

EURO COINS



Content

AUTHENTICITY CONTROL

Design elements	3
1 Common side	3
2 National side	3
3 Edge	3
4 €2 coin. Edge lettering	4
Commemorative and collector coins	5
1 National commemorative coins	5
2 Joint commemorative coins	5
3 Collector coins	5
Technical specifications by denomination	6
Security features. Electromagnetic properties	7
Five-step rule	8/9
Guidelines for identifying genuine euro coins	10
1 General visual appearance	10
2 Coin rotation	10
3 Design consistency	10
4 Magnetism	10
5 Negative micro-dots	10
Guidelines for identifying counterfeit euro coins	11
1 Authenticity check	11
2 Manual verification of coins	11

FITNESS CONTROL

Fit-for-circulation euro coins	13
Coin recirculation	15
1 Coin processing machines	15
2 Manual selection (five-step rule)	16
Annex.	17
1 Legislation	17
2 Links.	17
3 Videos of interest	17

AUTHENTICITY CONTROL

DESIGN ELEMENTS

1 Common side

Coin denomination:

1, 2 and 5 euro cent:

- Image of the European continent against a background bearing the 12 stars of the European Union (EU) flag.

10, 20 and 50 euro cent; €1 and €2:

- Design 1: map of the European Union before its enlargement (EU 15), for coins minted up until 2006.
- Design 2: complete map of Europe, for coins minted from 2007 onwards.



2 National side

Each euro area State chooses the motifs and images on their national side.

They must feature the following elements:

- The 12 stars of the EU flag.
- The year of issuance: since 1999.
- The identification of the issuing country.



Source: ECB website.

3 Edge

1 cent		Edge: Plain
2 cent		Edge: Plain and grooved
5 cent		Edge: Plain
10 cent		Edge: Scalloped
20 cent		Edge: 7 indentations
50 cent		Edge: Scalloped
€1		Edge: Plain/milled
€2		Edge: Milled edge lettered

DESIGN ELEMENTS (cont'd)

4 €2 coin. Edge lettering

Each euro area country has its own inscription on the edge of the €2 coin, with a characteristic lettering along the edge, made up of letters, numbers or symbols, that varies depending on the national side.

The edge lettering and the national side of the coin must match

Country	Edge lettering
Andorra, Belgium, Spain, France, Ireland, Luxembourg, Monaco	2 ★ ★ Ζ ★ ★ 2 ★ ★ Ζ ★ ★ 2 ★ ★ Ζ ★ ★
Austria	2 EURO ★ ★ ★ ОΥΡΕ Ζ ★ ★ ★ 2 EURO ★ ★ ★ ОΥΡΕ Ζ ★ ★ ★
Bulgaria	Б О Ж Е П А З И Б Ъ Л Г А Р И Я •
Cyprus	2 ΕΥΡΩ 2 EURO 2 ΕΥΡΩ 2 EURO
Croatia	O LIJEPA O DRAGA O SLATKA SLOBODO
Estonia	EESTI O I LSEE O
Finland	SUOMI FINLAND 
Germany	EINIGKEIT UND RECHT UND FREIHEIT ☸
Greece	ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ ★
Italy, San Marino, Vatican City	2 ★ Ζ ★ 2 ★ Ζ ★ 2 ★ Ζ ★
Latvia	DIEVS ★ SVĒTĪ ★ LATVIJU ★
Lithuania	LAISVĖ ★ VIENYBĖ ★ GEROVĖ ★
Malta	2 ★ ★ Ζ ★ ★ 2 ★ ★ Ζ ★ ★ 2 ★ ★ Ζ ★ ★
Netherlands	GOD ★ ZIJ ★ MET ★ ONS ★
Portugal	× × × × × × × D D D D D
Slovakia	SLOVENSKÁ REPUBLIKA ★  ★
Slovenia	S L O V E N I J A •

COMMEMORATIVE AND COLLECTOR COINS

1 National commemorative coins

Each country may mint up to two €2 coins per year, with a design different from the usual one, to commemorate people or events. The designs must still show the 12 stars of the European flag, the year of minting and the identification of the issuing country.



They are entered into the CMS2 application as National Series: X

Source: ECB website.

2 Joint commemorative coins

They are issued jointly by all EU Member States. Five issues have been made so far.



