

Trustee Certification

Use this form to:

- Remove trustees from a Vanguard mutual fund or brokerage trust account (see Section 2).
- Add trustees to a trust account (see Section 3).
- Designate the trustee who is authorized to control e-delivery preferences for a trust account *(applies only to trusts registered under an employer ID number (EIN) that have more than one trustee).* See Section 4 for details.

Note: If you're a trustee on more than one EIN trust with multiple trustees that has an account at Vanguard, you must submit a separate Trustee Certification for each trust to elect e-delivery for that trust.

All continuing and new trustees must sign in Section 5. In most cases, signatures must be provided in the presence of a notary public. However, if the trust is registered under an EIN and you're only completing Sections 1 and 4 of this form, notarization isn't required.

Don't use this form to establish a trust account at Vanguard.

For assistance in determining the conditions of your trust or the trust's authority, consult legal counsel. Vanguard won't review or interpret trust documents.

Print in capital letters and use black ink.

1. Trust information required

Provide the SSN or EIN on the existing trust > account held at Vanguard. Name of trust full, legal name

Social Security number (SSN) or employer ID number (EIN) Date of trust agreement mm/dd/yyyy

Or if the trust was created under a decedent's will:

Name of trust or section within will where trust is created Include decedent's name.

2. Departing trustee information if applicable

Provide the names of the departing trustees and their reasons for departure. Be sure to attach the required documentation. **Note:** If no trustees are being removed from the trust, skip to Section 3.

If you need more space to list additional > trustees, provide the information on a separate sheet.

Name first, middle initial, last

Questions?

Call 800-662-2739. If you need other forms, go to vanguard.com/serviceforms.

Reason for departure

Incapacity. Attach a physician's certification of incapacity on physician's letterhead dated within 30 days, or an original or certified (within 90 days) copy of the court appointment of the guardian or conservator for the trustee.
Death. Attach a certified copy of the trustee's death certificate.
Resignation/Removal. If a trustee is resigning, attach a signed letter of resignation. Otherwise, provide a certified board resolution, Certificate of Appointment and Incumbency, or other documentary evidence of the removal of the trustee.

3. New trustee information if applicable

Provide the requested information for each new trustee. Note: If no trustees are being added to the trust, skip to Section 4.

Important: If the trust has Vanguard Brokerage accounts, each new trustee must also provide association information below. If you're appointing a corporation or other business entity as a trustee, you must complete and attach our Organization Resolution form. If this business entity is the sole trustee, you must also complete and attach our Certification of Beneficial Owners form.

Name of individual first, middle initial, last or organization			
Social Security number or employer ID number Birth date mm/dd/yyyy			
Street			
City, state, zip			
Daytime phone area code, number, extension Eveni	ing phone area code, number, extension		
Email			
	Social Security number or employer ID number Street City, state, zip Daytime phone area code, number, extension Even		

Trustee name and association

Citizenship and tax residency

Check and complete only one.

□ U.S. citizen		
Resident alien	Country of citizenship	
Nonresident alien*	Country of citizenship	Country of tax residence

Return pages 1–6 of this form, even if some are left blank.

^{*}If you're a nonresident alien, you must complete an IRS Form W-8BEN electronically to certify your tax status, and to claim treaty benefits, if applicable. For joint accounts where both owners are foreign, both owners must complete a Form W-8BEN. We'll mail you instructions for completing the electronic Form W-8BEN once your account has been established.

If you check this box, a letter of account approval from the compliance officer of the associated organization is required. **Association** If the trustee is authorized to transact on a Vanguard Brokerage Account, check all affiliations that apply, regardless of employment or retirement status.

□ Check this box if you're associated with a member of a stock exchange, a FINRA member firm, or a municipal securities dealer.

Check this box if you're, or if a household member is, a control person or an affiliate of a public company, as defined in SEC Rule 144 (this would include, but isn't limited to, 10% shareholders, policymaking executives, and members of the board of directors). If you check this box, you must provide the names and trading symbols of the companies for which such person serves as a control person or an affiliate.

Trading symbol

Name of company

Additional trustee name and association

	Name first, middle initial, last		
	Social Security number or employer ID number	Birth date mm/dd/yyyy	
If you need more space to	Street		
list additional new > trustees, photocopy this page.	City, state, zip		
	Daytime phone area code, number, extension	Evening phone area code, number, extension	
	Email	'	

Citizenship and tax residency

Check and complete only one.

U.S. citizen		
Country of citizenship		
Nonresident alien*	Country of citizenship	Country of tax residence

^{*}If you're a nonresident alien, you must complete an IRS Form W-8BEN electronically to certify your tax status, and to claim treaty benefits, if applicable. For joint accounts where both owners are foreign, both owners must complete a Form W-8BEN. We'll mail you instructions for completing the electronic Form W-8BEN once your account has been established.

