

Withdrawn with effect from 6 April 2023

HM Revenue and Customs (HMRC)

Pay As You Earn (PAYE) Real Time Information (RTI)

The Hash Cross Reference Process & Bacs Payments

Contents:

1. [Introduction](#)
2. [Important Information](#)
3. [Legislation](#)
4. [Hash Generation](#)
5. [Reporting Scenarios](#)

Introduction

HMRC implemented RTI using existing channels for reporting PAYE data in real time and the hash cross reference process is an important aspect of RTI reporting. Whenever a reported payment is made directly into an individual's bank account via the Bacs system, using an allocated Bacs Service User Number (SUN), the RTI return must include a hash cross reference. This is often simply referred to as the "hash".

Generally this requirement will only impact on large employers or pension providers. HMRC does not expect all RTI submissions to include a hash. Employers and pension providers who use different payment methods, including those who pay by Bacs without using their own SUN, do not need to include a hash on their RTI submissions.

This hash cross reference is needed so that HMRC can match the payments individuals receive with the payroll data reported in real time. This also provides additional verification about the amount paid into an individual's bank account to assist DWP's administration of Universal Credit.

Important Information

- Employers and pension providers who pay their employees or pension recipients via a Bacs direct credit payment using their own Bacs SUN are required by law to include a hash cross reference in their RTI PAYE returns. A SUN is unique and allows a business to be easily identified by the Bacs providers.
- The same employers or pension providers must also provide the sub-reference (used to generate the hash) in field 7 of their Bacs (Standard 18) payment instruction, which normally involves software provided by a Bacs Approved Solution Supplier (BASS) or through a Bacs Approved Bureau (BAB).
- Payroll software and Bacs software products will normally automatically generate the hash data that is required. However, everyone involved in this process (employers,

pension providers, payroll administrators, bureaux and agents) must ensure that their related software or processes are hash compliant.

- Everyone involved in RTI reporting must also ensure that a hash is only generated when it is required. The RTI submission must not include a hash if the payment is made by another method, such as cash, cheque, internet banking, telephone banking or via a Bacs transfer that does not involve a SUN.
- HMRC attempt to match all hashes generated as part of the Bacs payment process, which are reported separately, with hashes included on RTI submissions. Risk-assessments carried out by HMRC and DWP in the course of their administration of tax and benefits may include consideration of the hash matching process.

Legislation

Regulation 67CA of the Income Tax (Pay As You Earn) Regulations 2003 (S.I. 2003/2682) has effect for relevant payments made on or after 1 September 2012. It was inserted into those Regulations by the Income Tax (Pay As You Earn) (Amendment No. 2) Regulations (S.I. 2012/1895) which are available here – <http://www.legislation.gov.uk/2012/1895>

It makes provision requiring employers and pension providers who are reporting PAYE information in real time to include a cross reference in their PAYE returns. They also provide for the Commissioners for Her Majesty's Revenue and Customs to make directions. The Commissioners for HMRC made a direction under regulation 67CA, which also takes effect for payments made on or after 1 September 2012. It is available here <http://www.hmrc.gov.uk/ebu/direction-reg67ca.pdf>

Taken together the regulations and direction require a cross reference (sometimes simply referred to as the 'hash') to be provided to HMRC for each RTI submission where employees or pension recipients are paid via Bacs using the employer's or pension provider's own Service User Number (SUN). The field to accommodate the hash is included in the RTI technical specifications. The same employers are also required to provide a sub-reference in field 7 of their Bacs (Standard 18) payment instruction.

Hash Generation

There are two parts to the hash cross reference, which can be produced at any time before the payment instructions are issued, and the exact timing will probably be determined by payroll software.

The first involves the RTI submission and the second involves the Bacs payment instruction.

(a) The hash included in the RTI submission to HMRC (FPS data item 118)

The hash should be generated using the Secure Hash Algorithm SHA-256, details of which are published by the National Institute of Standards and Technology (NIST). The NIST website can be found at <http://csrc.nist.gov/>

There are many implementations of SHA-256 available across multiple technologies and, whilst HMRC cannot recommend which one to use, only proven and reliable sources should be used. In addition there are also many documents publicly available providing test vectors

with the expected results for proving SHA-256. Object libraries exist in most commonly used coding languages.

It is generally expected that payroll software will automatically create the hash. The data used to generate the hash must be ASCII characters made up from:

- the four character sub-reference inserted, or to be inserted, in the Standard 18 payment file (explained in b below),
- the sort code of the originator's bank (6 numerical digits),
- the sort code of the recipient's bank (6 numerical digits),
- the amount of payment in pence (11 numerical digits with leading zeros and no decimal point) where required explained in c below).

