

Polymer banknotes

Q&A library

This Q&A library, produced by the Bank of England, pulls together a range of information relevant to the introduction of new polymer notes by the Bank of England. The library is updated periodically. If you would like to receive updates about polymer banknotes, and other banknote news, please register your interest here: www.bankofengland.co.uk/banknotes/Pages/subscribe.

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Section A: Q&A of general interest

What changes are planned for Bank of England banknotes?

1. Which banknotes are changing?

The Bank of England issued a new polymer £5 in September 2016. The paper £5 was withdrawn from circulation on 5 May 2017. This means that retailers, banks and Post Offices no longer have to accept the paper £5 note, but may do at their own discretion.

The design of the polymer £10 note was unveiled at Winchester Cathedral on 18 July 2017 and was issued on 14 September 2017. A new polymer £20 note will be issued in 2020. The Bank of England will make a decision on when to issue a new £50 note, and whether to print it on polymer, in due course.

2. How will the new banknotes be different from the current ones?

The new £5, £10 and £20 notes are being printed on polymer, a thin and flexible plastic material. This means the new notes are cleaner, safer and stronger than paper notes.

The new notes are around 15% smaller than the current paper notes but will retain the traditional look of the existing notes, with a portrait of Her Majesty the Queen on the front and historic characters on the back. The new banknotes include symbols representing all four of the home nations, with imagery taken from the Royal Coat of Arms and the Royal Badge of Wales.

3. What is polymer?

Polymer is a thin and flexible plastic material.

4. What size will the new banknotes be?

The polymer £5 note is 125mm x 65mm (the current paper note is 135mm x 70mm).
The polymer £10 note will be 132mm x 69mm (the current paper note is 142mm x 75mm).
The polymer £20 note will be 139mm x 73mm (the current paper note is 149mm x 80mm).

The existing format of tiered sizing will be maintained, i.e. the higher the denomination, the longer the height and the length of note.

5. How much will the new banknotes weigh?

The polymer £5 note weighs around 0.7g (the current paper note weighs around 0.9g).
The polymer £10 note will weigh around 0.85g (the current paper note weighs around 0.9g).
The weight of the £20 note will be confirmed in due course.

6. Which historic characters will appear on the new banknotes?

The polymer £5 note features Sir Winston Churchill
The polymer £10 note will feature Jane Austen (the current paper note features Charles Darwin).
The polymer £20 note will feature J.M.W. Turner (the current paper note features Adam Smith).

7. What security features will be on the new banknotes?

Some of the key security features for the new £10 and £5 note are listed below. Full details are available on the Bank of England website. Remember, do not rely on just one feature, check a few.

- There is a large see-through window on the note. A clearly defined portrait of the Queen is printed on the window with the numerical value of the note and the words 'Bank of England' printed twice around the edge.
- A finely detailed metallic image is positioned over the window. The foil is gold on the front of the note and silver on the back. When the note is tilted a multi-coloured rainbow effect can be seen.

- The Elizabeth Tower is shown on the £5 note. Winchester Cathedral is on the £10 note and the foil £ symbol below this is silver on the front and copper on the back.
On the front of the note, below the see-through window, is a silver foil patch. When the note is tilted, the word changes between the value of the note to 'Pounds' and a multi-coloured rainbow effect can be seen.
On the front of the note, above the see-through window, is a silver foil patch containing an image of the coronation crown which appears 3D. When the note is tilted a multi-coloured rainbow effect can be seen. If you look at the front of the note under a good quality ultra-violet light, the numerical value of the note appears in bright red and green whilst the background remains dull in contrast.

8. How will the waste from old paper and polymer banknotes be managed? Is polymer recyclable?

The Bank of England will fully segregate paper and polymer banknote waste. Old paper notes are shredded and composted. Old polymer notes are recyclable, and will be shredded and melted into pellets before being recycled into plastic items such as plant pots.

9. How will blind and vision impaired people be able to denominate the new banknotes?

On the front of the £10 polymer note (the side with raised print), there are two clusters of raised dots in the top left hand corner. This tactile feature helps blind and partially sighted people identify the value of the note.

The polymer £20 will also have a tactile feature, but with a different pattern. The polymer £5 will be identifiable as the only polymer note without a tactile feature.

Additionally, the new polymer notes will have the same features as the paper notes: the notes retain tiered sizing and include bold numerals and similar colour palettes to the current notes.

Why are banknotes changing?

10. Who decided that we should change our banknotes?

The Bank of England, following a three year research programme and consultation with both the cash industry and general public.