Association If the trustee is authorized to transact on a Vanguard Brokerage Account, check all affiliations that apply, regardless of employment or retirement status.

If you check this box, a letter of account approval from the compliance officer of the associated organization is required.

□ Check this box if you're associated with a member of a stock exchange, a FINRA member firm, or a municipal securities dealer.

Check this box if you're, or if a household member is, a control person or an affiliate of a public company, as defined in SEC Rule 144 (this would include, but isn't limited to, 10% shareholders, policymaking executives, and members of the board of directors). If you check this box, you must provide the names and trading symbols of the companies for which such person serves as a control person or an affiliate.

Name of company	Trading symbol

4. Authorization for e-delivery optional

Complete this section if the trust indicated in Section 1 is established under an EIN with more than one trustee and either of the following is true:

- You want to designate one of the trustees as authorized to elect e-delivery of the trust's Vanguard account documents (statements, confirmations, etc.) with email notification of document availability to that trustee's email address.
- You want to change the existing trustee authorized to elect e-delivery.

Important:

- If any of the continuing or new trustees is an organization, e-delivery is NOT available for the trust account. Skip to Section 5.
- If you're a trustee on more than one EIN trust with multiple trustees that has an account at Vanguard, you must submit a separate Trustee Certification for each trust to elect e-delivery for that trust account.

	Name of designated trustee first, middle initial, last	
		Date mm/dd/yyyy
Sign with today's date here, if > applicable.	X	
	Email address required for e-delivery	

5. Certification of all trustees required

Important: All continuing trustees (including any new trustees) must sign on page 6. In most cases, signatures must be provided in the presence of a notary public. However, if the trust is registered under an employer ID number and you're only completing Sections 1 and 4 of this form, notarization isn't required.

The Vanguard Group, Inc., and certain of its affiliates (collectively, "Vanguard") are required by federal law to obtain from each person who opens an account, and in some cases, regarding each owner or trustee, certain personal information—including name, street address, and taxpayer identification number, among other information—that will be used to verify identity. If you do not provide us with this information, we will not be able to open the account. If we are unable to verify your identity, Vanguard reserves the right to close your account or take other steps we deem reasonable.

I/We certify by signing below that:

- The trust is valid and in full force and effect as of the date of this certification; the trustees have full authority under the trust document and applicable law to enter into investment and brokerage transactions on behalf of the trust, including the purchase, sale, exchange, transfer, and redemption of mutual funds and stocks, bonds, and other securities; and the trustees may issue general instructions as well as execute and deliver documents on behalf of the trust.
 - The trustees listed and signing this form are all currently serving or are new trustees.

yet established checkwriting for your account and would like this privilege, > you must complete

If you haven't

and submit our Checkwriting Form

with this form.

Number of trustee signatures required to take any action on behalf of the trust. If a specific number isn't provided, the signature of any one trustee will be accepted for written transactions. Phone requests may be made by any single trustee.

I/We authorize Vanguard's custodian bank to honor checks drawn by the trustees on the Vanguard fund account and to effect a redemption of sufficient shares in the account to cover payment of such checks. I/We understand that (1) this privilege may be amended or terminated at any time by the fund or the bank, and neither shall incur any liability to me for such amendment or termination, or for honoring such checks, or for effecting redemptions to pay such checks, or for returning checks that have not been accepted; (2) checks drawn on a trust account will require the signature of one trustee unless indicated otherwise in the box above; (3) no check shall be issued or honored, or redemption effected, for any amounts represented by shares unless payment for such shares has been made in full and any checks given in such payment have been collected through normal banking channels; and (4) this privilege is subject to all the terms and conditions stated in the Vanguard fund's prospectus.

The trustees acknowledge that Vanguard has not reviewed the trust document and understand that Vanguard is relying on the statements made in this certification.

The trustees agree to inform Vanguard of any amendment of the trust that would impact the information in this certification.

The current and new trustees of the trust named in Section 1 hereby declare that all statements made in this certification are true and correct to the best of each trustee's knowledge, that all actions taken and instructions given by any of the trustees are within such trustee's authority under the trust document and applicable law, and agree that this certification is binding upon the trust, its beneficiaries, and all future trustees. Each trustee agrees, on behalf of the trust, to indemnify and hold The Vanguard Group, Inc., Vanguard Marketing Corporation, their affiliates, and each of the investment company members of The Vanguard Group and their respective officers, employees, and agents harmless from and against all losses, claims, and expenses (including attorney's fees) of any kind incurred by Vanguard for relying in good faith upon this certification.

