5.280 Bond Calculator

Bond Calculator is an online facility used to compute price given yield or yield given price to maturity or call as of a specific date. This calculation may be performed on most bond securities, whether defined to the security master file or not. If defined, relevant data is pulled from BOSB and/or BOCA. If not defined, the security number is left blank and all fields must be manually input. Generally, data may be manually entered and/or provided by the Security Master. Manually entered data overrides system-provided data.

Bond Calculator may also be used to calculate index ratio and reference index on Treasury Inflation Indexed Securities (TIIS). In this case, the security must be defined so that the required index data is available for the calculations. For more information of Treasury Inflation Indexed Securities, see Section 5.110.

- For Stepped coupon (Asset Group "SB" and "SM") bonds, the only manually entered Security Master data that is retained for the calculation is MATU/CALL DATE.
- For Fixed income coupon bonds, call/put dates are generally allowed to be off-cycle from regular coupon dates such that an irregular coupon period leading to or from a call/put date may exist. However, such irregular coupon periods should be avoided for stepped coupon bonds, as SIA price/yield formula 25 (used for these bonds) does not support irregular coupon periods.
### CALC Screen: Bond Calculator

#### Field Description. Fields Shaded Gray are Required.

<table>
<thead>
<tr>
<th>Field</th>
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</tr>
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<tbody>
<tr>
<td>SECURITY NO</td>
<td>Enter the specific number of a security as defined to the Security Master. Field may also be left blank. System displays security short description.</td>
</tr>
<tr>
<td>DATE</td>
<td>Enter the date the calculation is to be made (for example, trade date) [MMDDCCYY].</td>
</tr>
</tbody>
</table>
| COMPUTE PRICE, YIELD OR INDEX| P – Price  
Y – Yield  
I - Index |
| TO MATURITY OR CALL          | M - Maturity  
C - Call |
| ACCRUAL METHOD               | Enter one of the following values:  
A - Actual days/year  
B - CD (actual)  
C - CD (actual/360)  
D - 30/360 method  
N - Discount notes (actual/365)  
T - Discount notes (360) |

For securities defined with accrual method "X", the interest bearing commercial paper formula is used. This yield formula is independent of par, date, and the price of the security purchased. As a result, the same yield is returned regardless of the price specified. Conversely, the price result always equals 100.00 for any yield entered.
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| PAYMENT FREQUENCY   | Enter the payment cycle: A - Annually  
                      M - Monthly  
                      Q - Quarterly  
                      S - Semi-annually  
                      B - Every two months                                                                                           |
| ISSUE DATE          | Date bond came into existence.                                                                                                                                                                                                                 |
| MATU/CALL DATE      | Date bond is to mature or the date the bond will be called (MMDDCCYY).                                                                                                             |
| FIRST COUP DATE     | Enter the first coupon date.                                                                                                                                                                                                                  |
| PAYMENT MM/DD       | Enter the month and day of payment. This is the date when the payment is due, not the date the payment is actually received.  
                      MM - The month in which one of the payments occurs.  
                      DD - The day on which the payment occurs; for example, 15th. If the bond always pays on the last day of the month, 99 must be entered to indicate that the payment date varies depending on the month. |
| INTEREST RATE       | Enter annual rate of interest applicable to this bond; must be less than or equal to 100.0000. Percent is implied.                                                                 |
| MATU/CALL VALUE     | Enter the call price or the maturity value as a rate up to 100,000.0000.                                                                                                         |
| 1ST PDWN DATE       | A valid date entry is optional and allowed only for securities defined as having Asset Group “G1”, “G2”, “FH”, “FM”, or “MR” coupled with accrual method “A”, “D”, “E”, or “F” to support SIA Formula 2 for MBS having delayed principal payments.  
                      Must be a regular payment date based on Payment Frequency, Payment Month/Day, Issue Date, and Maturity Date. The date entered represents the first date at which principal paydowns are anticipated in calculating cash flows for input to the price or yield calculation. |
| PREPAY              | Blank – If FAS91 is "1", the effects of anticipated prepayments on yield or price calculations are based on CPRs.  
                      If FAS91 is "2", the effects of anticipated prepayments on yield or price calculations are based on PSAs.  
                      C - If FAS91 is "1" or "2", the effects of anticipated prepayments are based on CPRs.  
                      P - If FAS91 is "1" or "2", the effects of anticipated prepayments are based on PSAs. |
| PAR VALUE           | Enter the par value of the bond. Default is $100,000,000.00.                                                                                                                      |
| PRICE               | If computing yield, enter the market value of the bond as of calculation date. If left blank, Investment Accounting (InvestOne) computes based on DOLLAR VALUE and PAR VALUE. |
| YIELD               | If computing price, enter desired yield value.                                                                                                                                                                                                 |
| INDEX RATIO         | For an index request, the index ration from issue date to request date.                                                                                                           |
| REFERENCE INDEX     | For an index request, the reference index at request date.                                                                                                                        |
| PURCHASED INT       | System-calculated value of purchased interest based on accrual method, calculation date, payment frequency, and first coupon date.                                                  |

