The Association of Powder Process Industry and Engineering, JAPAN


APPIE
The Association of Powder Process Industry and Engineering, JAPAN (APPIE) was established in 1971. Approved by the government in 1981, this is the only one organization in Japan dedicated to the powder process industry, and it has continued and expanded its operations for more than 40 years.

The Association is comprised of corporations which manufacture and market powder machinery and equipment, those which deal with powders-such as foods, pharmaceuticals, cosmetics, chemicals, materials and mining companies-and those related to powder processing, including construction and engineering businesses. Researchers at universities and government research institutes, and consulting engineers participate in this organization as individual members, while we also enjoy a close fraternal relationship with The Society of Powder Technology, Japan. The Association is a unique body offering close ties among academic, business, and government circles.

Various services have been provided through technical group meetings and committee activities that transcend the boundaries of corporations and industries, such as research, studies, wide ranging technological exchanges, education, training courses, technical information exchanges, as well as the distribution of standard powders and voluntary operation of a powder industry exhibition.

Now, I would like to point out four major items to perform in the recent term starting in April 2014. The first item is to promote the exchange of ideas and opinions between manufacturers and operators of our machines and equipment, which will boot to grade up design capability and increase our activities especially in our technical groups. It is also promoted to image how the machines and equipment are working actively in new or high technology field where various valuable products will be produced.

The second is to rear youth in basic technology and engineering for the succession and progress of powder industry. To deal with problems necessitating advanced technology, skills trained by basic knowledge and experience are essential. Here also meeting for discussion will be supplied to image how and where our machines and equipment are working successfully.

The third is to manage particulate nano-materials. It is expected nano-materials to be a large market in near future. However, standardization in evaluation or safe treatment of nano-materials is not yet accomplished. As the recognition for nano-materials goes on in the public, our activities may assist the public requirement.

The fourth, and the most important is to promote POWTEX TOKYO 2014 successfully. It is the 20th International Powder Technology Exhibition in Tokyo, where many newly developed machines and equipment will be unveiled. Academic meeting of the Society of Powder Technology, Japan will be held parallel to the date. Many other meetings are under plan to coordinate the exhibition.

With the increasing trend towards the leading edge of technology, we are working hard to lead and promote our activities. We thank you for your continued interest in our Association, APPIE.

Hiroaki Masuda
President, APPIE
Professor Emeritus, Kyoto University
History

Nov. 18, 1971 The Council of Powder Process Industry, Japan, is founded as an informal organization with about seventy members in Nagoya.

Oct. 1972 A booth called "Powder Process Machinery and Equipment Corner" is set up for the first time at the Chemical Plant Show.

Mar. 1973 The Classification and Sieving Technical Group is the first technical group to be formed.

Feb. 20, 1974 The name of the organization is changed to the Association of Powder Process Industry, Japan.

Sept. 1976 The first exhibition called POWTEX in cooperation with the Japan Management Association is held at the Tokyo International Exhibition Center and has been held every two years since then.

Apr. 1979 The Editorial Committee is formed to supervise a monthly magazine, Powder Science & Engineering.

Oct. 1979 The service departments merge into Technical Center of Powder Technology.

Dec. 1, 1981 The Association becomes a legal corporation approved by Ministry of International Trade and Industry, Japan, and is registered under the name of The Association of Powder Process Industry and Engineering, JAPAN.

Apr. 1984 The International Liaison Committee is formed to deal with matters regarding overseas organizations and powder exhibitions in Chicago, USA and Nürnberg, Germany.

May 1991 The Special Committee for Cooperation with Thai Powder Technology Center (TPTC) is formed to promote powder technology in Thailand. The Committee continued until September 2000.

Jul. 1993 The first POWTEX OSAKA is held at INTEX OSAKA and has been held every other year alternately with POWTEX TOKYO since then.


Aug. 1999 The Battery Manufacturing Technical Group is formed as the first project-oriented technical group.

Dec. 2000 APPIE co-sponsors the first Asian Particle Technology Symposium (APT2000) in Bangkok, organized by The Society of Powder Technology, Japan, and TPTC.