Notification for Brokerage Accounts

Vanguard Brokerage Accounts are governed by the applicable Vanguard Brokerage Account Agreement, which incorporates by reference the Vanguard Brokerage Services[®] Commission and Fee Schedules. These important documents are provided at account opening and when updated. Additional copies of these documents are available by contacting us.

All continuing and new trustees must sign on the next page.

A.U		
All continuing trustees (including	Signature of trustee	Date mm/dd/yyyy
any new trustees)	x	
must sign. In most	^	
cases, signatures must be provided in		
the presence of a	Print name	
notary public.		
However, if the trust		
is registered under an employer ID		
number and you're	Signature of trustee	Date mm/dd/yyyy
only completing	X	
Sections 1 and 4 of this form,		
notarization		
isn't required.	Print name	
	Signature of trustee	Date mm/dd/yyyy
If additional		Date minyddyyyyy
signatures > are required, copy	X	
are required, copy this page.		
this page.		
	Print name	
	Notarization/Affidavit of all trustees	
	Date mm/dd/yyyy	
	On	
	Name(s) of trustee(s)	
The notary seal		
	County or state	
within 30 days		
of receipt of > this document		opeared before me, has/have proven
by Vanguard.	to be the individual(s) named in Section 3 (if applicable) and wh acknowledged that this certification is his/her/their wish.	io signed Section 5, and has/have
	Signature of notary public Notary seal	
	Commission expiration data area (dd/area)	
	Commission expiration date mm/dd/yyyy	

Return pages 1–6 of this form, even if some are left blank.

Mailing information

Make a copy of your completed form for your records.

Mail pages 1-6 of this form and any attached information in the enclosed postage-paid envelope.

Allow two weeks for this Trustee Certification to be processed and for the trustees to receive confirmation of this transaction by mail.

If you don't have a postage-paid > P.O. Box 1110 envelope, mail to:

Vanguard Valley Forge, PA 19482-1110

Vanguard For overnight delivery, mail to: Variation Park Drive

Wayne, PA 19087-1815

Reminders

Verify that the following information has been provided, and that pages 1-6 of this form are returned to Vanguard-even if some are left blank.

- The full Social Security number (SSN) or employer ID number (EIN) of the trust in Section 1.
- Reason for departure of previous trustee(s) in Section 2, if applicable.
- Any additional documentation that might be required as described in Sections 2 and 3 (for departing trustees, documentation requirements are also provided below).
- Full name, SSN/EIN, and full address of new trustee(s) in Section 3, if applicable.
- Full name and dated signature of designated trustee in Section 4, if applicable. •
- Signatures of all new and continuing trustees in Section 5. Note: In most cases, signatures must be provided in the presence of a notary public. However, if the trust is registered under an EIN and you're only completing Sections 1 and 4 of this form, notarization isn't required.

If a departing trustee is:

- Incapacitated. You MUST attach a physician's certification of incapacity on physician's letterhead dated within 30 days, or an original or certified (within 90 days) copy of the court appointment of the guardian or conservator for the trustee.
- Deceased. You MUST attach a certified copy of the trustee's death certificate. If the deceased trustee's SSN was the tax ID number for the trust account, you must also complete our Change of Ownership Form.
- Resigning or being removed. You MUST attach a signed letter of resignation, a certified board resolution, Certificate of Appointment and Incumbency, or other documentary evidence of the removal of the trustee.

NTCF 042018

Vanguard Brokerage Services commission and fee schedules

Effective July 20, 2017

Stock and ETF (exchange-traded fund) commissions

Assets invested in Vanguard ETFs®	Vanguard ETFs ¹	Stocks and non-Vanguard ETFs
Less than \$50,000 (Standard) ²	Free	Online. First 25 trades: \$7 ³ ; subsequent trades: \$20 By phone. All trades: \$25
\$50,000-\$500,000 (Voyager Services®)	Free	Online. All trades: \$7 By phone. All trades: \$25
\$500,000–\$1 million (Voyager Select Services®)	Free	Online. All trades: \$2 By phone. All trades: \$20
\$1 million–\$5 million (Flagship Services®)	Free	Online and by phone. First 25 trades: Free ³ ; subsequent trades: \$2
\$5 million and above (Flagship Select Services®)	Free	Online and by phone. First 100 trades: Free ³ ; subsequent trades: \$2

¹ If you buy and sell the same Vanguard ETF® in a Vanguard® Brokerage Account more than 25 times in a 12-month period, you may be restricted from purchasing that Vanguard ETF through your Vanguard Brokerage Account for 60 days.