(b) The sub-reference inserted in field 7 of the Bacs payment instruction

This value must be random (not sequential). The sub reference should be the same as that inserted in the hash for the RTI submission.

The sub-reference should be inserted in field 7 of standard 18 and the value of the field must be a solidus (/) to be inserted in character position 32 followed by a three alpha-numeric character sub-reference generated from the following characters in positions 33-35:

- hyphen (-)
- full stop (.)
- solidus (/) (hexadecimal value 2F)
- zero to 9
- A-Z (as specified for upper case alphabet)

So examples would be: "/123", "/ABC", "/.A", "/9C-", "/... ", "/9C/"

The hash will then be reproduced as part of the payment process and sent with confirmation of payment to HMRC for matching with the RTI hash. All of the elements used to create the hash, including the sub-reference, need to be present in the Standard 18 file used by Bacs for payment.

The combination of the sub-reference, sort codes and the amount to be paid provide a sufficient degree of uniqueness to allow effective matching to take place. The sub-reference needs to be generated with each relevant payment from the employer, so that where an individual is paid the same amount on a regular basis the sub-reference allows the different transactions to be identified.

(c) The amount of payment to be included in the hash

This must be the net amount of the payment that will reach the recipient's bank account and should match the amount derived from the following calculation:

- **The amount reported in data item box 59** - Pay after statutory deductions. This is the net pay after statutory deductions for tax, National Insurance and Student Loans and will not include payments entered at 58A and 58B.

Less

- **The amount reported in data item box 58B** - Value of deductions from net pay in pay period. This is the value of deductions made from net pay after deductions for tax, National Insurance and Student Loans. (For example, pension contributions that are **not**

paid under a net pay arrangement, trade union subscriptions, subscriptions for health cover and attachment of earnings orders).

Less

- **The amount reported in data item box 60** – Value of benefits taxed via the payroll in pay period. This is the value of benefits in kind on which PAYE has been operated, via the payroll in this pay period. (Benefits can only be taxed in this way with the prior agreement of HMRC and completion of this box does not negate the need for completion of a form P11D at the end of the tax year.)

Plus

- **The amount reported in data item box 58A** - Value of payments not subject to tax or NICs in pay period. This is the value of other payments that are not salary or wages and subject to neither tax nor National Insurance contributions. (For example, a season ticket loan advance and certain travel and subsistence costs).

It is vital that the payroll software ensures that the payment value used to calculate the hash is equal to that in the payment instruction.

This process is straightforward in most cases where a single Bacs payment relates to a single RTI submission. This and other scenarios are covered below.

Reporting Scenarios

1. A single Bacs (SUN) payment relating to a single RTI submission

This will cover most payments. For example, an employee is due to receive £1,256.71 made up as follows:

FPS data item 59	Pay after statutory deductions	1,520.30
less data item 58B	Value of deductions from net pay in pay period	100.00
less data item 60	Value of benefits taxed via the payroll in pay period	200.00
plus data item 58A	Value of payments not subject to tax or NICs in pay period	36.41
The hash is based on the Bacs payment (via a SUN)		1,256.71

The following example data would then be used to generate the hash:

Sub-ref inserted in field 7 of the Bacs payment instruction (standard 18 file)	/A..
The sort code of the originator's bank	10-00-00
The sort code of the recipient's bank	30-91-44
Amount of payment in pence (11 digits with leading zeros no decimal point)	00000125671

This would create an ASCII string of:
/A..10000030914400000125671

The hash generated using a Secure Hash Algorithm SHA-256 would look like this:
a8e88f215cc98f40a2d0c47c49d0b09f4593d9bb81aef118202987a8cc0e3689
(when represented in lower case as a hexadecimal string within the RTI submission).

2. A single Bacs (SUN) payment covers more than one tax year

If the payment consists of two or more net amounts for two or more tax years, then the amounts for all but the latest tax year should be totalled and added to any amounts in box

58A because the net amount for previous years are not subject to tax or NIC in the current year. If the amount relating to the earlier years totals £1,000, example 1 above would show:

FPS data item 59	Pay after statutory deductions	1,520.30
less data item 58B	Value of deductions from net pay in pay period	100.00
less data item 60	Value of benefits taxed via the payroll in pay period	200.00
plus data item 58A	Value of payments not subject to tax or NICs in pay period	1,036.41
The hash is based on the Bacs payment (via a SUN)		2,256.71

3. The Bacs (SUN) transfer does not cover the full payment amount

The matching process will take place against the Bacs payment amount only. The Bacs payment instruction should contain the 4 character string in Field 7, and the data used for this payment should be used to construct the 64 character hash that is reported on the FPS.