11. Why did the Bank of England decide to move to polymer?

The Bank of England decided to move to polymer notes because they are cleaner, safer and stronger than paper notes. Polymer notes provide enhanced counterfeit resilience and increase the quality of notes in circulation. And, because they last at least 2.5 times longer than paper notes, polymer notes are also more environmentally friendly.

12. Why did the Bank of England decide to change the size of the banknotes?

Bank of England banknotes are large by international standards. Smaller notes mean less material will be used in production. This will reduce manufacturing costs and deliver environmental benefits. There are also some savings to the costs of storing and transporting banknotes. The Bank of England has changed the size of its notes a number of times, most recently between 1990-1994.

13. Why were Winston Churchill, Jane Austen and J.M.W. Turner chosen to appear on the new notes?

The Bank of England seeks to celebrate individuals that have shaped British thought, innovation, leadership, values and society. Sir Winston Churchill was a British leader, statesman and orator; Jane Austen is recognized as one of the greatest writers in English literature; and J.M.W. Turner is considered one of the most influential and innovative artists of all time.

More information about banknote characters can be found on the Bank of England website: www.bankofengland.co.uk/banknotes/Pages/characters/default.aspx.

14. Which other countries use polymer banknotes?

Over 30 countries currently issue polymer notes. These include Australia (who introduced them in 1988), New Zealand, Mexico, Singapore, Canada and Fiji.

When will the new banknotes be issued and the old ones withdrawn?

15. When will the new banknotes be introduced?

The Bank of England issued the polymer £5 note on 13 September 2016, the polymer £10 note on 14 September 2017 and the polymer £20 note will follow in 2020.

16. When will the legal tender status of the old paper notes be withdrawn?

The paper £5 note was withdrawn on 5 May 2017. The last day to use the paper £10 notes is 1 March 2018. The paper £20 note withdrawal will be confirmed in due course.

17. What happens if I still have old notes after legal tender status has been withdrawn?

All Bank of England notes retain their face value for all time. If your bank, building society or Post Office is not willing to accept these notes then they can be exchanged with the Bank of England in London by post or in person.

More information about exchanging old banknotes can be found on the Bank of England website:
www.bankofengland.co.uk/banknotes/Pages/about/exchanges.aspx.

18. Will foreign exchange bureaus in other countries exchange paper notes?

Each foreign exchange bureau will make its own decision on whether to exchange notes.

Properties of polymer banknotes

19. What is polymer?

Polymer is a thin and flexible plastic material.

20. How long do polymer notes last?

Polymer notes last at least 2.5 times longer than paper notes.

21. Will I be able to use polymer banknotes in the same way as paper banknotes?

Yes, polymer notes can be used in the same way as paper notes. For example, polymer notes are available from ATMs and can be folded in a wallet.

22. Are polymer notes counterfeit proof?

No banknote is counterfeit proof. The question is how difficult it is to counterfeit effectively. The techniques required to produce high quality counterfeit polymer banknotes are slow, expensive and require a high level of effort and technical expertise. This presents a significant barrier to counterfeiters.

23. Can polymer banknotes be folded?

Yes, polymer notes are as thin and flexible as paper notes.

24. Are polymer banknotes slippery?

Polymer notes can feel slippery when new; although this tends to decline over time once the notes are in circulation. Polymer notes will also have areas of raised print which will give them a tactile quality and reduce the slippery feel.

25. Do polymer notes stick together?

Brand new polymer notes can sometimes stick together, as do brand new paper notes, but this effect is short-lived once in use.

26. Do polymer notes melt at high temperatures?

Polymer banknotes begin to shrink and melt at temperatures above 120°C, so they can be damaged by an iron for example.

27. Do polymer banknotes carry germs?

Banknotes, like any other surface that large numbers of people come into contact with, can carry bacteria. However, the risks posed by handling a polymer banknote are no greater than those posed by touching any other common surface, like handrails, doorknobs or credit cards.

28. Where are the polymer banknotes printed?

The polymer for the new fiver is made by Innovia who have a plant in Wigton, Cumbria. The notes are printed by De La Rue at the Bank of England's print works in Essex.

29. Do polymer banknotes contain animal derived products?

On 30 November 2016, the Bank issued a public statement confirming that it had recently become aware of the presence of a trace of animal derived product in our five pound polymer note. Investigations found that an extremely small amount of tallow (less than one part per thousand) is used in an early stage of the production process of the polymer pellets, which are then used to create the base substrate for the five and ten pound note. The Bank was not aware of this issue when the contract was signed for the supply of our polymer.