² Vanguard Brokerage Services[®] charges a \$20 annual account service fee. However, we don't charge the fee to: 1) Voyager, Voyager Select, Flagship, and Flagship Select clients; 2) clients who hold at least \$10,000 in Vanguard funds and ETFs; or 3) clients who've elected e-delivery of statements, our annual privacy policy notice, and brokerage and mutual fund confirmations, reports, prospectuses, and proxy materials.

³ The reduced commission or commission-free transactions will apply to the first 25 transactions for Standard and Flagship clients and the first 100 transactions for Flagship Select clients in each calendar year to any combination of stocks and non-Vanguard ETFs. The number of these transactions is limited to 25 per Standard or Flagship client and 100 per Flagship Select client, as identified by the primary Social Security number on the account. Vanguard Brokerage reserves the right to end these offers at any time.

You may receive a discount from standard commissions and fees if you're an enrolled client in Vanguard Voyager Services[®], Vanguard Flagship Services[®], or Vanguard Flagship Select Services[™]. Other discounts and fee waivers from standard commissions may also be available. Please note that Vanguard Retirement Investment Program pooled plan accounts are not eligible for discounts from standard commissions and fees. Additional information regarding discount eligibility is available at vanguard.com/investingbenefits.

For more information, visit us at vanguard.com/brokerage or contact Vanguard Brokerage Services.

Notes: A separate commission is charged for each security bought or sold. Orders that execute over multiple days are charged separate commissions. In addition, a separate commission is charged for each order placed for the same security on the same side of the market (buying or selling) on the same day. Orders that are changed by the client and executed in multiple trades on the same day are charged separate commissions. These commission and fee schedules are subject to change.

Options

Standard and Voyager Services	Voyager Select, Flagship, and Flagship Select Services	
\$7 + \$1 per options contract ⁴	\$2 + \$1 per options contract ^{4, 5}	

⁴ For Standard and Voyager Services, options exercises and assignments resulting in a stock trade will be subject to a \$7 + \$0.01 per-share commission. For Voyager Select®, Flagship®, and Flagship Select Services, options exercises and assignments resulting in a stock trade will be subject to a \$2 + \$0.01 per-share commission. All options exercises and assignments resulting in a stock trade will be subject to a \$2 + \$0.01 per-share commission. All options exercises and assignments resulting in a stock trade will be subject to a \$2 + \$0.01 per-share commission.

⁵ Options transactions are included in the offer of commission-free transactions (25 for Flagship clients and 100 for Flagship Select clients) described in footnote 3. Subsequent transactions are at the rates shown in the options fee schedule above.

Bonds and CDs

Vanguard Brokerage Services may act as an agent, executing your order at cost plus a commission, or as a principal, adding markups to purchase prices or subtracting markdowns from sales prices.⁶ When acting as a principal for a primary market issue, Vanguard Brokerage generally receives a fee concession from the issuer.

Security type	New issues	Existing issues
U.S. Treasury securities	Commission-free	Commission-free
U.S. government agency securities, corporate bonds, and CDs (certificates of deposit)	Commission-free ⁷	Standard and Voyager Services \$2 per \$1,000 face amount (\$250 maximum) Voyager Select, Flagship, and Flagship Select Services \$1 per \$1,000 face amount (\$250 maximum) Selling CDs prior to maturity Commission-free
Municipal bonds	\$50 commission if a fee concession isn't available ⁷	Standard and Voyager Services \$2 per \$1,000 face amount (\$250 maximum) Voyager Select, Flagship, and Flagship Select Services \$1 per \$1,000 face amount (\$250 maximum)
Mortgage-backed securities and commercial paper	\$50 per transaction	\$50 per transaction
Unit investment trusts (UITs)	Not available	Selling UITs \$35 per transaction

⁶ Bond and CD prices are available at vanguard.com and are price indications only. Online prices for all secondary-market bonds and CDs are before commissions.

⁷ Minimum purchase: \$10,000, subject to dealer minimum.

Mutual funds from other companies

Vanguard Brokerage Services gives you entry to thousands of mutual funds offered by hundreds of fund companies. We offer funds with and without transaction fees. We also offer load funds (see the next page).

Security type	Fee type	Amount
No-transaction-fee	Transaction fee	None
(NTF) funds		Standard and Voyager Services
		There's a service charge of \$50 for trades placed by phone.
		Voyager Select Services
		There's a service charge of \$40 for trades placed by phone.
	Minimum initial	For most funds: \$3,000 for nonretirement accounts and \$1,000
	investment	for IRAs ⁸
	Minimum additional	\$1,000 for any account type ⁸
	investment	
	NTF redemption fee	\$50 for all sales within 60 calendar days of the most recent purchase
		trade date
	Dollar-cost-averaging	No fee; \$100 minimum purchase; minimum two transactions
	transactions	
Transaction-fee	Transaction fee	Standard and Voyager Services
(TF) funds		Online. \$20
		By phone. \$50
		Voyager Select Services
		Online. \$8
		By phone. \$40
		Flagship and Flagship Select Services
		Online and by phone. \$89
		Fees apply per trade—purchases, sales, or exchanges
		- regardless of order size. A purchase fee is added to an
		order's cost. A sales fee is subtracted from an order's proceeds.
		If you exchange shares of a fund for another fund
		in the same fund family and share class, the transaction
		fee will be paid from your money market settlement fund.
	Initial and additional	\$1,000 ⁸
	investments	
	Dollar-cost-averaging	\$3 per transaction; \$100 minimum purchase;
	transactions	minimum two transactions

