



# whitepaper

*In Plain English:*  
**MONTHLY OUTSTANDING BALANCE (MOB)**

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This compliance white paper outlines the calculation of monthly-outstanding balance (MOB) credit insurance premium(s), interest charges, and the calculation of the disclosure requirements set forth by the Truth-in-Lending Act (Regulation Z). There are two general methods of calculating credit insurance premiums on closed-end loans:

1. A single premium is charged at the start of the loan, which covers the total cost of the insurance for the duration of the loan
2. A premium is charged each month during the term of the loan (MOB)

In the first method, the premium is nearly always added to the loan amount and financed as part of the loan. Although it is rarely done, it is possible for the borrower to pay for the credit insurance premium separately. Thus, a loan with proceeds to the borrower of \$10,000 with a credit insurance premium of \$200 becomes a loan of \$10,200. The monthly payment and interest charge is based on the loan amount of \$10,200. In this case, the financial institution has advanced the premium to the insurance company and has added it to the loan. The borrower pays interest on the premium at the same rate as charged on the proceeds of the loan. The monthly payment received each month by the financial institution will be comprised of interest and principal.

With the MOB method the borrower pays a portion of the insurance premium each month. The amount paid each month is dependent upon the balance of the loan at that time. Thus the total payment the borrower pays each month to a financial institution is comprised of the following three components:

1. Credit insurance premium (MOB)
2. Interest charge
3. Principal payment

The MOB method is widely used by credit unions and is also required for some states such as Pennsylvania and/or California. MOB calculation can be utilized for credit life insurance, disability insurance, or other types of insurance (involuntary unemployment, property), or any combination of these.

#### COMPUTING A MONTHLY MOB PAYMENT:

A simple-interest loan payment including MOB insurance is calculated with the addition of the credit insurance premium. Each month, the financial institution calculates the credit insurance premium due for the month, then the interest due for the month, and after reducing the payment by the total of the premium and interest charges, applies the remainder to reduce the principal balance.

In the examples that follow, we will use a simple interest loan with only 6 payments and with credit life insurance to keep the examples and amortization schedules a reasonable size. MOB loans can be written of any length, and are commonly written to 15 years or more.

#### Example 1:

Assume we have a \$10,000 loan for 6-months with an interest rate of 12.00%. Now, let's add MOB credit life insurance to this loan and recalculate the payment. Assume the life insurance rate is \$0.50 per month per \$1000.00 of the outstanding balance. This converts to an annual interest rate of 0.60% ( $0.50 / 1000 \times 12 \times 100 = 0.60\%$ ) that we will add to the interest rate to calculate the payment. Adding 0.60% to the interest rate of 12.00%, we get a combined rate of 12.60%, and the computed payment is \$1,728.45. Thus the borrower will make the same payment amount over the life of the loan. From month-to-month, the credit life insurance premium portion will decline much like interest does, and the principal portion will increase.

BOM Balance	Insurance	Interest	Principal	Monthly Pmt	EOM Balance
\$10,000.0	\$5.00	\$100.00	\$1,623.45	\$1,723.45	\$8,376.55
\$8,376.55	\$4.19	\$83.77	\$1,640.49	\$1,724.26	\$6,736.06
\$6,736.06	\$3.37	\$67.36	\$1,657.72	\$1,725.08	\$5,078.34
\$5,078.34	\$2.54	\$50.78	\$1,675.13	\$1,725.91	\$3,403.21
\$3,403.21	\$1.70	\$34.03	\$1,692.72	\$1,726.75	\$1,710.49
\$1,710.49	\$0.86	\$17.10	\$1,710.49	\$1,727.59	\$-

\$5,884.11      \$17.66      \$353.04      \$10,000.00      \$1,725.51

Generally, the insurance premium is calculated first and then the interest, however it does not matter which is calculated first because both calculations are made on the same principal amount. In certain loans with very long first periods, the total of the credit insurance premium and interest charge due in the first period may exceed the monthly payment. In this case, the credit insurance is usually paid to the insurance company (to keep the insurance in force) and the unpaid interest is held in a separate accrued but unpaid account by the financial institution until the next payment is made.

The payments in this example are rounded to the nearest cent. In closed-end lending, it is conventional to truncate the payment to the lower whole cent to avoid exceeding the stated interest rate by even a fraction. The reason is that if the loan is written at the maximum allowed interest rate, then by rounding the payment to the nearest cent, the actual interest rate charged could be slightly higher than the maximum allowed rate.