30. How is the Bank dealing with people's concerns?

The Bank recognises the concerns raised about the discovery of traces of tallow used in the production of its £5 polymer notes and is treating those with the utmost seriousness. The Bank worked closely with banknote polymer suppliers and has also spoken to a number of groups to understand their concerns more fully. It released a detailed statement on [15 February](#).

31. What is the Bank doing about the polymer £5 note and the new £10 planned for this year?

After careful consideration, the Bank concluded that it would be appropriate to keep the £5 polymer note in circulation and to issue the £10 polymer note as planned, in September. In reaching its decision, the Bank gave careful consideration to the possible alternative options for the current £5 note and the Jane Austen £10 polymer note. In doing so, the Bank has considered: its responsibility to issue and maintain the supply of high quality and secure banknotes, its obligations under the Equality Act 2010, the concerns raised about the use of animal-derived products, the impact of any changes on firms that process and handle cash, the potential impact on our suppliers, and value for money for the taxpayer. Further information on the Bank's assessment is presented in the paper published on 15 February

32. Do cotton paper banknotes contain animal derived products?

Following the discovery of traces of animal-derived products in the polymer substrate, the Bank asked its supplier of cotton paper to look into the process for making the substrate used in Bank of England's paper banknotes. That supplier has now conducted a thorough review and found that there are no animal-derived ingredients used in the primary manufacturing process for banknote paper. It has identified one ingredient used in the recycling of offcut material outside the primary manufacturing process which includes a trace amount of animal-derived ingredients. However, it has established that this ingredient is wholly consumed in the secondary production process and that no trace has been detected in the finished banknote paper.

33. Will future cotton paper banknotes contain animal derived products?

The Bank has sufficient stocks of £20 and £50 notes such that it does not need to order new banknote paper until July 2017. The Bank confirms that, when it does re-order, materials containing animal-derived residues will not be included in any recycling processes. The Bank will work with its supplier to identify whether alternative agents are available to enable continued recycling of offcut material.

£1 coin and Scottish and Northern Ireland banknotes

34. Who is responsible for the new £1 coin?

The Royal Mint is responsible for coins in the UK and issued a new £1 coin on 28 March 2017. The legal tender status of the existing £1 coin was withdrawn on 15 October 2017.

35. Who should I contact for more information about the new £1 coin?

Further information is available from the Royal Mint: www.royalmint.com/newonepoundcoin. Any questions should be directed to: newonepoundcoin@royalmint.com

36. Who is responsible for Scottish and Northern Ireland banknotes?

Three commercial banks are authorised to issue banknotes in Scotland: Bank of Scotland plc; Clydesdale Bank plc and The Royal Bank of Scotland plc.

Four commercial banks are authorised to issue banknotes in Northern Ireland: Bank of Ireland (UK) plc; AIB Group (UK) plc (trades as First Trust Bank in Northern Ireland); Northern Bank Limited (trades as Danske Bank) and Ulster Bank Limited.

These commercial banks are individually responsible for the design of their banknotes and robustness against counterfeiting.

37. Are the banks in Scotland and Northern Ireland introducing any new banknotes?

All three Scottish note issuers have now issued polymer £5 and £10 notes and plan to issue polymer £20 notes on similar timescales to the Bank of England. These notes will be the same size as the Bank of England polymer notes.

Ulster Bank has publically announced that they will issue a new polymer £5 and £10 note in 2019. Existing Ulster Bank £5 and £10 notes will remain in circulation until 2019, when they will be removed.

Bank of Ireland, Danske Bank and First Trust Bank have not made any public announcements on their respective future banknote issuance plans...

38. Who should I contact for more information about Scotland and Northern Ireland banknotes?

Further information about Scotland and Northern Ireland banknotes is available from the Committee of Scottish Bankers: http://www.scotbanks.org.uk/polymer_banknotes.php or from the individual commercial banks.

39. Are the Isle of Man, Jersey and Guernsey authorities planning to issue polymer banknotes?

There are three note issuing authorities in the British Islands but outside the United Kingdom: the Isle of Man, Jersey and Guernsey. None have plans to issue new polymer notes. Bank of England notes will continue to have the same status as today.

Section B: Q&A of particular relevance to retailers and businesses

Collaborative planning and preparation

40. What is the Bank of England doing to support businesses with the transition to the new banknotes?

As with any change in banknote design, all businesses that handle cash need to plan and prepare for the introduction of the new, smaller polymer banknotes. The Bank of England is committed to working collaboratively with businesses to support a smooth transition to the introduction of polymer banknotes.