2007
50th anniversary of the Treaty of Rome



2009
10th anniversary of the Economic and Monetary Union



2012
10th anniversary of euro banknotes and coins



2015
30th anniversary of the EU flag



2022
35th anniversary of the Erasmus programme

They are entered into the CMS2 application as National Series: Y

Source: ECB website.

3 Collector coins

They are not intended for circulation and are often minted in precious metals, with a face value and design different from coins intended for circulation. They are legal tender only in the issuing country.



TECHNICAL SPECIFICATIONS BY DENOMINATION

Euro coins in circulation are legal tender throughout the EU and have eight denominations. They are produced industrially using specialised machinery, following strict manufacturing standards, to obtain high-quality coins that faithfully reproduce the motifs and engravings.

The built-in security features incorporated into €1 and €2 coins include a sophisticated bimetallic material with an internal three-layer structure.

A unique coin alloy is used for the 10, 20 and 50-cent coins.

Low-denomination coins are made of steel coated with an electrolytic copper layer.

They are entered into the CMS2 application (only for €2, €1 and €0.50) as National Series: A, B, C, etc.

 <p>1.67 mm :  ←-----→ 16.25 mm</p> <p>Colour: ● Red Composition: 🏠 Copper-covered steel Shape: ● Round Weight: 🏠 2.3 g. Edge: 🏠 Plain</p>	 <p>1.67 mm :  ←-----→ 18.75 mm</p> <p>Colour: ● Red Composition: 🏠 Copper-covered steel Shape: ● Round Weight: 🏠 3 g. Edge: 🏠 Plain and grooved</p>	 <p>1.67 mm :  ←-----→ 21.25 mm</p> <p>Colour: ● Red Composition: 🏠 Copper-covered steel Shape: ● Round Weight: 🏠 3.9 g. Edge: 🏠 Plain</p>
 <p>1.93 mm :  ←-----→ 19.75 mm</p> <p>Colour: ● Yellow Composition: 🏠 Nordic gold Shape: ● Round Weight: 🏠 4.1 g. Edge: 🏠 Scalloped</p>	 <p>2.14 mm :  ←-----→ 21.25 mm</p> <p>Colour: ● Yellow Composition: 🏠 Nordic gold Shape: 🏠 Spanish flower Weight: 🏠 5.7 g. Edge: 🏠 7 indentations</p>	 <p>2.38 mm :  ←-----→ 24.25 mm</p> <p>Colour: ● Yellow Composition: 🏠 Nordic gold Shape: ● Round Weight: 🏠 7.8 g. Edge: 🏠 Scalloped</p>
 <p>2.33 mm :  ←-----→ 23.25 mm</p> <p>Colour: ● Outer ring: yellow /Inner part: white Shape: ● Round Edge: 🏠 Alternate plain/milled</p> <p>Composition: 🏠 Outer ring: nickel brass. Inner part: three layers copper-nickel/nickel/copper-nickel Weight: 🏠 7.5 g.</p>	 <p>2.20 mm :  ←-----→ 25.75 mm</p> <p>Colour: ● Outer ring: white /Inner part: yellow Shape: ● Round Edge: 🏠 Milled edge lettered</p> <p>Composition: 🏠 Outer ring: copper-nickel brass/nickel/nickel brass Peso: 🏠 8.5 g.</p>	


SECURITY FEATURES

Electromagnetic properties



Electromagnetic properties

Highly magnetic	No magnetic properties	The three-layer structure in the inner part is slightly magnetic, but the outer ring has no magnetic properties
-----------------	------------------------	---



Composition

Steel coated in electrolytic copper	Nordic gold: unique copper-based coin alloy, difficult to counterfeit	Bimetallic (copper-nickel and nickel brass) with an inner nickel layer, which provides a specific and detectable electromagnetic signal (EMS)
-------------------------------------	---	---