The final period interest amount has been adjusted downward by \$0.03 in order to fully amortize the loan. The adjustment is required because the payment was rounded to the nearest whole cent.

**MOB EFFECT ON A FINANCE CHARGE:**  
 It is interesting to note that the total interest charge in the example is slightly higher. This is a normal occurrence when MOB insurance is included in a loan and the total payment the borrower makes is level throughout the loan. It is caused by the fact that the insurance premium payments are larger at the start of the loan and decrease as the loan amortizes. By taking the premium payment out of the total payment the borrower makes, the amount left to service the debt is reduced during the early part of the loan compared to the same loan without credit insurance. This delays the repayment of principal, which results in the slightly higher finance charge.

If one examines the columns of principal payments in the example, one will note that the borrower is making smaller principal payments at the start of the example. Specifically, in month 1, the borrower paid \$1,623.45. This lower principal payment in month 1 causes the principal balance in month 2 to be correspondingly higher, resulting in a higher interest charge.

**MOB EFFECT ON AN ANNUAL PERCENTAGE RATE (APR):**  
 MOB insurance has no effect on the APR of a loan. If there are prepaid finance charges or other charges that must be treated as part of the finance charge, they will affect the APR but the inclusion of MOB insurance by itself does not. The APR is designed to allow borrowers to compare the true cost of borrowing. The APR is affected by both the amount of the finance charge and by the amount of time the borrower has the use of the money. In the above example, the borrower pays a slightly higher finance charge, but they also had use of a little more money when compared to no insurance. The average monthly balance in the example is \$5,884.11. Thus even though the finance charge is slightly higher, the borrower has also had the use of slightly more money these two factors offset each other and the net result is no change in the APR.

Calculating the APR of a loan with MOB insurance requires advanced techniques compared to a conventional loan with single premium credit insurance. It is a common error to apply conventional APR calculation tools to loans with MOB insurance. In all cases, these tools produce an APR that is too high because they consider the insurance premiums to be part of the finance charge (which they are not). Two assumptions exist in conventional loans with single premium insurance, which are not true for loans with MOB insurance:

1. The monthly payment the borrower makes contains only principal and interest
2. The amount financed plus the finance charge equals the total of payments

Nearly all APR computational tools make these assumptions. Before we explore the APR calculation method for a loan with MOB, it should be noted that it is only necessary to make such a calculation if there are prepaid finance charges or other items that must be included as part of the Finance Charge. If the Finance Charge consists only of interest calculated as shown above in examples, then the APR is the same as the interest rate.

If the intention is to verify the APR, it is easier to recalculate the payment using the proper credit insurance and interest rates. If there are no prepaid charges or other components that add to the finance charge, the recomputed payment and finance charge can be used to verify the disclosed values.

#### DISCLOSURE OF PAYMENT AMOUNTS:

For conventional loans, the disclosed payment amount includes only principal and interest, however, for a loan with MOB insurance, the disclosed payment amount also includes an insurance premium component. This is addressed in the Official Staff Commentary on Regulation Z, which states, "The payments may include amounts beyond the amount financed and finance charge." For example, the disclosed payments may, at the creditor's option, reflect certain insurance premiums where the premiums are not part of either the amount financed or the finance charge. The total of payments disclosed includes these credit insurance premiums because they appear as part of the disclosed payment schedule and "The total of payments is the sum of the payments disclosed under section 226.18(g)."

Another way to illustrate this occurrence is to compare two borrowers with credit-card accounts at identical interest rates. Each charges \$100. The first borrower pays \$25 the first and second month, and then \$50 the third month. The second borrower pays \$50 the first month, and then \$25 the second and third month. Although both borrowers are charged the same interest rate, the first borrower will pay more interest over the three months because he has repaid the principal at a slower rate.

Once it is discovered that an APR tool is producing incorrect results by using the entire loan payment, the next step usually involves subtracting the average premium amount from the loan payment amount to get an average debt payment. Although closer to the proper solution, this technique is still inaccurate because it ignores the fact that the premium charges are not the same amount each month.