⁸NTF, TF, and load funds are subject to the greater of the minimum investment requirements or those identified in the fund's prospectus. Vanguard Brokerage Services may negotiate fund minimum investment requirements that are greater than or less than the program standards noted above.

⁹TF fund transactions are included in the offer of commission-free transactions (25 for Flagship clients and 100 for Flagship Select clients) described in footnote 3. Subsequent transactions are at the rates shown in the fee schedule for TF funds above.

Mutual funds from other companies

(continued)

Load funds

Security type	Fee type	Amount
Class A shares	Front-end load (purchase fee)	Varies by fund or fund family and may be as high as 5.75%.
	Discounts (breakpoints)	May be available if you make a large purchase, already hold other mutual funds offered by the same fund family (individually or combined with a spouse or other qualifying person), or commit to regularly purchasing the fund's shares.
Class B shares	Back-end load (redemption fee, also known as a contingent deferred sales charge)	Decreases to zero over a period of years.
Class C shares	Back-end load (redemption fee, also known as a contingent deferred sales charge)	Smaller than a Class B redemption fee, it decreases to zero after one year.
All share classes	Sales charges and minimum purchases	The schedule for a specific load fund may vary, perhaps significantly, from the general description shown here. Check the fund's prospectus for details. Initial and additional investments: \$1,000. ⁸
	Fees	Vanguard Brokerage doesn't charge additional fees for a purchase, sale, or exchange of any load fund offered through our program.

⁸NTF, TF, and load funds are subject to the greater of the minimum investment requirements or those identified in the fund's prospectus. Vanguard Brokerage Services may negotiate fund minimum investment requirements that are greater than or less than the program standards noted above.

Note: Individual fund families may impose additional minimums, fees, or charges. For complete information, read the fund prospectus carefully before investing. The offering conditions of the various funds included in the Vanguard Brokerage Services program are subject to change at any time, including, but not limited to, fee classification (NTF, TF, or load) and transfer eligibility.

Fees for other services

Fee type	Amount	
Vanguard <i>Advantage</i> ®	Offered to clients of Voyager Select (\$30, charged annually), Flagship (free), and Flagship Select™ (
	Insufficient funds: \$20. Stop payment: \$15. Checkbook reorder: Voyager Select, \$9.95; Flagship, free; Flagship Select, free.	
	Vanguard <i>Advantage</i> Billpay [®] service: Voyager Select, \$4.95 per month; Flagship, free; Flagship Select, free.	
	Possible fees at automated teller machines not affiliated with PNC Bank.	
Foreign securities transactions	\$50 processing fee for non-DTC-eligible securities (not applicable to American Depositary Receipts) plus commission. If a trade executes over multiple days, the commission will be charged for each day on which an execution occurs. Additional fees may apply for trades executed directly on local markets.	
American Depositary Receipts (ADRs)	Banks that custody ADRs are permitted to charge ADR holders certain fees, as detailed in the ADR prospectuses. "Pass through" ADR fees are collected from Vanguard Brokerage Services by the Depository Trust Company (DTC) and will be automatically deducted from your brokerage account and shown on your account statement. Other fees, including dividend processing fees, may be withheld by the DTC from the amount paid by the issuer.	
Wire transfers	Vanguard Brokerage charges a \$10 wire fee for each holding you are redeeming from. The fee is not charged to Flagship and Flagship Select clients. Your bank may also charge a fee to receive or accept a wire. We don't charge a fee for electronic bank transfers.	
Miscellaneous	Other securities transaction or maintenance fees may apply. Call us for additional information.	

For more information about Vanguard funds, Vanguard ETF Shares, or non-Vanguard funds offered through Vanguard Brokerage Services, visit vanguard.com or call 800-992-8327 to obtain a prospectus or, if available, a summary prospectus. Investment objectives, risks, charges, expenses, and other important information are contained in the prospectus; read and consider it carefully before investing.