Oct. 2003 APPIE receives the Minister of Economy, Trade and Industry Award of the Industrial Standardization Awards for the contribution to the industrial standardization.

Nov. 2003 APPIE participates in the International Powder/Bulk Conference & Exhibition, Shanghai, hosted by the Chinese Society of Particuology at the invitation of the society, and a visiting group (led by Mr. Akitoshi Meio) is sent to strengthen cooperation with the society.

Oct. 2007 The first APPIE LINKAGE FORUM between Academia, Industry and Government is held at POWTEX OSAKA.

Jan. 2009 APPIE publishes FUNTAI GIJUTSU, a monthly magazine, replacing Powder Science & Engineering and APPIE NEWS.

Dec. 2010 The exhibition site of POWTEX TOKYO changes to Tokyo Big Sight.

Apr. 2011 APPIE becomes a General Incorporated Association approved by the Cabinet Office.

Nov. 2011 APPIE celebrates its 40th anniversary.

Membership

<table>
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<tr>
<th></th>
<th>Full Members</th>
<th>Supporting Members</th>
<th>Total</th>
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<tbody>
<tr>
<td>Member</td>
<td>279</td>
<td>7</td>
<td>363</td>
</tr>
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<td>Total</td>
<td>356</td>
<td>7</td>
<td>363</td>
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Classification of Industrial Corporations by Their Category

- Manufacturers and marketers of powder processing machinery and equipment (56%)
- Manufacturers of powder related products (32%)
- Construction and engineering firms (7%)
- Manufacturers of measurement instruments for powder (5%)
### Activities

<table>
<thead>
<tr>
<th>Technical Groups</th>
<th>As shown on page 6, 19 technical groups are formed to study technical problems together among APPIE members concerned. Each group consists of 30 to 60 members, and holds meetings 3 to 4 times a year. Technical groups are run by experienced persons in industry and experts in academia and public research institutions. In the meeting, members exchange technical information such as new products and new R &amp; D. Occasionally technical tour of new plants are planned and implemented by the groups.</th>
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<tr>
<td>POWTEX</td>
<td>Exhibitions called POWTEX TOKYO and POWTEX OSAKA were started in 1976 and in 1993, respectively, and are held every year alternatively in Tokyo and Osaka. Lectures and symposia are held in conjunction with the exhibition. Besides lectures and symposia, there are unique events taking place such as Asian Forum in POWTEX TOKYO and industry, academia and government linkage fair in POWTEX OSAKA.</td>
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| International Liaison | The following International Liaison activities are made.  
1. Increasing international recognition of APPIE by setting up a booth of APPIE in overseas exhibitions (Europe, America and Asia) and transmitting annual reports in English toward the rest of the world.  
2. Surveying events related to powder process and technology in the world. Providing collected information to APPIE members and other companies through the magazine and web-site.  
3. Planning and implementing technical tours of overseas exhibitions and companies related to powder processing.  
4. Making an international contribution to the promotion of powder technology in Asia. Holding seminars and courses where speakers are dispatched by APPIE in response to the requests from Asian countries. |
| Standards        | APPIE is devoted to making draft JIS (Japanese Industrial Standards) and amending it. It has also taken an active role as a subsidiary to the Japanese Industrial Standards Committee (JISC) in support of ISO/TC24, Particle characterization including sieving. Furthermore, APPIE establishes and maintains its own standards and manuals. |
Publishing Business

Periodical Publication

*Funtai Gijutsu* (powder technology)
A monthly magazine with approximately 100 pages is published. It contains several articles on recent technical topics and announcements of events and meetings.

**APPIE annual REPORT**
An annual report in English has been published since 2007 to introduce the activities of APPIE to the world.

Book Publication
Several books are published every year as outcomes of activities of committees and technical groups.

Research and Study
Survey reports are published as the achievement of survey research conducted by committees and technical groups. Besides publication of the reports, lectures, seminars, symposia, etc. are planned and held to disseminate the achievement of survey research to public.

