INVESTMENT PERFORMANCE COUNCIL (IPC)

INVITATION TO COMMENT:
Global Investment Performance Standards (GIPS®)
Guidance Statement on Calculation Methodology
The Association for Investment Management and Research (AIMR) seeks comment on the proposed Guidance Statement addressing calculation methodology set forth below. For information on the Guidance Statement process, please see http://www.aimr.org/standards/pps/process.html.

Comments must be submitted in writing and be received by AIMR no later than 31 October 2002. All comments and replies will be put on the public record unless specifically requested.

Comments should be addressed to:
Professional Standards and Advocacy
Association for Investment Management and Research
P.O. Box 3668
Charlottesville, Virginia 22903
USA
Re: GIPS Guidance Statement
Fax: 01-434-951-5320
E-mail: standardsetting@aimr.org

AIMR accepts responses by fax or e-mail, but it would be helpful if a hardcopy response is submitted as well.

Effective Date
This Guidance Statement will apply to all firms from the Effective Date forward. The proposed Effective Date for this Guidance Statement is 1 April 2003. This is the earliest date that the guidance can become effective given the estimated time needed for the public comment and IPC approval process. On this date, the Guidance Statement will replace all previous guidance on the subject.

Executive Summary
The GIPS standards indicate specific dates in the future when different calculation methodologies will be required. This Guidance Statement provides clarification on the various methodologies for calculating rates of return and asset-weighting portfolio returns to calculate composite returns.

Comment Requested
AIMR seeks public input on the proposals set forth in this document. Issues to consider in conjunction with this proposal include:

- Do you agree with the principles established in the Guidance Statement?
- Are all areas of rate of return and asset-weighted composite calculation sufficiently covered in this Guidance Statement?

- Are there other areas of calculation methodology that should be addressed in this Guidance Statement?
- Is it reasonable to expect that firms will be able to value portfolios at the time of any external cash flow beginning 1 January 2010 (excluding real estate, venture capital, and private equity)?
- Do you agree with the proposed Effective Date? If not, when should the guidance become effective?

If commentators suggest other proposals, AIMR requests that they explain the rationale behind their proposal.

Adoption Date:
Effective Date: 1 April 2003
Retroactive Application: No

INVESTMENT PERFORMANCE COUNCIL
Global Investment Performance Standards (GIPS®)

Guidance Statement on Calculation Methodologies

Standard 2.A.1: "Total return, including realized and unrealized gains plus income, must be used."

Standard 2.A.2: "Time-weighted rates of return that adjust for cash flows must be used. Periodic returns must be geometrically linked. Time-weighted rates of return that adjust for daily-weighted cash flows must be used for periods beginning 1 January 2005. Actual valuations at the time of external cash flows will likely be required for periods beginning 1 January 2010."

Standard 2.A.3: "In both the numerator and the denominator, the market values of fixed-income securities must include accrued income."

In calculating the performance of the portfolios within a composite, the GIPS standards require firms to use:

1. A total rate of return. A total return includes income as well as realized and unrealized gains and losses. Standard 1.A.5 requires the use of accrual accounting for fixed-income securities and all other assets that accrue interest income. Standard 1.A.6 states that accrual accounting must be used for dividends beginning 1 January 2005.

2. A time-weighted rate of return (TWRR), computed using a minimum of monthly valuations and adjusting for cash flows. Sub-period returns must be geometrically linked. The GIPS standards require the use of a time-weighted rate of return because it removes the effects of cash flows, which are generally client-driven. By removing the effects of cash flows, a time-weighted rate of return best reflects the firm's ability to manage the portfolio assets according to a specified strategy or objective. Calculation methodologies that include adjustments to remove the effect of cash flows from the performance return are considered time-weighted rate-of-return methods.

An example of the total return formula where no cash flows have occurred is:

$$R_{TR} = \frac{(EMV - BMV)}{BMV}$$

R_{TR} is the total return, *EMV* is the market value of the portfolio at the end of the period, including all income accrued up to the end of the period, and *BMV* is the portfolio's market value at the beginning of the period, including all income accrued up to the end of the previous period.

This formula represents the growth (or decline) in the value of the portfolio, including both capital appreciation and income, as a proportion of the beginning market value with no cash flows over a period.

However, most portfolios experience cash flows. A cash flow is an external flow of cash and/or securities (i.e., capital additions or withdrawals). Dividend payments and interest income are not considered cash flows. Unless adjustments are made, cash flows may skew the portfolio return. A more accurate method of calculating individual portfolio performance is to determine the market value of the portfolio on the date of each cash flow, calculate a rate of return for the sub-period according to the preceding formula, and geometrically link the sub-period returns to calculate the portfolio return for the full period.

