

3. *Scope of Determination*—Unless specifically excluded therein, this determination applies to all other determinations made pursuant to paragraphs (a), (b), (c), (d), (e) and (f) of section 64E (1) of the Income Tax Act 1976.

4. *Principle*—The test for sufficient precision is whether an increase in precision will give a significantly different result in respect of income derived or expenditure incurred in any period to which an amount that is deemed to be income or expenditure is to be allocated.

5. *Interpretation*—In this determination, unless the context otherwise requires, expressions used have the same meanings as in sections 64B of 64M of the Income Tax Act 1976.

6. *Method*—A calculation is sufficiently precise for the purposes of the application of any determination made under section 64E (1) of the Income Tax Act 1976 if the income derived or expenditure incurred from a financial arrangement in any period to which an amount that is deemed to be income or expenditure is to be allocated would not be changed by more than \$5 by the use of greater precision in all intermediate calculations.

7. *Example*—(1) The calculation of the income on the yield to maturity basis for this example is discussed in paragraph 7 of Determination G3: The Yield to Maturity Method.

A financial arrangement, with a face value of \$1,000,000 is purchased for \$1,012,500 on 12 March 1987. It bears interest at 7 percent per annum payable semi-annually and is repayable at par on 15 January 1988.

The coupon payments are made on 15 May and 15 November each year.

Using the yield to maturity method and 1 decimal place gives the accrued income schedule in Table 1 below.

Table 1: YIELD TO MATURITY 16.2 PERCENT

Cashflows	\$	Accrued Income \$
12 March 1987	(1,012,500.00)	
15 May 1987	70,000.00	28,760.55
15 Nov 1987	70,000.00	78,672.10
15 May 1988	70,000.00	79,374.54
15 Nov 1988	1,070,000.00	80,133.88
	<u>\$267,500.00</u>	<u>\$266,941.07</u>

Using a yield to maturity of 16.23 percent, on which Table 2 is based, allows the more precise calculation of accrued income. The difference column in Table 2 displays the difference between the calculated accrued income in Table 1 and the calculated accrued income in Table 2.

Since some of the net accrued amounts differ by more than \$5 more precision is required in the intermediate calculation—

Table 2: YIELD TO MATURITY 16.23 PERCENT

Cashflows	\$	Accrued Income \$	Difference \$
12 March 1987	(1,012,500.00)		
15 May 1987	70,000.00	28,813.81	53.26
15 Nov 1987	70,000.00	78,822.12	150.02
15 May 1988	70,000.00	79,538.03	163.49
15 Nov 1988	1,070,000.00	80,312.04	178.16
	<u>\$267,500.00</u>	<u>\$267,486.00</u>	

If any one of the differences is greater than \$5 it is necessary to repeat the calculation. As this is the case the calculation must be repeated at greater precision.

Table 3: YIELD TO MATURITY 16.231 PERCENT

Cashflows	\$	Accrued Income \$	Difference \$
12 March 1987	(1,012,500.00)		
15 May 1987	70,000.00	28,815.58	(1.77)
15 Nov 1987	70,000.00	78,827.12	(5.00)
15 May 1988	70,000.00	79,543.48	(5.45)
15 Nov 1988	1,070,000.00	80,317.98	(5.94)
	<u>\$267,500.00</u>	<u>\$267,504.16</u>	

Table 4 demonstrates the results using a yield to maturity of 16.2308 percent. The differences are all less than \$5 compared with Table 3 and would be acceptable for income tax reporting purposes.

Table 4: YIELD TO MATURITY 16.2308 PERCENT

Cashflows	\$	Accrued Income \$	Difference \$
12 March 1987	(1,012,500.00)		
15 May 1987	70,000.00	28,815.23	(0.35)
15 Nov 1987	70,000.00	78,826.12	(1.00)
15 May 1988	70,000.00	79,542.39	(1.09)
15 Nov 1988	1,070,000.00	80,316.79	(1.19)
	<u>\$267,500.00</u>	<u>\$267,500.53</u>	

(2) The calculation of the amounts used in this example are derived from paragraph 7 of Determination G1: Apportionment of Income and Expenditure on a Daily Basis.