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<td>PURCHASE DATE</td>
<td>To calculate price given yield for bonds using amortization/accretion method &quot;I&quot; (installment (NPV) method) enter the contractual settle date of the purchase on which the yield was based, otherwise leave this field blank.</td>
</tr>
</tbody>
</table>
| EFFECTIVE DATE        | Default - DATE entered, controls the cutover from using VSPB pool balance/factor date to using VSPP CPR/PSA data for FAS91 calculations. VSPB balances/factors corresponding with all cash flow dates less than or equal to the EFFECTIVE DATE are used.  
   - If the pool balance/factor with the cash flow date closest to but not greater than the EFFECTIVE DATE is available, the most recent CPR/PSA in effect for the next cash flow date is used for the next cash flow date and for all subsequent cash flow dates.  
   - If the pool balance/factor with the cash flow date closest to but not greater than the EFFECTIVE DATE is not available, the most recent CPR/PSA in effect for that cash flow date is used for that cash flow date and all subsequent cash flow dates.                                                                                                                                                                                                                     |
| FAS91                 | Blank – Default value. Normal non-FAS91 compliant price or yield request, where SIA Formula 2 is not invoked.  
   1 - FAS91 compliant price or yield request as though AAAD FAS91 were "1". SIA Formula 2 (modified for clean price) is invoked and CPRs on file and in effect as of request date are used to project cash flows for input to the price or yield calculation (unless PREPAY = "P", in which case PSAs are used instead of CPRs).  
   2 - FAS91 compliant price or yield request as though AAAD FAS91 were "2". SIA Formula 2 (modified for clean price) is invoked and PSAs on file and in effect as of request date are used to project cash flows for input to the price or yield calculation (unless PREPAY = "C", in which case CPRs are used instead of PSAs).                                                                                                                                 |
| MBS ORIG FACE OPTION  | Blank – Default. If FAS91 is blank, this field must also be blank, indicating that neither pool balances nor published factors are used in the price or yield calculation.  
   B - If FAS91 is “1” or “2”, this field must be populated, where “B” indicates that pool balances on file (as opposed to published factors) are used to derive historical cash flows for input to the price or yield calculation.  
   F – If FAS91 is “1” or “2”, this field must be populated, where “F” indicates that published factors on file (as opposed to pool balances) are used to derive historical cash flows for input to the price or yield calculation.                                                                                                                                                                                                                           |
| PAID DOWN OPTION      | Blank – Default. If FAS91 is blank, this field must also be blank.  
   Y – If FAS91 is “1”, “2”, “3” or “4”, this field must be populated, where “Y” indicates that the Par Value entered is assumed to have been reduced by the most recent paydown (because the paydown transaction for that payment date is assumed to be effective).  
   N - If FAS91 is “1”, “2”, “3” or “4”, this field must be populated, where “N” indicates that the Par Value entered is assumed not to have been reduced by the most recent paydown (because the paydown transaction for that payment date is assumed not to be effective).                                                                                                                                 |
| UNIT FACTOR           | Determines if a bond is unitized. When this field is a value other than 1.0000, the bond is considered "unitized" and will go through "unitized bond" processing. Yield calculations include the “Unit Factor” in the interest portion of the calculations when determining the future cash flows. This impacts both level yield and scientific yield calculations.                                                                                                                                         |
Notes

1. A bond is considered a “unitized” bond when the Unit Factor field is a value other than 1.000.
2. To calculate yield given price or price given yield for a “unitized” bond, the “Maturity/Call Value” will need to be overridden. Although, this field is not included in the calculation for the “Dollar Value” or “Price”, the field needs populated in order to calculate the proper yield or price for unitized bonds.
3. “Dollar Value” for unitized bonds is calculated as: “Par Value” * “Price”.
4. “Price” for unitized bonds is calculated as: “Dollar Value” / “Par Value”.
HYPOTHETICAL VS ACTUAL SECURITY

- Where the screen is used with a hypothetical security (that is, SECURITY NO is not entered) the standard SIA price and yield formulas are used to calculate results. Hypothetical security is not allowed for stepped coupon bonds, for which the interest rate in effect at the request date is automatically populated on the CALC screen from rate data seen on the VSCR screen.

- Hypothetical security is not allowed for FAS91 calculations. An actual security must be entered for these calculations.

- Where the screen is used with an actual security which has been defined to Investment Accounting (InvestOne):
  - The standard SIA price and yield formulas are used if the security is defined as having Amortization/Accretion Method “N”, “M”, “Y” or “S”;
  - The level-yield formulas are used if the security is defined as having amortization/accretion method “L”;
  - The catch-up formulas are used if the security is defined as having Amortization/Accretion Method “C”;
  - The installment (NPV) formulas are used if the security is defined as having Amortization/Accretion Method “I”.
    - Where the installment (NPV) formulas are used, the Repayment Schedule (BORS) screen data is used to provide cash flow details relative to the entire bond issue.
    - For the installment (NPV) yield formula, a yield of -999 is returned if the result is incalculable. For the installment (NPV) price formula, a yield of -999 will return a price result of zero.