You must buy and sell Vanguard ETF Shares through Vanguard Brokerage Services (we offer them commission-free) or through another broker (who may charge commissions). Vanguard ETF Shares aren't redeemable directly with the issuing fund other than in very large aggregations worth millions of dollars. ETFs are subject to market volatility. When buying or selling an ETF, you'll pay or receive the current market price, which may be more or less than net asset value.

All investing is subject to risk, including the possible loss of the money you invest.

Investments in bonds are subject to interest rate, credit, and inflation risk.

Options are a leveraged investment and are not suitable for every investor. Options involve risk, including the possibility that you could lose more money than you invest. Prior to buying or selling options, you must receive a copy of Characteristics and Risks of Standardized Options issued by OCC. A copy of this booklet is available at theocc.com. It may also be obtained from your broker, any exchange on which options are traded, or by contacting OCC at One North Wacker Drive, Suite 500, Chicago, IL 60606 (888-678-4667 or 888-OPTIONS). The booklet contains information on options issued by OCC. It is intended for educational purposes. No statement in the booklet should be construed as a recommendation to buy or sell a security or to provide investment advice. Call The Options Industry Council (OIC) Helpline at 888-OPTIONS or visit optionseducation.org for more information. The OIC can provide you with balanced options education and tools to assist you with your options questions and trading.

Vanguard funds not held in a brokerage account are held by The Vanguard Group, Inc., and are not protected by SIPC. Brokerage assets are held by Vanguard Brokerage Services, a division of Vanguard Marketing Corporation, member FINRA and SIPC.

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CMSCHP 062017

Vanguard Brokerage Account Application Agreement

Effective December 2, 2011

This Vanguard Brokerage Account Application Agreement (Application Agreement) relates to Your Account and is part of the Vanguard Brokerage Account Agreement (Account Agreement) between each Account Owner and Vanguard Brokerage Services (VBS). Defined terms in the Application Agreement have the same meaning as in the Account Agreement. Please read and retain for Your records.

Definition

"Retirement Account"—An Account held in a traditional or Roth individual retirement account or a Coverdell Education Savings Account (collectively, "IRA") or an employer-sponsored retirement plan.

Section 1: Scope of Agreement.

Your agreement with VBS will be governed by and consists of the terms set forth in this Application Agreement and incorporates by reference the terms set forth in the *Vanguard Brokerage Account Agreement*, which includes the *Vanguard Brokerage Services Commission and Fee Schedules, Vanguard Brokerage Account Application*, and the other disclosures, terms, and agreements relating to Your Account or to particular features or services offered in connection with Your Account. The Account Agreement is provided with this Application or at the opening of Your Account (the Agreement). You agree to contact VBS if You do not receive the Account Agreement and disclosures, terms, and agreements that pertain to certain account types, features, or services. References to the Agreement. Include these supplemental disclosures, terms, and agreements. You agree to read the Agreement carefully and retain copies for Your records.

Section 2: Acceptance of Agreements and Disclosures.

You agree that the Agreement governs all aspects of Your relationship with VBS, including all transactions between VBS and You and all products and services now or in the future offered through VBS. VBS may rely on Your use of VBS's products and services as evidence of Your continued acceptance of the Agreement.

Section 3: Your Representations and Warranties.

You represent and warrant that: (a) You are of legal age in the state in which You live and You are authorized to enter into the Agreement; (b) You have supplied accurate information in Your Vanguard Brokerage Account Application (Account Application); (c) no one except the Account Owners listed on the Account Application (and if community property is held, the Account Owners' spouses) has an interest in the Account; (d) no additional authorizations from third parties are required for You to open the Account and effect transactions therein; (e) except as You have otherwise indicated on Your Account Application or in writing to Us, (i) You are not an employee of or affiliated with any securities exchange or member firm of any exchange, the Financial Industry Regulatory Authority (FINRA), the Municipal Securities Rulemaking Board (MSRB), or any securities firm, bank, trust company, or insurance company, and (ii) You are not a director, 10% beneficial shareholder, policy-making officer, or otherwise an "affiliate" (as defined in Rule 144 under the Securities Act of 1933) of a publicly traded Company; and (f) the Agreement, as amended from time to time, is a legal, valid, and binding obligation, enforceable against You in accordance with its terms.

Section 4: Account Handling.

VBS will automatically hold all of Your securities purchased, sales proceeds, dividends, and interest. VBS will also release Your name, address, and securities positions to companies in which You hold securities upon request, unless You notify us otherwise in writing. If You maintain more than one account at VBS, You authorize VBS to transfer assets between Your accounts when no written authorization is requested.

Section 5: Responsibility for Investment Decisions.

You agree that You and any agent under a power of attorney or Investment Advisor (if You have one) are solely responsible for investment decisions in Your Account, including whether to buy or sell a particular security. Your obligation includes an affirmative duty to monitor and stay informed about Your Account and Your investments and respond to changes as You deem appropriate.

