



E&G Summer Powder School • Early Registration by April 8, 2011

—•—Evins Mill, Nashville, TN • June 20-24, 2011 —•—

Click on course title to learn more.

W1. Powder Flow I: Measuring Powder Flowability & Its Applications

Nashville, TN • June 20-21, 2011 • [Registration form](#)

An intense 2-day powder flow & handling workshop, for those involved in industrial chemical, pharmaceutical or solids processing issues in which flow properties are critical, including material handling, segregation, feeding, roll pressing and tableting. This course lays the groundwork for understanding the unique nature of powder flow properties, & its impact on processing & compaction, through team design problems & hands-on measurements by shear & permeability cell, fluidization/segregation testing, & roll press/tableting demos.

W2. Powder Flow II: Industrial Solids Handling & Mixing

Nashville, TN • June 22-24, 2011 • [Registration form](#) • **New Course!**

By popular request, a follow-on companion workshop treating industrial solids flow principles of Powder Flow I, & commonly encountered design & operational issues of powder systems and mixing. Topics include unassisted mass/funnel flow discharge; flow promoting devices, aeration and vibration; feeders; conveying of powders; processing of segregating blends; solids blending & mixing, mixer selection and mixture quality. This course is useful for anyone optimizing current or designing future solids handling systems. It presumes a requisite knowledge of powder flow principles such as Powder Flow I, or equivalent experience.

W3. An Introduction to Powder Processing

Nashville, TN • June 20-21, 2011 • [Registration form](#) • **New Course!**

A first powder technology workshop introducing participants to the unique attributes of powders, contrasted to more well understood liquids, and the impact of these complexities on solids processing. Topics include powder characterization; segregation & powder sampling; and an overview of key unit operations of mixing, grinding, agglomeration, classification, fluidization, & drying, as well as solids transport between operations.

W4. Granulation & Compaction Processes for Enhanced Product Performance

Nashville, TN • June 22-24, 2011 • [Registration form](#)

This agglomeration workshop is a relatively advanced course drawing heavily on the interaction between powder properties and unit-operations, covering a variety of granulation (fluid-bed, discs, pans, mixers) and compaction processes (roll pressing, tableting, extrusion) as well as formulation techniques. It emphasizes the marriage between formulation properties, characterization techniques, and engineering scale-up in controlling granule & compact quality.

Upon sufficient request: **W5. Mixing & Blending** **Powder Processing Practicum**

Detailed course information: [Click here](#). Course questions: courses@powdernotes.com

Lodging questions: william@evinsmill.com • 615.269.3740 • www.evinsmill.com

Early registration: April 8, 2011. 10% registration discount. Reserve to hold room.



Upcoming E&G Workshop:
W1. Powder Flow I: Measuring Powder Flowability & Its Applications: A Hands-On Design Oriented Workshop

W1. Powder Flow I: Measuring Powder Flowability & Its Applications: A Hands-On Design-Oriented Workshop

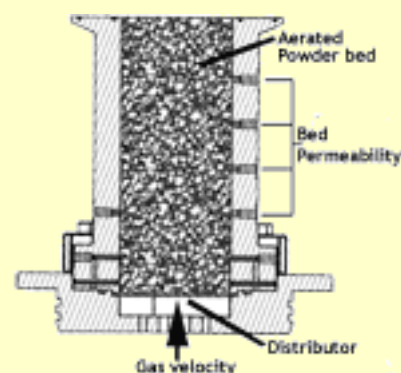
Nashville, TN • June 20-21, 2011 • [Registration form](#) • [Syllabus](#)

An intense 2-day powder flow & handling workshop, for those involved in solids processing issues in which flow properties are critical, including material handling, feeding operations, roll pressing and tableting. This course lays the groundwork for understanding the unique nature of powder flow properties, and its impact on processing & compaction, through team design problems and first hand lab measurements. **Typical schedule includes:**