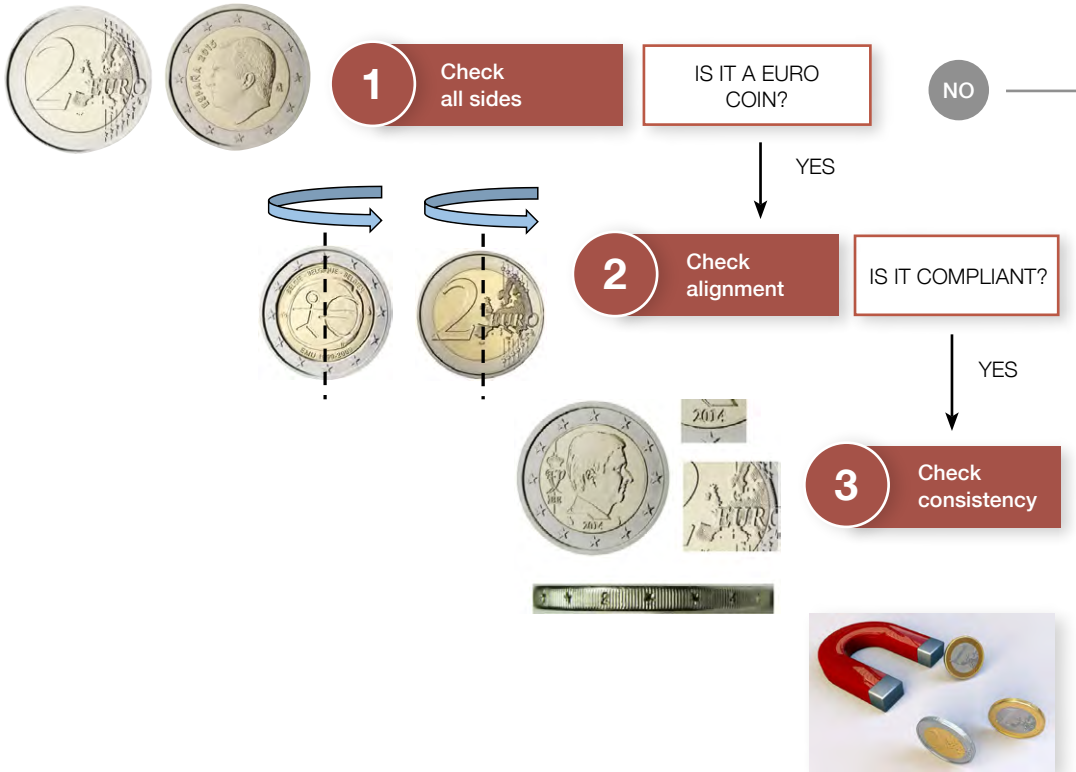
Verification of euro coins

The magnetism of €1 and €2 coins can be checked easily using the magnet supplied by the Banco de España's Cash Department.

For a more detailed analysis, specialised instruments are required, such as a magnifying glass with lighting, a precision scale, a caliper or Vernier gauge, a microscope, a binocular magnifier, a conductivity meter to determine the alloy and a fluxmeter to measure magnetism.