Adjustments must, therefore, be made to account for cash flows. The above formula also represents the same calculation used to compute sub-period returns using the Daily Valuation Method, with sub-period returns geometrically linked to produce the return for the period.

Until 1 January 2010, calculation methods that approximate the effect of cash flows are acceptable. However, the philosophy of the GIPS standards is to present performance returns that are as accurate as practically possible. Just as the Standards transition to more frequent valuations (See, Standard 1.A.3.), the Standards also transition to more precise calculation methodologies. Therefore, the GIPS standards will *require* time-weighted rates of return that adjust for *daily-weighted* cash flows by 1 January 2005 and will likely *require* time-weighted rates of return with valuations at the time of external cash flows by 1 January 2010. Each of these methodologies is described below. Firms are permitted to include portfolios with different calculation methodologies in the same composite (provided the methodologies are permitted according the dates stated above). Firms must be consistent in the methodology used for each portfolio within the composite (e.g., firms cannot change the methodology from month-to-month depending on which methodology produces the highest return).

TWRR that adjust for cash flows
(Permitted until 1 January 2005)

Various methods that approximate a TWRR are currently acceptable. The purpose of these methods is to produce as good an estimate as possible in circumstances where daily valuations are not readily available. One example of an acceptable method is the Original Dietz Method.

Original Dietz Method. This method approximates when cash flows are received into a portfolio by assuming that all cash flows occur at the midpoint of the period and half-weights the total flows for the period.

$$R_{Dietz} = \frac{EMV - BMV - CF}{BMV + 0.5CF}$$

where *BMV* and *EMV* are defined as above and *CF* is the net cash flow for the period (contributions to the portfolio are positive flows, and withdrawals or distributions are negative flows).

TWRR that adjusts for *daily-weighted* cash flows
(Required for periods after 1 January 2005)

Beginning 1 January 2005, approximation methods of TWRR must include a daily-weighted adjustment for cash flows that occur during the measurement period. Firms should calculate the return for each period using a denominator that reflects the weighting of cash flows for the time they have been invested during the period. This method contrasts with other approximation methods that may, for example, assume that all cash flows are spread evenly through the month. Examples of acceptable daily-weighted methods include the Modified Dietz and Modified Internal Rate of Return (IRR) Methods. These methods weight each cash flow by the amount of time it is held in the portfolio. These are an estimate of the true TWRR.

Modified Dietz Method. The Modified Dietz Method improves upon the Original Dietz Method by assuming a constant rate of return on the portfolio during the period, thereby eliminating the need to know the value of the portfolio on the date of each cash flow. The Original Dietz Method assumes that all cash flows occur during the midpoint of the period. In an attempt to determine a more accurate return, the Modified Dietz Method weights each cash flow by the amount of time it is actually held in the portfolio. The formula for estimating the time-weighted rate of return using the Modified Dietz Method is

$$R_{MDietz} = \frac{EMV - BMV - CF}{BMV + \sum_{i=1}^{n} \left(CF_i \times W_i\right)}$$

where *EMV* and *BMV* are as defined previously, *CF* is the net cash flows within the period (contributions to the portfolio are positive flows, and withdrawals or distributions are negative flows), and $\sum_{i=1}^{n} \left(CF_i \times W_i\right)$ is the sum of each cash flow, CF_i, multiplied by its weight, W_i.

The weight (W_i) is the proportion of the total number of days in the period that cash flow CF_i has been held in (or out of) the portfolio. The formula for W_i is

$$W_i = \frac{CD - D_i}{CD}$$

where *CD* is the total number of calendar days in the period and D_i is the number of calendar days since the beginning of the period in which cash flow CF_i occurred.

The numerator is based on the assumption that the cash flows occur at the end of the day. If cash flows were assumed to occur at the beginning of the day, the numerator would be (CD-D_i) + 1. Some firms adjust for cash in-flows at the beginning of the day and cash out-flows at the end of the day. The key is for each firm to establish a policy and treat cash flows consistently.

The chief advantage of the Modified Dietz Method is that it does not require portfolio valuation on the date of each cash flow. Its chief disadvantage is that it provides a less accurate estimate of the true time-weighted rate of return. The estimate suffers most when a combination of the following conditions exists: (1) one or more large cash flows occur; (2) cash flows occur during periods of high market volatility – i.e., the portfolio's returns are significantly non-linear. Firms should note that approximation methods such as the Modified Dietz Method will not conform with the GIPS standards beginning 1 January 2010 when the Standards will likely require the use of calculations methods that use actual valuations at the time of external cash flows.