- **Day 1 morning.** Powder flow basics, flow patterns, segregation, demixing & feeding. Automated shear cell measurements of powder cohesion, friction & flow indices. Historical soil mechanics engineering basis. Physical demonstrations of representative powder behavior. Introduction to hopper & bin design to prevent arching & ratholing. **Hands-on:** Team measurements of powder flow properties by shear cell. Mass flow design problem to prevent arching. Flow indices problems and implications for powder or formulation design.
- **Day 1 afternoon.** Rate of powder flow, feeding, or discharge. Fluidized-bed permeability characterization. Impact of aeration of powder flow, and deaeration times. **Hands-on:** Team measurements of aerated powder cohesion and permeability. Discharge rate experiment. Completion of flow measurements and flow design work.
- **Day 1 evening.** Segregation mechanisms and connect to flow properties. Impact of segregation on NIR and process measurements. Monitoring segregation. **Hands-on:** Team measurements of hopper segregation. Shear cell & particle sizing access for client samples. Offered on first come/first serve basis w/prior arrangements.
- **Day 2 morning.** Discussion of team powder flow homework problems. Impact of particle properties on bulk flowability. Particle property characterization methods of surface chemistry, hardness & particle size. Advances in particle sizing. Tableting and roll press design based on powder properties. Impact of wall and powder friction on stress transmission, die forces, and tablet ejection forces. Connection to other compaction methods such as encapsulation and ram extrusion. **Hands-on:** Tableting stress transmission & roll nip pressure team design problems. Roller compactor simulation. Measurements of particle size.
- **Day 2 afternoon.** Compaction design revisited. Simulations. Additional compaction methods. Heistand indices, fracture mechanics, heckle profiles, permeability. Fluidization methods of powder cohesion. Additional powder flow and particle size measurements for client samples.

Relative flow index:

<2	Difficult to handle
1.5-4	Cohesive powders
3-6	Granules
5-10	Harder excipients
10-15	Sand
>20	If fine, floodable



Learn about workshop leader:



Return to Contents. [Early registration ends Apr. 8, 2011.](#)

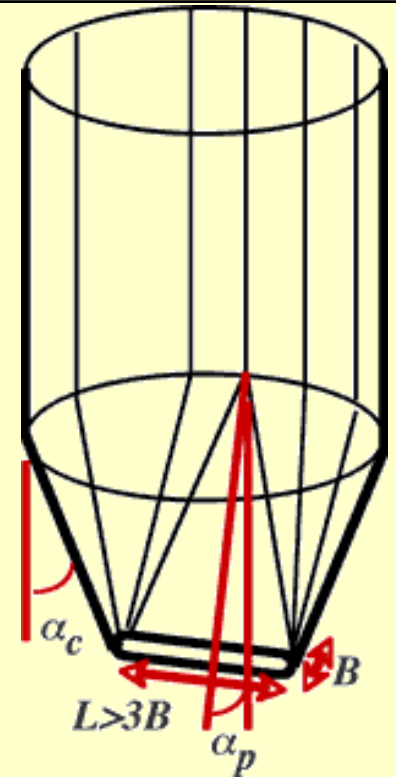


W2. Powder Flow II: Industrial Solids Handling & Mixing

Nashville, TN • June 22-24, 2011 • [Registration form](#) • [Syllabus](#)