41. How is the Bank of England working collaboratively with the cash industry?

The Bank of England hosts bi-annual industry-wide forums that are attended by over 90 key organisations, including financial institutions, ATM operators, cash-in-transit companies, banknote equipment manufacturers, retailers, and trade associations.

The Bank also supports five industry working groups that focus on: the readiness of the wholesale cash sector; upgrades for ATMs; upgrades for other cash handling machines; theft deterrent solutions; and awareness and training for staff who handle cash. A steering group brings together the Chairs of each working group to review progress, and ensure that key developments are effectively communicated.

42. How is the Bank of England working with manufacturers of cash handling machines?

The Bank of England offered machine manufacturers early access to the new banknotes for testing purposes.

A list of machine manufacturers who have, to date, taken up the offer of test notes can be found on the Bank of England website: www.bankofengland.co.uk/banknotes/polymer/Documents/manufacturers.pdf.

43. How do I gain access to polymer £20 test notes?

The first set of £20 test notes will be available to manufacturers of cash handling machines and machine users who have both suitable security arrangements and a demonstrable need to carry out testing on machines from end November 2017 onwards. Mass production £20 notes will be available in 2019. If you would like access to £20 test notes, please email your request to cashindustry.enquiries@bankofengland.co.uk.

Sample notes are not made available to support staff training ahead of the issuance of new banknotes. Please see the next section for details of the range of training materials that are available.

Recognising and authenticating the new notes

44. How will I be able to recognise and authenticate the new £10 note?

The Bank of England has released a range of materials to support staff training, including:

- Short videos introducing the new banknote, available on YouTube and as mp4 files
- A smartphone app, available from Google Play and the Apple App Store
- An e-learning package, which can run on the Bank of England's website or be used locally
- A range of posters and leaflets, available for download and in hard copy

More information about education materials can be found at:

<http://www.bankofengland.co.uk/banknotes/Pages/educational.aspx>

45. Can I use my banknote checking/counting machines with polymer banknotes?

Yes. Desktop authentication machines can be used for both paper and polymer banknotes, although they will need to be adapted for the new polymer notes.

You should engage directly with the manufacturer or supplier to discuss what adaptations will be required to your existing machines. Most machines will need a software update. When purchasing new machines, ask the supplier if they are capable of checking and counting paper and polymer notes.

46. Can I use detector pens to check polymer banknotes?

No. The pens work by reacting with the starch that is present in paper. So, while they are likely to detect some (but not all) counterfeits printed on paper, they won't detect any future counterfeits that are printed on polymer. Be careful as old or dirty pens can be unreliable.

47. Will there be a UV feature on the new banknotes?

Yes. UV features will be visible with a suitable UV lamp. A good quality UV lamp that emits light at around 365 nanometres is best for checking the fluorescent feature on all banknotes, both paper and polymer. LED devices, such as key-fob style detectors, are not recommended as these often emit light above 365 nanometres.

48. Can I use the Verus devices from Innovia to check banknotes?

Innovia Security sells Verus H and Verus D devices. They are designed to check whether a banknote is printed on polymer made by Innovia. They cannot be used to authenticate paper banknotes or the Scottish polymer banknotes, which are printed on a different type of BOPP polymer separately sourced to that used for Bank of England £5s and £10s. Following a recent tender, the next Bank of England £20 banknotes will be printed on two different types of polymer, from two separate suppliers. As such, the Innovia Verus H and Verus D devices will not be able to authenticate **100% of** Bank of England polymer £20 notes; therefore we advise that they are not used for checking £20s.

It is possible that in the future, the Bank may also use multiple substrates for its £5 and £10 notes. If this occurred, which would be in late 2021, Verus could not be used to authenticate all £5 and £10 notes.

Adapting cash handling machines

49. What are cash handling machines?

Cash handling machines need to be adapted for the new notes. These include self-service check-outs, desktop counters, ATMs, ticket machines, and any other machine that weighs, counts, checks, sorts, accepts, dispenses or recycles banknotes.

50. My business uses cash handling machines. What action do I need to take?

- Ensure you know which cash handling machines are being operated by your business.
- Contact the manufacturer or supplier of your machines to discuss what adaptations will be required, and when they will be available. For most machines, a software update will be needed.
- Before purchasing any new machines, check if any adaptations will be needed for the new polymer notes.
- Aim to implement adaptations to your machines before any new note is issued and consider the changes required to your machines once a banknote is withdrawn from circulation.