Technical Center of Powder Technology

Three divisions are formed in the Technical Center of Powder Technology: Continuing Education Division, Standard Powders Division and Industry-Academia Collaboration Division. The Continuing Education Division plans the lifetime learning program and holds lectures and seminars, etc. The Standard Powders Division produces and sells JIS test powders and APPIE standard powders. Industry-Academia Collaboration Division coordinates collaboration between APPIE member companies and academic experts in cooperation with Research Center of Fine Particle Science and Technology of Doshisha University.

Technical Information Exchange Meetings
Regional meetings for APPIE members are held in Tokyo, Nagoya, Osaka and Fukuoka. The meetings are held 3 or 4 times a year in each region. APPIE members exchange various information and deepen a friendly relation in a get-together.

Standard Powders Division

The Standard Powders Division produces and sells JIS Test Powders and APPIE Standard Powders.

1. JIS Z 8901 Industrial Test Powders 1 (Powders existing in natural environment as dust are standardized)
   - Class 1, Class 2, Class 3 (Quartz Sand) / Class 4, Class 9 (Talc) / Class 5, Class 10 (Fly Ash) / Class 7, Class 8, Class 11 (Kanto Loam) / Class 12 (Carbon Black) / Class 16, Class 17 (Calcium Carbonate, Heavy)

2. JIS Z 8901 Industrial Test Powders 2 (Narrow particle size distribution)
   - Glass Beads (GBL30-100, GBM20-40 : 7 classes differing in diameter, density, and refractive index)
   - White fused alumina (No.1, 2, 3, 4, 5, 6 : 6 classes differing in diameter)

3. JIS Z 8900-1 Standard Particles (Reference particles for calibrating particle size measurement apparatus) MBP 1-10, MBP 3-30, MBP 10-100 (Glass Beads)

4. APPIE Standard Particles and Powders (only for sale in Japan)
   - Sub-micron range reference particles for calibrating particle size measurement apparatus (Fused silica sphere) / Reference powders for specific surface area (Titanium dioxide and carbon black) / Lycopodium / Soma standard sand / 3-components mixture / Quartz dust / Air cleaner test dusts, Fine and Coarse

◆ For more information, please refer to the APPIE Homepage (http://www.appie.or.jp/).
Technical Group Activities

**Group Names & Recent Subjects**

**Powder Handling**  
- Hazard and safety control, sanitation and cleanliness of machinery and equipment  
- Development of handling method for fine powders in the range of 1-100 μm  
- Development of energy saving and eco-oriented (or environmentally sound) machinery and equipment  
- Development of simple and accurate powder transfer device/tool between equipment  
- Development of simple/effective devices for measuring powder properties and their application to material handling

**Comminution**  
- Mechanochemistry  
- Comminution of soft materials  
- Selective comminution for recycling of waste materials  
- Nano-dispersion technology (deagglomeration down to primary particles of agglomerated nano-particles)  
- Composite process of particles  
- Surface modification of particles

**Classification and Sieving**  
- Optimized procedure for closed circuit grinding system  
- Elaborate wet classification in industrial scale  
- Component separation of recycling process  
- Application of sieves to particle classification  
- Ultrasonic vibration technology for screening machines  
- Anti-corrosive and abrasive sieves

**Drying**  
- Energy efficiency, antipollution  
- Sanitary, non cross-contamination, sterilization  
- Multi-purpose and/or multi-performance dryer (e.g. granulation and inclusion of pharmaceutically active substances)  
- High quality and uniform drying of functional materials to add extra value

**Dust Collection**  
- Establishment and standardization of estimating method of cleanable filter media  
- Simultaneous removal of hazardous gases, wet dust, chemicals with trace quantities, and dust particles from flue gas.  
- Characterization of suspended particulate matter and its removal technique