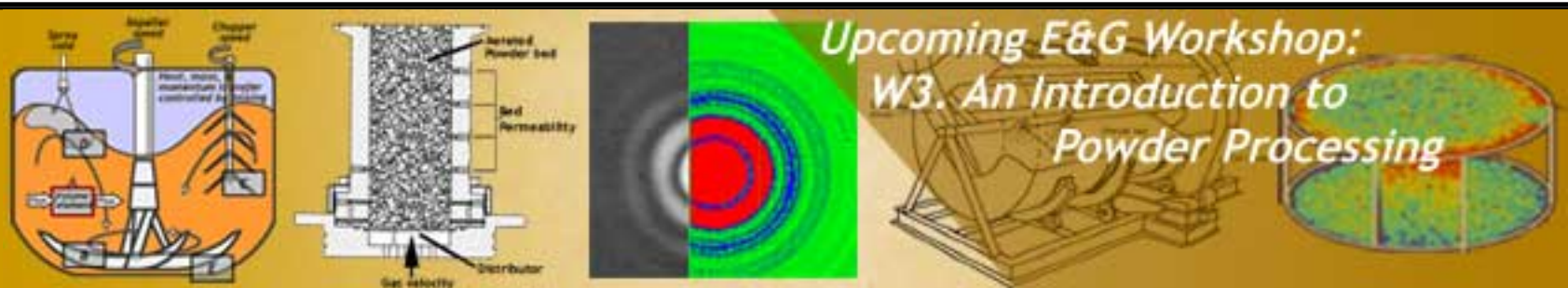
Powder Flow II is a follow-on companion workshop to Powder Flow I. It treats in detail industrial applications of the solids flow principles learned in Powder Flow I, covering many of the practical considerations encountered in the design & operation of powder systems. It presumes a requisite knowledge of powder flow principles such as W1. Powder Flow I, or equivalent experience. For those without first hand powder flow characterization experience, we would recommend attending both workshops. Concepts are reinforced through attendee worked examples involving bin design to prevent arching/ratholing, flow insert placement, aeration requirements, feeder design, handling segregation, and conveying considerations. **Typical schedule includes:**

- Day 1.** Overview - Plant solids storage, transport, handling and mixing issues. Mixing and Blending – Overview of mixing quality and operation, ingredient optimization and mixer selection. Impact of ingredient properties on expected variations, scale of scrutiny and mixing model attendee practice. Segregation & demixing – Practical problems/solutions to typical segregation issues. Bin Design – Review of unassisted gravity flow bin design of mass flow and funnel flow hoppers, and practical design examples.
- Day 2.** Flow Testing - Review of solids flow testing and flow report. Design examples - Attendee worked examples, calculating critical bin dimensions for mass, funnel flow and cone-in-cone inserts. Feeders – Volumetric and gravimetric, screws, belts, rotary valves, advantages and disadvantages, and key design principles. Aeration effects – Impact on discharge rate, methods of correction. Retrofits – Wedge hoppers, liners and coatings, other. Flow aids – Passive and active, bin inserts, air blasters, vibrators, other solutions.
- Day 3.** Chutes–Do' /don'ts, appropriate angles due to material impact pressure. Modeling—Using models to understand flow issues and develop solutions. Bin pressures and mass flow vs. funnel flow loading. Conveying—Overview of mechanical and pneumatic conveying.



[Click to: Learn about workshop leaders.](#)

[Return to Contents.](#) [Early registration ends Apr. 8, 2011.](#)



W3. An Introduction to Powder Processing

Nashville, TN • June 20-21, 2011 • [Registration form](#) • [Syllabus](#)

A new, first powder technology workshop introducing participants to the unique attributes of powders, contrasted to more well understood liquids, and the impact of these complexities on solids processing. Topics include powder characterization; segregation & powder sampling; and an overview of key unit operations of mixing, grinding, agglomeration, classification, fluidization, and drying, as well as solids transport between operations. It is an excellent course for anyone in the field who needs to expand their knowledge of powder systems in general. It also would serve new practitioners in powder technology giving them a major head start in the field. Practical, hands-on examples and demonstrations enhance the theory. Practical tips for system improvements in plants will also be discussed, so key plant maintenance personnel may also find the course valuable. **Typical schedule includes:**

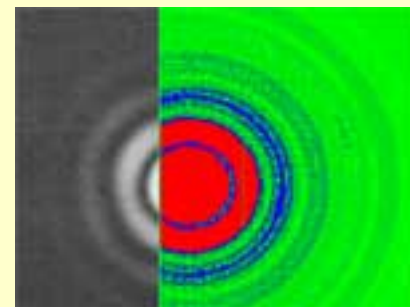
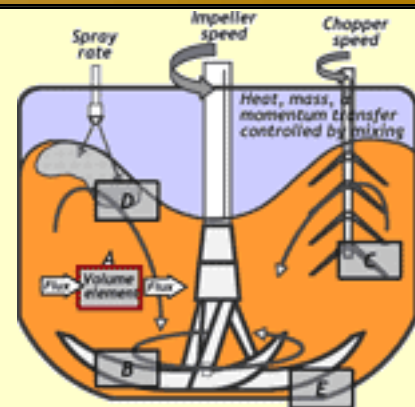
Day 1:

- Particle Characterization – Aspects of particle size distributions, methods of measuring particle size, variations of density, and tools to measure key particle characteristics. Powder flow shear cell and particle sizing demos.
- Moisture Sorption – ERH and its relation to moisture content, types of isotherms, and how to use isotherm data.
- Powder Handling – Introduction to solids handling, including bin design, causes of flooding & segregation, feeder basics, and pneumatic conveying.
- Powder Mixing – Sampling techniques, texture vs. mobility, mixer types & selection, statistics of mixing, scale-up principles.

Day 2 :

- Agglomeration - Wet granulation vs dry compaction processes, w/demos.
- Grinding and Classification – Basic grinding theory and principles, types of grinders, mechanical separation, air classification.
- Fluidization - Principles of fluidization and fluid-bed drying, w/demos.

Return to Contents. [Early registration ends Apr. 8, 2011.](#)



Learn about workshop leader:





W4. Granulation & Compaction Processes for Enhanced Product Performance

Nashville, TN • June 22-24, 2011 • [Registration form](#) • [Syllabus](#)

This granulation/compaction workshop is an in-depth course drawing heavily on interactions between powder properties & unit-operations, covering a variety of granulation and compaction processes. The course emphasizes the marriage between formulation properties and engineering scale-up in controlling granule/compact quality. This course is based on latest advancements in size-enlargement theory based on the work of Dr. Ennis and colleagues: Perry's Chem. Engin. Hndbk, 8th Ed, 2006; & "The Science & Engineering of Granulation Processes," 2004. **Typical schedule includes:**

- Day 1.** Overview of granulation & compaction processes, w/ identification of key controlling phenomena, illustrating interactions of feed/ formulation properties & process operating variables. Wetting - Binding fluid addition & nuclei formation, impact on final granule distribution, characterization techniques based on Washburn & IGC, & spray flux regime map. Granule coalescence & growth - Impact of feed/binder properties on agglomeration rate, granule yield properties & deformability, characterization of wet mass rheology and power, regime map of granule growth. Granule consolidation - Impact of densification on bulk density, Granule breakage & attrition - controlling fracture properties and testing. Hands-on demonstrations.
- Day 2.** Design, scale-up & operation of granulation processes. Morning: Low shear processes: Fluid-bed, drum, pan or disc. Impact of key operating variables. Non-inertial growth. Control of granule size and densification. The importance of spray flux to granule growth and bed weight to bulk density. Operational issues. Limiting granule size and population balances. Interactions between powder properties and process equipment. Afternoon: High shear mixers. Competition between growth and densification in inertial regimes of growth. Growth regime map. Wet mass rheology and uses and limitations of power. Attendee worked examples of engineering calculations. Overview of solids handling, hopper discharge and feeding.
- Day 3.** Compaction agglomeration processes: roll presses & briquetting, tableting, and paste extrusion. Tableting and roll press design based on powder properties. Powder flow characterization. Impact of wall and powder friction on stress transmission, die forces, and tablet ejection forces. NIR chemical imaging. Simulations & die demonstrations. Additional compaction methods. Heistand indices, Heckle profiles, permeability, and flaws in compaction forms. Scale-up approaches and equipment selection for agglomeration processes, with worked examples.