FIVE-STEP RULE

Decision tree: coin rejected three times by the machine

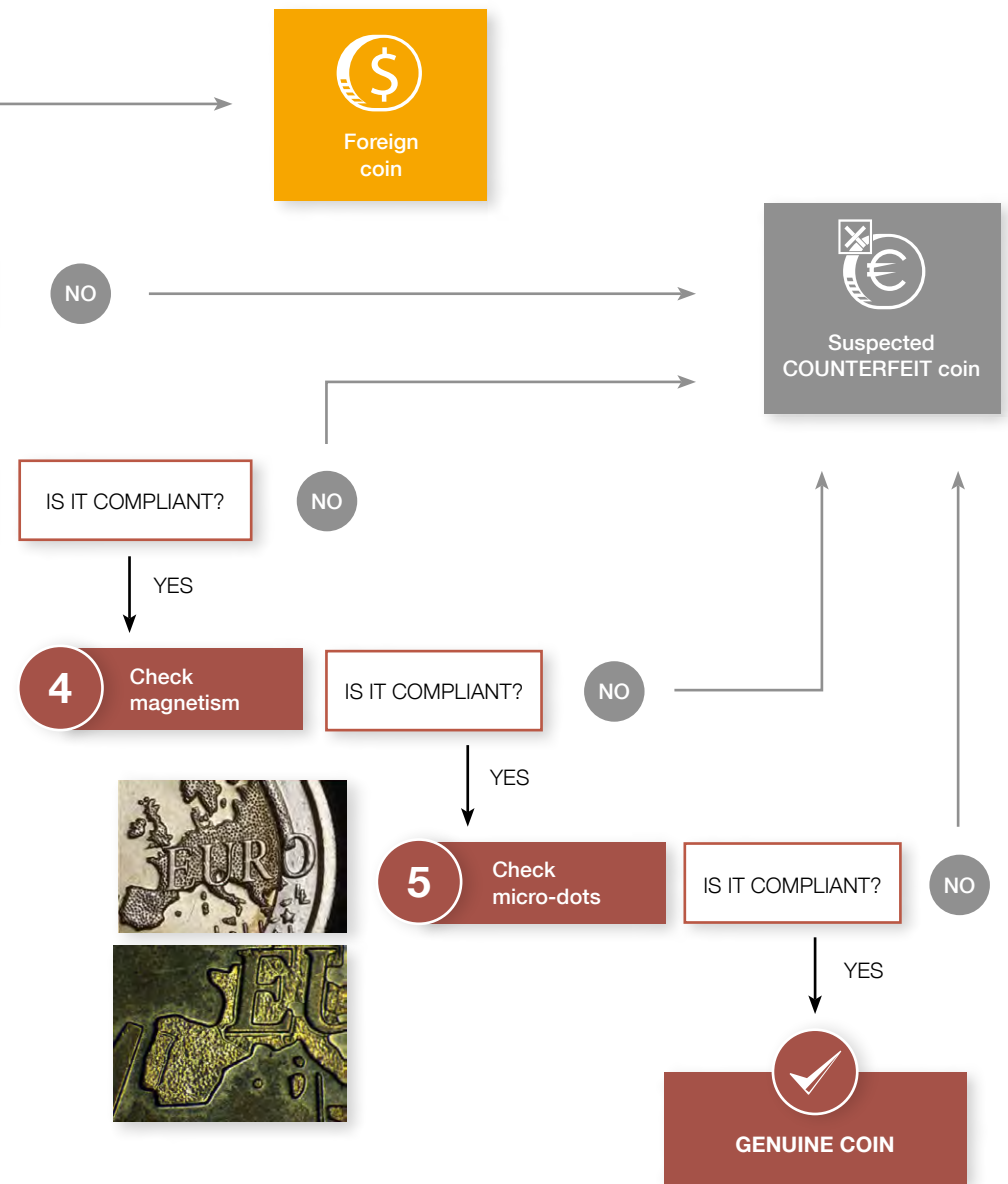


- Become familiar with coins.
- Check several security features.
- Compare with a genuine coin.
- If in doubt, contact the authorities.

<https://www.bde.es/wbe/en/areas-actuacion/billetes-monedas/monedas-euros/>



https://economy-finance.ec.europa.eu/euro/euro-coins-and-notes/euro-coins_en



IS IT COMPLIANT?

YES

4 Check magnetism

IS IT COMPLIANT?

NO



YES

5 Check micro-dots

IS IT COMPLIANT?

NO



YES


GENUINE COIN

GUIDELINES FOR IDENTIFYING GENUINE EURO COINS

1 General visual appearance

The relief of the engravings stands out clearly from the flat areas, as they are perfectly positioned.

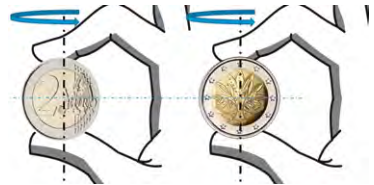
The contrast between the shiny and matte areas is sharp. The relief of the rim is pronounced.

€1 and €2 coins have a two-colour design.



2 Coin rotation

The images on the common side and the national side are aligned at 0 degrees when the coin is flipped along its vertical axis. The image remains upright.



3 Design consistency

The year of minting in the national side must match the design of the European map (EU 15 or full European map).

The edge lettering must also match the national side of the coin.



4 Magnetism

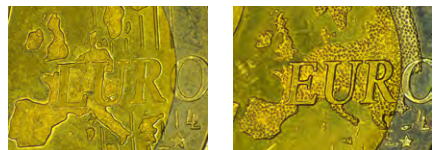
Depending on their denomination, coins behave differently when exposed to a simple magnet:

- 1, 2 and 5-cent coins are strongly attracted to the magnet.
- 10, 20 and 50-cent coins are NOT attracted to the magnet.
- €1 and €2 coins are slightly attracted to the magnet in the centre.



5 Negative micro-dots

The map of Europe is not smooth, but has a negative relief made up of tiny dots.



GUIDELINES FOR IDENTIFYING COUNTERFEIT COINS

1 Authenticity check

It is possible to verify the authenticity of most coins with a basic magnifying glass and a simple magnet. To do this, it is helpful to check several security features and compare the coin with a known genuine one. If in doubt, the coin should be sent to the Coin National Analysis Centre (CNAC) for a more detailed examination.