**Mixing, Kneading and Forming**  
- Ordered mixing and particle design (pharmaceutical, cosmetic, electric and bio-materials)  
- Hybridizing and functionalizing of powders (polymer, magnetic and battery)  
- Development of characterization of mixing and kneading processes  
- Near-net shaping  
- Sanitary improvement of facilities  
- Improvement of pharmaceutical direct tabletting technique

**Granulation**  
- Micro design of particles and granules  
- Coating and granulation materials  
- Functional modification of granular materials classified by industry  
- Development of precise functional granulators  
- Granulation techniques in recycling resources  
- Granulation technology in energy area

**Measurement and Control**  
- Correspondence to ISO  
- Standard reference particles  
- Measurement for nano materials  
- Automation of measurements

**Wet Process**  
- Precise control of coagulation, dispersion, adhesion and coating of particles in aqueous and non-aqueous media  
- Handling of highly concentrated slurries  
- Advancement of separation technology in filtration and dewatering

**Particulate Modification**  
- Process validation, Scale-up  
- Characterization of particulate materials  
- Conversion of empirical work into technology  
- Development and industrialization of new particulate materials  
- Composite and functional particles  
- Ordered Particle System  
- Industrialization of drug delivery system

**Transportation**  
- Response to the needs of wide variety of products and diversification  
- Prevention of contamination  
- Energy-saving transportation  
- Mass transportation

**Clean Technology**  
- Separation techniques and micro-environment  
- Contamination control (fine particles, microbes, chemical materials)  
- Age of Gbit  
- Clean-Enough (optimal cleaning)  
- Mini-environment and local cleaning (for 300mm wafers)  
- Microorganism contamination control and validation (source origins, chemical filters)  
- cGMP, HACCP and validation  
- Application of ISO standard

**Environment, Energy and Fluidization**  
- Next generation stoker furnace, and gasification and slagging combustion furnace  
- Establishment of scale-up method in granulation process and development of binderless granulation process  
- Biomass utilization technologies such as combustion and gasification  
- Liquid fuel production technology from biomass  
- Combustion technology of automobile shredder residue

**Crystallization**  
- Offering the Incentive Seminar for Experts  
- Control of polymorphism in crystals  
- Creation of nano-particles  
- Mixing operation and crystallization phenomena in crystallization  
- Rigorous calculation of phase equilibrium  
- Collaboration with the crystallization Party for Fine Particle Formation and Functionalization

**Fine Powder Nano-technology**  
- Aggregation and adhesion behavior control  
- Characterization technology for fine powder, interface structure, interaction between particles and performance  
- Development of material performance based on fine powder design  
- High reliability yield and low cost technology

**Electrostatic Processing Technology**  
- Charging mechanism of fine particles  
- Measurement of charging characteristics of particles and design of charged particles.  
- Development of electrographic system  
- Development of powder coating system  
- Elimination of electrostatic charge and troubles  
- Fine dust collection using electrostatic charge  
- Development of fine particle processing technology using electrostatic charge

**Battery Manufacturing Technology**  
- Batteries for hybrid vehicles (Ni-metal hydride battery, Li-ion battery, capacitor)  
- high-power capability, high reliability, long life, cost-reduction  
- Batteries for mobile applications (advanced Li-ion batteries)  
- improvement of energy density using alloy-based negative electrodes and high-capacity positive electrodes.  
- Fuel-cell system for vehicles, residences and mobile appliances  
- high-power capability, cost reduction, marketing, infrastructure of hydrogen supply  
- New material development for batteries, fuel cells, hydrogen storage

**Recycling and reclamation**  
- Advanced separation technology  
- Reuse, Reduce & Recycle (3R) of metal resources  
- Resolution & reproduction of plastics  
- Conversion technology of biomass energy  
- Assessment of environmental burden  
- Load reduction in final landfill site

**Food Process Technology**  
- Food reliability  
- Indication (expiration date, place of origin, etc.)  
- Prevention of contamination (allergen, etc.)  
- Trace system  
- Food safety (pesticide residue, etc.)  
- Healthy intention (Development of nutritional supplements and low-calorie food, etc.)  
- Environment (Global warming preventive measures, etc.)
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