Learn about workshop leader:



Return to Contents. [Early registration ends Apr. 8, 2011.](#)



W5. Solids Mixing & Blending

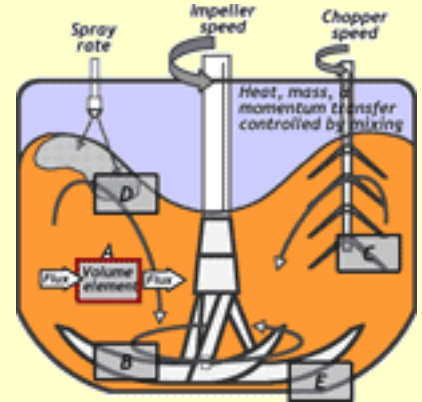
Offered upon sufficient demand • [Registration form](#) • [Syllabus](#)

CONTACT US TO EXPRESS INTEREST: courses@powdernotes.com

An in-depth, two-day course focusing on the mixing, blending, and subsequent handling of powders and their blends. Topics include differences of mixing free-flowing powders versus cohesive powders; the impact of powder characteristics; ordered versus random mixes; main mixer types & their selection & scale-up; mixer performance based on mix variance; proper system design to enhance and maintain a quality mix; proper sampling techniques; segregation issues and fixes in transporting blends, as well as related topics in solids handling and reblending.

Highlights include:

- Day 1: Free-flow powders, cohesive powders, powder flow characteristics as they apply to mixers, random versus segregated mixing, mixer types & selection, mixture variance, scale of scrutiny, system design.
- Day 2: Statistics of mixing, hands-on calculation examples, sampling techniques, analysis considerations, mixing scale-up. Proper sampling to understand mixer versus downstream process affects, correct downstream design, segregation and its causes, solving segregation issues, related solids handling topics.



Workshop leader:

Jim Davis is a Principal Consultant to E&G Associates, and President of Powder Processing Solutions LLC. As a previous solids handling technical leader with Procter & Gamble, he has 26 years of experience in the optimization, design & startup of powder processing/material handling systems, spanning over 20 countries and 4 continents. He offers many practical, unique insights for resolving difficult processing problems, and for minimizing design and development costs, from his experience in developing low cost systems for low income, third world markets. Jim holds a BSc in Mechanical Engineering degree from the University of Cincinnati, and a Professional Engineer's license from the State of Ohio. He has served on the Executive Committee of the International Fine Particle Research Institute, as Chairman of the ASTM subcommittee on Powder and Bulk Systems, as Chairman of the Powder Handling subcommittee of the Particle Technology Forum of AIChE, and sits on the industrial advisory board for the trade journal Powder & Bulk Engineering.



Return to Contents. [Early registration ends Apr. 8, 2011.](#)



E&G Summer Powder School • Early Registration by April 8, 2011
—•—Evins Mill, Nashville, TN • June 20-24 —•—

Workshop leaders:

Dr. Bryan J. Ennis is President of E&G Associates, Inc. With three decades of experience in powder manufacturing, he has consulted for over 100 clients, including most major pharmaceutical/consumer products companies. He led agglomeration, solids handling & powder characterization programs of DuPont Engineering, and served as an Adjunct Professor of Vanderbilt Univ. He received his B.S.Ch.E. from Rensselaer Polytechnic & Ph.D. from The City College of NY. Dr. Ennis is a cofounder and previous Technical Vice-Chair of the Particle Technology Forum of the AIChE. Honors include two national AIChE awards for service to the profession, Deutscher Akademischer Austausch Dienst Award (Germany), and a Visiting Research Fellow of Delft Technical University (Netherlands). He is the author of several invited contributions on particle processing, including the *Agglomeration Advisor* column of *Powder & Bulk Engineering*, Section Editor of *Section 21: Solid-Solids Operations & Equipment* of the *Perry's Chemical Engineer's Handbook* (8th Ed.); *Theory of Granulation: An Engineering Perspective*, in *Hdbook of Pharma Granulation*, 3rd Ed., & *The Science & Engineering of Granulation Processes*, Kluwer Academic.