VBS does not have any discretionary authority or obligation to review or make recommendations for the investment of Securities and Other Property in Your Account. You acknowledge that VBS does not provide tax or legal advice.

Section 6: Payment of Indebtedness.

You agree to satisfy, promptly upon demand, any Debit Balance or other indebtedness or outstanding obligation related to Your Account, including, but not limited to, any such indebtedness that results from instructions provided to VBS by You, Your agent, or any attorney-in-fact under a power of attorney, or Investment Advisor authorized to make transactions in Your Account. We may elect anytime, with or without notice, to make any Debit Balance or other indebtedness or outstanding obligation related to Your Account immediately due and payable. Except for Retirement Accounts, We may elect anytime, with or without notice, to sell securities in any of Your brokerage accounts or in any of Your accounts with Our affiliates to satisfy any Debit Balances. For a Retirement Account, We may only sell securities in Your Retirement Account or in any of Your accounts with Our affiliates that are part of the same retirement plan to satisfy any Debit balances. You further agree to be responsible for all costs and commissions related to such sales. In addition, You agree that VBS shall be entitled to apply any dividends, capital gains payments, interest payments, or other incoming funds, such as funds that would otherwise be invested through the Vanguard Brokerage Dividend Reinvestment Program, to cover fees or other indebtedness to VBS. Debit Balances in Your Account will be charged interest in accordance with VBS's established rules and policies, as disclosed to You.

If You owe money to VBS as the result of activity in Your Retirement Account and there are other assets in that Retirement Account or that same IRA or other retirement plan that You hold at VBS or with any of Our affiliates which could fully or partially satisfy the debt, You agree that, upon VBS's written demand, You will execute all documents and/or give any oral instructions necessary to effect a transfer of such other assets, including cash, to Your VBS Retirement Account.

Section 7: Security for Indebtedness.

As security for the repayment of all present or future indebtedness owed to Us by each Account Owner, each Account Owner grants to Us a first, perfected, and prior lien on, a continuing security interest in, and right of set-off with respect to, all Securities and Other Property that is, now or in the future, held, carried, or maintained for any purpose in or through VBS, and, to the extent of such Account Owner's interest in or through, any present or future account with Us or Our affiliates in which the Account Owner has an interest. VBS may rehypothecate any Securities or Other Property held, carried, maintained, or in the possession and control of VBS. In the event of a breach or default by You under the Agreement, VBS will have the rights and remedies available to a secured creditor under all applicable laws in addition to the rights and remedies provided in the Agreement. You agree to indemnify VBS for any loss or expense that VBS may incur in enforcing its lien or any other remedies available to it, including the reasonable cost of collection. This section does not apply to assets in a Retirement Account or to IRA or other retirement plan assets held at Our affiliates.

Section 8: Liquidations.

Whenever it is necessary for Our protection or to satisfy a margin deficiency, debit, or other obligation owed Us, We may (but are not required to) sell, assign, and deliver all or any part of the property securing Your obligations, or close any or all transactions in Your Account or in any of Your accounts with Our affiliates. We may choose which property to buy or sell, which transactions to close, and the sequence and timing of liquidation. We may take such actions on whatever exchange or market and in whatever manner that We choose in the exercise of Our business judgment. You agree not to hold Us liable for the choice of which

property to buy or sell or of which transactions to close or for timing or manner of liquidation or any tax consequences from such actions.

We may transfer property from any brokerage account or in any of Your accounts with Our affiliates in which You have an interest to any other brokerage accounts in which You have an interest, regardless of whether there are other Account Owners on either account, if We determine that Your obligations are not adequately secured or to satisfy a margin deficiency or other obligation. You agree to pay on demand any Account deficiencies after liquidation, whether liquidation is complete or partial.

All of the above may be done without demand for margin or notice of purchase, sale, transfer, or cancellation to You. No demand for margin or notice shall impose on VBS any obligation to make such demand or provide such notice to You in the future. Any such notice or demand is hereby expressly waived, and no specific demand or notice shall invalidate this waiver.

Section 9: Terms of Agreement.

The Agreement, and the terms contained on the Account statements and confirmations sent to You by or on behalf of VBS contain the entire understanding between You and VBS concerning the subject matter of the Agreement. In certain non-U.S. jurisdictions, We may incorporate agreements deemed appropriate and advisable under local law.

On prior or concurrent written notice to You, We may modify or rescind existing provisions or add new provisions to the Agreement. By not closing and/or continuing to use Your Account, You confirm Your agreement to abide by the Agreement, as amended from time to time. Amendments will not affect rights or obligations either of us incur before the effective date of the amendment. No prior conduct, past practice, or oral statement by any VBS employee or agent can amend or modify this written agreement.

