on the MIC and its critical components.
- Identify MIC enterprises and their supplier partners (including those operating outside Russia). Select

for further study the largest enterprises producing strategically important end products (artillery shells, UAVs, missiles, combat vehicles, etc.). Map supply chains for these enterprises – raw materials, key components, equipment, technologies. Apply sanctions pressure to critical nodes in these chains to complicate or disrupt the full cycle of military production and supply.

- Coordinate with partners (primarily the EU and the U.S.) sanctions against specific enterprises. Coordinated sanctioning (simultaneous measures by the EU, U.S., and other partners) against critical nodes and supply chains will cause meaningful disruption to Russia's MIC, up to suspension or significant reduction of production.

7. Investigate and cut off possible routes for supplying critical raw materials for military production to Russia via Ukrainian territory. Terminate transit of critical raw materials across Ukraine to Russia.

Sanctions on Russia's MIC are only one strand of sanctions policy under conditions of full-scale invasion. Achieving reductions in Russia's production of armaments and military hardware is possible only through **systematic, targeted, coordinated** action with partners, focusing specifically on the MIC's critical nodes.

Despite the need to intensify sanctions pressure on Russia's MIC, restrictive measures in other areas should continue – notably against budget-forming sectors of the Russian economy, information resources, software products, oligarchs and their assets, etc.