W1. Powder Flow I: Measuring Powder Flowability & Its Applications

W2. Powder Flow II: Industrial Solids Handling & Mixing

W4. Granulation & Compaction Processes

Jim Davis, P.E. is a Principal Consultant to E&G Associates, and President of Powder Processing Solutions LLC. As a previous solids handling technical leader with Procter & Gamble, he has 26 years of experience in the optimization, design & startup of powder processing/material handling systems, spanning over 20 countries and 4 continents. He offers many practical, unique insights for resolving difficult processing problems, and for minimizing design and development costs, from his experience in developing low cost systems for low income, third world markets. Jim holds a BSc in Mechanical Engineering degree from the University of Cincinnati, and a Professional Engineer's license from the State of Ohio. He has served on the Executive Committee of the International Fine Particle Research Institute, as Chairman of the ASTM subcommittee on Powder and Bulk Systems, as Chairman of the Powder Handling subcommittee of the Particle Technology Forum of AIChE, and sits on the industrial advisory board for the trade journal *Powder & Bulk Engineering*.



W2. Powder Flow II: Industrial Solids Handling & Mixing

W3. An Introduction to Powder Processing

W4. Granulation & Compaction Processes

Return to Contents. Early registration ends Apr. 8, 2011.



E&G Spring Powder School • Early Registration Discount: April 8, 2011

Additional Practicum, Lodging & Venue Information. Download: [Syllabus](#)

NOTE: OFFERED ON SUFFICIENT DEMAND. CONTACT US TO EXPRESS INTEREST.

Powder Processing Practicum • A Hands-On Lab

To reinforce the learnings of our workshops, a structured hands-on practicum is being offered as part of our Powder School. Participation is free for workshop attendees, but is also open for new visitors hoping to gain a first-time exposure to powder handling and processing. Practicum students will work as small groups through a step-by-step, 1/2-day, structured lab of unit operations, and powder characterization tests Friday afternoon, followed by group presentations and discussion of data Saturday morning, ending at 10 am. Friday lunch & dinner, Saturday breakfast, and lodging are included in the Practicum accommodation fee.

Friday morning:

- Arrival and check-in for new attendees. Lunch at 12:00 pm

Friday: 1:00 - 4:30 pm

- Feed powder particle size by laser diffraction
- High shear mixing/roll pressing, followed by imaging particle size
- Granulate flow properties by shear & permeability cell
- Blending w/lubricants. Mass discharge rate through orifice
- Die compaction, and die force measurements

Saturday: 8:00 - 10:00 am

- Group presentations of findings
- Discussion and contrasting of results

Note: Schedule subject to changes and updates. Offered upon sufficient demand.



iPowder Systems
Instruments for Powder Characterization



Evins Mill, Nashville, TN

Nestled among the towering bluffs and meandering streams of Tennessee's Highland Rim and Cumberland Plateau, Evins Mill is located in Smithville outside Nashville. The serene, natural setting of the Mill offers an ideal retreat location for our training workshops. The relaxed atmosphere promotes inspiration and a focus on meeting content, as well as valuable networking and sharing among meeting attendees.

Registration: 615.469.1342 • [Registration form](#) • [Powder School Syllabus](#)

Lodging questions: william@evinsmill.com • 615.269.3740 • www.evinsmill.com

Course contact questions should be directed to: courses@powdernotes.com

Early registration: April 8, 2011. 10% registration discount. Reserve to hold room.

Return to Contents.

E&G Associates Summer 2011 Powder School, Evins Mill, Course Registration Form

Participant Information
(Please print clearly)

Workshop Dates: June 20-24, 2011, Nashville, TN

Dr./Mr./Mrs./Ms. _____
(Please Circle One) FIRST NAME M.I. LAST NAME NICKNAME (TO APPEAR ON NAME BADGE)

COMPANY NAME _____ POSITION TITLE _____

MAILING ADDRESS _____

CITY _____ STATE/PROVINCE _____ ZIP CODE _____ COUNTRY _____

PHONE _____ FAX _____ E-MAIL _____

Description of process/product related issues or course objectives

Where did you hear about the course?

Colleague E-mail notification Trade Magazine/Site Other: _____

General Information

I would like to receive E&G's Powder Notes Newsletter. Notify me regarding future course offerings.