2 Manual verification of coins

A Visual inspection of the sides and edge



Counterfeit coins can look visually convincing, but their relief is generally too flat and their surface uneven. Engravings may also look distorted. The minting tools used by counterfeiters often have surface defects (in raised and recessed areas) that produce superficial marks and irregularities.



A magnifying glass should be used to verify that the **relief of the engravings on the surface** of the suspected counterfeit coins shows lower definition (as they are produced in a less controlled way and using more rudimentary means than those used for genuine coins), although the definition may sometimes be good enough to make detection by the general public difficult.



Counterfeit €1 and €2 coins may have inaccurate **bi-metal junctions between the inner part and the outer ring**, whereas genuine coins have sharp and fully anchored junctions.



The **edge lettering** of genuine €2 coins is minted in a uniform manner and with good definition, while on counterfeit coins the motifs often look irregular and poorly executed. In 50 cent and €1 coins, the most common defects relate to differences in the milling (in both shape and quantity). If in doubt, the coin should be compared with one you know to be genuine.

GUIDELINES FOR IDENTIFYING COUNTERFEIT COINS (cont'd)

B Assessment of magnetism

€1 and €2 coins

A simple magnet like that provided by the Banco de España's Cash Department is recommended. Three scenarios are considered regarding the rejected coins:



- 1** If the coin is not attracted by the magnet or if it is attracted so strongly that it cannot be shaken off or it is attracted along the edge, it should be submitted to the Banco de España as a **suspected counterfeit coin**.
- 2** If the coin is attracted to the magnet by the centre, not along the edge, in such a way that when we lift the magnet the coin sticks to it, but easily detaches when we shake our hand, then it should be submitted to the Banco de España as a **suspected damaged coin unfit for circulation**.
- 3** However, in some cases this behaviour can indicate that it is a highly sophisticated counterfeit coin. When there is any kind of doubt or the coins appear fit but cannot be identified as genuine at first glance, they are considered **unfit and should be submitted to the Banco de España for analysis and recognition**. Specifically, reassembled and altered pieces shall be considered as such.

Legitimate €1 and €2 euro coins are slightly and uniformly magnetic across their centre when attracted by a simple magnet, but they can also be easily separated from it.

50 cent coins

50 cent coins that have been rejected by the sorting machine but appear fit should be submitted to the Banco de España as suspected **counterfeit coins**.

Euro coins with a face value of 20 cents or less that have been rejected by the sorting machine and are highly damaged (dirty, corroded, mutilated, etc.) or that have been altered to the point that they have been mechanically deformed, should be submitted to the Banco de España as damaged coins.



FITNESS CONTROL

FIT-FOR-CIRCULATION EURO COINS

The prolonged circulation of coins can lead to their gradual deterioration, affecting their characteristics and making them difficult to identify. They are then considered **genuine coins unfit for circulation**. The Banco de España puts new euro coins in circulation to preserve their quality and removes from circulation those that are unfit.

During the coin handling and authentication process, in order to be put back into circulation, coins should be checked not only for being genuine, but also for fitness (Regulation (EU) No 1210/2010). Unfit coins should be removed from circulation to avoid problems in their identification by vending machines and to avoid creating confusion for users and the general public as to their authenticity.

General reimbursement criteria

- As a general rule, the Banco de España shall reimburse or replace genuine euro coins that are damaged and **recognised as such by the machines used for this purpose**.
- However, the Banco de España may **refuse reimbursement** of euro coins unfit for circulation which have been **altered either deliberately or by a process that could be reasonably expected to have the effect of altering them**.
- In general, euro coins that have been subjected to processes such as those applied in **waste incineration plants or metal recycling plants can be considered to have been altered deliberately** and, accordingly, may not be reimbursable.
- Other coins deemed to have been deliberately altered and which are therefore likewise non-reimbursable include those whose deterioration was caused by **intentional mechanical damage or for decorative, artistic or advertising purposes**.
- The Banco de España shall refuse reimbursement of €1 and €2 euro coins whose outer ring has been separated from the core or which appear to have been **reassembled**.