On 29 January 1987 a company issues 180-day bill for an amount of \$3,000,000 at a discount of \$294,000. The company's balance date is 31 March and it elects under Determination G1: Apportionment of Income and Expenditure on a Daily Basis to use a 365-day year.

There are 61 days from 29 January to 31 March 1987.

As 31 March falls between the issue date and the redemption date it is necessary to apportion the \$294,000 expenditure incurred between 2 income years. To do so it is necessary to calculate 61/180 as a proportion.

Initial Calculation:  $61/180 = 0.3$

Amount allocated to income year 1 =  $.3 \times 294,000 = 88,200$

Amount allocated to income year 2 =  $.7 \times 294,000 = 205,800$

The company is required to do a second calculation using greater precision.

Second Calculation:  $61/180 = 0.34$

Amount allocated to income year 1 =  $.34 \times 294,000 = 99,960$

Amount allocated to income year 2 =  $.66 \times 294,000 = 194,040$

As the change in expense allocated to each year is greater than \$5 it is necessary to increase the precision so the company tries:

Third Calculation:  $61/180 = 0.339$

Amount allocated to income year 1 =  $.339 \times 294,000 = 99,666$

Amount allocated to income year 2 =  $.661 \times 294,000 = 194,334$

As the change in expense allocated to each income year is still greater than \$5 it is still necessary to increase precision:

Fourth Calculation:  $61/180 = 0.3389$

Amount allocated to income year 1 =  $.3389 \times 294,000 = 99,636.60$

Amount allocated to income year 2 =  $.6611 \times 294,000 = 194,363.40$

The comparison must be repeated again as the difference has not yet reduced to \$5 or less:

Fifth Calculation:  $61/180 = 0.33889$

Amount allocated to income year 1 =  $.33889 \times 294,000 = 99,633.66$

Amount allocated to income year 2 =  $.66111 \times 294,000 = 194,366.34$

Since the difference is less than \$5 it is acceptable to use the ratio .3389 to allocate expenditure to the income year ending on 31 March 1987.

This determination is signed by me on the 13th day of May in the year 1987.

JOHN SIMCOCK, Commissioner of Inland Revenue.

#### YIELD TO MATURITY METHOD

DETERMINATION G3: This determination may be cited as "Determination G3: Yield to Maturity Method".

1. *Explanation* (which does not form part of the determination). This determination states how the yield to maturity method shall be applied to a financial arrangement to calculate income derived or expenditure incurred for the purposes of section 64C of the Income Tax Act 1976.

It applies to all financial arrangements where the amounts and dates are known not later than the first balance date of the issuer or holder after issue or acquisition, as the case may be, and determined in New Zealand currency.

The approach adopted is to define a constant annual rate R representing the yield to maturity of all the cash flows in the financial arrangement. Income derived and expenditure incurred is assumed to be compounded on the date of each payment. If they wish holders or issuers may simplify the calculations by using regular periods, such as half-years or weeks, where most or all of the cash flows occur at such intervals.

However where a period between payments is longer than 1 year, income derived and expenditure incurred must be compounded at yearly intervals.

In general there is no explicit formula for a yield to maturity in terms of the cashflows. The yield to maturity is defined as the discount rate at which the cashflows accumulate to zero. As part of the method, the amount of income derived or expenditure incurred to be compounded at the end of each period is calculated as a fraction F multiplied by the principal outstanding during the period. This income derived and expenditure incurred is then added to the principal outstanding for the next period (if one exists). The final payment must equal the principal outstanding during the final period plus the income derived or expenditure incurred during that period.

The amount of income derived or expenditure incurred by the holder or issuer in respect of a period is to be apportioned among income years in the period on a daily basis using Determination G1: Apportionment of Daily Income and Expenditure.