Registration Fees

Workshops (Please indicate course):

June 20-21: **Mon-Tue:** Powder Flow I or Intro to Powder Processing
June 22-24: **Wed-Fri:** Powder Flow & Mixing II or Granulation & Compaction

Mon-Tue: <input type="checkbox"/> Powder Flow I <input type="checkbox"/> Intro Powder Proc	Wed-Fri: <input type="checkbox"/> Powder Flow/Mix II <input type="checkbox"/> Gran & Compact
---	---

Select below as appropriate (Reserve early to ensure your room hold):

Fill-in fees as appropriate:

Course Fees: <input type="checkbox"/> Registration course fee and notes. Payment received by May 16, 2011.	\$	1,450.00	\$	1,950.00
<input type="checkbox"/> Payment received after May 16, 2011. Add \$100:				
Book early to ensure room hold at the Mill.				

Discounts: EARLY BIRD: Received by April 8, 2011. **Less 10% (\$145 or \$195):**

OR	
-----------	--

NOTE: Registering for two workshops entitles attendee **Less 15% (\$218 or \$293):**
to a 15% discount. DO NOT INCLUDE EARLY BIRD DISCOUNT AS WELL.

Accommodation Fees: Food and lodging, all inclusive of service and tax:

(Single Occupancy) **2 Day Workshop**

Mon-Tue Workshop: Sunday Dinner & Reception thru Tuesday Lunch

Add fees: **\$** **570.00**

3 Day Workshop

Wed-Fri Workshop: Tuesday Dinner & Reception thru Friday Lunch

Add fees: **\$** **855.00**

Contact Evins Mill to secure or for changes to accommodations. Ph: (615) 269-3740
Spouses and guests welcome. Fee arrangements w/Evins Mill. info@evinsmill.com
Accommodations are offered as an integral part of course structure & are not optional.
Overflow/increment weather lodging arranged as necessary. No walk-in registration.
For inclement weather lodging, contact (615)-469-1342 upon airport arrival.

Adjustments:

Indicate arrival time & flight if known. Driving directions available at www.evinsmill.com

Indicate any special needs or dietary requirements.

Total fee: _____

Add fees above & pay this amount.

Payment Terms & Conditions

Payment Schedule & Cancellation Policy:

All payments received by May 16, 2011.

Cancellation & late fees apply after

April 18, 2011 as noted above & below.

Note: Rooms held till April 8, 2011.

Book early to ensure a room is held.

Refund Amount for all Fees:

Before April 18, 2011: 100%, less \$100

After April 18, 2011: 50%

After May 16, 2011: 0%

Payment Method:

Company/personal check enclosed. **\$150 fee for returned checks.**

<input type="checkbox"/> Credit card:	Name: _____	Type: _____
	Number: _____	Expiration: _____

Payable to:	E&G Associates, Inc.	Federal Tax ID#: 27-0064786
	PO Box 681268	Email: workshops@powdernotes.com
	Franklin, TN 37068	info@evinsmill.com
	Ph: (615) 469-1342	Fx: (240) 524-8482

Registration Process:

1. Fax completed and signed registration form to both (615) 597-2090 & (240) 524-8482.
2. Contact Evins Mill to verify registration, special dietary needs & accommodation changes. (615) 269-3740
3. Mail completed forms/payment to E&G to be received by registration deadline, after which late fees apply.
Retreat location (not for mailing): Evins Mill, 1535 Evins Mill Road, Smithville, TN 37166

Attendee Application & Acceptance

Please sign & date below:

Company Use Only:

Date Attendee Applicant Signature

E&G Associates, Inc. (E&G) reserves the right to modify course location, venue & accommodations; to decline any course applicant; or to cancel or reschedule course in its entirety or partially due to unforeseen circumstances. In the event of cancellation, participants will be entitled to a full refund of registration fees, with no further obligation on the part of E&G or course facilities. Final course details & schedule to be provided two weeks prior to course. E&G will invoice for any billing discrepancies. Overflow accommodation arranged as necessary. With signature, attendee accepts these terms & holds E&G & facility grounds entirely harmless from all liability involving participation at conference site.