For example, an employee is due to receive £1,256.71 overall with separate amounts of £756.71 paid via a Bacs (SUN) channel and £500 paid by other methods, which may include cash, cheque, internet / telephone banking or a non SUN Bacs transfer. The total of £500 should be added to any figure that is already included in box 58B on the RTI submission:

FPS data item 59	Pay after statutory deductions	1,520.30
less data item 58B	Value of deductions from net pay in pay period	600.00
less data item 60	Value of benefits taxed via the payroll in pay period	200.00
plus data item 58A	Value of payments not subject to tax or NICs in pay period	36.41
The hash is based on the Bacs payment (via a SUN)		756.71

4. A single RTI submission is covered by two or more Bacs (SUN) payments

Where an employee has his net pay paid via Bacs into two or more bank accounts, the matching process will take place against the largest value payment. The Bacs payment instruction for the largest amount should contain the 4 character string in Field 7, and the data used for this payment should be used to construct the 64 character hash that is reported on the FPS. The other Bacs payment instructions will not need a sub reference.

For example, an employee is due to receive £1,256.71 overall with separate amounts of £956.71, £200 & £100 paid into different bank accounts. The total of £300 for the two smaller payments should be added to any figure that is already included in box 58B:

FPS data item 59	Pay after statutory deductions	1,520.30
less data item 58B	Value of deductions from net pay in pay period	400.00
less data item 60	Value of benefits taxed via the payroll in pay period	200.00
plus data item 58A	Value of payments not subject to tax or NICs in pay period	36.41
The hash is based on the largest value Bacs payment (via a SUN)		956.71

5. A single RTI submission covers several payments reported under the temporary "on or before" relaxation for micro employers

The matching process will take place against the last payment included in the FPS. The Bacs payment instruction for the last payment should contain the 4 character string in Field 7, and the data used for this payment should be used to construct the 64 character hash that is reported on the FPS. The other Bacs payment instructions will not need a sub reference.

For example, an employee receives £100 each week for 4 weeks and one FPS is submitted as required covering the 4 weeks. The amounts are reported as a single payment of £400

being paid on the payment date applicable for the last week. The payments for weeks 1, 2 and 3 should be added to any figure already in box 58B (£300 to be added):

FPS data item 59	Pay after statutory deductions	400.00
less data item 58B	Value of deductions from net pay in pay period	300.00
less data item 60	Value of benefits taxed via the payroll in pay period	0
plus data item 58A	Value of payments not subject to tax or NICs in pay period	0
The hash is based on the final Bacs payment (via a SUN)		100.00

6. A single Bacs (SUN) payment covers two or more RTI submissions

Where two or more RTI submissions are sent to HMRC for one individual and it is known that the net payment amounts for each submission will be added together, so that only one Bacs payment is made to that individual, the same hash should be reported on each submission based on the actual combined Bacs payment. The Bacs payment instruction should contain the 4 character string in Field 7, and the same data used for this payment should be used to construct the 64 character hash that is reported on each FPS. This does not impact on the aggregation of pay for NI calculations that may be required and reflected in the relevant data boxes on the FPS before the amalgamated Bacs payment is calculated.

For example, three separate RTI submissions relating to one individual reflect payments of (A, B & C) £500, £300 and £200 respectively and the amounts are amalgamated into one payment of (D) £1,000 (later on during the process) before the Bacs payment instruction is issued. The hash should be produced based on £1,000 and the same hash cross reference is reported in each RTI submission (covering the £500, £300 and £200 reported payments). The hash submitted to HMRC as part of the Bacs payment process will be matched with each hash included on the separate RTI submissions. A supplementary test is carried out by HMRC to ensure that $A+B+C = D$.

This will also apply where the single Bacs (SUN) payment covers two or more RTI submissions across two or more PAYE schemes requiring the unique hash cross reference being reported on each RTI submission. There may be some differences here where the pay values in box 59 might be aggregated within each PAYE scheme (for NI calculations) rather than across all of the submissions when appropriate.

7. Alterations to the Bacs (SUN) payment made after the RTI submission is sent

If alterations are made between payroll software and BASS software then the final amount to be paid, as per the Bacs payment instruction, needs to be reflected in the hash attached to each related RTI submission, if possible. Under RTI employers must operate PAYE at the time that they make a relevant payment and they must take reasonable care to report data accurately to HMRC.

Where the Bacs payment instruction is altered after the RTI data has been submitted to HMRC and it is not feasible to run the payroll again to correct matters, the employer should correct the employee's position in the FPS for the next relevant payroll run. This is done by ensuring that the YTD figures are accurate in that FPS. The hash cross reference in the next submission should be produced in the usual way.