Modified IRR Method. The Modified IRR Method (also known as the Modified Bankers Administration Institute (BAI) Method) alters the Internal Rate of Return (IRR) formula by taking into account the timing of each cash flow, thus transforming it from a money-weighted calculation method to a time-weighted method. In the Modified IRR approach, the IRR is that value of R that satisfies the following equation:

$$EMV = \sum_{i=0}^{n} F_i(1+R)^{Wi}$$

where EMV and W_i are the same as for the Modified Dietz Method.

The cash flows, F_i, are also the same as with the Modified Dietz Method with one important exception: The market value at the start of the period is also treated as a cash flow; i.e., $BMV = F_0$.

The IRR is obtained by selecting values for R and solving the equation until the result equals EMV. For example, if three cash flows (including the market value at the beginning of the period as the cash flow) have occurred, the computational formula will have three terms:

$$EMV = F_0(1+R)^{W_0} + F_1(1+R)^{W_1} + F_2(1+R)^{W_2}$$

The first term deals with the first cash flow, F_0, which is the value of the portfolio at the beginning of the period; W_i is the proportion of the period that the cash flow F_i was held in (or out of) the portfolio. Because F_0 is in for the whole period, $W_0 = 1$. The larger the value of F_i in the term, the more it will contribute to the total, but the smaller the exponent (i.e., the value of W_i), the less the term will contribute to the sum. The usual effect is that the first term, with a large F_0 and W_0 equal to 1, will contribute far more than the other terms.

The advantages and disadvantages of the Modified IRR Method are the same as those of the Modified Dietz Method. The Modified IRR Method has the additional disadvantage of requiring an iterative process solution and is thus less desirable than the Modified Dietz Method when manual calculation is required. It is also possible to have multiple answers if there are both positive and negative cash flows. Calculator and computer programs are available, however, for solving for the Modified IRR.

TWRR that uses actual valuations at the time of external cash flows
(Likely required beginning 1 January 2010)

The actual valuation of the portfolio each time there is an external cash flow will result in the most accurate TWRR calculation. In practice, this requirement can only be met by having the ability to obtain daily valuations on all portfolio holdings on a continuous basis.

Daily Valuation Method. The Daily Valuation Method calculates the true TWRR rather than an estimate. The Daily Valuation Method breaks the total performance period into sub-periods, based on the occurrence of cash flows, in order to remove the effects of the cash flows. The formula for calculating the sub-period return is:

$$R_n = \frac{(EMV - BMV)}{BMV}$$

where *EMV* is the market value of the portfolio at the end of the sub-period, before any cash flows in the period, but including accrued income for the period. *BMV* is the market value at the end of the previous sub-period (i.e., the beginning of the current sub-period), including any cash flows at the end of the previous sub-period and including accrued income up to the end of the previous period.

The sub-period returns are then geometrically linked according to the following formula:

$$R_{TR} = ((1 + R_1) \times (1 + R_2) ... (1 + R_n)) - 1$$

where R_{TR} is the total return and R_1, $R_{2...}R_n$ are the sub-period returns for sub-period 1 through n respectively. Sub-period 1 extends from the first day of the period up to and including the date of the first cash flow. Sub-period 2 begins the next day and extends to the date of the second cash flow, and so forth. The final sub-period extends from the day after the final cash flow through the last day of the period.

This method assumes that the cash flow is not available for investment until the beginning of the next day. Accordingly, when the portfolio is revalued on the date of a cash flow, the cash flow is not reflected in the Ending Market Value, but is added to the Ending Market Value to determine the Beginning Market Value for the next day.

The chief advantage of this method is that it calculates the true time-weighted rate of return rather than an estimate. The major disadvantage is that it requires precise valuation of the portfolio on the date of each cash flow, something that may not be practical for some firms at this time. In practice, this means that firms must have the ability to value portfolios on a daily basis. If all securities are not accurately priced for each sub-period valuation, errors generated in the return calculation using the daily valuation method may be greater than the errors caused by using the approximation methods. In such cases, it is important to be able to correct for errors,

such as missed security splits, mis-pricings, and improperly booked transactions, because day-to-day compounding will not correct for them automatically if there are cash flows.