Waivers of rights under the Agreement must be expressed in writing and signed by the party waiving the rights. A waiver will apply only to the particular circumstance giving rise to the waiver and will not be considered a continuing waiver in other similar circumstances, unless the intention to grant a continuing waiver is expressed in writing. Our failure to insist on strict compliance with the Agreement or any other course of conduct on our part is not considered a waiver of Our rights under the Agreement.

VBS can close Your Account, or terminate any feature, at any time, for any reason, and without prior notice. Such termination may include order rejections and liquidation of Your Account. You can close Your Account, or terminate any optional feature, by notifying Us in writing. VBS may automatically close accounts with zero balances. Regardless of how or when Your Account is closed, You will remain responsible for all charges, debit items, or other transactions You initiated or authorized, whether arising before or after termination. Note that a final disbursement of assets may be delayed until any remaining issues have been resolved.

Section 10: Verification.

You authorize VBS to inquire from any source, including a consumer reporting agency, as to Your identity (as required by federal law), creditworthiness, and ongoing eligibility for the Account of the Account Owners, any other person referred to on this Application, or any person whom VBS is later notified is associated with or has an interest in the Account (as well as such persons' spouses if they live in a community-property jurisdiction) at Account opening, at any time throughout the life of the Account, and thereafter for debt collection or investigative purposes. On Your written request, We will inform You whether We have obtained credit reports and, if so, We will provide You with the name and address of the reporting agency that furnished the reports.

Section 11: Required Arbitration Disclosures.

The Agreement contains a predispute arbitration clause. By signing an arbitration agreement, the parties agree as follows:

• All parties to the Agreement are giving up the right to sue each other in court, including the right to a trial by jury, except as provided by the rules of the arbitration forum in which a claim is filed.

- Arbitration awards are generally final and binding; a party's ability to have a court reverse or modify an arbitration award is very limited.
- The ability of the parties to obtain documents, witness statements, and other discovery is generally more limited in arbitration than in court proceedings.
- The arbitrators do not have to explain the reason(s) for their award unless, in an eligible case, a joint request for an explained decision has been submitted by all parties to the panel at least 20 days prior to the first scheduled hearing date.
- The panel of arbitrators may include a minority of arbitrators who were or are affiliated with the securities industry.
- The rules of some arbitration forums may impose time limits for bringing a claim in arbitration. In some cases, a claim that is ineligible for arbitration may be brought in court.
- The rules of the arbitration forum in which the claim is filed, and any amendments thereto, shall be incorporated into the Agreement.

Section 12: Arbitration Agreement.

You agree to settle by arbitration any controversy between or among You and VBS arising out of or relating to VBS's business or the Agreement. Such arbitration will be conducted by, and in accordance with, the securities arbitration rules and regulations then in effect of FINRA or any national securities exchange that provides a forum for the arbitration of disputes, provided that VBS is a member of such national securities exchange at the time the arbitration is initiated. Arbitration must be commenced by service upon the other party of a written demand for arbitration or a written notice of intention to arbitrate, therein electing the arbitration tribunal. In the event the undersigned does not make such election within five (5) days of such demand or notice, then the undersigned authorizes VBS to do so on behalf of the undersigned. The award of the arbitrator will be final and binding, and judgment on the award may be entered in any court having jurisdiction.

No person shall bring a putative or certified class action to arbitration, nor seek to enforce any predispute arbitration agreement against any person who has initiated in court a putative class action or who is a member of a putative class who has not opted out of the class with respect to any claims encompassed by the putative class action until: (i) the class certification is denied; (ii) the class is decertified; or (iii) the customer is excluded from the class by the court. Such forbearance to enforce an agreement to arbitrate shall not constitute a waiver of any rights under the Agreement except to the extent stated herein.

Section 13: Governing Law.

The Agreement, all transactions made in Your Account, and all matters arising in connection with the Agreement will be governed by, and construed and enforced in accordance with, the laws of the State of New York (regardless of the choice of law rules thereof).

Section 14: Electronic Copies.

The electronically stored copy of Your (or Your agent's) signature, any written instructions or authorizations, the Vanguard Brokerage Account Application, and the Agreement are considered to be the true, complete, valid, authentic, and enforceable records, admissible in judicial, administrative, or arbitration proceedings to the same extent as if the documents and records were originally generated and maintained in printed form. You agree not to contest the admissibility or enforceability of VBS's electronically stored copy of such documents in any proceeding between You and VBS.

Section 15: Information about SIPC.

To obtain information about the Securities Investor Protection Corporation (SIPC), including an explanatory SIPC brochure, please contact SIPC at www.sipc.org or 202-371-8300.