51. Who should I contact to find out what I need to do to adapt my cash handling machines?

You should engage directly with the machine manufacturer or supplier. Most cash handling machines will need a software update so that they are able to recognise and authenticate the new note design. Some machines may also need a hardware adaptation.

52. When will I be able to adapt my machines for the new notes?

The final polymer £10 test notes were issued to manufacturers in early November 2016 and then available to business owners to supplement manufacture testing from January 2017. Some machines may require a hardware update to be able to handle the new polymer notes. The vast majority of software updates were made available at least 3 months before the polymer £10 note was issued. You should check this with your machine manufacturer if you require a machine adaptation to accept or dispense the new polymer £10 note.

53. What is Field Testing?

Field testing is defined as testing carried out at a business location external to the company's agreed business address for the purpose of checking that machine adaptations have been correctly completed. This will become available for the new £20 note once the design is unveiled publically, ahead of the issue date. If you would like to undertake field testing or find out more about this, please contact cashindustry.enquiries@bankofengland.co.uk.

54. I use weighing scales to count banknotes. Will they need to be adapted?

Yes. Polymer notes are slightly lighter than paper notes. So you will need to separate the polymer and paper notes before you weigh them; and the scales will need to be calibrated for the weight of the £5 and £10 polymer notes, and in due course for £20 polymer notes. Check how to do this with the machine manufacturer or supplier.

55. How do I load an ATM cassette with polymer banknotes?

Each ATM Manufacturer will have a set of procedures for cash cassette loading. You should contact your ATM manufacturer to get a copy of these procedures.

There are some basic guidance steps you should always follow when filling a cassette to reduce the risk of note jams:

1. Poor quality notes and foreign objects are to be removed and not used
2. All note bundles must be fanned
3. Note bundles must be inserted in alternate orientations
4. When refilling cassettes the new note bundles must be placed in front of the existing cash

Due to the design of the £10 polymer note including the Tactile Features, it is important that notes are placed into cassettes in different orientations. If the note orientation is constant and not mixed the tactile feature can cause an increased thickness on one side of the cassette which may lead to dispense related faults.

56. My business has an ATM that is filled with takings from the till. What will I have to do to change over to dispensing the new notes?

Your ATM may need to be adapted to dispense the new notes because they are a smaller size and a different design from the current notes. You can continue to fill your ATM with paper banknotes until your ATM is converted to dispense polymer notes only. Your ATM supplier will be in touch with you to schedule the adaptation.

57. My business hosts an ATM that is filled by a cash in transit company. What will I have to do to change over to dispensing the new notes?

You do not need to do anything. The ATM operator and cash in transit company will take responsibility for switching over to the new notes. If in doubt, check with your ATM operator.

58. My business uses self-service tills. What will I need to do to prepare?

You should engage directly with the machine manufacturer or supplier. In general:

To accept payment with any new note, self-service tills need a software update. This should be done before the issue date. The till will then be able to accept payment with both the old and new notes.

To dispense change with the new polymer notes, the dispense cassette will need to be adjusted for the new note size. You will not be able to dispense a mix of paper and polymer notes of the same denomination from a single cassette.

Further information

59. Where can I find more information about Bank of England polymer banknotes?

More information can be found on the Bank of England website (www.bankofengland.co.uk/banknotes/polymer) and new £10 note microsite (www.thenewten.co.uk).

If you would like to receive updates about polymer banknotes, and other banknote news, please register your interest here: www.bankofengland.co.uk/banknotes/Pages/subscribe.

60. Who should I contact if I have a question about Bank of England polymer banknotes?

You can email your questions to enquiries@bankofengland.co.uk.

61. Who should I contact to find out if a cash handling machine used by my business is compatible with the new banknotes?

You should engage directly with the machine manufacturer or supplier.

A list of machine manufacturers who have taken test notes can be found on the Bank of England website: www.bankofengland.co.uk/banknotes/polymer/Documents/manufacturers.pdf.

62. Who should I contact for more information about the new £1 coin?

Further information about coins is available from the Royal Mint: www.royalmint.com/newonepoundcoin. Any questions should be directed to: newonepoundcoin@royalmint.com

63. Who should I contact for more information about Scotland and Northern Ireland banknotes?

Further information about Scotland and Northern Ireland banknotes is available from The Committee of Scottish Bankers: <http://www.scotbanks.org.uk/polymer-banknotes.html> or from the individual commercial banks.