Since a time-weighted rate of return using *actual* valuations at the time of external cash flows will likely be required for periods beginning 1 January 2010, firms using an approximation method will have to change their calculation method by that time.

Geometric Linking

If monthly portfolio returns are calculated, the monthly returns are linked geometrically to compute a quarterly return using this formula:

$$R_{QT} = \left(\left(1 + R_{MO1}\right) \times \left(1 + R_{MO2}\right) \times \left(1 + R_{MO3}\right)\right) - 1$$

where R_{QT} is the portfolio quarterly return and R_{MO1}, R_{MO2}, and R_{MO3} are the portfolio returns for months 1, 2, and 3, respectively.

Similarly, to compute the annual rate of return for portfolio returns calculated quarterly, the formula to use is

$$R_{YR} = \left(\left(1 + R_{QT1}\right) \times \left(1 + R_{QT2}\right) \times \left(1 + R_{QT3}\right) \times \left(1 + R_{QT4}\right)\right) - 1$$

where R_{QT1}, R_{QT2}, R_{QT3}, and R_{QT4} are composite returns for Quarters 1, 2, 3, and 4, respectively. Alternatively, firms could geometrically link the twelve monthly returns to calculate the annual return.

Application:

Example 1: *Given the following information, calculate the rate of return for this portfolio for January, February, March, and the first quarter of 1998, using the* ***Modified Dietz Method:***

Date	Market Value (€)	Cash Flow (€)	Market Value Post Cash Flow (€)
12/31/97	200,000		
1/31/98	208,000		
2/16/98	217,000	+40,000	257,000
2/28/98	263,000		
3/22/98	270,000	-30,000	240,000
3/31/98	245,000		

Solution:

January

$$R_{Jan} = \frac{(208{,}000 - 200{,}000)}{200{,}000} = 4.00\%$$

February

$$W = \frac{(28 - 16)}{28} = 0.43 \quad R_{Feb} = \frac{(263{,}000 - 208{,}000 - 40{,}000)}{(208{,}000 + (40{,}000 \times 0.43))} = 6.66\%$$

March

$$W = \frac{(31 - 22)}{31} = 0.29 \quad R_{Mar} = \frac{(245{,}000 - 263{,}000 - (-30{,}000))}{(263{,}000 + (-30{,}000 \times 0.29))} = 4.72\%$$

Quarter 1

$$R_{QT1} = ((1 + 0.0400) \times (1 + 0.0666) \times (1 + 0.0472)) - 1 = 16.16\%$$

Example 2: *Given the following information, calculate the rate of return for this portfolio for January, February, March, and the first quarter of 2000, using the* ***Daily Valuation Method****:*

Date	Market Value (€)	Cash Flow (€)	Market Value Post Cash Flow (€)
12/31/99	500,000		
1/31/00	509,000		
2/19/00	513,000	+50,000	563,000
2/28/00	575,000		
3/12/00	585,000	-20,000	565,000
3/31/00	570,000		

Solution:

January

$$R = \frac{(509{,}000 - 500{,}000)}{500{,}000} = 1.80\%$$

February

1/31/00 – 2/19/00 $R = \frac{(513{,}000 - 509{,}000)}{509{,}000} = 0.79\%$

2/19/00 – 2/28/00 $R = \frac{(575{,}000 - 563{,}000)}{563{,}000} = 2.13\%$

1/31/00-2/28/00 $R_{FEB} = ((1 + 0.008) \times (1 + 0.021)) - 1 = 2.92\%$

March

2/28/00 – 3/12/00 $R = \frac{(585{,}000 - 575{,}000)}{575{,}000} = 1.74\%$

3/12/00 – 3/31/00 $R = \frac{(570{,}000 - 565{,}000)}{565{,}000} = 0.88\%$

2/28/00-3/31/00 $R_{Mar} = ((1 + 0.017) \times (1 + 0.009)) - 1 = 2.62\%$

Quarter 1

$R_{QT1} = ((1 + 0.018) \times (1 + 0.029) \times (1 + 0.026)) - 1 = 7.48\%$

Standard 2.A.4: "Composites must be asset weighted using beginning-of-period weightings or another method that reflects both beginning market value and cash flows."

Discussion: A composite is an aggregation of individual portfolios or asset classes representing similar investment objectives or strategies. The objective in calculating the composite returns is to use a method that will produce the same value as if the assets of all the individual portfolios in the composite were aggregated and a return is calculated for one "master portfolio."