#### COMPUTING AN MOB APR:

The procedure to calculate the APR of a loan with MOB insurance requires that the payment the borrower makes to service the debt be determined for each month in the loan. The MOB credit insurance premium is excluded from the total payment the borrower makes because it is not part of either the amount financed or finance charge. The fundamental APR calculation involves finding a monthly rate (for monthly loans) that will amortize the amount financed to zero using the debt payment stream the borrower is required to make. The amortization procedure is described in the introduction to Appendix J of Regulation Z:

“at the end of each unit period (or fractional unit period) the unpaid balance of the amount financed  is increased by the finance charge earned during that period and is decreased by the total payment  (if any) made at the end of that period”

Refer first to Example 1 above. The amount financed of \$10,000 is amortized to 0 by applying the  periodic interest rate of 1% per month using the stream of payments made by the borrower to  service the loan. Thus we can state that the APR is 12%.

Now refer to Table 2 below. Using the same technique, the amount financed of \$10,000 is amortized  to 0 by applying the periodic interest rate of 1% per month using the stream of debt payments the  borrower makes to service the loan.

Table 2 – APR Amortization:

BOM Balance	Interest	Principal	Monthly Pmt	EOM Balance <input type="checkbox"/>
\$10,000.0	\$100.00	\$1,623.45	\$1,723.45	\$8,376.55 <input type="checkbox"/>
\$8,376.55	\$83.77	\$1,640.49	\$1,724.26	\$6,736.06 <input type="checkbox"/>
\$6,736.06	\$67.36	\$1,657.72	\$1,725.08	\$5,078.34 <input type="checkbox"/>
\$5,078.34	\$50.78	\$1,675.13	\$1,725.91	\$3,403.21 <input type="checkbox"/>
\$3,403.21	\$34.03	\$1,692.72	\$1,726.75	\$1,710.49 <input type="checkbox"/>
\$1,710.49	\$17.10	\$1,710.49	\$1,727.59	\$ - <input type="checkbox"/>

\$5,884.11                      \$353.04                      \$10,000.00

This table uses the actual stream of payments made by the borrower to service the loan. Note that  the total finance charge and average monthly balance are exactly the same as in Table 2 where MOB  insurance is included, thus no additional interest charge has occurred because of the inclusion of MOB  insurance.

APR Calculation using a Spreadsheet:

(10,000.00) \$Amount Financed

1,723.45    \$Payment #1

1,724.26    \$Payment #2

1,725.08    \$Payment #3

1,725.91    \$Payment #4

1,726.75    \$Payment #5

1,727.59    \$Payment #6

12.000% Computed APR (Formula: =IRR(A1:A7)\*12)

This is a sample personal computer spreadsheet using the IRR (Internal Rate of Return) financial  function to compute the periodic rate. This rate is multiplied by 12 to obtain the APR.

APR Calculation using a Spreadsheet with Prepaid Charge

It is not common, but entirely possible that a prepaid charge be made on a MOB loan. In this case,  the prepaid charge must be deducted from the amount financed and the APR calculated. With a \$50  prepaid charge applied to Example 2, the APR increases to 13.752%.

(9,950.00) \$Amount Financed (with \$50 prepaid charge)

1,723.45 \$Payment #1

1,724.26 \$Payment #2

1,725.08 \$Payment #3

1,725.91 \$Payment #4

1,726.75 \$Payment #5

1,727.59 \$Payment #6

13.752% Computed APR (Formula: =IRR(A1:A7)\*12)

CONSTRAINTS:

This compliance white paper does not address the calculation of a payment with MOB insurance in  situations where the maximum amount of insurance is exceeded and the premium amount(s) are  limited to some maximum amount(s). This situation can complicate the calculation of the payment  significantly. The techniques described in this compliance white paper to compute the APR are valid  for such loans provided the MOB premium amounts and debt payment amounts are properly  calculated.

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1. Official Staff Commentary on Regulation Z, §226.18(g) Payment Schedule. 1. Amounts included in  repayment schedule.

2. Ibid. §226.18(h)(2) Total of Payments. 2. Calculation of total of payments.

3. Regulation Z, Appendix J (a)(2). The "total payment" referred to here is the payment to pay the  amount financed and finance charge (the "debt payment"), and does not include the MOB credit  insurance premium.

4. For monthly loans, the A.P.R. in the U.S. is defined as 12 times the periodic interest rate, thus  $12 \times .01 \times 100 = 12.00\%$ . Regulation Z, Appendix J (b)(1) "The annual percentage rate shall be ...  determined by multiplying the unit-period rate by the number of unit periods in a year."