FIT-FOR-CIRCULATION EURO COINS (cont'd)

Most common defects of unfit genuine coins



Dirtiness



Corrosion



Holes



Mutilations



Defective



Deformed



Worn



Coin fragments



Reassembled

Pieces that are clearly identified as **unfit** genuine coins must be submitted to the Banco de España to complete the withdrawal and demonetisation process. **When submitting them, those not susceptible to reimbursement (because they are severely damaged or have been deliberately manipulated) should be separated from those that are (the three bag system).**

Authenticity and fitness checks may sometimes be difficult; coins whose authenticity is uncertain should be sent to the CNAC **for expert examination.**

Other metallic pieces, such as foreign coins or scrap metal debris that are rejected by sorting machines, can also be found in circulation. These pieces **should not** be sent to the Banco de España.

COIN RECIRCULATION

Under Regulation (EU) 1210/2010 concerning authentication of euro coins and handling of euro coins unfit for circulation, institutions shall ensure the authenticity and fitness of euro coins they have received and intend to put back into circulation.

Within this common European framework for recirculation, authentication may be conducted in two ways:

- 1 Through coin processing machines that have successfully passed the established detection test.
- 2 Through manual selection by adequately trained personnel.

1 Coin processing machines

Coin authenticity and fitness for circulation can be checked by using coin-processing machines that have passed the **coin detection test** established in the **European Technical and Scientific Centre** guidelines.

Only €0.50, €1 and €2 coins shall be considered suspected counterfeit coins.

- A Machine verification of authenticity:** financial institutions, cash-in-transit companies and currency-exchange bureaux.
- B Machine verification of circulation fitness:** financial institutions, cash-in-transit companies and currency-exchange bureaux.

Once processed, those coins that are **suspected to be counterfeit** should be sent to the Banco de España within the **period stipulated, for subsequent analysis by the CNAC**.

Coins that are severely damaged and are **unfit for circulation** should be submitted at the counters of the **Banco de España's** branches. Those that have been **manipulated or cannot be exchanged in general** should also be sent to the Banco de España for demonetisation.

Accepted coin-processing machines are included in the official consolidated list that is published and regularly updated by the European Commission. They must be used by the agents required to conduct machine processing.

National competent authorities (Banco de España) perform on-the-spot controls through scheduled periodic visits to coin processing centres to verify the proper functioning of a representative number of coin-processing machines and to check administrative procedures.

COIN RECIRCULATION (cont'd)

2 Manual selection (five-step rule)

Manual checking of coins rejected and not accepted by sorting machines

Coins rejected by sorting machines because they are not deemed genuine, together with those rejected due to mechanical deformation, must be examined manually and separately, bearing in mind that this verification differs depending on the denomination of the coins; to this end, the **five-step rule** is recommended.

Professional cash handlers (staff of financial institutions, cash-in-transit companies and currency-exchange bureaux) must check coin authenticity manually.



1 Legislation

- Regulation (EU) No 1210/2010 of the European Parliament and of the Council of 15 December 2010.
- Council Regulation (EC) No 1338/2001 of 28 June 2001.
- Official Journal of the European Union 19/09/2006 C 225/7.
- Council Regulation (EU) No 729/2014 of 24 June 2014.
- Regulation (EU) No 651/2012 of the European Parliament and of the Council.
- Council Regulation (EC) No 2182/2004 of 6 December 2004.

2 Links

- https://economy-finance.ec.europa.eu/system/files/2019-11/etsc_guidelines_october_2019_public-ares2019-6661509.pdf
- <https://www.ecb.europa.eu/stats/html/index.en.html>
- <https://www.ecb.europa.eu/euro/coins/html/index.en.html>
- <https://www.bde.es/wbe/en/areas-actuacion/billetes-monedas/monedas-euros/contenido/monedas-conmemorativas-coleccion/>

3 Videos of interest

This is how the new King Felipe VI coins were designed and minted (Spanish Royal Mint):

- https://www.youtube.com/watch?v=DK_3aK_1fCQ

Made in Spain - How a coin is made:

- <https://www.youtube.com/watch?v=oXS231cmB7M>

Organising the fight against counterfeiting:

- <https://www.youtube.com/watch?v=UgL6mo6wAhk>

The five-step rule:

- <https://www.youtube.com/watch?v=5yZprgr9M2s>

Producing euro coins and putting them into circulation:

- <https://www.youtube.com/watch?v=jCZJojB2MrY>

Cash Department
cnac.es@bde.es
Alcalá, 522
28027 Madrid

BANCO DE **ESPAÑA**
Eurosistema