The GIPS standards are based on the principle of asset-weighted returns. For example, if a composite contains two portfolios, one of which is ten times the size of the other, the rate of return for the larger portfolio should have more impact on the composite return than that of the smaller portfolio. The asset-weighted return method accomplishes this by weighting each portfolio's contribution to the composite rate of return by its beginning market value (as a percentage of the composite's beginning market value).

The Standards require asset weighting of the portfolio returns within a composite using beginning-of-period weightings, beginning-of-period market values plus weighted cash flows, or by aggregating portfolio assets and cash flows to calculate performance as a single master portfolio.

The beginning market value-weighted composite return, R_{BMV}, can be calculated using the formula

$$R_{BMV} = \frac{\sum_{i=1}^{n} \left(BMV_i \times R_i \right)}{BMV_{TOTAL}}$$

where BMV_i is the beginning market value (at the start of the period) for Portfolio i, R_i is the rate of return for Portfolio i, and BMV_{TOTAL} is the total market value at the beginning of the period for all the portfolios in the composite.

The beginning market value plus cash flow-weighted method represents a refinement to the asset-weighted approach. Consider the case in which one of two portfolios in a composite doubles in market value as the result of a contribution on the third day of a performance period. Under the asset-weighted approach, this portfolio will be weighted in the composite based solely on its beginning market value (i.e., not including the contribution). The beginning market value plus cash flow-weighted method resolves this problem by including the effect of cash flows in the weighting calculation as well as in the market values. The weighting factor is calculated using a similar formula as the Modified Dietz Method:

$$W_{i,j} = \frac{\left(CD - D_{i,j} \right)}{CD}$$

where CD is the total number of calendar days in the period and $D_{i,j}$ is the number of calendar days since the beginning of the period in which cash flow j occurred in portfolio i.

The beginning market value plus cash flow-weighted composite return, R_{BMV+CF}, can be calculated as follows:

$$R_{BMV+CF} = \frac{\sum_{i=1}^{n}\left(\left(BMV_i + \left(\sum_{j=1}^{m} CF_{i,j} \times W_{i,j}\right)\right) \times R_i\right)}{\sum_{i=1}^{n}\left(BMV_i + \left(\sum_{j=1}^{m} CF_{i,j} \times W_{i,j}\right)\right)}$$

where $CF_{i,j}$ is cash flow j within the period for portfolio i (contributions to the portfolio are positive flows, and withdrawals or distributions are negative flows) and R_i is the return for portfolio i.

The aggregate return method combines all of the composite assets and cash flows to calculate performance as if the composite were one portfolio. The method is also acceptable as an asset-weighted approach.

Application:

Calculate the composite return using each of the three methods based on the following data:

Portfolio 1

Date	Market Value ($)	Cash Flow ($)	Market Value Post Cash Flow ($)
12/31/99	100,000		
1/10/00	103,000	20,000	123,000
1/22/00	130,000		
1/31/00	133,000		

Monthly Return = 11.32%

Portfolio 2

Date	Market Value ($)	Cash Flow ($)	Market Value Post Cash Flow ($)
12/31/99	500,000		
1/10/00	512,000		
1/22/00	530,000	-70,000	460,000
1/31/00	470,000		

Monthly Return = 8.26%

Composite Return

Beginning Market Value Weighting Method:

$$R_{BMV} = \frac{(100{,}000 \times 0.1132) + (500{,}000 \times 0.0826)}{(100{,}000 + 500{,}000)} = 8.77\%$$

Beginning Market Value Plus Cash Flows Method:

$$W_{PORT1} = \frac{(31-10)}{31} = 0.68$$

$$W_{PORT2} = \frac{(31-22)}{31} = 0.29$$

$$R_{BMV+CF} = \frac{((100{,}000 + (20{,}000 \times 0.68)) \times 0.1132) + ((500{,}000 + (-70{,}000 \times 0.29)) \times 0.0826)}{((100{,}000 + (20{,}000 \times 0.68)) + (500{,}000 + (-70{,}000 \times 0.29)))} = 8.85\%$$

Aggregate Method: (Using Modified Dietz Method)

$$W_{Port1} = \frac{(31-10)}{31} = 0.68$$

$$W_{Port2} = \frac{(31-22)}{31} = 0.29$$

$$R_{January} = \frac{((133{,}000 + 470{,}000) - (100{,}000 + 500{,}000) - (20{,}000 - 70{,}000))}{(100{,}000 + 500{,}000 + (20{,}000 \times 0.68) + (-70{,}000 \times 0.29))} = 8.93\%$$